A case study on Computer Assisted Instructions and Traditional Instructions: Comparative Study

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Abstract- **Computer Assisted Instruction is one of the Information and Communication Technology Tool and interactive instructional technique whereby a computer is used to present instructional material and monitor the learning that takes place. The purpose of this proposed plan of research is to examine the effectiveness of computer Assisted Instructions in mathematics. This study is to check the performance of secondary school students in mathematics with inclusion of Computer Assisted Instructions (CAI). The present comparative study is based on 40 sampled students of 7th standard class from Umarkhed taluka. The school is specifically chosen from the rural region because rural areas have less infrastructure facilities. The selection of students was made on the basis of their performance in classroom during mathematics lecture. In this paper the students were divided into two groups from which one group was exposed to CAI and the other group to traditional learning method. The selected sampled data was analyzed using t-test. The finding of this result shows that the effectiveness of Computer Assisted Instruction on students is better than the effectiveness of Traditional Learning Methods. This research allows students to express their opinions whether they like this type of instruction or not. Hence, the present research was necessary for numerous purposes. There is a need to improve students for understanding complex experiment, concepts and processes in mathematics.**

Keywords: **Information and Communication Technology tool, Computer Assisted Instruction (CAI), Traditional Teaching Methods, t-Test.**

I. INTRODUCTION

Mathematics plays a crucial role in everybody's life, it is used everyday everywhere. Applications of mathematic start with simple counting to various other tasks like Decision Making, Problem solving, Analysis etc. In today's technological environment we cannot think of a field, where calculations or computations are not used. Knowingly or unknowingly everyone uses mathematics in their regular life. It can be used everywhere from household to industries, business, education, science and technology, art and craft, Constructions, Stock Maintenance, Share Markets and also in music, dance etc. Hence, mathematic is added as an important subject from childhood education to higher studies. It is added in almost all studies from engineering to management to Agriculture to Medical to Pharmacy almost all courses has mathematics as a subject. Hence it is very important that everyone's basic knowledge of mathematics has to be very clear and if anybody is perfect in it then that means he can do better in future. Because studying and having proficient in mathematics not only increases the academia but also improves the analytical and logical knowledge of a person which helps him in various moments of life such as in correct decision making and all, and that's the reason every competitive exams include mathematical and logical questions to analyze the knowledge and capability of an examiner. So, if the students are made proficient in mathematics from their childhood, they can definitely scores good in their academia in future.

But studies have shown that, the performance of students in mathematics seems to be poor. In fact, many students got scared of this subject, because they find this subject very complicated. Students are not able to remember series of formulae required for finding the solutions. Theorems and measures make the subject complicated for most of the students. Again because of overcrowded classrooms teachers find it difficult to pay attention on individual student; hence students are unable to understand this subject since it requires high logical and analytical ability. They feel bored to study this subject; therefore it is very important to improve the teaching methods of mathematics, i.e. to make it interesting and enjoyable so that students can learn this important subject joyfully.

One way to achieve this is to use technology in education. During the past few years the advancement of technology has laid emphasis on almost all the fields of human life. In education, use of technology such as radio, film, filmstrips, and overheads has been used as a support for learning and proved to be effective. By using Information and Communication Technology tools to study this subject one can make the subject easier to understand. Various researches have been made in this era to generate various ICT tools for teaching various subjects.

In all these tools the potential benefits of CAI cannot be underestimated. Various CAI packages have created to teach such subjects to make teaching and learning interesting. Various methodologies like drill method, using different audio visual aids, computer aided instructions are created under CAI which seems to be very helpful in teaching and learning mathematics. Teachers must adopt all these methodologies in their teaching, so that they can help students to overcome the difficulties in learning mathematics. These kinds of exercises are readily accessible

on web, but still many teachers and students are not making use of it because of lack of awareness. In bygone days CAI computer and its use was not widely spread, again the cost and processing power of computers at that time was the biggest obstacle, also Internet facility was rarely available and hence it is very difficult to implement CAI in education. Unavailability and huge cost of Internet is another cause of not using technology in education.

But as time passes new improvements were made inside the computer which increases its processing speed and decreases the cost. Now a day's technology is in our hand. Mobiles, laptops, IPods etc makes computer handy and portable, we can use technology anywhere and anytime because of this. Also the internet is so widely spread that it is available in all parts of world. Wi-Fi connection is developed, using which we can easily connect with the network. So, in today's technological environment it is very easy and handy for the teachers and students to use computer technology for teaching or learning purposes.

Number of studies was made to check the performance of students after using CAI in education for learning various subjects. Mudasiru Olalere YUSUF & Adedeji Olufemi AFOLABI, 2010 in their research of finding the performance of secondary school students in biology was found that the performance of students after using CAI for biology increased much as compared with the traditional methods. They check the performance of Nigerian students in Biology subject, for this they used pre-test/post-test, quasi-experimental design to study the effect of instructional method on final grades in Biology. On contrary some research have found that Students enrolled in classes using traditional instruction methods performed better than those enrolled in classes using CAI methods (Sayed A. Moosavi,2009). Jose M. Barlis Jr. and Josefin D. Fajardo III (2013) were studied the effectiveness of Simulation and Computer Assisted Instruction (CAI) on the Performance of Students under Regimental Training on Selected Topics in Physics II. In this they made a groups of students and check their performance in pretest and posttest and found that there is significant difference between the pretest and posttest means scores in multiple choice questions and problem solving type of questions of the midshipmen exposed in CAI and Simulation and there is no significant difference between the posttest mean scores in multiple choice questions and problem solving type of questions of the students exposed in CAI and Simulation and those students exposed to traditional teaching method. B. Hershkovitz(1997) uses BioChem thinker a CAI program for his research and found that there is a significance improvement with the performance of the students after 6 hours of practice with the Biochem Thinker.

The overall purpose of this study is to compare the achievement of secondary school students in Mathematics where CAI is used, with the achievement of students where traditional teaching method is used. So that more such methods can be used and implement on them to improve their knowledge and skills. The Research questions consider over here are; will there be any impact of Computer Assisted Instruction on student performance while learning Mathematics? And will the students who are facing difficulties while handling CAI tool, are they aware about it?

II. RESEARCH METHODOLOGY

Research Hypotheses

The following research hypotheses were tested.

H1 There is impact of CAI on Students performance compared with traditional teaching methods.

Research Design

This study was a quasi-experimental type, of the post-test, non-equivalents, non- randomized, control group design. It represents two levels of treatment: the Computer Assisted Instruction (Group-C), and the Traditional Instruction (Group-T).

Sample

The target population of this research was the secondary school students having Mathematics as an important subject from Umarkhed city, Maharashtra. These samples are intentionally selected from rural area because to know the awareness of Computer Assisted Instructions among school students of rural areas and also to check the available facilities in the schools established in rural areas.

The sample for Experimental Groups i.e. Group-C which is the group of students who are going to learn through CAI and Group-T which contains students who learn using traditional old teaching methods contains 20 students from which 10 are sharp, 5 are average and 5 students are taken from below average category which was decided according to their performance in class specifically in Mathematics subject.

The test paper which was named as CAI_MATH_Test was consisting of 25 questions based on the content which they learned during this experiment.

The students of Group-C were exposed to CAI package for mathematics which had been installed on desktop computers, the students in this group were introduced to the CAI format under teacher's supervision for some period so that they can be familiar with the navigation buttons and use the package independently. In addition, they were encouraged to take enough notes that could be useful for them in the test. The second group Group-T students were exposed to the conventional teaching method on the same content used for previous groups. They were taught using traditional classroom format i.e. using chalkboard, overhead projector, and charts. After this a test was taken between two groups.

The scores of students in the groups were analyzed using **t-test**. The analysis was done using the two research hypotheses stated for the study. The results of the analysis and discussions are as stated below.

Hypothesis 1: There is a positive impact of CAI on Students performance as compared with the traditional teaching methods.

To prove above hypothesis, students' scores were analyzed using t-test and the result is as shown in Table 1.

Table 1: analysis of covariance of mean score of students exposed to CAI and traditional teaching method by t-Test: two-sample assuming equal variances

	Group-C	Group-T
Mean	19.5	10.2
Variance	14.26	14.12
Observations	20	20
df	38	
t Stat	7.82	

An examination of Table 1 reveals that the calculated value of t is 7.82. Entering a t distribution table at 38 degrees of freedom (19 for n_1 + 19 for n_2) we find a tabulated t value of 2.02 (p = 0.05), hence, the calculated t value is significantly higher than the tabulated t value, which shows that CAI instructions have a significant effect on scores of Students as compared to the traditional method.

This result shows that CAI has a positive impact on student's performance as compared with traditional teaching method. Hypothesis one was therefore accepted.

III. DISCUSSION OF FINDINGS

The results of the above experiment have shown that there is a significant difference between the students exposed to Computer Assisted Instructions and those who are exposed to traditional classroom practices. It is observed that the students who learn under CAI have done much better than the students who learn using traditional teaching methods. They understood and remember the concept much better than the students exposed to traditional method. Again it is observed that though CAI is very helpful and supportive for students in learning mathematics it requires human assistance at least in a starting period. So, CAI must need teacher assistance.

It is also observed that, students are became active listeners when they starts learning through CAI, they enjoyed while learning through CAI, at the same time faced lots of difficulties while handling computers because of their lack of knowledge regarding the same. This indicates wide disparities among students in acceptance of CAI. Reasons for this disparity include hardware and software technical difficulties, problems with implementing the program, and software inflexibility in input and output formats. Other difficulties, such as lack of motivation, lack of traditional student-teacher interaction, and student discomfort with computers are also observed. The report further suggested that, students with weak math backgrounds have trouble learning math from computers.

IV. LIMITATIONS OF THE *STUDY*

The following limitations can be observed regarding this study. First, the study was designed to focus on learning of mathematics by secondary students drawn from the single secondary school, i.e. the scope of this study is relatively narrow and focuses on achievement in quantitative terms. Thus, the findings may not be generalisable to other public institutions and other private institutions. Second, computer was used only to present the content delivered by CAI package, the test is taken using traditional method i.e. using pen and paper approach. So computer technology is not used that much. Third, the study did not examine other alternative means like Internet for delivering the course content. Fourth, the test is to be taken on some limited content only. Despite these limitations the findings are significant, particularly in the use of CAI in the school system.

V. RECOMMENDATIONS

Based on the results of this study the following recommendations can be made:

1. Necessary attention should be given on computer literacy among students because all students need teacher assistance for handling computer. Again the awareness about the Computer Assisted Instruction packages and its use must need to be created among them so that they can use these packages and improve themselves, because many students are not aware about these kinds of packages. Specifically in rural areas it is very necessary to create the awareness about the Information and Communication Technology and its use in education.
2. Again it is observed that, there is a need of computer devices on per student basis. Colleges must have proper infrastructure like well equipped computer lab with necessary software's and hardware.

VI. *CONCLUSION*

CAI alone can produce higher achievement than conventional instructions alone. In addition, students learn instructional contents faster with CAI than with conventional instructions, they retain what they have learned better with CAI than with conventional instruction. Also, CAI activities appear to be more cost-effective than other instructional methods, such as teacher-directed instruction and tutoring. Furthermore, computer assisted instruction has been found to enhance students' performance than the conventional instructional method. Hence, they construct their knowledge by themselves rather than simply receiving it from knowledgeable teachers.

CAI is a tool that can enhance a well-designed curriculum and the efforts of a good teacher, but they cannot replace them. They must still be part of an overall instructional design and rely on the timely guidance of a teacher.

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