



Computer-Assisted Learning (Cal)

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Abstract

Computer-assisted learning (CAL) may be defined as any learning that is mediated by a computer and which requires no direct interaction between the user and a human instructor in order to run. Instead, CAL presents the user with an interface (constructed by an educator skilled in the field of study) which allows the user to follow a lesson plan or may allow self-directed access to particular information of interest. CAL has been claimed to improve knowledge retention and achievement scores, enhance clinical judgment skills and reduce required instruction time; performing as well when compared to other more traditional education techniques. The advantages of the utilization of CAL can be made clear by consideration of educational objectives and curriculum design, as well as the particular learning needs of the students themselves. Research and scientific development into a theoretical framework for CAL design and implementation has allowed the identification of beneficial aspects of CAL resources. Although the cost of commercial software may be prohibitive to some institutions, possibilities exist for teachers to create their own CAL packages relatively simply.

Keywords: Computer, Learning, Knowledge, Education, Students, Teachers, Technology.

Introduction

Computer-assisted learning is the future, and that future is now. Education, as a process and discipline, is mainly concerned with imparting knowledge, methods of teaching, and providing/maintaining a conducive learning environment as opposed to informal education and other means of socialization. Computer-assisted learning (CAL), as the name implies, is the use of electronic devices/computers to provide educational instruction and to learn. Computer-assisted learning can be used in virtually all fields of education, ranging from TV/DVD play-learn program for kindergarten kids to teaching quadruple bypass surgery techniques in medicine. CAL is developed by combining knowledge from all fields of education/learning, human computer interaction (HCI) and cognition.

These days mostly children and adults spend a huge portion of their time on their computers, tablets and phones both at home and at school, so it's no surprise that computers are being incorporated into the classroom.

Computer-Assisted Learning (or CAL) has completely modernized the way that students learn, both in the average classroom as well as in language-learning settings. Computer-Assisted Learning can make lessons much more interactive and engaging, and can pique the interest of even the most reluctant of students.

Definition

Computer-assisted learning (CAL) may be defined as any learning that is mediated by a computer and which requires no direct interaction between the user and a human instructor in order to run. Computer-Assisted Learning also includes online courses and supplemental course materials used in colleges, homeschooling and distance learning. Basically, any type of technology that can be used to learn most likely falls beneath the umbrella of Computer-Assisted Learning.

Computer-assisted learning (CAL) is also known as computer assisted instruction (CAI). By playing and using materials stored on DVDs, mobile phones, and other web-based resources, learning becomes more attractive and dynamic, and offers the students entertaining avenues to showcase their listening and learning skills. It boosts the students' confidence in solving the tasks they are assigned and therefore improves the quality of what they have learnt.

Importance of Computer-Assisted Learning

Today, classical education methods are rapidly being replaced with virtual education, online school, and distance learning systems. Boosted by improved visualization and data transmission technologies, it is now quite easy to create computer software programs that display and analyze graphic multidimensional data for human interpretation. This has become an integral part of education and is frequently used to develop and make attractive presentations in subjects that are difficult for students to understand without proper illustration.

On a higher level, computers can facilitate live/active teaching interaction between the students and the tutor or among the students themselves and moderated by the tutor. The concept of human interaction with computers has been on since the introduction of household electronic devices in the late 1980s. However, this only began to happen in the last decade due to aggressive mobile technology revolution and Internet that promotes inexpensive and reliable communication across the globe.

Basic Goal of Computer-Assisted Learning

The use of computer information technology and networks is becoming indispensable in almost every profession. Recent changes in education concepts as well as new business and

technical innovations are all computer-centered. As a result, educational institutions have to modify their curriculum and teaching methods to be computer-compliant.

The basic goal of CAL is to stimulate and develop the assimilation/learning capacity of students, increase the effectiveness and productivity teachers with the help of computer based technology and update students' knowledge to current trends as most of the concepts outside the last decade are gradually getting out of date. Computer technology should therefore be an integrated part of the education system. Another objective of CAL is to develop easily understandable and attractive tutorials and demonstrations of the field they are employed in.

Computer-Assisted Learning Assessment Tools

- **Multiple Choice Questions:** Mainly used for computer based tests, this type of exercise is used to assess a student's understanding of things they have been taught. It is used for CBTs.
- **Fill-in the Gap:** Also used for CBTs, the student is required to type text in gaps/spaces where some of the words are missing. The student has to provide suitable words to solve the exercise. The test can be easily done within a few minutes and can be created with inexpensive software such as Hot Potato.
- **Find the Answers:** In this test, the student(s) are given questions and they have to look for the answer on their own in e-libraries or using the Internet. The answers may be submitted to the teacher in various required submission formats.
- **Scrabble/Crossword Puzzles:** Crossword puzzles are mainly used in computer assisted language learning or at the basic education level. They can be created from the vocabulary that students have just been learning and the game can be played during leisure hours.
- **Online Interactive Chat:** Group chats can be a good learning avenue for students and teachers to share ideas online through text or speech. It is pretty easy to set up a group chat server using a social media tool. However, it can sometimes be difficult to moderate and it can become boring if there are only few users online in the chat room. When run with tasks and suitable groups of students (age groups, interests, etc.) chats can result into exciting communication, especially when post chat tasks are issued in the end in the instructor.
- **Drills:** Real life scenario drills can be computer simulated to prepare the students for real on-field challenges. Drills can be carried out using software programs specially formulated for the purpose. Computer simulated drills can be expensive to organize, particularly when special equipments are required and also require high level of computer skill.

- **WebQuest:** A WebQuest is an exercise where the students are required to provide answers to questions on issues mostly found on the web. WebQuest is meant to develop the student's skill on using/analyzing provided information rather than looking for it. In this case, the teacher will provide the students with the needed internet links to the exercise.
- **Adventure Games:** These are computer simulated role-plays where the student is presented with a situation that he/she has to deal with and pass. The student has to be fast in analyzing the game and inputting the result either as text, by manipulating the game's controls, or by clicking on certain options. At the end of the game, the program gives feedback on the player's performance.
- **Listening Exercises:** For these exercises, the computer replaces the tape recorder. The computer is connected to a sound system. Students are required to listen attentively to an audio recording being played from the computer. Podcasts, audio CD/DVD, audio streams, etc., are often used. This exercise is used to promote listening skills in students. It can be followed immediately with multiple choice exercises if the students have grasped the content.

Visualization Tools for Computer-Assisted Learning

Visualization is an important aspect of CAL. Seeing is believing; that is, students grasp what they are taught better when the lecture is properly illustrated for them to see. 3D objects can easily be created and refined using 2D plots. Traditional tools for visual demonstration such as photographs, sketches, maps, and renderings are now grossly inadequate for teaching a subject/course that requires attention to detail. The new visualization tools include 3D computer models, video demonstration, animations, colored computer maps, etc.

Today, visual CAL tools are used in a wide range of disciplines to illustrate and demonstrate important concepts, for presentation as well as for teaching purposes. The visualization hardware should be portable, while the software should be able to run on most computers with minimal configuration. The teaching technique should be flexible for the students to visualize the demonstration comfortably. The students/user should be able to adjust the viewing angle and to expand/retract certain parts of the concept being viewed.

The most popular software tool for developing visual programs is JAVA. With JAVA, one can easily write and build software that can run on different platforms without much modification. JAVA can be combined with HTML and VRML to create portable and interactive web-based applications.

Correcting Electronic Exercises

When students submit an assignment in electronic form, it would be lazy for the teacher just to print it out on paper and comment/mark it with red ink. It would be better if the teacher

inserts red flagged comments into the submitted texts text using a word processor or other dedicated programs to perform e-correction/commenting.

Advantages of Computer-Assisted Learning

CAL provides many advantages to the education sector. These include:-

- **Self-Paced/ Self-Directed Learning:** Since the students have greater control over the CAL process, they can decide on their pace of learning. Students can study as fast or as slowly as they like through a course. If they want to repeat some task or review some material again, they can do so as many times as they choose. They can also skip over a topic if they already know about it. This saves time and makes teaching more efficient. Similarly, students can choose what they want to learn and in what order, as students have different learning styles and strategies.

This offers a solution to the issue of slow and fast learners. With CAL, each student can study at his/her own pace. The slow learners will not feel frustrated if they are unable to keep up with the others since they can always review the lesson when it is opportune to study. While managing their own learning pace, students become more responsible and more aware of the implications of the learning style/strategy they choose to adopt. Web-based adaptive educational systems (WAES), for example, adapt to the student, and provide different levels of data, assessment, and feedback for the student's perusal.

- **Improved Computer Skill:** By interacting often with computers, students who are not computer-literate will be compelled to develop/improve their computer skills and it also gives them a sense of collaboration when two or more students have to share a computer. As their computer competence gets better, the students will be encouraged to use computers more in doing their work.
- **Visualization:** Naturally, a student becomes more alert when a computer-based learning/test is going on. There is a sense of anticipation that makes the student more attentive when learning the lesson. Students are better motivated visually by multimedia materials and listening is supported by seeing. This boosts students' natural way of learning.
- **Learning Efficiency:** With CAL, students are better able to pick up concepts or skills faster and with less effort and also retain what they have learned longer. Consequently they would require less teacher time.

- **Sensory Stimulation:** Humans are multi-sensory beings as we can receive and process information. According to Fletcher (1990), people remember 20% of what they hear,

40% of what they have seen and heard and 75% of what they see, hear and do. Since the computer can stimulate the various human senses and present data in a different media can spice up the learning process. Computers encourage learning as they promote enthusiasm and provide stimulating environment.

- **Communication Development:** Chats and videoconference help in the development of writing, speaking, and communication skills. They provide speaking practice through debates and opinion chats. Sometimes, this does not involve the teacher's formal assessment.
- **Content/Lesson-Centered:** Unlike a traditional class that is teacher-centered, the computer-based class shifts the student's attention from the teacher to the lesson/content being taught. The student benefits from a lesson-centered teaching approach. Students give direct attention to the computer(s) in front of them, which makes them feel more comfortable with their lesson.
- **Enthusiasm:** Generally speaking, the use of computer technology in education makes the class more appealing and interesting. It maintains students' attention and stimulates their motivation to actively participate in the class.

Other Basic Advantages of Computer-Assisted Learning

There's a myriad of reasons to use CAL in the classroom. Here are a few ways CAL can empower the students:

1. It Caters to the Individual

With CAL, each student can go at their own pace and make progress in their own time. Computer lessons or games normally adapt to the individual based on their own progress, not on a set standard, so each student is able to have a more personalized experience.

2. It Promotes Active Interaction and Use of Target Language

It is fine to sit in class and repeat words and make verb charts, but the real learning comes when you use that knowledge in a real situation. Students who actively using the language they're trying to learn helps them remember certain words or phrases better.

3. It Lets Students See Their Progress

Again, the feelings of success and satisfaction are key to encouraging students to want to learn more. Because of this, CAL is a great method to use in the classroom. Students can easily see the progress they're making. Every time they solve a puzzle or get to the next level in a game or an online course, they feel as if they're doing well, which keeps them engaged in the lessons.

4. It Breaks Down Complex Topics into Smaller Pieces

Sometimes it's tough for teachers to break down complex topics because they don't know the best way to go about it. Computer games and lessons do this for you, however, and break down material into bite-sized chunks that can be learned and retained more easily.

5. It's Interesting and Engaging

Let's be real: A bored student isn't a good one. While some students adore lectures, many others require more stimulation to stay involved and actively learning. CAL is perfect for this, because it offers many ways for each individual student to engage and stay interested in the topic at hand.

Disadvantages of Computer-Assisted Learning

While CAL might seem like a flawless technique, it does have a few downsides. Here is a look at some of the disadvantages of using Computer Assisted Learning in your lessons.

1. It Can Be Expensive

Cost is perhaps the biggest barrier to using CAL in the classroom. Computers, electronic devices and software are expensive. As such, having a computer for each student is just not a realistic goal for some classrooms.

2. It Can Be Difficult for Teachers to Implement

Any time electronics become involved in something, it gets more complicated, at least initially. Teachers have to learn how to use the tech themselves before they can have their students use it, and sometimes the proper training can take up a lot of precious time. We have all had that teacher who wastes a bunch of time during the lesson because they don't know how to use the computer or the overhead projector... no one wants to be that teacher!

3. CAL Activities Don't Always Fit the Teacher's Goals

When using third-party programs, videos or lessons, it's sometimes hard to find one that exactly fits your needs or teaching style. There are going to be times when an online quiz doesn't have the exact words you want to test for, or that the video you are watching uses every part of speech you need to highlight. Teachers have to find a way to integrate CAL into their lessons without letting it dictate the material to be learned, and sometimes finding the balance can be tough.

4. It Can Lead to Isolation among Students

While an individual, personalized learning experience is a good thing, the isolation it can lead to is not. Just imagine a classroom full of students, each at their own computer, not looking at each other and only interacting with that computer in front of them. Socializing is an important part of language use, and we learn new things about language from interacting with each other. Students need other students to help them learn, and CAL can inhibit this.

Barriers of Computer-Assisted Learning

The first time computers are introduced into the teaching process, the students may not be familiar with what is going to be presented before them and this may result in general anxiety. If the students (particularly older students) are not computer-literate, computer anxiety is another issue the teacher will have to deal with. In this environment, it would take considerable time before students become comfortably adapted to CAL.

With a computer-based self-assessment class where students have to be left on their own, they may become overwhelmed by the amount of data they are handling. As a result of this, excessive use of multimedia relays should be avoided at the first introduction of CAL and the teacher has to place more emphasis on the content being taught because often the students' attention is focused on the computer.

There is also an undesirable state when the students become so excited with what they are seeing on the computer that they hardly pay attention to what is being taught. They may get fascinated by the multimedia images to the point that, at the end of the class, they wouldn't have grasped the core concepts of the lesson or just half-heartedly do their follow the lecture as their mind is "far away." The younger the students, the more likely this will happen.

Ever since the CAL programs were introduced as a modern teaching method, as opposed to the traditional teacher-centered classroom system, a growing number of concerns have been raised about the efficiencies of the CAL teaching method. Sometimes, teachers do show anxiety about CAL because they fear the computers could take over their jobs. Secondly, most of the technologies used in CAL are new and therefore teachers need training to become familiar with the new technology. Teachers are required to test run the system before the class begins and to anticipate and fix technical glitches that might occur during the class. If the generation gap is taken into consideration, the teachers who volunteer to use the CAL program have to adjust their orientation and competence to what could seem a completely new teaching system.

Agreed that providing attractive presentations is an integral part of CAL, the most important objective of the lecture is that the students learn and understand what is being taught; otherwise, the introduction of computers into the learning process will not be effective. The teacher should try to maintain equilibrium in student-computer interaction. The teacher should regularly check the students to make sure they are learning by asking questions on what is being taught. Though the computer may stimulate students' interest and make them understand a course better, it is the teachers' duty to ensure that students learn and can expressively demonstrate what they have learnt confidently.

Conclusion

The impediments associated with computer assisted learning are not related to the computer programs, but how to teach with them. The snag with CAL is chiefly the low-level pedagogic (methods and activities of teaching) strategies of teaching/learning with ICT systems. A thorough pedagogical review should be initiated to provide guidelines on the use of computer technology in classes.

To overcome computer anxiety, the use of computers should be encouraged among students and teachers and practical computer skill classes should be infused in the educational curriculum. Depending on the resources available, post-nursery/primary computer should be made mandatory in order to speed up the level of computer literacy among all students.

References

- Ioana Iacob: *The Effectiveness of Computer Assisted Classes for English as a Second Language*; "Tibiscus" University of Timișoara, România. Annals. Computer Science Series. 7th Tome 1st Fasc. – 2009.
- Leonardo Da Vinci Language Competences: *Introduction To Computer Assisted Language Learning*; www.languages.dk
- Ramazan Basturk: *The Effectiveness of Computer-Assisted Instruction in Teaching Introductory Statistics*; *Educational Technology & Society*, 8 (2), 170-178. 2005
- Sıtkı Külür: *New Possibilities For The Photogrammetry Education In Turkey*; Istanbul Technical University, Civil Engineering Faculty, Commission VI, Working Group VI/2
- <https://pubmed.ncbi.nih.gov>
- <https://resources.intenseschool.com>
- <https://www.encyclopedia.com>
- <https://www.fluentu.com>