

COMPUTER ASSISTED INSTRUCTION (CAI): AN INNOVATIVE APPROACH FOR INDIVIDUALIZED EDUCATION

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ABSTRACT:

This study assessed the impact of Computer Assisted Instruction (CAI) on learning of Indian students. Computer Assisted Instruction (CAI) can prove to be a useful tool to enhance cognitive, emotional, and linguistic and literacy skills in school children. These programmes may never replace the books and the blackboard but this aspect cannot be ignored that young children learn better with pictures and sounds; and the proper use of appropriate programme could make a considerable difference in learning of children and understanding. To conduct the study, purposive sampling method was employed. The study was conducted on 60 male students aged between 7-8 years. All 6 sections of class II from the St. Peter's College (Agra district) were selected. Total sample was divided into two categories where 40 students were in experimental group and 20 students in control group, thus the 3 groups were formed and each group had 20 students. The education in control group was through traditional black board and discussion method whereas in the first experimental group exclusive CAI programme was executed and in second experimental group CAI was provided along with classroom teaching. This CAI programme was designed for students of class II on their multiplication chapter of mathematics subject. Two tools which are MAT (Math Ability Test for pre and post- testing) and CAI software designed by the researcher were used to assess the influence of CAI on learning of school going children. While calculating the t-values among all the three groups, during pre-

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testing non-significant t- values were found that indicates all three groups had no difference in their knowledge before starting the intervention. During post-testing (after implementation of respective education methods) significant difference was found in the mean scores of control group and both the experimental group where CAI with classroom teaching was employed, this indicates students learned better by CAI with classroom teaching. This intervention programme revealed that CAI along with classroom teaching is the better method of instructing children as compared to conventional method because of its individualized, self-pacing and interactive nature. Therefore, this can be among one of the strategies to enhance learning of school going children.

Keywords: Computer Assistive Programme, Learning, School going Children.

INTRODUCTION:

In recent times, the world has witnessed a rapid increase in technological innovations. This era ushered in the advent of the electronic computer system among other modern technologies. At present the computer technology has permeated nearly all aspects of human organizational roles and education. Computer encompasses almost all facets of human endeavours. So much has been written on it and its relatedness to all areas of human disciplines, which include computer/information technology, engineering, agriculture etc. This work aims to fill this gap, as it discusses its importance to the field of education. Today, computer technology in schools is one of the most far-reaching and fast growing developments in education. Technology has become very important in human life at the present time. Technology proves to change the less developed characteristics of the countries by changing their cultural and social structures. Therefore, the knowledge which provides appearing and the advance of the technology have been key for development and improvement (**Hançer, A. H., 2005**).

In schools, computers are widely used; and the need for computer technology and literacy in the educational system has become more relevant. Computer has been found to be an effective device for presenting an instructional programme. **Ochoyi & Ukwumunu (2008)** reported that the use and increasing growth of technology in the classroom provides new opportunities for delivery of instruction. Technology has been described by Abimbade, **Aremu & Adedoja (2003)**

as a systematic and integrated organization of man, machine, idea and procedure to achieve a desire goal. Over the years, various machines have been invented by man in technology. The major and most influential technology in the last millennium is the introduction of computer. "Computer literacy should be taught as early as possible; otherwise students will be left behind." Computers have become an essential tool in our society. Early exposure to computers may help students gain the computer literacy that will be crucial for future success in the workplace. In similar study, **Ogunleye (2007)** also noted that computer in expands pedagogical resources available to teachers in science classroom thus supporting teaching. The implication of this is that the introduction of computer in the delivery of biology instruction as a science subject in classroom may improve the quality of pedagogical delivery and students' learning outcome.

According to Gloor tutor classification of four modes of CAI :

- **Drill and Practice** is suited to behaviourist model with repeated practice on lower-level cogitative skills. The computer provides the student with exercises that reinforce the learning of specific skills taught in the classroom, and supplies immediate feedback on the correctness of the response. Used in this manner, CAI functions as a supplement to regular classroom instruction, and may be especially useful when a teacher does not have the time to work individually with each student. Drill and practice on the computer may also motivate student's more than traditional workbook exercises.
- **Tutorial mode** is probably one of the most common ones within Computer assisted instruction (CAI). In this mode, the computer presents the information which guides the learner through the system and then assesses the learner. Tutorial CAI provides some information or clarifies certain concepts in addition to providing the student with practice exercises. In this sense, the computer begins to take over actual instructional functions, tailored to the student's individual level of achievement.
- **Simulation mode**, the learner works with a simulation of the real world simulations are used where it is not practical or feasible to provide the learning in real-life. It is a computerized model of a real or imagined system designed to teach a how a system works. Simulations differ from drill and practice activities by providing learner-structured activities. Educational

simulation allows to student experience events, or phenomena that they are not able to witness personally and that would be too difficult or dangerous to duplicate in the classroom setting. Software can manipulating objects, performing a set of procedures or acting in a given situation. The person using the courseware usually chooses tasks and the order in which to do them.

- **Games mode**, this is generally a competitive element. It is a courseware with a function to increase motivation by adding game rules to learning activities. Instructional games can be very similar to drill and practice but have an entertaining environment. Students may be more willing to work at practicing skills if they know they can do so by playing a game. Depending on the particular game, student can compete against the computer or against other student.

Role of computer in learning:

It is widely accepted that the integration of modern Information and Communication Technologies (ICT) into the teaching learning process has great potential. In fact, it could be the most important way by which students can meet their educational aspirations within reasonable time and resources. The use of computers in Elementary schools is basically vision as a teaching and learning aid besides to develop computer literacy amongst the children. Computer aided learning will help students to make the present teaching learning process joyful, interesting and easy to understand through audio-visual aids. Teachers will be resourced with Multimedia Contents to explain topics better. Overall it will help students to improve quality of education in long learn.

CAI benefits for teachers:

The classroom teacher may never replace programme of self-instruction. Rather, teacher/educator will be free to guide the learning students in ways that only a human being can. In using computer for instruction, the teacher's role is hypothesized as changed basically from that of informer to learning facilitator. Teachers' duty of delivering lectures changes to that of guide and problem solver.

- The teacher/educator free from time consuming chores as compiling, administering and marking tests, has time to work individually with the students. At the schools, the teacher is the manager of the learning process. The teacher/educator decides when the students use the

programme, read the textbook, or work with laboratory equipment. This is to say that the teacher is relieved from pure informative tasks. He could dedicate himself to the processing of this information.

- The teacher's roles in using computer for instruction are further conceptualized as spending his time in leading group discussions and in working with students individually and in small groups using laboratory work where applicable. The teacher is not a spectator of incomprehension but guides the students in the multitude of diversified documents to make relevant choices. He is a guarantor of assimilation as well as facilitator to help learner's use and access knowledge in computer education. Hence, the teacher's attitudes, beliefs and preferences will be changed and be adapted.

- **According to Jenks (2002)**, the objectives of Computer Education are not determined by student's needs, interests or hope alone. The goals are agreed upon in consultation with the teacher. To achieve the set objectives of using computer for instruction, the teacher should check what each student is doing and equally reconsider with the student the goals, methods, content, level and pace. Where a student with low ability tries a difficult material, it is imperative for the teacher to decide the possibilities of doing so. The teacher should discuss the method and content of such difficult material with the students to enable such students understand the content of the material.

Advantages of Computer Assisted Instructions (CAI):

- The pace of instruction concerns everyone involved in the development of educational activities. Parents often worry about their child being either left behind or held back by the performance of the other students in the classroom. Teachers using traditional learning activities have trouble progressing some of the students in a classroom if not all are ready. Computer-based educational activities assist here by allowing each student to learn at his or her own pace. One student can move onto more demanding educational activities before the rest of the class without disrupting anyone else's learning. Simultaneously, another student can repeat certain learning activities as often as advisable.

- It enhances behaviour and retention rate of student; it motivate and develop sense of efficacy of students.

- People remember 20% of what they hear, 40% of what they see and hear and 75% of what they see, senses and present through computer enhance the learning process.
- Computers encourage learning as they provide a stimulating environment and promote enthusiasm.
- CAI may help the reticent student who is afraid to make mistakes in a classroom situation.
- A computer program can be used diagnostically, and, once a student's problem has been identified, it can then focus on the problem area.

OBJECTIVES OF THE STUDY:

- Developing the computer assisted instruction (CAI) on the selected topic of curriculum.
- Implementation of computer assisted instruction (CAI) software on experimental group.
- Evaluate the effectiveness of computer assisted instruction (CAI).

METHODOLOGY:

St. Peter's college was selected as locale of the study. All the children studying in 2nd class of St. Peter's college were the population of the study. To conduct the study Purposive sampling method was employed. St. Peter's College was purposefully selected as school was fulfilling all the requirements to conduct present study and school authorities were ready to provide support. All six sections of class 2 were selected. For the intervention programme researcher selected the 90 students of St. Peter's college 2nd class. Each section has 60 students. Researcher selected 10 students by systematic random method. Intervention method of investigation was used for the present study. Tools to be used in the study of Mathematics Ability test (MAT) for pre and post-testing, PowerPoint presentation to aware the teachers regarding CAI, Questionnaire to assess Teacher Satisfaction & Opinion by use of CAI (QAST) and Computer Assisted Instructions (CAI) Software. To compare the three groups' student-t test was applied on the pre and post scores of the groups because t-test was employed to find out the significance of difference between the groups. Other than t, percentage, mean, and SD were also is used to analyze the data.

RESULT & DISSCUSSION:**Table 1: Developing Computer Assistive Instruction-**

For the implementation of the CAI programme researcher purposefully selected St. Peter's college because this school fulfil the all requirements which were required to conduct the study especially individual facility of computer for each students. To compare the conventional and CAI method of teaching researcher was prepared a CAI software on the selected curriculum content. This software is a web application which can be run on any operating system and this software needed basic html and java programming to run. JSP, HTML and java script were used to design this software. Other language like; asp.net can also be used to design this kind of software. For developing the content of CAI software Researcher used the 2nd class mathematics books, internet related literature and one specialist of computer language.

Table 2: Implementation of CAI software on experimental group-

An experiment was conduct to determine the influence of CAI program on learning of school going children. For this researcher implement the one week intervention programme on the students of experimental groups.

Table 3: Evaluate the effectiveness of computer assisted instructions (CAI)-

For evaluating the effectiveness of CAI programme researcher applied the 2 test

3.1 Inter Sampling (Pre-testing scores)-Mean, SD & t-values of scores obtained by students during pre-testing

CATEGORY	Group distribution	N	MEAN	SD	t-value		
Control group (20)	Only class room teaching	20	9.96	2.35	-	0.37	0.53
Experimental group (40)	Only CAI (20)	20	10.26	2.62	N.S.	-	0.20
	CAI with class room	20	10.45	3.28	N.S.	N.S.	-

	teaching						
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N.S. – Non significant

Table reveals the pre-testing scores of school going children where the mean and SD values of experimental and control group were similar before the CAI programme given.

In pre testing scores non-significant difference was found. It showed that non-significant difference is found between control and experimental groups pre-testing scores. These scores reveal the previous knowledge of school going children about the multiplication content.

3.2 An Ability test to assess the change in knowledge of students. This test having questions related to content of the prepared CAI.

Showing the mean, SD value, scores of sample during the pre –testing and post-testing

Category	Group distribution	Test type	Mean	SD	t-value	p-value
Experimental group (40)	Only CAI (20)	PRE	10.26	2.62	3.61	S.(0.01)
		POST	13.41	3.12		
	CAI with class room teaching (20)	PRE	10.45	3.28	4.44	S(0.01)
		POST	14.32	3.49		
Control group (20)	Only class room teaching (20)	PRE	9.96	2.35	2.11	S.(0.05)
		POST	11.8	2.99		

S- Significant

Significant difference was found between pre and post testing scores of experimental group at 0.05 levels of significance and control group at the 0.01 level of significance. Statistically great significant difference was found; as a result learning of experimental group and form the CAI

programme was greater than the control group. Mean scores of experimental group shows that learning status from the CAI programme is more them.

Results show that majority of school going children learnt from the class room teaching but they learnt more when they studied from only CAI and CAI with classroom teaching. **Mulenda (2004) and Breriter (2006)** believe that approaches from various learning theories can be combined in a particular instructional program for the purpose to enhance and improve student learning.

3.3 Intra Sampling (Post-testing scores)- Mean, SD & t-values of scores obtained by students during Post-testing

CATEGORY	Group distribution	N	MEAN	SD	t-value		
Control group (20)	Only class room teaching	20	11.8	2.99	-	1.62	2.39
Experimental group	Only CAI (20)	20	13.41	3.12	N.S.	-	0.85
(40)	CAI with class room teaching (20)	20	14.32	3.49	S.(0.01)	N.S.	-

N.S. – Non significant S. – Significant

Table reveals the post-testing scores of school going children where the mean & SD values of experimental and control group were different after the CAI programme given.

In post testing scores non-significant difference was found and significant difference was found at the 0.01 level of significance also. Results show that learning improved when the teachers include CAI teaching method with the conventional teaching method because it makes the teaching intrusting and more motivational also but the learning was not affected when the teachers gave the knowledge only CAI. A Meta analysis also supports the effectiveness of CAI on motivation and attitude, finding that computer-based instruction in curriculum improved

attitude-toward-instruction scores. In addition, these studies indicate that student learning rate is faster with CAI than with traditional instruction. Not only is it indicated that students learn faster, but it is also suggested that they retain the information longer.

CONCLUSION:

Present study showed that CAI is the better method of instruction for compared to traditional/conventional teaching methods. **Copper and Coople (2001)** also found similar results and concluded that CAI users sometimes learn as much as 40% faster than those receiving traditional and teacher directed instruction, retention of content is superior to traditional instruction alone. The results of the present study indicate that students were benefited from the individualization, self-pacing and interactive nature of the CAI programme and this can be among one of the strategies to enhance learning. Each segment was followed by questions and immediate feedback in instructional process had a better impact on student learning. Learners' active participation in instructional process like the CAI this can be results for better student learning. CAI is a powerful, useful and interesting mode of instruction. Software type of CAI is found to be feasible and applicable for teaching maths at 2nd class/primary level.

Exhibited positive attitude towards the learning of mathematic **Mckningh (2002)** if the students miss key concepts in mathematics and sufficient practice in applications, failure may be certain because the foundation for future learning is absent. From the present study CAI is also included reform how mathematics is thought. So, this present study reveals that studied mathematics with excitement and broke loose from their fear of the subject and incorporation of math questions and feedback in instructional process has a better impact on student learning. The results of the present study are in consonance with the results of many of the experimental studies demonstrating impact of CAI for better student learning in mathematics. Computers are highly educational tools but it is the way computers are used rather than the actual machines themselves that contribute to learning. In the present study Researcher indicate that impact of CAI improved student learning as attributed to the software use in experiment and the way it was used.

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