

# Effectiveness of Computer Assisted Instruction in the Acquisition of Mathematical Concepts at Secondary Stage

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## ABSTRACT

The present investigation was conducted to find out the Effectiveness of Computer Assisted Instruction in the Acquisition of Mathematical Concepts at Secondary Stage. Sample of 120 students of 9th class was taken randomly from that school which has computer lab. This group was divided into two parts one would be taught by computer Assisted Instruction and other was with traditional teaching method. Computer software package from 9th class syllabus was developed and used as treatment variable by the investigator and Achievement test of mathematics was constructed by the investigator itself. Significant difference had been found between achievement of students taught through CAI and traditional method.

## INTRODUCTION

Success in mathematics is central to a quality education. The better educated a society, the more flourishing the society. Proponents of computer technology in education argue that it makes learning easier, more efficient and more motivating (Schacter and Fagnano, 1999). Computer assisted instruction is an educational medium in which instructional content or activities are delivered through the computer and projector. Great emphasis is given to the Computer assisted instruction in the curriculum of education of the developed countries. The main purpose of using computer technology is to train individuals to cope with the fast developing and changing science world and also helps them to utilize the recent technologies in every field. With the rapid development of information and communication technology, the use of computers in education has become a necessity. The use of computers in education provides the students with a more satisfactory learning environment, serves to create and sustain interest and helps in increasing the students' motivation level. Hence, the use of computer technology plays a very important role in the teaching and learning process (Isman, Baytekin, Balkan, Horzum and Kiyici, 2002).

With the furtherance in technology, computers start to be used in educational environments to develop audio and visual materials such as simulation and animation. The use of computers in teaching and learning activities to unite science and technology is defined as Computer-assisted instruction. The computer assisted teaching has an impact on the development of the educational technology to a large

amount and this has resulted in the formation of the instructional packages for the Computer assisted instruction. The primary purpose of the educational instructional packages is to solve the learning problems in the mathematics courses encountered by the students, to increase their motivation, achievements and to protect them against the negative effects of the cramming in the educational system. The teachers used computer instructional packages as complementary materials for taking notes about their students and observations, making tables, developing materials, doing calculations and preparing simple educational software. These are used as teaching material in the teaching as a part of a subject or the whole subject (Alkan, Deryakulu and Simsek, 1995, Isman, 2005).

### **COMPUTER- ASSISTED INSTRUCTION (CAI)**

Computer-assisted instruction (CAI) represents a teaching tool that involves the use of a computer program or programs to facilitate the education of a group of students. Its major goal is to provide practical instruction through interactive programs that teach effectively. The method was first introduced in the 1960s. Since then it has evolved so that in the twenty- first century computers are an integral part of the education process in the developed countries. Even though there are many types of educational computer use, not all are defined as CAI. This term generally refers to educational activities, in which a computer program is used to teach passive students, or to such courses in which the computer acts as a platform for the creation of a personalized and interactive learning environment. CAI can be used alone or in combination with other teaching methods. According to certain studies the combination of CAI and teacher assisted instruction (TAI) is highly effective in bolstering students achievements. CAI can be applied to all ages and forms of educations from Pre-School to professional school and even in many employment areas. It can be used in a wide range of fields including all the main disciplines in elementary and secondary school. CAI is also applied in the training of nurses, jet engine mechanics, foodservice workers, law students and many more. It can assist with the teaching of people with physical limitations, learning disabilities and language limitations. As the use of CAI varies depending on the target group and subject, CAI programs never follow a single theoretical model of instruction. In many of them the instruction is organized as interaction between student and a teacher. Others programs seek to create an engaging and motivating environment in a drive to encourage the learning process.

### **SIGNIFICANCE OF STUDY**

Mathematics is one of the most important subjects of the academics in secondary level education, because mathematics at secondary level education is the basic mathematics which is the laying stone for the higher education in mathematics. Some students who want to peruse career in mathematics or want to study mathematics at higher level of education, sometime due to complexity of the subjects, students find it difficult to understand the basic concepts of mathematics, which is perhaps due to fault lecture method so some other unfair seen causes. As it is evident from the previous studies

like Gasiorowaski, Jeanne Heindel (1998) in his study ‘The relationship between students characteristics and math achievement when using computer spread sheets found that following a computer software technology –rich supplement to regular math instruction, suggest that spread sheets can serve as a valuable cognitive tool for all seventh grade math students in general and for those who have an active learning strength and those will lower socio economic status in particular. Another author, Carter, F.I (1999) in his study found that computer assisted instruction training programs were superior to traditional programs on vocational education among high school students. Thus we can say that computer assisted instruction can help to understand the complexity of the subjects at each step in very interactive way. One can’t go to the next step of the complexity unless the previous one is understand and applied clearly and correctively So computer software package provide the better access to understand the complexities of the topic / subjects and create interest among students. Thus will help the students to learn more in sort time and will save the precious time of students. So keeping in view, the importance mathematics concepts especially at secondary stage when students are at threshold of conception of their future stream, the investigator selected the study which aimed not only teach IX class through computer assisted instruction but also determining the efficiency of computer assisted instruction in acquisition of mathematical concepts.

### **STATEMENT OF THE PROBLEM**

“Effectiveness of Computer Assisted Instruction in the Acquisition of Mathematical Concepts at Secondary Stage”.

### **OBJECTIVE OF THE STUDY**

To study the effect of strategies of Teaching on acquisition of mathematical concepts.

### **HYPOTHESIS OF THE STUDY**

There is significant difference in mean scores of acquisition of mathematical concepts of students taught through traditional strategy and computer assisted instructional strategy.

### **SAMPLE OF THE STUDY**

The population for the study was students of 9th class enrolled in different secondary school in Abohar Tehsil. Two samples were raised from the above mentioned population: one for developing achievement test and other for conducting experiment. Cluster sampling technique was employed to raise the sample. For conducting the experiment, sample size was 120 students of 9th class.

## RESEARCH TOOLS

1. Computer software package from 9TH class syllabus was developed and used as treatment variable by the investigator.
2. Achievement test of mathematics was constructed by the investigator itself.

## STATISTICAL TECHNIQUES

Statistical techniques i.e Mean, SD and t-ratio were employed to analyze the raw data.

### Descriptive statistics of pre-test scores of experimental and control group

The scores on achievement test for experimental and control group were subjected to descriptive statistics such as mean, standard deviation, skewness and kurtosis to see the normal distribution of the whole sample. The obtained scores of experimental and control groups have been presented in table 1.1

**TABLE 1.1**

A summary of descriptive statistics of pre-test scores of experimental and control group

Pre test	N	MEAN	SD	Skewness	Kurtosis
control	60	24.08	10.51	-.011	-1.161
<b>experimental</b>	60	23.90	10.22	-.008	-1.165

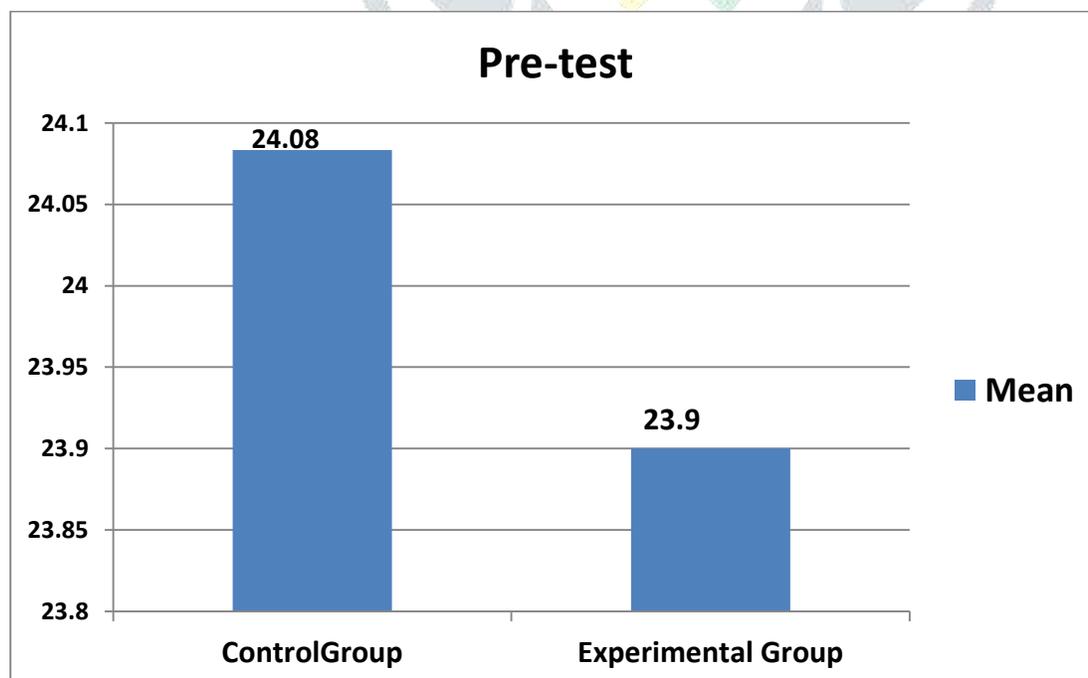
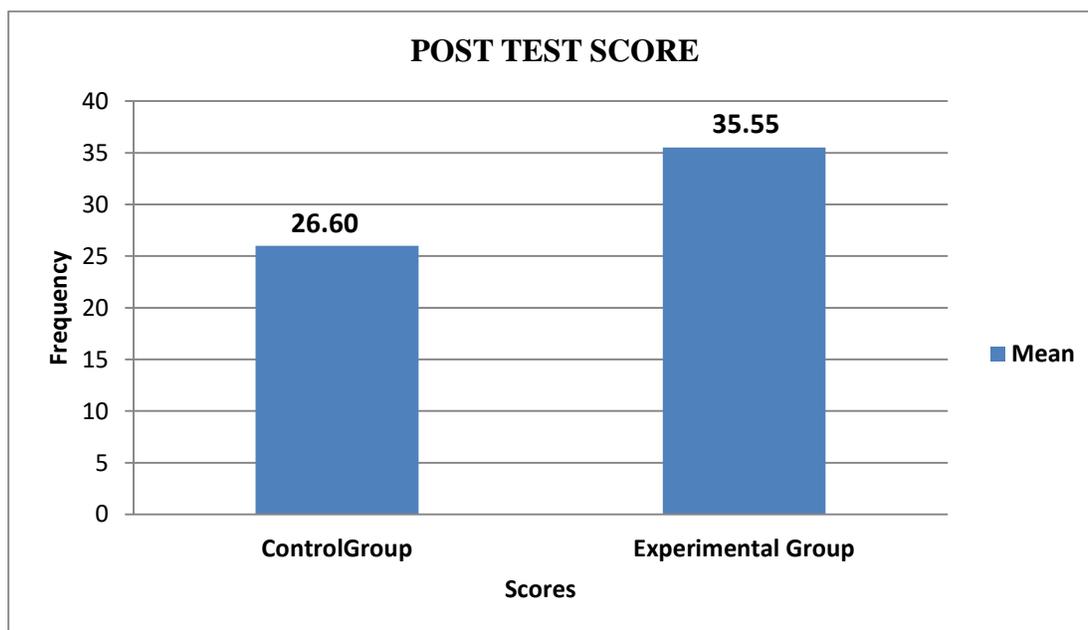


TABLE 1.2

A summary descriptive statistics of post-test scores of experimental and control group

Post test	N	MEAN	SD	Skewness	Kurtosis
control	60	26.60	10.50	.088	-1.143
experimental	60	35.55	12.45	.041	-1.528

Bar diagram showing comparison between means of post-test scores of experimental and control group

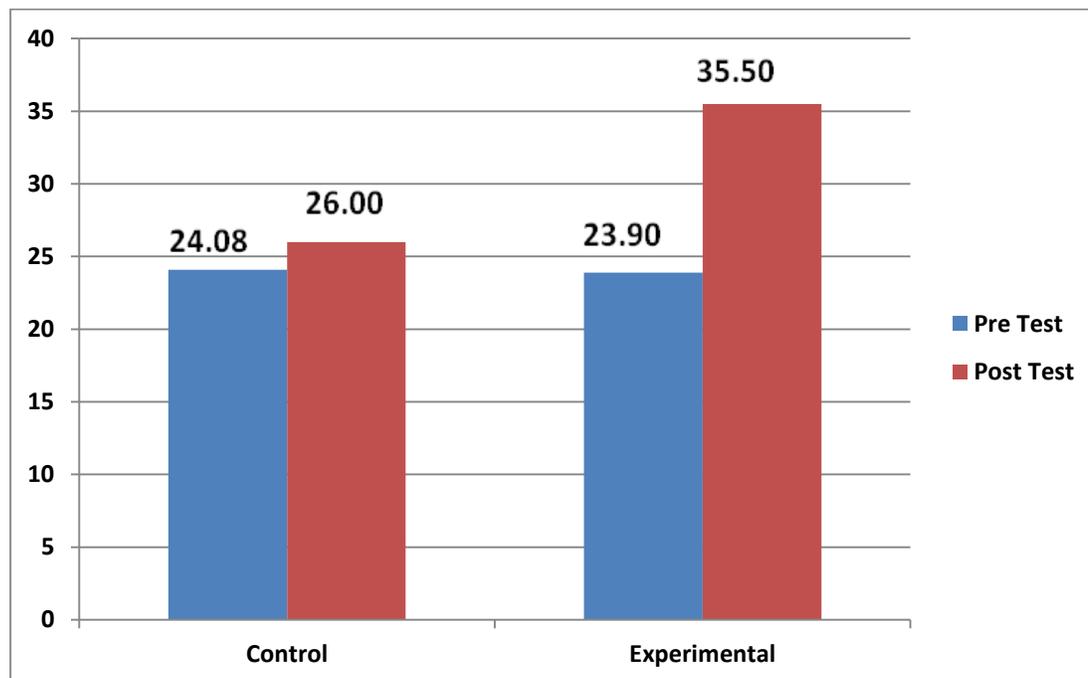


Showing t-ratio for mean gain achievement scores of control and experimental group

Group	Mean	SD	N	S.Ed	C.R.	Interpretation at different level
G1 Control Group	26.00	10.49	60	1.06	4.257	Significant at 0.01 Level
G2 Experimental Group	35.50	12.44	60			

(CR<sub>tab</sub> 2.00 at 0.05 and 2.66 at 0.01 level)

### Bar diagram showing comparison of mean gain achievement scores of experimental and control group



It is observed from the table and fig that the mean gain achievement scores of experimental group i.e. group taught through computer assisted instruction is 35.50, which is higher than the corresponding mean gain scores of 26.00 for the control group i.e. group taught through traditional method of teaching. The t-value testing the significance of mean gain difference on achievement in mathematics of experimental and control group is 4.25 which in comparison to the table value is found significant at 0.01 level of significance. Hence, the hypothesis of significant difference is accepted in case of computer assisted instruction and traditional method of teaching irrespective of grouping across other variables. The result indicates that the students taught through computer assisted instruction perform significantly better than that of students who taught through traditional method of teaching.

Several studies also observed computer assisted instruction a superior strategy of teaching as compared to the traditional method the following results are supported by Bump (2004), Gupta & Garg (2010), Singh (2010), Iyekekpol (2011).

### CONCLUSION

There was significant difference in mean scores of acquisition of mathematical concepts of students taught through traditional strategy and computer assisted instructional strategy.

## EDUCATIONAL IMPLICATIONS

- To increase the effectiveness of teaching mathematics the teacher should make use of the computer with possibly the latest software so that the students get interested in learning.
- Students benefited from the individualization, self-pacing and interactive nature of CAI.
- The teaching through this kind of CAI effects more senses of the students and they make use of the learnt concept in higher education or in life were necessary.
- CAI proved to be a better mode of instruction than the traditional method in all the content areas i.e. Geography, History, Mathematics, Physics etc.
- The teacher should use this kind of package for slow learner, low achievers and wanders as per the need.
- CAI proved to be reducing the burden of the student as well as the teacher.
- To prepare a multimedia package in the form of CAI, contemplate training should be given to the teacher.
- To aware, the teachers with such kind of package demonstration should be made and motivation should be provided to use packages in the classrooms.

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