

Chapter II

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Review of the Related Literature

2.1 Introduction:

A careful review of literature makes a researcher aware of the important and unimportant variables in the concerned area of research. It helps in selecting the variables lying within the scope of his/her field. It helps in avoiding any duplication of work done earlier. Prior studies serve as the foundation for the present study. Through review of the literature, a researcher builds up better perspective for future researches. A cautious review of the literature enables the researcher to collect and synthesize prior studies related to the present study. A synthesized collection of previous studies also help a researcher to identify the insignificant overlaps.

Good, Barr and Scates(1972), point out that reviewing assists in

- Avoiding the risk of duplication,
- Identifying appropriate research methods,
- Searching theories, explanations and hypotheses valuable in formatting the research design,
- Locating data for making comparisons and interpretations,
- Having a vision of totality of field to be investigated.

2.2 Computers in Education:

The greatest contribution of technology development is the use of computers in various sectors. Reigeluth & Garfinkle proposed the use of microcomputers into the schools, and this recommendation has become an integral part of American classrooms since its introduction.



During the 1970's, secondary schools primarily implemented microcomputers within the laboratory settings, where their focus was to develop computer literacy and programming skills. However, some institutions and agencies choose to utilize computers primarily for enhancing achievements in various subject areas. In this way, Computer-Assisted Institutions (CAI) became a supplemented instructional method in schools across the nation.

With the gradual increase in CAI, various studies have been undertaken to evaluate the impact of CAI on students' achievements. Such studies aimed at analyzing the impact of CAI on the achievements of students, with different capabilities and in different subject areas, in this chapter effort has been made to compile the studies, in Indian context, over a period of last 20 years and present their compiled summaries.

2.3 Studies Conducted Abroad:

The research studies conducted abroad have been classified into the following areas:

1. Effectiveness of computer aided instruction.
2. Effect of computer games on cognitive domain.
3. Social impact of computers.
4. Attitude towards computers.
5. Computer aided instruction and students characteristics.
6. Computerized Systems and automation:

These areas are discussed in detail as follows:

1. Effectiveness of Computer aided instruction:

Paul (1985) evaluated the effects of computer based instruction using a variety of techniques. Meta analytical techniques were used to synthesize the studies on the effectiveness of computer based instruction. Younger lower achievers, male and exceptional students appeared to profit most



from the exposure to CAI. When study methodology was considered, stronger studies produced different results than weaker studies.

Barbara (1986) carried out a study to compare the keyboarding performance of sixth graders resulting from two different teaching methods: computer assisted instruction and teacher directed instruction. The background data collected on each student included previous keyboard instruction, ownership of a microcomputer, piano playing ability, achievement test scores and prior computer use. Analysis of variance revealed the following significant results: females achieved higher speeds than males; the computer assisted group achieved higher speeds than the teacher directed group; achievement scores, piano playing ability and absenteeism were related to speed scores; females were more accurate than males; there was no difference in accuracy between treatment groups; achievement scores, previous keyboard instruction and absenteeism were related to technique scores.

Henry (1986) investigated the effects of computer assisted instruction tutorial programme on the academic performance and attitudes of college athletes. A pre-test post-test experimental design was employed in this study. The following conclusions were drawn as a result of the findings of the study. First it was concluded that computer assisted instruction had a significant effect on the academic performance of college athletes. Secondly it was concluded that the exposure of college athletes to computer assisted instruction did not have a significant effect on their attitudes towards computer assisted instruction. Thirdly it was concluded that the sex of student athletes did not have a significant effect on their attitudes towards computer assisted instruction.



2. Effect of Computer Games on Cognitive Domain:

Only one study was found related to the effect of computer games on cognitive domain.

Strein and Kachnean (1984) conducted out a study to find out the effect on children co-operative behaviour of participation in mildly competitive co-operative and individualistic games presented on micro computer terminal. The overall results were clearly non significant and trends were in the expected direction. Clear conclusions regarding the effect of computer games on children's co-operative behaviour could not be drawn due to the lack of statistical significances.

3. Social Impact of Computers:

Only one study was found pertaining to the social impact of computers. Calvin (1988) carried out a study to investigate the social impact of micro computers in the workplace and on the lives of computer users. In-depth interviews were used for this purpose. The study revealed that the computerization of job functions

- I. Made the worker more productive.
- II. Did not have a negative effect on worker self esteem and job satisfaction
- III. Had a negative effect in the workers interpersonal relationship with co-workers and family workers.

4. Attitude towards Computers:

Under this caption only three studies were found.

Eric (1987) tried to detect the differences in student attitude towards computers. Students were from grades five to nine, attending schools being exposed to computers in different settings. Results indicate that sexes differed little on the mean on most of the measurable attitudinal variables; classrooms differed greatly from one another, suggesting an environmental



effect. Even though sexes were similar in mean attitudes, they differed in variables predicting attitudes; self concept predicted a measure of task quite strongly in males while for females. The environmental effect was most important.

Winston (1986) in his research study tried to find out the attitude of educational administrators and teachers towards computer networks and factors that affect these attitudes. Result of the study suggested that those who plan for teacher training and for implementation of educational technology critically examine three areas; teacher preparation, technological change and availability of resources.

Alex (1988) carried out a study to investigate the variables associated with computer anxiety, computer confidence, computer liking and computer usefulness. The variables of interest were gender, keyboarding knowledge, prior computer experience, programming knowledge, database knowledge, and spreadsheet knowledge. Subjects were 81 undergraduate students enrolled in different computer based education courses. The results indicated a significant difference between males and females for the computer usefulness subscale. Also significant difference among the levels other selected variables and the computer subscales were found. Some predictors of success were identified for computer anxiety, computer confidence and computer usefulness. Based on the result of this study, recommendations were made for practice and future research.

5. CAI and Students Characteristics:

Five studies have been reported related to the various aspects of CAI and students characteristics.

Lee (1986) undertook a study with an aim to add to the small amount to existing research in the area of computer anxiety.



Statistical analysis included difference testing, correlations and multiple regressions. A model of computer anxiety as a function of math anxiety, sex and trait anxiety was proposed and tested. The findings indicated that most of the variances in computer anxiety were associated with math anxiety and trait anxiety. Sex appeared as a suppressor variable.

Gerard (1987) compared the effects of item format and item feedback conditions on student achievement, confidence perceived item difficulty and response latency. Students' perception of the value of computer testing and the feasibility of using the microcomputer to score opened items were also examined. Analysis indicated that students had somewhat higher confidence when responding to multiple choice items than when responding to open ended items. Approximately 90% of the students preferred taking multiple choice quizzes. 67% preferred the immediate item feedback condition although about 20 % reported that receiving immediate feedback made them nervous.

Liabre, Clements and Guinones (1987) studied the effect of a computer administered test on anxiety and performance. Results indicated that the computer administered testing can potentially increase test anxiety and depress test performance for examinees who are relatively unfamiliar with computers. Commonality analysis indicated that most of the variance in computer anxiety was associated with math anxiety and trait anxiety. Sex appeared as a suppressor variable.

Marie (1986) investigated how students in the elementary grades utilized computers and explored the factors which affected the choices both male and female students made relevant to computer use. Results indicated that both teachers and students expressed positive attitude towards computers. However, the positive attitude of students, particularly female students was not reflected in their free choice use of computers.



Valley (1986) assessed the incidence of computer anxiety (CA) in an urban professional population and tried to determine whether there is a correlation between computer anxiety and six selected variables. Data were used to construct a profile of the person who typically experiences computer anxiety. Results indicated that;

- a. 51.3% of the sample experienced computer anxiety.
- b. But there was no significant difference between CAI scores of men and women of management and non-management, and
- c. Computer anxiety correlates positively with sex, length of time with the organization and state anxiety; it is correlated negatively with computer experience.

6. Computerized Systems and automation:

The following studies have been found in the area of automation.

Orr, Nancy and Anne (1988) studied the relationship of extraneous variables with performance by 1st year medical residents on a computerized examination. A computerized pilot exam was used to assess the clinical problem solving skill of 1st year medical residents.

Isaak, Troy Joel (1983) found the effectiveness of computerized drill and practice and bi-sensory input in teaching music reading skills to elementary students. Research has indicated that computerized instruction is an effective means for teaching a variety of skills to a wide range of students population.

Salavert, Roser (1988) conducted "Computerized speech and whole language in the elementary school: A study with limited English proficient (LEP) students". The study links the knowledge gained from studies of the development of literacy in a second language to the knowledge in the use of computer technology for educational purposes. More specially, this study



demonstrates the effectiveness of an integrated use of computerized speech and whole language in the development of literacy in young LEF children. Finally, this study is significant in that it contributes to the understanding of the role of the teacher as a mediator of the learning, and the role of the acquisition of the literacy in English. Results provide evidence that the computerized CBX exam did not favour the computer-experience examinee or discriminate against the computer novice.

Vafeas, John George, D.S.W. (1988) conducted a study "Computer use in social work practice"; an automated system for use in vocational rehabilitation of physically disabled adults. The findings of this research indicated that computer technology can be used at a practitioner level. The system helped practitioner level, and practitioner carryout administration and clinical decision making functions. The user friendly software can be used by social workers with no computer expertise.

Moore, Patricia Ann (1988) studied computerizing individual education plans in the Fort Zumwalt School District. The purpose of the study was to develop a handbook for computerized individual education plan (IEP's) for the Fort Zumwalt School District. Because there is a paucity of information on the IEF in the literature, it is recommended that continued research be conducted in the selection of hardware and software.

Change, Linda Li (1983) studied the effect of computerized picture-word processing on kindergarteners language development. The results showed that students who received the picture-word processor instruction did significantly better in reading than those who received no instruction. Further more, the picture-word processor users responded enthusiastically towards the system as evidenced by their reports and written messages, and by the comments in the questionnaires form.



2.4 Indian Studies on Computer Assisted Instruction:

Prabhakar & Sansanwal (1989), in their study "Development of software for computer aided instructions and its comparisons with traditional methods for teaching semi-conductors at +2 level" tried to evaluate the effect of computer assisted instruction in the teaching of semi-conductors, on the students. For this study software on semi-conductors was developed by the investigators. A sample of 58 students (12 from class XII and 46 from class XI) was taken up for the study. The post-test only (on post facts) central group design was adopted for the study. The students of the experimental group were given floppies of the material to be studied and they were given the facility to use computers of a computer training center. This study also attempted to obtain the responses and observations of the students towards Computer-Assisted Learning. A criterion test was developed for measuring achievements of students in the subject matter after the intervention. A five point rating scale was developed by the investigator to obtain students' responses and observations about the use of CAI. The study revealed that Computer Assisted Instruction is effective in terms of achievements of the students. The results were found to be favorable. There was no difference found in the achievements of girls and boys students, after categorizing them on gender basis.

Bhardwaj (1990) carried out a study on "Development of computer aided instructional material on microbes for class VII". Objectives of the study were; to study the effectiveness of CAI for teaching microbes in terms of achievement of students and study reactions of students towards CAI material. Findings of the study indicated that the developed computer aided instructional material proved to be quite effective. The students' reaction towards computer aided instructional material turned out to be positive.

Jeyamani (1991) in the study "Effectiveness of the simulation model of teaching through Computer-Assisted Instructions (CAI)"; compared the achievements of students, who studied through simulation model using CAI and those who



studied through the traditional method, the simulation model was used to teach Physics to the students of class XI through CAI. The study was conducted with the objectives of finding out the effectiveness of the simulation model of teaching as compared to the traditional method and to utilize the growing use of computers in education. The pre-test, post-test method was used for the study and "t"-test was used to treat the data. The findings of the study revealed that the experimental group taught through CAI obtained a higher mean than the central group. The sex-wise comparison proved too insignificant and medium of education also did not influence the learning level through CAI.

Mahapatra (1991) carried out a study on "Development and effectiveness of computer aided instruction in terms of achievement and abstract reasoning of class IX students". Objectives of the study were; To develop the computer aided instruction and study its effectiveness in terms of student's achievement on criterion test. To compare adjusted mean achievement score of students' studying through computer aided instructional material with those studying through traditional method by taking intelligence as co variant. To compare the adjusted mean abstract reasoning scored of student studying through CAI with those studying through traditional method. To compare the reaction of introvert with those of extrovert students studying through CAI. Findings of the study indicated that the CAI proved quite effective and the students' reactions towards CAI material were positive.

Singh, Ahluwalia and Verma (1991) also tried to study the effectiveness of Computer-Assisted Instructions (CAI) and Conventional Methods of Instructions in Mathematics. The study concentrated on the students' achievement in mathematics and the direction of change in attitude towards the subject, of male and female students. The study also analyzed the gender difference in achievement. The sample consisted of students of higher secondary level. The study found a significant high score of achievement of students who were



taught mathematics through CAI. Students also reflected significantly high favorable attitude towards mathematics. Achievements in mathematics and change in attitude towards mathematics were found to be independent of the sex factor.

Stella V. (1992) in the study "Effectiveness of Computer Assisted Instruction with special reference to Underachievers" attempted to throw light on the application of Computer Assisted Instruction (CAI) and the Teacher Support System (TSS) for the optimum development of underachievers (UA). The study was conducted on class IX students from urban and rural locale. The underachievers in the sample were identified by using the regression analysis. Standardized CAI software and standardized tests were used in the study. Mean, SW, 'T' test, chi-square, one-way and two-way ANOVA were used to treat the collected data. The findings of the study revealed that CAI strategy was more effective as compared to traditional methods. Variables, 'sex' and 'locale' did not affect the achievement level of the students after CAI intervention.

Dubey and Adhikari (1999), in their study, "The Effectiveness of CAI, In Terms of Achievement of Students and Its Comparison with Traditional Method", attempted to develop CAI in Biology for class IX students and to find out its effectiveness in terms of achievement students thus taught was compared with the achievement of the students, who were taught the same content through traditional method. The study was conducted on Kendriya Vidyalaya students, following pre-test, post-test, two group design. The same achievement test was administered as pre-test and post-tests both. After the commencement of the experiment, the CAI was found to be more effective in terms of the achievement of students.



Gautam (1999) attempted to study the effect of Computer Assisted Instruction on the achievement of tribal students. The study "Effectiveness of Teaching Science to X class Tribal Students of North-East through Computer" aimed to study the effectiveness of teaching science through computer and the effect of this method on the tribal students, particularly, of different north-eastern states. The pre-test, post-test equivalent group design was adopted for the study. Tool prepared for the teaching of science in class X of school under CBSE. Achievement tests were prepared by the investigator to be used as pre-test and post-test. The 'T' value calculated, indicated the effect of CAI is significant on the achievement of tribal students and further it was found that the study was most effective to the Mizo. students.

Reddy and Ramar (1999) conducted their study focusing on the slow learners. The study "Effectiveness of Computer Assisted Instruction in Teaching Science to Slow Learners" aimed to develop CAI software for teaching science to class VIII students and assess its effectiveness with special reference to slow learners. The experimental method was used for the study. The two equivalent groups; experimental group and control group were selected following systematic random sampling technique. To assess how far CAI enables the slow learners to cope with the normal students a normal group comprising of average and above-average students, was also formed. This normal group was exposed to the traditional method of teaching only. The result of the study proved that CAI is more effective than the traditional lecture method in teaching Science of Standard VIII to slow learners. A critical analysis signified that CAI enabled the experimental group slow learners to cope with the normal students to a great extent.

Shah and Agarwal (1999) conducted the research study "student's intelligence: A Determinant for Effectiveness of Programmed Instruction and Computer Assisted Instruction". They referred to a number of studies (Vinsonhaler and



Bass, 1972; Austin, 1984; Bradley, 1984; Merbel, 1985; Hurst, 1987) that had identified CAI to be more effective compared to the traditional method. This study attempted to assess the relative effectiveness of PI and CAI methods in terms of achievement and the learning time consumed by the students belonging to different levels of intelligence, e.g. high, average and low. The *instructional material* was developed by the researchers for this study. The study was designed on the lines of pre-test, post-test randomized group design. Quartile deviation was used to classify the students into three groups of intelligence – high, average and low the data related to achievement test and time scale were analyzed with the help of 'T' test. The findings of the study concluded that the intelligence of the students play a significant as well as pace of learning, if the biological concepts are taught through the CAI method, whereas PI is equally effective for all the students. The concept that computer is an interesting media and so, the learner immediately becomes ready to learn is acceptable; but it was found true only for the average and genius students, in the study.

2.5 Summary of the Reviewed Studies:

A review of the researches conducted during the past 15 years reveals that the research in Computer Assisted Instruction is still in its infancy in the country. A major trend observed in the researches is a heavy concentration of explanatory studies evaluating students' achievement in various subjects as a result of computer based lessons' interventions. All the studies except one, concentrated on the students of urban locale. Head Start program focuses on providing the "click by click" learning to the disadvantaged children of underdeveloped urban towns and rural areas. The present study felt the significant need of analyzing the effectiveness of CAI for such students. Also, all the studies focused on the secondary level student, but the Head Start inputs are given to elementary school children and a different populations is the subject of the present study.

