



**International Journal of Allied Practice, Research and Review**

Website: [www.ijaprr.com](http://www.ijaprr.com) (ISSN 2350-1294)

# **EFFECTIVENESS OF COMPUTER ASSISTED INSTRUCTIONS (CAI) IN TEACHING OF TRIGONOMETRIC FUNCTIONS AT +2 LEVELS**

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**ABSTRACT** -The present study was aimed at effectiveness of computer assisted instructions (CAI) in teaching of mathematics at secondary level adopted experimental method and observing the difference between (CAI) and traditional method. Samples were collected from well-equipped College of Gulbarga Rural area. A sample of sixty (60) students of +2 level in SRMS P.U. College at Kusunoor, Gulbarga district were selected for a sample and sample was divided into two group namely experiment and control group. The experimental group consisted 30 students who were taught 'Trigonometric Functions' by the computer assisted instructions and the control groups containing 30 students were taught by the conventional method of teaching. Data analyzed using mean, S.D. and t-test. Findings of the study clearly point out that significant increase in the mean gain scores has been found in the post test scores of the experimental group. Significant differences have been found between the control group and experimental group on post test gain scores. The experiment group, which was taught by the CAI showed better learning. The conclusion is evident that the CAI is an effective media of instruction for teaching Mathematics at +2 levels.

*Keywords: CAI; Mathematics and +2level*

## **I. Introduction**

Teacher play very significant role in molding up tomorrow's citizen, the teachers should have training in using the most new technologies in the field of education. Computer assisted instructions (CAI) have emerged as an effective and efficient media of instruction. The Computer Assisted Instruction (CAI) not only makes the communique inspiring, but also helps in motivating the learners and provokes curiosity. In science and mathematics teaching the computer Assisted Instruction (CAI) has been proved to be significantly beneficial to know the unfamiliar topics and making them conceptual clarity. Certain topics in Mathematics are based more on imagination; the computer assisted instructions. (CAI) can prove to be helpful to teach such topics. There is required to insinuate the importance of media of communications including audio-visual aids and projected materials as essential device to inculcate the scientific knowledge to pupils. Therefore, it is worthwhile to find the effectiveness of CAI in teaching learning process of mathematics.

## II. REVIEW OF RELATED STUDIES

Review of related literature in any field of investigation has become an inevitable part of research work. Best (1977) is of strong opinion that “familiarity with the literature in any problem area helps the student to discover what is already known, what others have attempted to found out , what method of approach have been promising or disappointing and what problems remain to be solved”. The investigator has made an earnest effort to find out and study the researches related to topic under investigation concluded by the various researchers and scholars.

Shah (1981) conducted a study on programmed learning in Mathematics students of class V in Gujarat state with the following objectives. 1. To develop programmed learning material on various units of mathematics syllabus of class V. 2. To try the same on children of class V from two selected schools. The findings were, 1. Programmed learning material on the selected units in Mathematics for class V was developed. The total time for completing the programmed learning material was 24 hours and 40 minutes. 2. The reactions of the students and the teachers were favourable.

Fin Sindhi, N.O. (1996) Studied the construction and try out of multimedia package for the teaching of physics in standard XI. The study revealed that there is a significant difference between mean of pre test and post test scores of the experimental group. This shows the effectiveness of multimedia package. There is a significant difference between mean post test scores of controlled group and experimental group. This proves that the teaching through multimedia package is more effective in comparison to conventional method of instruction. There is no significant difference between the mean post test score and mean scores of retention test of experimental group. This shows that if the teaching is done through multimedia package than student can remember it for a longer time.

DipikaBhadresh Shah (1997) conducted, “A study to find out the effectiveness of mathematical learning package over traditional method”. The sample consisted of 120 students. Out of that 60 for Group A and 60 for group B within the groups, the numbers of male and female students 30-30 were also tried to maintain. The researcher has to developed mathematical exercises for the unit of “Logarithm” from the subject of std 9th and tried out with the experimental method and measured the effectiveness of mathematical exercise and collected opinions of students regarding learning through mathematical exercise. The major findings were from the results that students learnt through mathematical exercise have scored high on post test as compare to that of students learned through traditional teaching.

Rivet, J.R. (2001) Studied students achievement in middle school Mathematics Computer Assisted Instruction versus traditional instruction method, four 6th grade class-room were identified, two classroom within each of two middle schools. Two classrooms used Computer Assisted Instruction as the primary means of content delivery involving mathematical concepts all pertaining to the content area of fractions. Within the same content area, the other two class rooms’ primary mode of instruction remained the lecture and text-book. A quasi experimental pre test post test design was used. Following a six week study, difference scores were examined to substantiate the primary hypothesis that the use of Computer Assisted Instruction led to increases student achievement when compares to traditional instruction techniques. Findings: In spite of variability in performance in individual types of fraction operations, the overall improvement scores were significantly greater in Computer Assisted classrooms than in the traditional classrooms. Further, in spite of the achievement difference between schools, the Computer Assisted classrooms performed better than the traditional class-rooms at each school

### **III. OBJECTIVES OF THE STUDY**

1. To develop a computer assisted instructional package on the topic of ‘Trigonometric Functions’
2. To compare the mean scores of the control group and experimental group in their pre test
3. To find out whether there is significant difference in the scores of the pre test and post test of the control group.
4. To find out whether there is significant difference between the score of the pre test and post of experimental group.
5. To compare the scores obtained by the control group and experimental group in their post test.

### **IV. HYPOTHESES OF THE STUDY**

1. There is no significant difference between the mean scores of experimental and control group in the pre test.
2. There exists no significant difference between the mean scores of the pre test and post test of the control group.
3. There exists a significant difference between the pre test and post test gain scores of experimental group.
4. There is a significant difference between the post test scores of the control group and experimental group.

### **V. METHODOLOGY**

#### **5.1 Design of the studies**

The investigator adopted experimental method for the present study. Sixty (60) students of +2 level in SRMS P.U. College at Kusunoor, Gulbarga district were selected for a sample and sample was divided into two group namely experiment and control group. The experimental group have consisted 30 students who were taught ‘‘Trigonometric Functions’ by the computer assisted instructions and the control group consisting 30 students was taught by the conventional method of teaching. The sample of sixty students was divided into two equated groups of 30 students in each. Both the groups were equated on their previous achievement scores in the subject of mathematics. The students have divided equally on the basis of randomly selection for both the experimental and control groups to find out whether there was any significant difference between the two groups; t-test was applied to previous achievement scores and the value of t-was calculated as 1.41, which was insignificant. Hence an attempt was made to increase the internal validity of the results and it was assured that both the groups were equivalent to each before beginning of the experiment.

#### **5.2 Construction of Tools**

The investigator constructed an achievement test in Mathematics on the topic of ‘Trigonometric Functions’. The achievement test containing 30 items was administrated to 10 students of P.U class who were not included in the sample of the study. Experts of the views expressed by the experts after the logical evaluation of the test items were taken as the index of the validity of the tool. The reliability was established by the split half method and their reliability coefficient was found to be 0.81, were which showed the reliability of the tool. Finally the scale containing 25 items were used as an achievement test .The same test was used in pre test as well as in post test of the study.

#### **5.3 Development of CAI**

The contents were taken from +2 level of CBSE on the mathematics subject. The computer assisted instructions were developed by dividing the whole content into different tasks, which were presented in the form of micro soft office power point. After completing each question was post there to test the understanding and learning of the students. Appropriate background, content videos, pictures and animated images were order to made instructions more interesting. The experimental group was exposed to CAI and the control group was instructed by the traditional method of teaching. At the end of the teaching by CAI and by traditional method, a post test was administrated to all the students of both the groups. To find the significance of the difference between pre and post test scores t-test was applied.

**Prove that**

$$\text{LHS} = \tan A + \cot A$$

$$= \frac{\sin A}{\cos A} + \frac{\cos A}{\sin A} \quad \therefore \text{taking LCM}$$

$$= \frac{\sin^2 A + \cos^2 A}{\cos A \cdot \sin A} \quad \therefore \sin^2 A + \cos^2 A = 1 \quad \therefore \frac{1}{\cos A \cdot \sin A} = \frac{1}{\cos A} \times \frac{1}{\sin A}$$

$$= \frac{1}{\cos A} \cdot \frac{1}{\sin A}$$

$$= \sec A \cdot \text{cosec} A = \text{RHS}$$

Then

$$\sin \theta = \frac{\text{Opp}}{\text{Hyp}} = \frac{MP}{OP} = \frac{y}{r} \quad \text{cosec } \theta = \frac{\text{Hyp}}{\text{Opp}} = \frac{OP}{MP} = \frac{r}{y}$$

$$\cos \theta = \frac{\text{Adj}}{\text{Hyp}} = \frac{OM}{OP} = \frac{x}{r} \quad \sec \theta = \frac{\text{Hyp}}{\text{Adj}} = \frac{OP}{OM} = \frac{r}{x}$$

$$\tan \theta = \frac{\text{opp}}{\text{Adj}} = \frac{MP}{OM} = \frac{y}{x} \quad \cot \theta = \frac{\text{Adj}}{\text{opp}} = \frac{OM}{MP} = \frac{x}{y}$$

## VI. THE STATISTICAL TECHNIQUE USED

Statistical techniques use the fundamental purpose of the description and inferential analysis. The following statistical techniques were used in the study; mean, Median, Mode, standard Deviation and t-test were calculated.

### 6.1 Results and Discussion

The results obtained in the experiment were tabulated and have been presented in the form of table as below:

**Table-1: Experimental and Control Group in the Pre-Test**

Group	N	Mean	S.D	t-value	Level of Significance
Experimental	30	12.20	2.71	1.31	Not significant
Control	30	13.01	2.50		

The above table reveals that the mean achievement score in the pre test are 12.20 and 13.01 for the experimental and control group. The 't' value is 1.31, which is not significant at 0.05 level. Hence it can be concluded that there is no significant difference between experimental and control group in the pre test of achievement. Both the group has nearly the same score in the pre test. Hence the first null hypothesis has been accepted.

**Table-2:Control group in the Pre and Post test**

Group	N	Mean	S.D	t-value	Level of significance
Pre-test	30	12.21	2.7	1.54	Not significant
Post-test	30	13.2	2.6		

The above table shows that the mean scores obtained by control group in pre and post-test are 12.21 and 13.20 respectively. The t-value is calculated as 1.54, which is not significant at 0.05 level of confidence, this calculated value is lesser than the table value hence control group has showed no significant change in their achievement scores in pre and post test. Hence the second hypothesis is accepted.

**Table-3:Experimental group in the Pre and Post-test**

Group	N	Mean	S.D	t-value	Level of Significance
Pre test	30	13.01	2.51	7.1	Significant
Post-test	30	17.70	2.40		

The above table shows that t-value is 7.1 which is statistically significant at 0.05 level of confidence. Hence it can be safely calculated that experimental group has achieved significantly higher score in the post test. This evidently the positive impact of CAI an achievement the students. With this result the third hypothesis of the study is accepted.

**Table-4: Experimental and Control group in Post test**

Group	N	Mean	S.D	t-value	Level of Significance
Experimental	30	17.70	2.760	7.41	Significant
Control	30	13.20	2.541		

The table shows the mean scores of the experimental and control group are 17.70 and 13.20 respectively in the post test. The t-value is 7.41 which are significant at 0.05 levels. Hence it is interpreted that the experimental and control group differ significantly in the post test and the difference is in favor of experimental group. Conclusion is evident that the students who are taught by the computer assisted instructions learned more and so higher achievement than the traditional method of teaching. This is due to the favorable impact of CAI an achievement of the students. Hence the fourth hypothesis of the study is accepted.

## VII. CONCLUSION

The result of the present study clearly point out the significant increase in the mean scores has been found in the post test scores of the experimental group. Significance differences have been found between the control and experimental group on post test scores. The experimental group, which was taught by the CAI, showed better learning. The conclusion is evident that the CAI is an effective media of instruction for teaching mathematics at +2 levels.

## VIII. EDUCATIONAL IMPLICATIONS

The present study has established that CAI significantly improves the performance and learning achievement of the students in mathematics. In present era the computer education has been introduced at the primary, secondary and higher secondary levels. The teacher should use the computer as a media of instructions in class room. CAI can be arranged to be presented in large class rooms as it provides maximum amount of variety and flexibility by maintaining the quality and quantity. Especially +2 mathematics teachers should be acquired knowledge of variety method of teaching. Teacher should provide with proper training.

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- [10] International Journal of Scientific and Research Publications, Volume 2, Issue 11, November 2012 9 ISSN 2250-3153 [www.ijsrp.org](http://www.ijsrp.org)