CHAPTER - II

REVIEW OF RELATED LITERATURE

INTRODUCTION

A) Studies comparing the use of traditional method with the computer method.

1) Traditional method of teaching and learning of Algebra.

2) Related studies.

3) Studies presenting views and opinions about the use of computer.

4) Other studeis

5) Concluding statement

6) Importance of present study

REVIEW OF RELEATED LITERATURE

A good deal of research has been done about methods and strategis of teaching mathematics. The effect of methods have been evaluated on variety of variables. They include personality types, achievement, intelligence level of thinking, sex, concept attachment in mathematics, motivation and reasoning ability, general mental ability, self concept, attitude towards mathematics etc.

Various methods have been tried out for teaching mathematics. Individualised instruction, lecture discussion, inductive deductive, discussion, drill, auto instructions, visual projection, Analytic Synthetic programmed learning and tell and do method.

In this chapter of review of related literature, all the available literature regarding the use of computer for teaching have been studied by grouping them under the following variables....

(a)   Studies regarding views and opinions about the computer use.

(b)   Studies regarding comparison of traditional method of learning with computer method.

(c)   Studies regarding use of computer in mathematics teaching.

(d)   Conclusion statement.

(e)   Importance of the present study.

(A)   STUDIES REGARDING VIEWS AND OPINIONS ABOUT USE OF COMPUTER IN EDUCATION :

Yeaman A.R.J. (1986) in his paper 'Learner Environment of Fifty University students in computer Room' reported theory of person environment fit predicts unheathy strain caused by a mismatch between factors external to the individual and those that are internal.

Early research studies have approximately attempted to trace the diffusion of computers into their social settings. These inlcude homes, schools, libraries, museums, and camps,. Similar to audience surveys in the early days of radio and television, those studies investigate the characteristics of computer users versus, non users, types of use, and the decision making processes affecting adoption and implementation. Given their rapid acquisition of computers, schools and classrooms are the local settings for much of this research.

Henry Jay Becker's Survey of school computer use is one of the most cited projects in this growing field. Summarizes the most significant data and analyses from a national probability sample of 1082 computer using elementary and secondary teachers in the United States during Janyary 1983. Data are presented on types of micro computer use by teachers and students, amount of time spent by student user with computers, how access and use of computer differs within schools by ability groups and between schools by ability groups and between school by grade ses, and facial factors and teacher percieved outcomes of computer use.

Robert K Yin and J. Lynne (1982) white emphasizes the implementation phase. Their research employed case study methodology to examine school districts in twelve states. Finding address rates of implementation, the mix between instructional and administrative uses top down versus bottom-up diffusion patterns, and importance of training and co-ordination. These issues are discussed in terms of prevailing theories of organizations innovation. They found that rapid implementation of computer has occured as the new technology has been embraced vigorously by schools accross the country.

Bruce Watkins and David Brimm, reports on two related stuides. The first investigates the adoption and use of computer in a moderate sized mid western school system. The study focuses an attitude and adoption processes from the perspective of both teachers and administrators at the elementary and secondary levels. The second study assesses the penetration of micro computers in a representative sample of seven suburban communities in Michigan. Data were gathered on children exposure to and use of computers in homes schools and play environment.

They found following results.....

1.   Only a few teachers in each school used computers.

2.   For the most part, computer use was as a resource rather than as a tool.

3.   An elementary school aged child had access to a computer for fewer that 30 minutes per week.

1) STUDIES COMPARING THE USE OF TRADITIONAL METHOD WITH THE COMPUTER METHOD

Traditional Method of Teaching and Learning

At present the teaching learning process is dominated by the teachers activity. That is to say the teacher is active and the students most of the time are passive. This had led to dissatisfaction both among teachers and students.

Researchers have attempted to design the teaching learning process in such a manner that it is dominated by student rather than by the teacher i.e. More emphasis should be given an child in the teaching learning process. For this different types of instructional materials, audio visual aids were developed. These materials made the child an active learner but the instruction was not child centered. In the traditional methods the teaching is group based whereas in computer Aided instruction, it is student based. In the traditional teaching there is hardly any mechanism with the help of which the teacher can find whether the students are understanding what the teacher is teaching. The speed of presentation in the traditional teaching is at times much higher than the comprehension of the students.

All above mentioned points are well taken care during the CAI and therefore CAI was found to be more effective in comparision to traditional teaching. In this section we will see some related studies about this.

2) **Related Studies**

Sansanwal, D. N. and Prashankar S. (1989) in their study 'Comparison of CAI with traditional method in Terms of Achievement of Students' investigated the effect of CAI. They have the following objectives....

1. To compare the achievement of students taught through CAI with those taught through traditional method by considering intelligence as covariate.

2. To study the influence of treatment sex, and their interaction of achievement.

The hypotheses tested were

1. The adjusted mean achievement of students taught through CAI will not differ significantly from those taught through traditional method.

2. There will be no significant effect of sex on achievement of students.

3. There will be no significant effect of interaction between treatment and sex on achievement of students.

They had chosen 31 male and 27 female students from standard XII and XI randomly for the research purpose.

It was an experimental study in which students were divided into two groups namely Experimental group and control group. Experimental group was taught by computer and control group was taught by traditional method by their own teacher. Data were collected and it was analysed with the help of ANCOVA and 2 x 2 factorial design. ANOVA of unequal cell size.

They have drawn following conclusions.

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

2. Sex did not influence the achievement of students.

3. There was no significant effect of interaction between treatment and sex on the achievement of students.

3) Kulk, Kulik and Cohen (1980) conducted a meta analysis of fifty nine independent evaluations of CBE uses at the college level and reported findings related to student attitudes and instructional time which are summarized as follows.

1. The computer has made a small but significant contribution to the effectiveness of college teaching raising examination scores by about 0.25 standard deviations (a change that was noticeable in high aptitude and low aptitude students as it was in average students.)

2. CBE has had small but positive effects on attitude of college students towards instruction and towards subject matter.

3. In a few cases CBE has had a strong, positive effect (Cart Wright, Cart Wright and Robine, 1972, Grandey 1970 Roll and Pasen 1977).

4. CBE produced learning in about two thirds of the time required by traditional instruction.

5. Accomplishment of CBE must be considered modest at the college level.

All the studies (Gordon 1971 and Rosenshine and Furst, 1971) indicated that the following attributes should be included in the instructional invironment.

1. Frequent feed back to learners.

2. Tutorial relationship.

3. Individual pacing.

4. Individual programming.

5. Clarity of presentation.

6. Motivational factors.

7. Variability in classroom activities.

8. Enthusiasm.

9. Task oriented or achievement oriented instructions and.

10. Opportunity for students to learn criterion material etc.

Gupta in (1988) in her study on 'Two strategies of computer assisted instruction in chemistry' had the following objectives.

1. To design two strategies of CAI in Chemistry.

2. To study the relative effectiveness of two strategies of CAI in Chemistry.

3. To compare the mean retention stores of two strategies of CAI in Chemistry.

4. To know the opinion of students towards CAI.

In her investigation the pre-test, post test experimental design was employed. Under incidental sampling technique, VIII class students were selected. The two groups of thirty students in each were formed. The students of two groups were matched with respect to their mean age, sex, aggregate marks and marks in

science in the current school examination.

One group received instruction under strategy. I of CAI. The other group received instruction under strategy II CAL,. The students of strategy I were assisted during instruction in understanding the content of software programme while the students of strategy II were allowed to learn by themselves. They were not assisted for understanding the content of the software programme on symbols and moles. An opinionnarie of twenty statements pertaining to the opinion of students towards computer Assisted instruction (CAI) was used.

The statistical technique t test was used to find out wheather the mean gain scores and mean retention scores of students of two strategies differ significantaly.

She found that

1. Students of strategy I, scored significantly higher than the students of strategy II in terms of their mean gain scores and mean retention scores on the criterion test.

2. Girls of both the strategies scored significantly higher than the boys of both the strategies in terms of their mean gain scores and mean retention scores on the criterion tests.

3. Girls and Boys of strategy I scored significantly higher than the girls and boys of strategy II in terms of their mean gain scores and mean retention scores on the criterion tests.

4. Students of both the strategies revealed highly favourable

opinion towards CAI in terms of the percentage of favourable responses.

5. Girls of both the strategies revealed more favourable opinion towards CAI than the boys in terms of percentage of favourable.

6. On comparing the mean gain scores of criterion tests one and two (based on logical problem) with the mean scores of criterion test three and four (based on mathamatical problems)

It can be generalised that the students of both the strategies learn more in terms of their mean gain scores in mathematical problems rather than logical ones through CAL.

Dhorthard, S. (1990) Kamat S. (1990) Khochage B. (1990), Patil J. A. (1990) Patil T. G. (1990) Khot P. J. (1992) in their dessertations for the Masters level studied the use of computers in teaching and learning of various school subjects. They used the experimental design and compared the learning through computer with the traditional class room method and found that better and faster learning occured with the use of computers.

4) Several extensive reviews of the research concerning the effectiveness of computer assisted instruction have been conducted Billing 1983 Bracey 1982 Chamber & Sprechor 1980 Edward Norton Taylor Weiss & Dusseldrop 1975 Fetcher suppes & Jamison 1972 Forman 1982 Hartley 1978 Kearsley Hunter & Seidel 1983 Madgidson 1978 0 Donell 1982 Visonhaler & Bass 1972.

Most of them combine results from all grade levels; However they provide directions for education. There is general aggrement

on the following points.

1. Computers can be used to make instruction more effective, the use of CAI either improves performance or shows no difference when compared with traditional classroom approaches, regardless of the type of CAI, computers or measurement instruments used; it is approximately equivalent to individual tutoring

2. CAI usually yields this improved performance in less time than traditional instruction.

3. Computer can make the learning experience more existing satisfying and rewarding for learner and teacher, students have a positive attitude towards CAI frequently accomplished by increased motivation, attention span and attendance.

4. Students given CAI lessons may not retain as much information.

5. Computers do not stifle the creative process, nor are they dehumanizing.

6. None of these benefits is inherent in CAI; rather they depend on the abilities of the professionals involved CAI is most effective when it is used as an adjunct under the control of class room teacher.

7. It is still not known why CAI is effective or how to individualize instruction or maximize the positive effects.

8. Teachers training must be radically altered and updated.

9. There is a direct need for quality course ware and new instructional design methodologies for technological media.

10. Computers have dramatically changed the entire field of education and educational research, and yet the potential of CAI has only begun to be realized.

There are some limitations also

1. There is progress being made in developing intelligent computer assisted instruction which will have the capability to understand the learner and serve as an intelligent, sensitive tutor. The problem is complex. The computer must possess models of

    a. Learners and their knowledge.

    b. The knowledge of expert.

    c. Teaching strategies.

    However recent interdisciplinary efforts involving psychologists, educators and computer scientists show promising signs of progress.

2. The CAI categories overlap in many ways, and good computer programmes after combine, elements of each. In fact quality programmes of the future might well insert a bit of tutoring into any game like drill exercise or start out with a simulation or tutorial and then provide within the same programmes tools for children to use to solve resulting problems.

3. Each category (i.e. Drill and Practice tutorials, simulations etc.) has its own characterstics, its own strengths and weakness, and thus there are particular situations in which each should and should not be used. A balance of approaches is needed.

4. Every category of software will be used more effectively if you spend time using it alone first getting used to it and checking to see whether there might be interpretation problems.

5. Children need to know exactly how to use and why they are using a program.

STUDIES REGARDING USE OF COMPUTER IN MATHEMATICS TEACHING :

Sharma D. K. and Garg C. (1979) in Computer Assisted instruction journal in Indian Education (NCERT) Vol V No. 4 reported that school going children learnt Mathematics very quickly and logically through computer instructed learning in comparision to traditional teaching methodology

In a meta analysis (a way of combining the results of several studies) of the research on CAI and Mathematics achievement covering grades through 12 Burns and Bozeman (1981) concluded that.

1. A Mathematics programme suplemented with CAI was significantly more effective in fastering students achievement.

2. CAI drill and practice were more effective at all levels with highly achieving and disadvantaged students as well as with students whose distinct ability level were not determined by researchers however the achievement average level students was not signficantly enhanced.

3. There was no evidence that results were an artifact of

experimental design features.

(B)5) CONCLUDING STATEMENT :

From above review of related literature some of the findings can be summarized as under.

1. Computer can be used as an instrument in education system.

2. As compared to traditional instruction CBI provides superior achievement and develops a positive attitude in students. It also saves the time.

3. Using the computer as a problem solving tool gives the students a strong motivation.

4. The computer provides a lot of information and continously monitors progress of the learner and the learner can learn at his own pace.

5. Computer saves time efforts in teaching learning process.

(6) IMPORTANCE OF THE PRESENT STUDY

As far as the knowledge of investigator goes, as far as India is concerned no research work in the area of computer Assisted instruction has been reported in any journal, especially within the subject of eighth standard Algebra keeping in mind the paucity of studies and inconsistency in the findings due to differences in their purposes, it was decided to explore this area of research. Computer is one of the major instrument for monitoring information. A teacher who, tries to transmit information must have the knowledge of computers.

In Ninth and Tenth standard syllabus of Maharashtra State Secondary School Certificate curriculum Computer Education is included. Therefore it is necessary to identify whether computers are useful for teaching Albegra. If it is so and if it is beneficial we can use computer for teaching all subject. Especially the subjects topics which seem to be difficult to be taught by teachers can be taught in comparitively good manner by using computer.