Importance of computer aided learning and teaching

Objectives: At the end of this lesson you shall be able to
• **describe computer-aided learning**
• **list the advantages of CAL.**

Computer-aided learning

Historically, it was in the early fifties during the last century that human beings used any kind of electronic device to perform a mathematical calculation. As soon as this was realized a series of developments took place and soon the computer came into being. People realized the immense potential computers where being started to use in almost every field. Researchers openly stated that the use of computer for educational purpose would change the face of education in a very short span of time. Computer had the potential to stimulate and support various educational goals. The crucial question at that time and even now is that which goals should be selected? It was very important to select the goals appropriately as the choices made would have an immense effect on the children's minds, their learning styles and on the education process overall. The educational goals that could be achieved using computers 20 years back were limited due to technological barriers. With an exponential growth in technological breakthroughs and growing experience in using these computers for education the statements made during the last quarter of the 19th century makes a lot of sense now. Technology is no more a barrier today and it is up to the academicians to use it appropriately to meet the desired educational goals. Today a number of CAL programs available on the market.

Computer in Education

Game-based learning

Generally, games satisfy the basic requirements of learning environments identified by Norman (1993) and can provide an engaging environment for learning. Games should provide possibilities for reflectively exploring phenomena, testing hypotheses and constructing objects.

Computer simulations

Grimes et al studied the effects of a textbook-based software package in two classes of the Introductory Macroeconomics course. Their results indicate no statistically significant difference in learning between the experimental (software users) and control (non-users) groups. Finally, Grimes and Wiley conducted an experiment using a textbook-based simulation package in the Introductory Macroeconomics course. Their results indicate a statistically significant difference in overall attitude and performance between students who did and did not use the simulation software.

Animations

One particularly promising capability of computer based learning is the ability to integrate animation as part of instruction. Authoring application programs have made animation readily accessible to any educator who has the patience to learn how to use the application. Some other forms of Computer based instruction include Virtual Seminars/ Video conferencing, Drill and Practice and Problem Solving.

In its infancy CAL was used as a knowledge bank of questions and the students could self-assess themselves. Apart from this other computer related activities were not really adding to the 'learning' process of the students. With the advent of multimedia the role of CAL was extended and it was used to display simulations and animations to the students which were otherwise not possible for the students too see in real-time. This was seen as one of the most important reason to include computers in the classroom lecture as far as the teachers were concerned.

Providing study material in computer format can improve knowledge on the subject. Ideally the role of CAL in education lies in the hands of the academicians. The role that these Educators gave to CAL will determine the limits of its achievement.

Some of the main pedagogical and economical forces that have driven the push for universities and schools to adopt and incorporate computer aided learning include: Greater information access – The World Wide Web has made it possible for people to access primary sources of information on demand. Mastery of this tool has become essential in order to gain access to an ever-growing body of recent and up-to-date knowledge available electronically.

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Greater Communication facilities – Interaction between academic staff, colleagues and students can be structured and managed through electronic communications to provide greater access and flexibility.

The quality of teaching – New technologies have gained much attention from academic staff as they perceive, their use, will lessen their problems of high workloads, increased student to teacher ratio and use of inexperienced staff to teach. There is ample evidence, that well designed multimedia software can be more effective than traditional classroom methods, where students are able to interact with the software and learn at their own pace. Integrated effectively into the classroom environment, ICTs can facilitate higher order thinking skills and develop new ways of learning.

Asynchronous learning – This initiative has enabled institutions to cater for a variety of students by removing the barriers of time and distance. Students who are normally, geographically disadvantaged have access to a variety of resources not usually at their disposal.

Pedagogical Improvement and staff renewal – Teaching staff are able to preset information using a variety of tools in order to better relate to the content to the concrete realities of a given field of study. Innovative hands-on learning experiences are also made possible for students through computer simulation software.
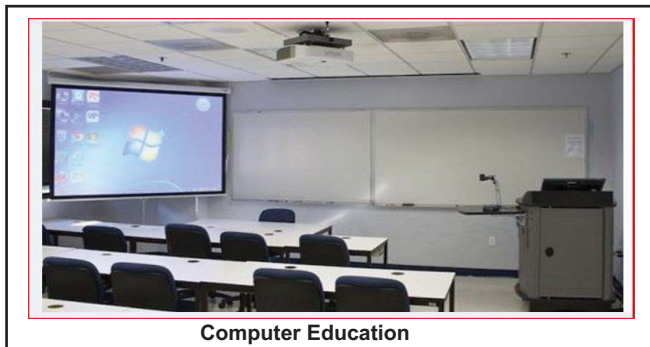
Computer Education

Advantages of CAL

One of the main advantages of Computer aided learning concerns the time, the place and the pace with which one can learn. A few more advantages of CAL identified by the researchers and authors are listed below:

- **Provision of alternative teaching techniques**. The computer can utilize a number of teaching methods and materials that may not be viable to use in a traditional setting. For example, a graphics display terminal using animated characters on a screen is a stimulating tool.

- **Individualized instruction**. Learning is significantly more effective and efficient when instruction can be tailored to the unique needs of each learner. CAL enables students to go through specific lessons at their own pace.

- **Ability to conduct simulations**. In a National survey on the use of CAL in Dutch institutions of higher education found, that the most popular form of CAL was simulation. One of the reasons that simulation is so popular, could be that it is the only type of CAL in which the program adds something to the curriculum that a teacher cannot offer.

- **Providing instructions on demand**. The computer can provide virtually unlimited accessibility to educational material. The computer's availability is not constrained by the same factors that place a limit on a teacher's time. Whereas a teacher is available only during specific hours, in a specific place, and usually for group lessons, a computer is available for use at all times and on an individual basis and in many places.

- **Flexibility** is another reported strength of CAL it was easier to work in collaborative groups in an online course without rearranging everyone's schedule as one might do in a traditional face-to-face course.