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CLUSTER UNIVERSITY OF JAMMU

UNIT 4. TOPIC: COMPUTER ASSISTED INSTRUCTION (CAI)

ICT IN EDUCATION

JATINDER SINGH

MCA, BCA, PGDBM, B.ED (UNIVERSITY OF JAMMU)

COMPUTER ASSISTED INSTRUCTION(CAI)

Introduction:-

In the early stages of development, computers were involved only in simple tasks such as performing calculations. Although computer technology has made tremendous progress, computers still are a long way from meeting the needs and expectations of many people. The development of artificial intelligence is a promising stage in computer technology development. Despite advances in areas such as expert systems, much of what is done remains at a relatively primitive level. Computers are currently being used in education in six common categories: (1) introducing students to the use of computers, (2) programming instruction, (3) drill and practice, (4) recreational games, (5) administrative uses, and (6) word processing. 1 The primary purpose of this paper is to define and present the key concepts of computer-assisted instruction (CAI) in the educational process. The basics of CAI must be understood in order to know how this approach can be useful in the education of nurses.

HISTORY

In the mid-1950s and early 1960s a collaboration between educators at Stanford University in California and International Business Machines Corporation (IBM) introduced CAI into select elementary schools. Initially, CAI programs were a linear presentation of information with drill and practice sessions. These early CAI systems were limited by the expense and the difficulty of obtaining, maintaining, and using the computers that were available at that time. Programmed Logic for Automatic Teaching Operations (PLATO) system, another early CAI system initiated at the University of Illinois in the early 1960s and developed by Control Data Corporation, was used for higher learning. It consisted of a mainframe computer that supported up to 1000 terminals for use by individual students. By 1985 over 100 PLATO systems were operating in the United States. From 1978 to 1985 users logged 40 million hours on PLATO systems. PLATO also introduced a communication system between students that was a forerunner of modern electronic mail (messages electronically passed from computer to computer). The Time-shared Interactive Computer-Controlled Information Television (TICCIT) system was a CAI project developed by Mitre Corporation and Brigham Young University in Utah. Based on personal computer and television technology, TICCIT was used in the early 1970s to teach freshman-level mathematics and English courses. With the advent of cheaper and more powerful personal computers in the 1980s, use of CAI increased dramatically. In 1980 only 5 percent of elementary schools and 20 percent of secondary schools in the United States had computers for assisting instruction. Three years later, both numbers had roughly quadrupled, and by the end of the decade nearly all schools in the United States, and in most industrialized countries, were equipped with teaching computers. A recent development with far ranging implications for CAI is the vast expansion of the Internet, a consortium of interlinked computers. By connecting millions of computers worldwide, these networks enable students to access huge stores of information, which greatly enhances their research capabilities.

CONCEPT:

CAI is a method of instruction that uses the computer as a tool to assist in identifying and meeting the needs of individual learners. This method is based on a human machine relationship where there is two-way communication between the learner and the computer. The objective of CAI is human learning and retention; consequently, the instruction is learner-centered. The method of communication is customarily based on a stimulus-response-feedback signal flow. 2 The computer contains a stored

instructional program designed to inform, guide, control, and test the student until a prescribed level of proficiency is reached. 2 The learner interacts with the computer, info{mation and/or a stimulus is presented on monitors, and the learner receives feedback from the computer. For a system to be defined as CAI, the computer must instruct, not just serve as a tool to assist in problem solving and information retrieval. The mere presence and utilization of a computer in the educational environment is not sufficient for that system to be considered CAI. Individual programs have a degree of control over the sequencing of instructions, whether or not the learner must go through all parts of the program or skip sections if he/she already has learned that part.

COMPUTER ASSISTED INSTRUCTION

Computer assisted instruction (CAI) includes a variety of computer-based packages that provide interactive instruction. Some are sophisticated and expensive commercial packages while other applications are simple solutions developed by individuals for a local situation. Since work done in one subject area is difficult to transfer to other subject areas, much time and money needs to be invested toward its development. However, once an application has been set up, the cost per additional student is relatively small. Since fewer face to face lectures and seminars are required, this also places fewer geographical and temporal constraints on staff and students.

Computer assisted instruction can be Internet-based or run on a personal computer from a CD or DVD. Presentations on computers are particularly suited to subjects that are visually intensive, detail oriented, and difficult to conceptualize. Upper level science courses can benefit the most using the "virtual" cases to illustrate the complex biochemical processes or microscopic images as well as reducing the need to use animal or human tissue. Since the 1970s, CAI packages have become more advanced, interactive, and attractive multimedia learning experiences.

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.

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.

Typical CAI provides

1. text or multimedia content
2. multiple-choice questions
3. problems
4. immediate feedback
5. notes on incorrect responses
6. summarizes students' performance
7. exercises for practice
8. Worksheets and tests.

Types of Computer Assisted Instruction

1. **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.
2. **Tutorial** Tutorial activity includes both the presentation of information and its extension into different forms of work, including drill and practice, games and simulation.
3. **Games** Game software often creates a contest to achieve the highest score and either beat others or beat the computer.
4. **Simulation** Simulation software can provide an approximation of reality that does not require the expense of real life or its risks.
5. **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.
6. **Problem Solving** This approach helps children develop specific problem solving skills and strategies.

FEATURES:

1. Interactive and can illustrate a concept through attractive animation, sound, and demonstration.
2. Allow students to progress at their own pace and work individually or problem solve in a group.

3. **Provide immediate feedback, letting students know whether their answer is correct. If the answer is not correct, the programme shows students how to correctly answer the question.**

4. **Offer a different type of activity and a change of pace from teacher-led or group instruction.**

5. **Improve instruction for students with disabilities because students receive immediate feedback and do not continue to practise the wrong skills.**

6. **Capture the students' attention because the programmes are interactive and engage the students' spirit of competitiveness to increase their scores.**

7. **Move at the students' own pace and usually do not move ahead until they have mastered the skill.**

8. **Provide differentiated lessons to challenge students who are at risk, average or gifted.**

Characteristics of Computer Assisted Instruction

1. **Two way interaction: Computer-assisted instruction is an, instructional technique based on the two way interaction of a learner and a computer with the objective of human learning and retention.**

2. **Stored instructional programme Computer- assisted instruction is an instructional technique in which the computer must actually instruct the student, and the computer contains a stored instructional programme designed to inform, guide and test the student until a profile level of efficiency is retained.**

3. **Student's responses: Computer-assisted instruction is an instruction technique in which the computer is based**

(I) to control the presentation of stimulation to a student.

(ii) to accept and evaluate the student's responses, and

(iii) to present further stimuli based on that interaction calculated to shape student responses in the desired manner. The student uses a terminal directed by a computer that may be in the same room or some distance away. The terminal is generally equipped with information display and the student response devices.

4. **Individualised instruction: Computer assisted instruction is an instructional, technique using the computer which follows for individual, individually paced and individualised instruction, since the computer's behaviour is dependent upon the responses of the student.**

USES

1. **The capability of individualizing both the means and ends of instruction.**

2. The capability of doing research –

i) On teaching under controlled conditions.

ii) Under conditions which individualize instructions in a particular way.

iii) On various modes of teaching.

iv) Ability to collect detailed records of student performance.

3. Permits evaluation of effectiveness of the teaching procedures as well as teaching materials.

4. The capability of developing ways of assisting teachers and authors in the development of instructional materials.

5. The capability of evaluating alternative media used to implement and support instruction.

6. Computer aided instruction (CAI) mean using computers to teach people, it does not mean teaching people to use computer or teaching people about computer technology. Computer can be used in education – i) To reinforce present educational system. ii) To revolutionize the present educational system. iii) To lay the foundations for future system of education to come.

7. Role of Teacher: CAI has proved powerful tool for the teacher in the instructional process. Of course, there is some change in teacher's role as. CAI directly interacts with the students individually and with the teacher. Teachers are to play their role in CAI. Human teachers cannot be eliminated from teaching-learning process. We can highlight the role of a teacher in CAI in the following manner Use of New Tools : CAI provides the teacher some chance

● to use new tools: This use will enhance the person's satisfaction. Also it will increase the individual's efficiency. The CAI can compute accurately and rapidly amounts of data. It can produce elaborate graphs and drawings. Compatible with Line Teaching : CAI is compatible

● with line teaching: It can be used side by side. CAI is flexible system of instructions. It can very promptly evaluate the performance of individual student. The teacher can devote his time for more creative activities.

Advantages of CAI

● one-to-one interaction

● great motivator

● freedom to experiment with different options

● instantaneous response/immediate feedback to the answers elicited

• **Self pacing - allow students to proceed at their own pace**

• **Helps teacher can devote more time to individual students**

• **Privacy helps the shy and slow learner to learns**

• **Individual attention**

• **learn more and more rapidly**

• **multimedia helps to understand difficult concepts through multi sensory approach**

• **self directed learning – students can decide when, where, and what to learn.**

Limitations of CAI

1. Experts Needed in CAI - Compute aided instructions need the help of the following experts –

i) Computer Engineer – A computer engineer is a technical person and knows about basic principles and techniques of programming.

ii) Lesson Writer - The losson writer is an expert who is familiar with lesson writing. Lesson writers may be experienced teachers or an experienced teacher may be a lesson writer. He knows theories of learning.

iii) System Operator – He knows the system thoroughly andcan cope with all commonly thoroughly and can cope with all commonly occurring failures of software and hardware in the system.

2. The computer fails to appreciate the emotions of students. The emotional climate created by teacher in direct class room interaction with the students is absent in CAI.

3. CAI programs do not in themselves solve psychological or educational problems. Computer programmes of conventional type do not work like human beings at all.

4. CAI fails to develop essential features of language competency where the ability to generate or construct meaningful sentences is essential.

5. It was pointed out that some students got more tired than conventional study or felt like quitting the study.

6. CAI cannot appreciate the student's artistic endeavor and cannot strengthen his friendship and deepen his pereception of those around him.

7. The peripheral equipment puts constraints in the ways on which a student can interact with the computer.