Chapter 2

Review of Related Literature
CHAPTER-2

REVIEW OF RELATED LITERATURE

2.1 INTRODUCTION

Review of related literature is the initial task of a researcher to decide on a specific problem for investigation. It will help the researcher to locate and find out the problem for the present study and also to identify the research gap if any, in order to make a new ground in research. Review of related literature is highly beneficial for the researcher to gather up-to-date information about the area in which he proposes to study and it is the basis for further research problems.

The review gives the researcher an understanding of the previous work and the data used by them and also it offers a valuable guidance in defining the problem, identifying its significance and selecting data-gathering devices, study design, and suitable analysis of data. The methodology of different researches may also be compared with that of the present study and it helps to avoid repetition of the problem. It helps to known different views of various researchers on a particular problem.

2.2 REASONS FOR THE CONDUCT OF REVIEW OF LITERATURE

Review of Literature helps the researcher to select the methods and measures and also provides the current trends of research. Success or failure of past investigations provides rationale and insight for the present research design and analysis of measures. The researcher can compare his present work with that of previous researcher's work by means of research periodical abstracts, theses and dissertations, computer-generated reference materials, recorded reference information and recorded content of references. The review of related literature completes several purposes.
Without a review of related literature one cannot proceed with the research with firm ground and justification.

Many studies have been conducted in India and abroad in connection with Computer Assisted Instruction (CAI), Computer Aided Learning (CAL), Self-Regulated learning (SRL) and Interactive Multimedia.

A brief description about studies on Computer Assisted Instruction (CAI) and Computer Aided Learning (CAL) are given hereunder chronologically and research gap was duly identified.

### 2.3 STUDIES OF COMPUTER AIDED INSTRUCTION (CAI) AND COMPUTER AIDED LEARNING (CAL) IN INDIA AND ABROAD

**Karte Kaywin** (1980) found out that metric achievement through Computer Assisted Instruction (CAI) over the Conventional Lecture Method differed significantly and was in favour of CAI.

**Tairo John Peter** (1980) found out that the students scored higher in Chemistry examination when exposed to Computer Instruction (CAI). **Burns Patricia Knight** (1981) compared to pedagogical effects of Computer assisted maths instruction was more effective than the traditional maths instruction at the elementary and secondary school level.

**Trueman, D.** in his study (1981), "Telidon and Computer Assisted Learning - A Report on the First Experiment Using Telidon for CAL". This paper indicate as part of the TV Ontario Telidon and Education Field Trials, a study was made of the application of the Telidon videotext systems to computer-assisted learning (CAL), including the future directions of these applications and differences in achievement between advanced and general-level students. Subjects were 129 middle- to upper-middle, ninth-year mathematics students in Burlington (Ontario), who used a CAL module based on the general mathematics course outlined by the Ontario Ministry of Education. Within the student sample were two control and two experimental groups, one of each in the general level and advanced level programs. Control groups received a lesson on the transformational geometry topic of
dilatations through a traditional Socratic Method and chalkboard presentation, while the experimental groups used an individually paced module presented on the video screen. Posttest results showed little difference (2%) in achievement for the two control groups. In the experimental groups, the advanced level group was significantly superior (15%) to the general level. The teacher-led group in the general level did 12% better than the Telidon group, while the advanced level Telidon group performed 1% better on the average than the teacher-led group.

Robin Earl's (1982) study brought out the significant high achievements in mathematical pre-algebra through Computer Assisted Instruction (CAI) on electronic lesson and programmed learning texts and derived that Computer Assisted Instruction (CAI) was superior method of instruction.

Loach, Ken (1982) in his study, "STAF: A Powerful and Sophisticated CAI System" Describes the STAF (Science Teacher's Authoring Facility) computer-assisted instruction system developed at Leeds University (England), focusing on STAF language and major program features. Although programs for the system emphasize physical chemistry and organic spectroscopy, the system and language are general purpose and can be used in any discipline.


Kent, Ashley (1983) in his study," The Impact of the Micro on Social Studies Curricula or Computer Assisted Learning (CAL) in Economics, History, and Geography Curricula in England, Wales and Northern Ireland", describes the Government initiatives for incorporating microcomputers in the
schools in England, Wales, and Northern Ireland as well as the availability of and attitudes toward computer assisted learning (CAL) in secondary school geography, economics, and history are discussed. In 1980, the government launched the Microelectronics Education Programme to support curriculum development, teacher training, and resource organization. The program has set up 14 regional information centers where in-service training is conducted and has financially supported various agencies to engage in software development. By the end of 1983, every secondary school in England will have a microcomputer. In history, economics, and geography instruction, CAL consists of information handling; statistical analysis; simulation; reinforcement of knowledge, skills, and ideas; production of teaching materials; and management of resources and learning. Of the three subjects, geography has sustained CAL developments on the widest scale. Many history teachers regard CAL as no more than a gimmick. In economics, much software has been promised, but little produced. Most teachers have decided against using CAL since there is not enough hardware or software available. Teacher awareness and knowledge is limited, and sparse research suggests that less able students may have negative attitudes toward CAL. Thus, in-service training is critical to the success of CAL.

Wood, K. R. J. (1983) in his study, "Computer Assisted Learning in a Sixth Form Economics Course in Economics Education", describes the impact that computer assisted learning (CAL) has had on economics teaching in British high schools and the extent of use of CAL materials by British economics primary and secondary teachers is provided through two case studies and a survey. The first case study investigated the use of an economics computer simulation as a teaching aid on the achievement of 2 groups of 11 British high school students. The second case study, involving a group of 12 high school students split into 2 matching groups with regard to ability, compared the use of CAL with the lecture method. Materials used in the case studies were those developed by the Schools Council Computers in the Curriculum Project. Knowledge attainment and students' attitudes were assessed through pre- and posttests and questionnaires. Results show that CAL does not have a superior effect on learning compared with more
traditional methods; student motivation is enhanced by the use of the computer; the size and composition of the teaching group is an important determinant of learning; and CAL may be best suited to high ability students. The survey of a sample of 38 members of the Economics Association of Kent (response rate of 50%) and of 21 economics teachers attending an economics education conference in Kent (60% response rate) indicates that CAL has not been integrated into economics teaching to any significant extent.

Taylor Vivan Baker (1983) made studies using computers in high school about the effects of teaching American History. An analysis of covariance results, it was found out that for both male and female pupils the achievement was significantly high through the use of on Computer Assisted Instruction (CAI).

Gallitand (1983) made a study using in Computer Assisted instruction (CAI) for class test performance for both male and female. It was found out that computer increased performance efficiency and had advantages over calculations.

Austin Richard Arthur (1983) made studies by teaching the properties of parallelograms using both computer assisted instruction and also through conventional methods. It was found out that the group using computer scored higher than the conventional group.

Wright Pamela, A.(1983) took up a study on Computer Assisted Instruction (CAI) for remediation in maths at the secondary level and found out that Computer Assisted Instruction (CAI) produced significantly high scores in the particular classrooms of two selected as compared to traditional classroom setting.

Vazques Charles Lowis (1983) made studies by taking some students for a chemistry course to determine the effectiveness resulted through CAI than the traditional method.
Moursund, David (1983) in his study, "Pre-college Computer Literacy: A Personal Computing Approach", Intended for elementary and secondary teachers and curriculum specialists, this booklet discusses and defines computer literacy as a functional knowledge of computers and their effects on students and the rest of society. It analyzes personal computing and the aspects of computers that have direct impact on students. Outlining computer-assisted learning (CAL), the author delineates two types: tutor mode CAL (the computer imparts knowledge to the student) and tutee mode CAL (the student directs interaction with the computer). Discussing the use of computers as an aid to problem solving in the classroom, the author predicts it will substantially change parts of the curriculum. The discipline of computer and information science is a new and important discipline, and high schools may need to provide such courses as part of computer literacy. Describing entertainment uses for the computer, the author shows there is no clear dividing line between entertainment and education. Students understanding the computer's potential for change are better prepared to plan their future. The booklet includes a glossary of computer terms.

Abraham Sandura (1984) studied the effect of Computer Assisted Instruction (CAI) on first grade phonics and mathematics and found out that there was significant gain for the CAI group than the conventional group in learning mathematics.

Levy Max Henry (1984) measured by standardized test for the evaluation of CAI upon the achievement of fifth grade students and found out there was significant gain for the CAI group than the conventional group in learning mathematics.

Opera (1984) made his study on the effects of computer programming on sixth grade pupil's generalisation in mathematics and about understanding of variables. It revealed that learning of computer programming enhanced students of variables. It revealed that learning of computer programming enhanced students learning of the above mentioned categories.
Paul (1984) studied the effect of computer based instruction using a variety of techniques. Meta analytic techniques were used to synthesize studies on the effectiveness of computer based instruction. Forty eight students were coded on 66 variables. Assuming normal distribution for both control and Computer Managed Instruction (CMI) groups, it was interpreted as an average CMI students scoring at the 60\textsuperscript{th} percentile of the control group distribution. Generalizations showed that the effect of Computer Managed Instruction (CMI) was trivial (ES=.03) in comparison to the effects of computer aided instruction (CAI) (ES=.45). Younger lower achievers, male and exceptional students appear to profit most from exposure to CAI.

Lewis Emery (1984) conducted a study to test the two learning strategies i.e., one is class quizzes and interactive computerized quiz and proved that the experimental group’s achievement was higher than the conventional group.

Choi Byung Soon (1984) made studies to compare the effectiveness of the two methods of instruction i.e., micro computer method to compare the effectiveness of the two methods of instruction i.e. micro computer method and hands on laboratory method to understand volume displacement and it was observed that the performance in comparing that both was equal.

Steven Edward Lewis (1984) studied the effectiveness of using microcomputer simulation on the identification of achievement of concept and attitude it was computers and instruction of science for middle school students with various logical reasoning abilities revealed that combination of the microcomputer simulation and lab-activities resulted in high achievements than the traditional learning in classroom.

Perking Harvey Williams (1984) made studies to determine the effect of usage of microcomputers on the skills of critical thinking of middle school students. He took a sample of ten classes and exposed the treatment groups the four modules of learning in computer. He found out that there was no significant difference between the groups which used microcomputers and that of lecture methods.
Shaw Donna Gail (1984) studied the problem solving abilities of fifth grade students through learning to program a computer in basic or logo and found that the programming group students achieved significantly high scores in post-test than the control group in mathematics achievement test, but however the concluded that the problem solving skills are not increased through learning programs.

West charlene Esther (1984) made studies on the relationship between pupils mathematics achievement and the computer program in promoting specific high level abilities like solving a problems and spatial ability and found out that spatial visualization and the skills of problem solving were enhanced.

Porncahk (1984) studied the impact of CAI in developing the reading skill of pupils at the secondary level showed and there was significant difference on learners preference where the computer was used as a mode of instruction .He proved that the effects of the traditional method and CAI were equal for the average students and the CAI was more effective for the students of below average.

Mason Margurite (1984) made in longitudinal studies of the effects of CAI on the mathematics achievement of learning the educable mentally retarded and disabled and proved that there was no detrimental effect between the CAI and the conventional methods but however he indicated a promise for the future.

Wainwright, Camille L. (1985) in their study, "The Effectiveness of a Computer-Assisted Instruction Package in Supplementing Teaching of Selected Concepts in High School Chemistry: Writing Formulas and Balancing Chemical Equations", describes four classes of high school chemistry students (N=108) were randomly assigned to experimental and control groups to investigate the effectiveness of a computer assisted instruction (CAI) package during a unit on writing/naming of chemical formulas and balancing equations. Students in the experimental group
received drill, review, and reinforcement using the microcomputer while students in the control group used conventional paper-and-pencil worksheets for their lessons. Findings show: (1) that the use of the microcomputer materials did not contribute to more effective learning (the control group's scores were significantly higher on an achievement test than the CAI group mean); (2) that there were no significant interactions favoring either CAI or control activity for students of differing cognitive levels (as measured by Lawson's Classroom Test of Formal Operations); (3) that females displayed attitudes toward computers that were nearly identical regardless of treatment; that males' attitudes were far more favorable toward computers in the CAI group (especially favorable were males' attitudes toward the use of CAI in chemistry instruction); and (4) that females' attitudes toward chemistry were more favorable in the control group while males' attitudes toward chemistry were essentially the same between experimental and control groups. The attitude survey used in the study, along with an analysis of student errors and a bibliography, are appended.

Dalten (1985) studied the effects of various amounts of CAI and achievement of Biology and found that higher retention than conventional instruction was achieved through either total or two-thirds of CAI. It was also found out that more positive attitude towards computers were had by the students receiving CAI than the students receiving traditional instruction.

Dunn (1985) conducted studies on the effect of experience in computer programming on the cognitive level. Based on the results of the study the researcher made conclusion that the effective method of improving logical thinking can be achieved through computer programming.

Miller Jerold Dale, JR (1985) attempted to study the ability of 5th grade students in using the computer as a tool for solving problem. Results have revealed that I reading comprehension and problem solving ability there is a significant difference between control and experimental group.

Melink Leah (1986) investigated fifth grade on the two instructional methods of improving problem solving performance found by analyzing
variance that in problem solving ability the computer software group gained significantly higher.

Reed, JoyLynn Hailey; Judkins, John (1986) in their study, "Evaluation of a Holistic CAI System in Introductory Chemistry", Discusses a study that assessed how students felt about computers and how they perceived computers performed as instructional tools. A majority of the tested students indicated that the computer was a useful tool in their chemistry classes that the labs were realistic, but computer grading should not be used.

Chandra (1986) made a study comparing CAI, CCTV and conventional instruction in chemistry for IX standard students. It was found out that learning was better through CAI.

Huppert, Jehuda; Lazarovitz, Reuven (1986) in their study, "A Case Study of a Computer Assisted Learning Unit, "The Growth Curve of Microorganisms": Development, Implementation, and Evaluation", this three-part paper describes the development of a software program called "The Growth Curve of Microorganisms" for a tenth-grade biology class. Designed to improve students' cognitive skills, the program enables them to investigate, through computer simulations, the impact upon the growth curve of a population of three variables: temperature, nutrient concentrations, and initial cell numbers. In presenting the sequence of the developmental steps, the first section of this report examines the basic assumptions of using computer-assisted learning (CAL) in the classroom and the criteria for efficiency, the formation of a team of developers, and how the team works. The description of the program in the second section includes the rationale for using the microcomputers and its integration into learning activities in the classroom and the laboratory, the four steps covered by the computer simulations, and the procedures for a self-assessment test. The third section discusses three factors involved in the implementation process: classroom setting, the student and self-paced progress, and the role of the teacher in the classroom. Four flow charts are provided which depict the modular course, steps of the
development team stage, student self-paced activities, and classroom management activities.

Sivaraj (1986) conducted a study on the effectiveness of learning properties of Triangles at X standard level through CAI program. From his study it was proved that the CAI method was superior and that the variables of sex, watching TV and socio-economic status had no influence on the experimental group achievement.

Henry (1986) investigated the effects of computer assisted instruction, tutorial programme on the academic performance and attitudes of college athletes. A pretest posttest experimental design was employed in this study. Forty athletes enrolled at a university located in South West Texas were divided into two groups viz., experimental group and control group. The experimental group was assigned a series of CAI tutorial lessons to be done in three months while the control group was tutored by the traditional method during the same period of time. A modified version of an instrument developed by Brown was used to measure the attitude of college athletes towards CAI. The following conclusions were drawn: (i) computer assisted instruction had a significant effect on the academic performance of college athletes, (ii) the exposure of college athletes computer assisted instruction did not have significant effect on their attitudes towards computer assisted instruction, and (iii) the sex of student athletes did not have a significant effect on their attitudes towards computer assisted instruction.

Niemice and Walberg (1987) carried out a critical examination of CAI (Computer Aided Instruction) and synthesized what was known about CAI at all levels of implementation. Evidences indicated that: (i) CAI could teach as good as live teachers or other media, (ii) there was saving in time, (iii) students responded favorably towards Computer Aided Instruction, that the computers could be used to accomplish impossible versatility in branching and individualizing instruction, because true natural instructional dialogue was possible, and (iv) the computer could virtually perform miracles in processing performance data. The most valuable finding was that many students gained mastery status in a short period of time.
James (1987) carried out a study to see the effect of computerized tutorial programme on high school, juniors and seniors, in terms of ACT scores. The students were randomly assigned to an experimental group and a control group. The control group used a textbook approach to prepare the ACT and the experimental group used a computerized tutorial. The results of the study showed that the experimental group scored significantly higher on ACT composite scores than the control group. No significant difference was seen in the ACT composite scores between juniors and seniors. A significant relationship was found to exist between a students' background in mathematics and their ACT sub-test scores in mathematics. Students with the practical background scored significantly higher on the sub-test than those lacking the prescribed mathematics background.

Davis, Larry P.; And Others (1987) in their study, "Physical Chemistry at USAFA: Personalized Instruction" Describes a personalized method of instruction being used in junior-level physical chemistry classes which uses computer-aided instruction (CAI) and computer-managed instruction (CMI). Claims these results in more instructor-student interaction, better use of classroom time, and better scores on standardized examinations.

Sharma (1987) made a study to determine the effectiveness of Computer Assisted Instruction (CAI) at Xth standard mathematics. Two other instructional strategies were designed by him and to study relative effectiveness of CAI in comparison of the two other strategies was his objective. It was concluded by him that significant difference existed between the learning strategies in favour of CAI. There was significant difference in the achievement of boys and girls was also proved from his study.

Huge (1988) carried out a study to examine the effects of computer-assisted instruction on the academic gains of students of sixth, seventh, and eighth grades in the subject area of maths and reading in a selected school of the district. Findings showed that the students receiving direct CAI had significantly higher academic gains in both reading and maths when
compared with the students of control group who were taught without the benefit of computers. When considered in conjunction with grade level, ability level, sex, ethnicity and socio-economic status, all had a significant effect on the academic gains over students using CAI. Only ability level, when considered in conjunction with grade level, had a positive effect on the academic gain of students receiving CAI in reading.

Areuven Lazarowitz (1988) attempted to study the effectiveness of computer Development Education Simulation in education. They analyzed and brought to light that automation of education shall provide its user with enough intellectual, direct expertness for nature, but rapid development of needed skills. Their experiments have been compared to traditional teaching and have proved that specially designed “traffic educational games” performed the job well.

Boyes, E. (1988) made studies and attempted in teaching physics for the first year U.G. students through CAI. From his results we can come to a conclusion that there are considerable difference between male and female students in their previous experience rather than the quality and their attitude towards computer while starting their course.

Andrew Jones and Michael Thome (1988) conducted an experimental study to find out the effectiveness of mathematics of mathematical problem solving in modified logo environment through the aid of computers. His study revealed that the initial tests gave him good reason to hope that NOLOG is teachable and learnable and its useful contribution to mathematical developments.

Nagar, Nirmal (1988) examined the usefulness of the computer in teaching mathematics and also examined the trends regarding the use of Computer Aided Teaching of Mathematics. The analysis of data revealed that Computer Aided Teaching (CAT) of mathematics benefited both the teacher and the learner and it encouraged individualization and practice without burdening the teacher with repetitive and monotonous activity. There were not enough computers in schools and not enough awareness regarding the
computer. The Computers that were available were not being put to the best possible use.

Palaniappan (1988) studied to determine the effectiveness of CAI in learning mathematics. His findings revealed that there was significantly better performance for the group that was exposed to CAI.

Singha (1988) made studies to determine the effectiveness of CAI in teaching chemistry at High School level. The covariance analysis proved that there was significantly enhanced performance by both male and female students through CAI.

Fahy, Patrick J. (1989) in their study, "Keewatin Region Educational Authority Pilot Adult Education Project: Computer-Assisted Learning. Final Report", This 2-year project attempted to improve local employment prospects of young adult Inuit in seven communities in the Keewatin Region in the Canadian Northwest Territories by providing them computer-assisted instruction (CAI) in adult basic education and high school equivalency upgrading programs; business, financial, and telecommunications software applications; and advanced topics such as higher math, physics, and chemistry. The programs operated at the level and pace of each learner.

Data were gathered using a variety of qualitative and quantitative methods in order to address the five anticipated results of the project. The anticipated results of the project and whether they were achieved were as follows: (1) the training did attract and maintain the interest of a greater segment of the target population, as evidenced by enrollment increases in all programs, including typically low-prestige compensatory education programs upon which the computer technology seemed to confer prestige; (2) the training did not produce faster progress in academic training in that there were no differences between the Tests of Adult Basic Education scores of the computer-assisted students and those of Inuit students in other regions who did not have access to CAI; (3) the training did provide job readiness skills, including improved reading and speaking skills, greater awareness of and realism regarding their goals, skill at using software applications programs, and greater writing ability; (4) the training did increase students' chances of obtaining employment, with
46 percent of graduates employed 6 months after the course ended and the most common reason given for unemployment being the pursuit of more training; and (5) the training did develop an effective new educational model for the North, of which computers will be part.

Pravakar (1989) Developed Software for Computer Aided Instruction and studied its comparison with traditional method of teaching. The objectives of the study were as follows: (1) to study the effectiveness of CAI for teaching “semiconductor” in terms of achievement and reaction towards CAI material, (2) to compare the achievement of class IX students taught through CAI material with those studying through traditional method by considering pre-test as and intelligence as co-variates, (3) to compare the achievement of male students taught through CAI material with female students by considering intelligence as co-variate, (4) to study the influence of treatment, sex and their interaction an achievement, (5) to compare the reaction towards CAI material of class XI students with those of class XII students by considering post-test as co-variate. Sample comprised of 58 students from class XII & 46 from class XI selected randomly from three English medium schools of Indore. Results of the study were as follows: (1) The CAI was found to be effective in terms of achievement of the students belonging to class XI & XII, (2) the CAI material was found to be effective in terms of reaction of students belonging to class XI & XII, (3) the CAI material was found to be suitable to teach Semi Conductor topic well to both classes XI & XII students when pretest was considered as co-variate. (4) 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, (5) the treatment, sex and their interaction did not influence the achievement, (6) both class XI & XII students were found to have equally favorable reaction towards CAI material when the groups were matched with respect to post-test.

Antony Stella (1989) made studies to find out the effectiveness of CAI program on learning set theory at VIIIth standard level. From her study it was concluded that the more effective method than the conventional method was
CAI. She proved that there was significantly better performance group than the control group taught by the traditional method irrespective of sex.

**Garhort, Prisilla Marie** (1989) attempted to study the effectiveness of CAI among school children. Test score analysis revealed that there were significantly higher scores for pupils who had initial training comprehension monitoring, enabling a student to predict level of understanding and improving learning through active monitoring.

**McDermind Robert Dale** (1989) studied that the quantitative review of the literature concerning CAI with learning disabled and Educable Mentally Retarded. The content analysis included the total of 103 manuscripts. He concluded that CAI was moderately effective to this population.

**Nachimuthu** (1989) made studies to develop and validate CAI software on the topic “leaves” in Botany. With reference to the selected software he proved the supremacy of CAI.

**Cannaday Billy Kerford** (1990) made a comparative study for improving math’s performance of low achievement students in identifying relative effectiveness of computer assisted instruction. From his studies it was found out that CAI co-operative learning was more effective.

**Charlottle Evan** (1990) made his studies to analyse the effectiveness of using the micro-computer for low achievers to improve the mathematics achievement. The microcomputer group used micro-computers for follow-up activities such as games and puzzles spending approximately 20% of the time. The results of his study revealed that there were significantly higher scores in the post test by the pupils of the micro-computer group.

**Clements and Battista** (1990) conducted studies to investigate the effects of computer programs in LOGO in specific geometric conceptualization of primary grade children. The LOGO or control group consisted of randomly assigned students of 47 third graders. At pretest level the groups are matched the instruction was given for 26 weeks for the LOGO group in a LOGO environment. A posttest was conducted after the
LOGO/Control treatment. For the LOGO group the performance was significantly higher.

**Shanmuga Sundaram and Antony Stella (1990)** attempted to study the effectiveness of CAI in learning English grammar. The results revealed that the CAI performed significantly better than the control group which was start by the traditional method.

**Bhardwaj (1990)** studied “Development of Computer Aided Instructional Material on Microbes for class VIII”. Objectives of the study were: (i) to study the effectiveness of computer aided instructional material for teaching microbes in terms of achievement, and (ii) to study the reactions of students towards computer aided Instructional material. Class VII students of Bright School, Indoor were used for the study. CAI was found to be effective and interesting. Students reacted favorably towards CAI.

**Ryser (1990)** studied the effect of computer education on students’ achievement, attitudes and self esteem. Investigator also established the relationship between success with computer instruction and personality characteristics, IQ, age and attitude towards school. The sample consisted of students from two elementary schools. One hundred and fourteen students participated in this study. One school was given the treatment of integrated computer instruction and the other school used traditional instruction without the benefits of computers. The study revealed that there was no significant gain in mathematics, language, arts and reading achievement, while there were interesting student gains in affective areas, such as, attitude and self esteem. According to the results of the attitude measure, Students in the school receiving computer instruction agreed more strongly with positive attitude statement than the students of the school not receiving computer instruction. Results also indicate that, there were no sex relation differences in achievement, attitude and personality characteristics.

**Cox, Gregg Clayton (1990)** studies the effects of curriculum specific Computer Aided Instruction on students’ achievement in a College Algebra course. The result of the study indicated that the use of curriculum specific
computerized drill and practice can significantly increase the mathematics achievement of those students receiving a traditional lecture and there was a significant relationship between a student's pretest score and their level of success when using curriculum specific Microcomputer Aided Instruction.

Singh, Ahluwalia and Verma (1991) studied the difference in mathematics achievement, which occurs as a result of the difference in instructional strategy among boys and girls separately and as a group and also studied the direction of change in attitudes of male and female students separately and as a group towards mathematics as a result of two different instructional strategies. The result showed that 1) the students who used the computer scored significantly higher than those taught mathematics through the conventional method. 2) The students who used the computer showed significantly highly favourable attitude towards mathematics than those who did not use the computer and 3) Achievement in mathematics and change in attitude towards mathematics were found to be independent of the sex factors.

Daily Bonnie (1991) made studies in determining the effectiveness of computer integrated, multimedia learning and environment on Engineering education. From the results it was revealed that there was no positive responses and affirmed the need for instructional technology in Engineering education.

Purushothaman and Antony Stella (1991) conducted studies to prove that in maths learning the CAI group performance was significantly better and that the time taken by the CAI group to complete the instruction on the selected topic was nearly two-third of the time taken by the traditional group. Also in another study they found out that the CAI was more beneficial to the low and average achievers than the high achievers.

Canaday, Kathlyn Yvonne (1991) determined and analyzed the changes in knowledge and attitudes of a selected group of sixth-grade mathematics teachers following the use of computer and student-oriented software. The results showed that a significant difference exists between the
pretest and posttest scores on mathematical knowledge and a significant difference exists between the pretest and posttest scores of attitudes toward mathematics and problem solving.

**Easterling, Sherill Elaine** (1991) studied the effect of computer aided lab instruction on achievement in fundamentals of college algebra. The results showed that 1) There were no significant differences between CAI students opposed to teacher-aided lab students. 2) There were no significant difference was found between the males opposed to the females. 3) There was a significant difference between traditional aged and non traditional aged students, with the non traditional aged students scoring higher on the post test. 4) There were no significant differences in the interaction effects of the lab type and age, lab type and gender or of gender and age.

**Fahy, Patrick J.** (1991) in his study, “Adult Literacy Learning and Computer Technology: Features of Effective Computer-Assisted Learning Systems” Computer-assisted learning (CAL) can be used for adults functioning at any academic or grade level. In adult basic education (ABE), CAL can promote greater learning effectiveness and faster progress, concurrent learning and experience with computer literacy skills, privacy, and motivation. Adults who face barriers (financial, geographic, personal, or motivational) affecting their attendance or progress and adults who prefer self-paced learning should be considered for CAL. For a CAL system to be successful, it should have features that make it relevant to adults, reliable, and effective. Competency-based learning principles, emphasizing careful determination of previous learning, the mastery of new concepts and skills, and retention through review, are recommended for courseware design. The use of competency-based learning principles implies a new role for the instructor as facilitator, motivator, and guide, rather than as dispenser of information. The focus on individual needs results in a more flexible environment, where problems with scheduling, interpersonal conflicts and other barriers to the learning process are minimized. (Essential features of courseware, software, hardware, and vendor support for a CAL system are suggested, and a checklist is provided to assist adult educators to identify questions to be posed to vendors.)
Williams Michael (1992) made studies to analyze the differential effectiveness, Attributional feedback and learner-control in a computer based economic lesson. 142 High School students were delivered with return computer based economic lesson in the study. Before starting the treatment free test was conducted for the students and six attribution style scales were completed and were assigned randomly to each of two treatments. The results of his study showed that the blocking factors of the three attribution styles showed negative relationship with post test.

Adhikari (1992) studied "Development of Computer Aided Instructional Material on cell and cell Reproduction for class IX". Objectives drawn for the study were: (1) to develop computer aided instructional material on cell reproduction and study its effectiveness in terms of: (a) achievement of students, and (b) reaction of students studying through computer aided instructional, material, and (2) to compare mean achievement scores of the students towards the computer aided instructional material and traditional method by taking intelligence as co-variate. The design of the study was pre-test post-test control group design. 40 students were taken for experimentation. The findings of the study were: (1) the computer aided instructional material was found to be effective in terms of achievement of students, (2) students showed positive reaction towards computer aided instructional material, and (3) computer aided instructional material is effective in terms of achievement when both the groups were matched on intelligence.

Mc Conaghy and Elizabeth Williams (1992) made studies by taking two elementary school compensatory programs and studied about computer utilization. The results of their study brought out the facts that successful compensatory programs have used various instructional configurations and have incorporated into the curriculum the uses of computer through various models and schedules.

Stella (1992) studied the impact of Computer Assisted Learning (CAL) material developed on the topic "The Language of Sets" in mathematics, upon
the under achievers, normal achievers and over achievers. The sample consisted of 147 students of class VII of Kanchi Kamakodi Matriculation School, Tiruchirapalli, Tamilnadu. Main findings of the study were: (i) the CAL was an effective individualized instructional technique that helps underachievers reach their optimum expected level of achievement, (ii) it was found to be more effective for underachievers than both the normal and over achievers in terms of achievement, (iii) it was clearly seen that some of the normal achievers could be helped to become over achievers and the over achievers too could be helped to score better, though their gain was not found to be statistically significant.

Payne, John William assessed the effectiveness of Computer Assisted Instruction (CAI) as a method of delivery and examined students' attitude toward the method of instruction. It was found that students in the CAI group scored significantly higher on the first posttest. This was also true on the second posttest. The attitudes of the two groups regarding method of instruction were not significantly different. Attitude toward method of instruction appeared to have no impact on the student achievement.

Fredenberg, Virgil Grant (1993) explored the use of CAI in a traditional college calculus course. The analysis of data revealed that there was little statistically significant change in student attitudes and anxiety, and no statistically significant change in achievement. Student receiving supplemental computer labs performed as well as students who received additional homework.

Anuradha Joshi and Bhuban Mohaptha (1993) conducted studies to find out the effectiveness of CAI and its effectiveness in terms of achievement of pupils.

Park, Insun Hwang (1993) assessed the effects of co-operative learning and individual learning with Computer Assisted Instruction (CAI) in a university-level introductory chemistry course. The results of the study revealed that 1) Subjects who participated in co-operative learning performed their achievement better than subjects in the individual learning groups with Computer Assisted Instruction (CAI). 2) High-ability level students and low-
ability level students in the co-operative learning group improved their performance more than high-ability or low-ability level individuals who worked alone with a computer. 3) There was no significant different on students' attitude between students who worked in the group use of computers and individual use of computers. 4) The majority of the students in the university level class showed positive co-operation on group work and positive attitude toward using computers in the classroom.

Okamoto, Toshio; And Others (1994) in his study, “The Architecture of an Intelligent Multimedia CAL Software with the Expert System for Environment Education”, they describes multimedia CAL software with CAD/expert systems capabilities designed for use in environmental education for fourth- through sixth-grade children. The software is based on concepts of situated learning and knowledge Constructivism, provides a learning environment that supports a student's decision making, and provides online feedback.

Castleford, John; Robinson, Geoff (1994) in their study, “The Development of Computer Assisted Learning in UK Universities” reviews two of the United Kingdom's national programs to promote the use of computer-based teaching throughout higher education. In the first phase (1985-89) of the Computers in Teaching Initiative (CTI), a suite of 139 individual software-production projects generally failed to meet expectations. In 1989, CTI became a network of subject-based centers with a remit to promote the use of information technology (IT) within specific academic disciplines. Following wholesale changes in the national organization of higher education in 1991, the UK government sought to double the number of students in higher education. A new program of courseware development was initiated, the Teaching and Learning Technology Programme (TLTP): 75 projects are currently being funded, involving both single academic institutions and consortia. One example of TLTP project, Geography-CAL, which aims at specifying, developing, testing, and delivering a library of 21 high-quality transportable computer-based learning (CBL) modules and other support material, is described in detail. In examining the effects of these initiatives, it
is concluded that, while CBL has pedagogical benefits, there are many factors which hinder its adoption by university teachers.

**Gardner, John; And Others** (1994) in their study, "Learning with Portable Computers", Reviews the Pupils' Learning and Access to Information Technology project that was conducted in elementary and secondary schools in Northern Ireland to investigate the impact of using portable home computers on students' learning. Performance gains are examined, and operational issues in the use of portable computers are discussed.

**Mahajan** (1994) made studies and attempted to find out CAI as an effective method of teaching singular and plural at second grade. Traditional lecture method on the CAI was compared between these studies. Comparing to the traditional method it was found out that the CAI as an effective method for teaching singular and plural.

**Karpagakumaravel** (1994) developed a Computer Software Programme in English Grammar for XI standard students. A heterogeneous group of twenty pupils were exposed to the English lesson developed a in the computer. The criterion level of validating the CAI lesson was kept as 80% average. The immediate achievement of the pupils in the standardized criterion test was found satisfactory as 80% of the sample (Sixteen pupils) scored 80% average. The running time for the whole programme was found to be 45 minutes.

**Reader, Will; Hammond Nick** (1994), in their study, "Computer-Based Tools to Support Learning from Hypertext", Reports the results of a study conducted at the University of York (England) that was designed to test the effectiveness of a concept mapping tool in aiding student learning from a hypertext-based computer-assisted instruction system. Effects on learning are compared with standard note taking through results of a post test.

**Hutchings, G. A.; And Others** (1994) in their study, "Experiences with Hypermedia in Undergraduate Education", discusses the use of hypermedia in education and describes the Interactive Learning and Biology project that was developed at the University of Southampton (England) to teach
undergraduate cell biology. Topics addressed include authoring tools for hypermedia; a study of undergraduates learning cell motility; student attitudes; and navigation within the system.

Mahapathra (1995) has developed a software package for teaching Chemistry and studied its effectiveness in terms of students' achievement on a criterion test. And also the investigator compared the scientific attitude scores of students taught through the developed software package with those taught through the traditional method. Developed software package was found to be effective in terms of achievement of the students on a criterion tests. Seventy five percent students achieved more than sixty percent of marks. The developed software package was not found to be superior to the traditional method when assessed in terms of scientific attitude scores of the students.

Ruhlmann, Felicitas (1995) in his study, "The Emulation of the Teaching Process with CAL and its Implications for the Design of a Multimedia CAL Tutorial", He argues for the development of tailor-made computer-assisted learning (CAL) tutorials with the aim of replacing traditional lectures in second-language instruction. Issues related to the production of multimedia modular templates and prototypes, including module design, design criteria, methodology, and learner interaction, are described.

Balasubramaniyan (1995) attempted to find out the cognitive attainment of school children. His studies found out that students studying in higher standards have more computer literacy and higher cognitive achievement and higher cognitive attainment in computer application than those studying in lower forms.

De Bruijn, H. F. M. (1995) in his study, "Cognitive Apprenticeship in a CAL-Environment for Functionally Illiterate Adults", describes a computer program for arithmetic in which the use of the operationalized cognitive apprenticeship methods was studied together with effects of modeling and
coaching on student performance. Results showed that adult basic education students make little use of optional materials in a computer program.

*Purushothaman and Antony Stella* (1995) conducted studies to analyse the criteria for selection of computer software. From the results of their findings it was revealed that there is no guarantee for the improvement of education by the mere presence of computers in schools. By developing a critical attitude towards computer software the teachers can make optimum utilization of the potentials of the computer.

*Burton, Beatrice Spencer* (1995) examined the effectiveness of Computer Assisted Instruction (CAI) versus traditional instruction on the academic performance of adult students on the mathematics and investigated the independent influence of the variables age, gender, income, marital status, educational level, ethnicity, and employment status on the academic performance of adult students. The data analysis revealed that 1) CAI had an influence on the academic performance of adult students on the mathematics. 2) Adult students' age had no effect on their total scores. 3) Male and female adult students had similar scores and 4) Ethnicity had some influence on the academic performance of adult students.

*Levy, Mike; Green, Alison* (1995) in their study, "CALL Bibliography for Postgraduate Study", describes the Cites significant publications in the field of computer-aided language learning (CALL), citing 133 general works, 41 on methodology and instructional design, 35 on multimedia, 12 on interface design, 27 on word processing and writing, 25 on concordance, 18 on intelligent CALL, and 37 on computers in general education and the humanities. A list of CALL journals is included.

*White, Mary Jean* (1995) determined whether technical college students who received CAI scored significantly higher on a post-test of computer competence than students who received the lecture method of instruction. The results showed that there was no significance found on the
post-test. And either the CAI or lecture method of instruction could be used with comparable success to teach technical college students enrolled in Introduction to Microcomputer courses.

**Hudson, Mark Edward** (1996) tested effectiveness of Computer Assisted Music Instruction Programme in improving the knowledge of the work as measured by a researcher-developed test. Results revealed that the experimental group obtained significantly greater gains over the control group. The computer may effectively supplement traditional conducting of instruction in the area of study. **Woodham, Myra Earlene Murray** (1996) determined the differences between cerebral hemispheric preferences and attitudes toward Computer Assisted Instruction (CAI) for the students and the faculty associated with baccalaureate nursing programmes. Result of the study indicated that 1) right cerebral hemispheric preference was more frequent among students and balanced hemispheric preference was more frequent among faculty. 2) Both student and faculty attitudes toward CAI were more positive for being useful, valuable, and efficient and were more positive for the function subscale. 3) There was no significant difference between student and faculty attitudes toward CAI. 4) There was no significant difference between cerebral hemispheric preferences and attitudes toward CAI for students or faculty.

**James, Robert** (1996) in his study, "CALL and the Speaking Skill", Using common technologies listed in the conversation class, the article suggests a computer-aided language learning (CALL) speaking methodology that has interaction rather than machine centered and outlines ways to ensure the success of speaking activities at the computer.

**Steyn, M. M. de V.; And Others** (1996) in their study, "CAL for First Year Analytical Chemistry by Distance Education" describes a study that was conducted at the University of South Africa to determine the feasibility and the effectiveness of using computer-aided learning for a distance education chemistry course. Highlights include summative courseware testing; cost effectiveness; student achievement; student attitudes; and an appendix that lists responses from student questionnaires.
Fazal, Minaz Barkat (1996) examined the effectiveness of computer-based Instruction (CBI) compared with conventional instruction. The results suggested that CBI was found to be equally effective when used either as a supplement to or a replacement of conventional instruction and CBI was also found to be more effective when used without interactive videodisc (IVD) than the IVD.

Robinson, Sally Ann (1996) determined the effects of Computer Animated Instruction in college trigonometry on student achievement, and student attitudes. The results indicated that the two treatments were not significantly different with regard to achievement, and computer attitudes. Collins, Thomas, Jr. (1996) examined the effects of Computer-Assisted Algebra Instruction on attitudes towards personal use of computers of students in a historically Black university. On overall attitudes towards personal use of computers, significant differences were found between the experimental and control groups on the follow-up test. Students in the experimental group had significantly more positive attitudes toward personal use of computers than the students in the control group.

Keyvan, Shahla A.; Pickard, Rodney; Song, Xiaolong (1997) in their study, "Enhancement of Teaching and Learning of the Fundamentals of Nuclear Engineering Using Multimedia Courseware" , discusses the Computer-aided instruction incorporating interactive multimedia and network technologies can boost teaching effectiveness and student learning. This article describes the development and implementation of network server-based interactive multimedia courseware for a fundamental course in nuclear engineering. A student survey determined that 80% of the students found the courseware to be useful.

Rangaraj (1997) developed a syllabus based computer software package in teaching physics at higher secondary level and studied the effectiveness of Computer Assisted Instructional in teaching Physics at higher secondary stage. The analysis of data revealed that there was significant difference between the means of pre and posttest in Physics among
controlled and two experimental group at all the levels of cognition in favour of the posttest.

**Gregory; Stewart (1997)** discussed the benefits of using multimedia Computer Assisted Learning (CAL) as an alternative teaching method. CAL packages may provide more flexibility in the course design, encourage student-centered learning and help students of differing abilities and academic backgrounds. Also examined problems associated with the use of multimedia CAL such as the provision of computer facilities and software purchase.

**Joshi, Anuradha and Mahapatra (1997)** compared the developed software package with traditional method in terms of reasoning ability in Science by considering intelligence as a co-variate. The results showed that the students taught through developed computer software package were significantly higher in the reasoning ability than the corresponding figures for those taught through traditional method.

**Hazelbaker, Deborah Jean (1997)** compared the Lecture method to the Computer-Assisted Method and examined the effects of Computer Assisted Methods on achievement and attitudes toward mathematics. The analysis of data revealed that students who participated in the lecture class outperformed in the computer-assisted class on the post-test achievement scores and a higher percentage of the lecture method students had improved attitudes toward mathematics than their computer-assisted counterparts. **Strong, Rosalie (1997)** examined the levels of computer anxiety among students in a Technology Tools course. Although the treatment was not shown to be significant in reducing anxiety, there was an overall reduction of computer anxiety among all the participants’ pre and posttests scores.

**Bernard (1997)** made studies using meta analyses for examining various questions concerning gender differences in computer related attitudes and behaviours. The results revealed that girls exhibited lesser sex role stereo typing of computers than boys. The results of the study revealed that there were small gender differences in computer related behaviours and there
was no difference in terms of both current behaviour and prior experience with computers as a function of the study population.

Bowen, Craig W. (1998) in his study, "Item Design Considerations for Computer-Based Testing of Student Learning in Chemistry", considers how computers might help broaden assessment practices by examining the types of test items that might be used in computer environments. Explores ideas from cognitive psychology and research on problem solving.

Anandan (1998) made a study and attempted to find out the effectiveness of CAL in teaching Economics XI standard level. From the results it was found out that comparing to the traditional method the CAI method had produced significantly positive effects on the achievement of the students. Also it was observed even after controlling the intelligence and socio-economic status of the students there was significant difference in achievement between CAI method and tradition method.

Shinde (1998) attempted to find out the effectiveness of teaching English grammar to the IX standard pupils through CAI packages. The results of his study revealed that comparing to the traditional methods the CAI packages were more effective in teaching English grammar positive opinion was shown about CAI by the pupils of the Experimental group and a feeling arouse in them that the CAI packages were useful.

Werner, Jenny Lynn; Klein, James D. (1999) in their study, "Effects of Learning Structure and Summarization during Computer-Based Instruction" describes the purpose of this study was to investigate the effects of learning strategy and summarization within a computer-based chemistry and physics program. High school students worked individually or in cooperative dyads to complete science instruction; half of them completed summaries over the instructional content when directed to do so. The study examined the effects of learning strategy and summarization on posttest and enroute performance, attitude, time-on-task, and cooperative interaction behaviors.
Panda, et al., (2000) determined the degree of attainment of cognitive skills through Computer Assisted Learning (CAL) compared to the traditional approach to teaching; and compared the effect of CAL on the learning achievement of boys and girls. The sample consisted of 40 students (23 boys and 17 girls) with the age group of 15-17 years from Class XII, selected using cluster sampling. They were further divided equally into groups as control group and experimental group. Standard Raven's Progressive Matrices to measure intelligence and objective-based achievement test constructed for the purpose were used. Special objective-based lesson plans on CAL were used for treatment in experimental group. Statistical techniques like 'F' test, 't' test and chi-square were used to analyze the data. Data analysis indicated that 1) the Computer Assisted Learning (CAL resulted in greater learning achievements in all hierarchies of cognitive domain. 2) Male students were found to be superior to female students in learning physics.

Kadhiravan and Suresh (2001) found out whether the three different instructional strategies (viz. Lecture Method, Computer Assisted Instruction as Individualized Instructional Strategy and Computer Assisted Instruction (CAI) with Peer Interaction) are helpful in enhancing the use of Self-Regulated Learning Strategies among the students. Five CAI packages from the XI standard Physics syllabus were developed in Visual Basic and used in this study. The results of the study revealed that the instructional strategies enhance the students' use of SRL strategies. CAIPI strategy is most effective one in enhancing the students' use of SRL strategies, whereas CAI strategy is more effective when compared to the lecture method. Hence it was concluded from the study that CAIPI and CAI strategies are more effective in enhancing the students' use of higher order learning strategies than the lecture method.

Balamurugan (2002) developed a computer aided learning package for learning Chemistry at College level and examined the effects of learning Chemistry through CAL packages. The results of his study revealed that comparing to the traditional methods, the CAL packages were more effective in learning Chemistry at college level. The most important finding of the research is that the posttest performances of the experimental subjects are
significantly greater than their pretest performance implies that the treatment mated out to the experimental group was effective. The CAL package was effective in helping the students of the experimental group perform better in the posttest. This proves the effectiveness of the CAL package developed in Chemistry.

Annaraja and Jenitha Rani (2003) developed and validated the Visual Basic based CAI package on the topic “Joint Stock Company” for XI standard and studied the effectiveness of the Visual Basic based computer Assisted Instruction in teaching Commerce for the students of XI. The 't' test result showed that the control group was better than the experimental group.

Shanthi and Amalraj (2003) studied the effectiveness of Computer Assisted Learning on achievement of students studying through CAL and traditional methods of instruction and they studied the effectiveness of CAL on achievement in Bio-Zoology among the experimental and control group students with reference to different mental abilities such as Gifted, Average and Slow learners. The results indicated that significant difference was observed when the pre-test scores were compared the post-test scores of the control and experimental groups separately. It revealed that both Lecture Method and CAL have made significant effect on achievement of the students. At the same time, when the comparison was made on the achievement between the control group and the experimental group. The experimental group's achievement score was significantly high. This shows that CAL has made significant favourable effect on achievement in Bio-Zoology.

Vasanthi and Hema (2003) studied effectiveness of teaching Chemistry through Computer Assisted Instruction (CAI) over the Traditional Teaching Method. In this study, the respondents for the investigation were I-year B.E., students. There were 220 students in I-year B.E. Based on their performance in a class test, 60 students were selected. Those 60 students were divided into two equal groups, namely Control group and experimental group of 30 each on the basis of marks obtained in the class test. A common pre test consisting of multiple choice questions was administered to both
groups. The 't' test was administered to find out the significance of the difference between the mean scores of the control and experiment group in pre-test. The analysis proved that there was no significant difference between the two groups. It established the fact that the two groups were homogenous. The software has been developed in Visual Basic Version-6. It provides multimedia platform to attract the sense of the learner for easy and happy learning. The results showed that 1) There is no significant difference between the mean score in pre-test of the control group and the experimental group. 2) There is significant difference between the mean scores in the post test of the control group and the experimental group. 3) There is significant difference between the mean gain score of the control group taught through TTM and the experimental group administered through CAI in all units put together (Electro Chemistry and Banding). From the findings, it could be concluded that teaching Chemistry through CAI was found to be more effective than teaching through the Traditional method.

Kukreti and Rajesh Nagarkoti (2003) compared the effectiveness of CAI method and the traditional method of teaching on the basis of achievement of the students in Economics. The analysis of data clearly indicated that the students of the experimental group (taught through CAI method) had scored higher mean scores than the students of the control group (taught through traditional lecture). The gain scores of the first are higher than that of the second. The magnitude of the difference in gain score of the experimental (CAI group is statistically significant.

Anna Raja and Felcia Persis Rani (2003) developed the computer animated package in biology and found out the effectiveness of computer animated package in teaching biology for the VIII standard students. They used Power Point for developing the computer-animated package in biology. Each slide was designed for a specific topic, the investigators developed a computer-animated package by various animation effects like appear, fly, swivel, spiral, etc., and the slides were presented with the help of the multimedia computer. The 't' – test results indicated that the experimental group is better than the control group in achievement in Biology. This may be due to the fact that the experimental treatment in effective in learning Biology.
Further, it showed that the animation given in power point slides drawn attention of the students. Moreover, the computer-animated technique has motivated the students to learn Biology.

Mridula D. Ranade (2004) prepared a Computer Assisted Instructional (CAI) package on “Multiple Intelligences” and studied the effectiveness of the package in terms of achievement. In the analysis of data, the 't' – test indicated that there is a significant increase in the achievement in the post-test than in the pre-test. The pre-test scores indicated that the topic was entirely new for most participants.

Arumugam and Sivakumar (2004) developed an instructional packages based on the E-resources to teach life science at the VIII Standard (Matriculation) level and tested the effectiveness of the newly developed instructional packages. The results indicated that 1) the experimental group showed higher performance in the post-test than in the pre-test. 2) The experimental group showed higher performance than the control group in their post-test and 3) The higher performance of the experimental group in the post test indicated the effectiveness of utilizing electronic resources in teaching life science.

Bobby (2004) studied on Computer Supported Collaborative Learning (CSCL) in learning Zoology among IX std. students. For his study he used single group design. 37 students were selected from standard IX for the present investigation. CSCL was implemented to learn the unit in Zoology ‘Organisms and Environment’. Selected students were grouped into 9 based on their performance in the previous achievement test. CSCL includes the following tasks namely – Teacher Presentation (Multimedia), Student Presentation (Multimedia), Assignment and Brain Storming. Each one of the task covers one subunit of the lesson. After completing each task, the investigator assessed their performance and hence continuous assessment was made. The students participated actively and enthusiastically. The results of his study indicated that there was a significant impact of CSCL in learning Zoology and learning is accelerated by Computer Supported Collaborative Learning.
W Bruce; et. Al., (2004) compared computer-assisted instruction (CAI) with lecture format using recent hardware and software advances. A pre and Post-test was used to determine student performance and instructional preference. In addition, a post-instruction survey was used to determine the student-learning preferences. Data revealed that there was no significant difference between the pre-test and post-test outcomes, indicating that similar learning took place using the interactive multimedia CD and/or lecture format. However, students preferred CAI to lecture format.

Helen Joy; Shaiju (2005) developed Computer Assisted Lesson on the topic, UNO in History at the Higher Secondary Level and tested the effectiveness of the Computer Assisted Teaching and the Lecture Method of the lesson on the topic, UNO in History at the Higher Secondary Level. The results indicated that there was no significant difference between the control and the experimental (CAT group) group in the mean pre-test achievement score and the mean post-test scores of the CAT group was found to significantly higher than that of LM group.

Arulsamy (2005) developed an interactive multimedia CD based learning courseware for learning zoological concepts at Higher Secondary Level and investigate the effects of newly developed learning courseware. The major findings are: The performance of the learners in the Experimental Group in the Post-Tests is better than that of the Pre-Test performance. The mean scores of the Post-Tests of the Experimental group are higher than that of the mean score of the Control Group. The supremacy of the interactive Multimedia CD based learning was established over the Traditional Method of Instruction.

Rajshree Vaishnav, Parashar (2005) developed CAI in Biology on topic “Food Nutrition and Health” and study its effectiveness in terms of achievements of students and compared the mean achievement scores of the students studying through CAI and traditional method by considering intelligence as covariate. The findings of the study showed that the computer aided instructional material was found to be effective in terms of the
achievement of the students and the CAI materials are found to be superior to the traditional method when intelligence was taken as co-variate.

2.4 CONCLUSION

It is very much imperative on the part of the investigator to make a survey on the findings of the previous studies as it helps him to formulate objectives and hypotheses and design the research process. In this chapter, related literatures are reviewed extensively.

The review of literature provides a clear picture about the present status of computers in education and the importance and effect of computer aided instruction. From the studies, it was understood that recent research on students' academic performance stressed the need for effective teaching. Until recently there has been very little empirical evidence regarding how students become masters through computer aided teaching.

Hence it was inferred that only a few researches had so far been attempted in any new innovative technique in general and computer aided instruction (CAI) in particular in Commerce education and that too at the School level. The survey of related studies helps the investigator in identifying the research gaps in the area of the study. Thus in the present study, an attempt has been made to study the effectiveness of Computer Aided Instruction in enhancing the academic achievements of Higher Secondary students in Commerce. Hence this research.

The researches conducted in India and abroad on effectiveness of Computer Aided Instruction (CAI) in Commerce and other subjects are discussed in this chapter. The next chapter deals with Methodology of the study.