Impact of Computer Assisted Instruction (CAI) on Teaching and Learning for National Development

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ABSTRACT
Computer-assisted instruction (CAI) is an interactive instructional technique whereby a computer is used to present the instructional material and monitor the learning that takes place. CAI uses a combination of text, graphics, sound and video in enhancing the learning process. Its application in education has made teaching and learning interactive and interesting. However, its usage has been hampered by inadequate facilities and resources. Hence, this paper examined the impact of Computer Assisted Instruction (CAI) and its Relevance to Teaching and Learning for National Development. The meaning of Computer Assisted Instruction and its importance in teaching and learning were investigated and discussed. The advantages and disadvantages of Computer Assisted Instruction in teaching and learning were also highlighted. The study, concluded that Computer Assisted Instruction (CAI) in teaching and learning process will not only facilitate learning but make learning relatively permanent.The study recommended that proper use of CAI can be impactful and relevant in the teaching and learning process for national development.

Keywords: Computer Assisted Instructions (CAI), Relevance, Teaching, Learning, Education, Computer.

Introduction

The use of computers in education started in the 1960s Darthmouth (1960). With the advent of convenient microcomputers in the 1970s, computer use in schools has become widespread from primary education through the university level and even in some preschool programmes. Instructional computers are basically used in one of two ways: either they provide a straightforward presentation of data or they fill a tutorial role in which the student is tested on comprehension. If the computer has a tutorial programmes, the student is asked a question by the computer; the student types in an answer and then gets an immediate response to the answer. If the answer is correct, the student is routed to more challenging problems; if the answer is incorrect, various computer messages will indicate the flaw in procedure, and the program will

bypass more complicated questions until the student shows mastery in that area (Encyclopædia Britannica 2015).

There are many advantages to using computers in educational instruction. They provide one-to-one interaction with a student, as well as an instantaneous response to the answers elicited, and allow students to proceed at their own pace. Computers are particularly useful in subjects that require drill, freeing teacher time from some classroom tasks so that a teacher can devote more time to individual students. A computer program can be used diagnostically, and, once a student's problem has been identified, it can then focus on the problem area, because of the privacy and individual attention afforded by a computer, some students are relieved of the embarrassment of giving an incorrect answer publicly or of going more slowly through lessons than other classmates (Encyclopædia Britannica 2015).

There are drawbacks to the implementation of computers in instruction, however. They are generally costly systems to purchase, maintain, and update. There are also fears, whether justified or not, that the use of computers in education decreases the amount of human interaction. One of the more difficult aspects of instructional computers is the availability and development of software, or computer programmes. Courseware can be bought as a fully developed package from a software company, but the program provided this way may not suit the particular needs of the individual class or curriculum. A courseware template may be purchased, which provides a general format for tests and drill instruction, with the individual particulars to be inserted by the individual school system or teacher. The disadvantage to this system is that instruction tends to be boring and repetitive, with tests and questions following the same pattern for every course. Software can be developed in-house, that is, a school, course, or teacher could provide the courseware exactly tailored to its own needs, but this is expensive, time-consuming, and may require more programming expertise than is available (Encyclopædia Britannica 2015).

Meaning And Importance of Computer Assisted Instruction (Cai) in Teaching and Learning

Computer-assisted instruction (CAI), as the name may suggests, stands for the type of instruction aided or carried out with the help of a computer as a machine. Mangal and Mangal (2009) alluded to the fact that Computer-assisted instruction has now taken as so many dimensions that it can no longer be considered as a simple derivative of the teaching machine or the kind of programmed learning that Skinner introduced. Mangal and Mangal (2009) stated that CAI is an interaction between a student, and a computer-controlled display and a response entry devise for the purpose of achieving educational outcomes.

CAI is a self-learning technique, usually offline/online, involving interaction of the student with programmed instructional materials. Computer-assisted instruction (CAI) is an interactive instructional technique whereby a computer is

used to present the instructional material and monitor the learning that takes place. CAI uses a combination of text, graphics, sound and video in enhancing the learning process. The computer has many purposes in the classroom, and it can be utilized to help a student in all areas of the curriculum (Patel 2013). CAI refers to the use of the computer as a tool to facilitate and improve instruction. CAI programs use tutorials, drill and practice, simulation, and problem-solving approaches to present topics, and they test the student's understanding (Patel, 2013). Typical CAI provides text or multimedia content, multiple-choice questions, problems, immediate feedback, notes on incorrect responses, summarizes students' performance, exercises for practice, and Worksheets and tests (Patel, 2013).

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 (Encyclopædia Britannica, 2015). CAI lifts up the student's motivation as it provides him or her with a more challenging and stimulating context than conventional teaching methods. Increased motivation may lead to personal satisfaction and the feeling of challenge. It can also create a positive perspective on lifelong learning (Encyclopædia Britannica, 2015).

Computer-assisted instruction improves instruction for students with disabilities because students receive immediate feedback and do not continue to practice the wrong skills. Computers capture the students' attention because the programs are interactive and engage the students' spirit of competitiveness to increase their scores. Also, computer-assisted instruction moves at the students' pace and usually does not move ahead until they have mastered the skill (www.starfall.com). Mosby's Medical Dictionary (2009) examinedCAI as a teaching process that uses a computer in the presentation of instructional materials, often in a way that requires the student to interact with it. According to Miller-Keane (2003), defined computer-assisted instruction (CAI) as instructional an activity that uses a computer as the primary vehicle for teaching content or processes rather than one-to-one interaction with a student.

CAI programmes are developed to offer a specific kind of student interaction with the computer screen. For CAI developers, the computer screen represents a programmable interactive communications medium. As these programmes seek to address the needs of a particular group of students, their developers aim to create a program that would teach effectively and feature all the available experience and expertise (Traynor & Patrick, 2003).

CAI can be applied to all ages and forms of educations, from preschool 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, food service workers, law students and many more. It can assist with the teaching of people with physical limitations, learning disabilities and language limitations (Traynor & Patrick, 2003).

Types of Computer Assisted Instruction

- ✓ **Drill-and-practice:** Drill and practice provide opportunities or students to repeatedly practice the skills that have previously been presented and that further practice is necessary for mastery.
- ✓ **Tutorial:** Tutorial activity includes both the presentation of information and its extension into different forms of work, including drill and practice, games and simulation.
- ✓ **Games** Game software often creates a contest to achieve the highest score and either beat others or beat the computer.
- ✓ **Simulation:** Simulation software can provide an approximation of reality that does not require the expense of real life or its risks.
- ✓ **Discovery:** Discovery approach provides a large database of information specific to a course or content area and challenges the learner to analyze, compare, infer and evaluate based on their explorations of the data.
- ✓ **Problem Solving:** This approach helps children develop specific problem solving skills and strategies.

Advantages and Disadvantages of Computer Assisted Instruction in Teaching and Learning

CAI can dramatically increase a student's access to information. The program can adapt to the abilities and preferences of the individual student and increase the amount of personalized instruction a student receives. Many students benefit from the immediate responsiveness of computer interactions and appreciate the self-paced and private learning environment. Moreover, computer-learning experiences often engage the interest of students, motivating them to learn and increasing independence and personal responsibility for education. Although it is difficult to assess the effectiveness of any educational system, study have reported that CAI is successful in raising examination scores, improving student attitudes, and lowering the amount of time required to master certain material. While study results vary greatly, there is substantial evidence that CAI can enhance learning at all educational levels (Douglas,2000).

In some applications, especially those involving abstract reasoning and problem-solving processes, CAI has not been very effective. Critics claim that poorly designed CAI systems can dehumanize or regiment the educational experience and thereby diminish student interest and motivation. Other disadvantages of CAI stem from the difficulty and expense of implementing and maintaining the necessary computer systems. Some student failures can be traced to inadequate teacher training in CAI systems. Student training in the computer technology may be required as well, and this process can distract from the core educational process. Although much effort has been directed at developing CAI systems that are easy to use and incorporate

expert knowledge of teaching and learning, such systems are still far from achieving their full potential (Douglas,2000).

Effectiveness of CAI

Erhan and Okan (2011) researched on the relationship between students' exposure to PPPs and their achievement in Science and Maths. The data for the study came from the 2009 administration of the Programme for International Student Assessment (PISA) using 9th grade students in schools. The sample of 4996 students in Turkey were used for the study Hierarchical linear modeling was used for analyzing the effects of ICT in students. The results indicated that students' familiarity with ICT and their exposure to technology helped to explain Maths and Science achievement gap among students. Erdemir (2011) determined the effect of power point on students' achievement in Physics over the traditional lectures, using pretest-posttest control group quazi-experimental research design and 90 science student-teachers (Pre-service teachers) in physics education in a University in Turkey. The *t*-test was used to analyze the data collected. The results indicated that PPPs group had higher grades than the control group and that intelligent use of power point presentations in Physics instruction is capable of increasing the students' success.

Bartsch and Cobern (2003) investigated effectiveness of power point presentations in lectures over overhead transparencies. Quazi-experimental design was adopted for the study with thirty-nine students in social psychology class at the University of Texas and Analysis of variance as a method of data analysis. The result showed that students preferred power point presentations to overhead transparencies and traditional method of lecture. Afolabi (2006) investigated the effects of Computer Assisted Instructional package on secondary school students' performance in Biology, in Oyo, Nigeria. The researcher made use of quasi experimental design. One hundred and twenty senior secondary school One students were randomly assigned to experimental group I (20 males and 20 females), experimental group II (19 males and 21 females) and control group (19 males and 21 females). Biology performance Test (BIOPET) was the research instrument. The students' pretest and posttest scores were subjected to Analysis of Covariance (ANCOVA) and post hoc analysis using Scheffe test. The findings showed that the performance of students exposed to CAI either individually or cooperatively were better than their counter parts exposed to the conventional classroom instruction.

Susskind (2007) determined the limits and effects of power point's power: Enhancing students' self-efficacy and attitude but not their behaviour. Quazi-experimental design was adopted with two groups composed of 42 students in experimental group and 38 students in the control group. Descriptive statistical of mean and standard deviation were used to describe the results as well as a non-parametric statistic of ANOVA to determine any significant difference in the two groups. The results showed that power point presentations have significant influence

on student's self-efficacy, attitude and academic achievement in university than the traditional method.

Harshad (2007) studied development and effectiveness of Computer Assisted Instruction Programme for teaching of Adjective in English Language. Two equal groups only posttest experiment design was adopted for the study. Forty-six students of grade IX were selected as sample for the replication of the experiment. A teacher made unit test was administered as posttest. The scores obtained on the test were analyzed by t-test. Students' reactions(attitude) were obtained on opinionnaire developed by Okebukola (2013) and analyzed employing chi-square technique. The findings revealed that the CAI package developed to teach Adjective in English grammar to the students of grade IX was effective with respect to the students' academic achievement and that students responded favourably towards learning through CAI package.

Conclusion

The world is a global village. In this twenty-first century, the use of Computer Assisted Instruction as well as in the teaching and learning process cannot be overemphasized due to its immense contributions in the development of education globally and nationally. The present age of technological advancement has brought changes into virtually all human endeavour including the teaching and learning processes. For this reason, Computer Assisted Instruction (CAI) in teaching and learning process will not only facilitate learning but make learning relatively permanent.

Recommendatios

For Computer Assisted Instruction to be impactful and relevant in the teaching and learning process for national development, the following recommendations were considered:

1. Teachers should be more committed to teaching with the use of Computer Assisted Instruction, given the importance of practical knowledge in it;
2. Efforts should be made by government to post and provide teachers skilled in computer assisted instruction to teach schools in order to impact skills to the students.
3. Government should provide institutions at all levels in the country with adequate computers.
4. Curriculum planners should incorporate computer assisted instruction into methods of instruction right from primary to tertiary levels of education.
5. Curriculum planners, which the teachers should take the ample opportunity to lift their instructional level to 21st century compatibility by using computers.

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