

RESEARCH CORRESPONDENCE

Computer assisted learning : a challenge for teachers and learners

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Received: 04 July 2005; Accepted: 18 August 2005

The role of computer technology in education is currently a widely-discussed and a well-researched area. Throughout history there has been the desire to integrate new technologies into education, with the expectation of improving the teaching and learning process.¹ While facilitating the teaching-learning process through enhancing interactive and collaborative learning, supporting self study and increasing student motivation, modern computer-based technologies offer the potential for changes in the traditional roles of the teachers and learners. Hence, it provides a great opportunity to improve the quality of teaching and learning.

The term Computer Assisted Learning (CAL) generally refers to the use of computer-based educational packages, to enhance the learning process. CAL can be deployed either through floppy diskette, CD, Local Area Network (LAN) or the Internet, to be accessed by a learner. These CAL packages can vary from sophisticated commercial packages, to applications developed in educational institutions, or simple materials developed by individuals. The use of computers in education through CAL is one option among many other modes of learning, such as face-to-face teaching, print materials, radio and television broadcasts, as well as audio and video recordings. Yet, as a computer-based multimedia learning package can contain text, graphics, animations, audio and video, separately, as well as a combination of all these, CAL becomes more powerful than any other mode.

Since the inception, classroom use of computers encompassed mostly instructional and support applications of the computer. The role of computers was perceived either as 'tutors' where students learnt directly from the computers, 'tutees' where students learnt by teaching the computers through programming, or as

'tools' where teachers extensively used word processing software, databases, spreadsheets, graphic programmes and desktop publishing software to assist teaching and learning.² With the development of multimedia computers and the Internet in 1990s, the role of computers expanded further.

However, it is often observed that the conception of educational computing focused mainly on learning 'from' the technology. Jonassen³ argues that computer applications should be used as 'cognitive tools' that enhance the thinking of learners, where learners will learn *with* the technology and not *from* it. Different kinds of challenging activities provided by the teachers and technology will engage learners in thinking, and this will result in meaningful learning. The most appropriate use of computers to facilitate such meaningful learning is viewed as 'knowledge construction tools'.⁴ This paradigm shift from teaching to learning is significant in CAL where the learners can actively participate in learning, interacting in a computer interface, rather than just accessing information from it.

CAL materials can be easily designed to support a systematic instructional design that provides a step-by-step process for instruction where the learners may self-study the content. However, with the gradual adoption of constructivist principles, designers tend to integrate activities that encourage learners to construct knowledge, rather than receiving knowledge. As suggested by Starr,⁵ the interface should incorporate 'human-computer interface design principles and not just transfer paper or previous non-graphical interfaces to the screen'. Designing and developing CAL materials thus becomes a challenging task. The designers are responsible for effectively utilizing the available facilities in the medium, to create a meaningful learning environment.

Teachers are identified as a crucial element in the successful integration of technology in education.⁶ However, in contrast to the rapid changes in new technologies, the associated changes in actual teaching-learning situations are found to be occurring rather slowly.⁷ The experienced teachers were found to be less confident in using the technology,^{8,9} while their students adapt more easily to it. The integration of computers in education demands acquisition of several new competencies by the teachers - technical level knowledge and skills in using the hardware and software, as well as pedagogical approaches and beliefs in using the technology. Hargreaves and Fullan¹⁰ argue that, 'unless teachers become experts in designing pedagogy for using technology, computers will do more harm than good'. Appropriate teacher training in integrating technology into classroom teaching is thus crucial.

A computer policy for Sri Lanka was formulated only in 1983, which identified the key areas of development in the use of computers. A National Policy on Information Technology in School Education (NAPITSE) was approved in 2002, which indicated a six-year strategic plan from 2002-2007. This plan is being implemented under four major themes; curriculum development, human resource development, physical infrastructure development and support initiatives development.^{11,12} In addition to the school sector, all the Sri Lankan Universities as well as other educational institutions have taken numerous measures to integrate CAL into their study programmes.

Despite the various initiatives taken to integrate CAL into school education, there are diverse issues that arise in implementation. Limitations in IT infrastructure facilities, problems with power supply and telephone lines, limited bandwidth and unaffordable higher bandwidths for Internet connectivity, high costs of developing infrastructure, learner support systems and teaching resources, are some key constraints faced by a developing country such as Sri Lanka. Even when the physical facilities are made available, there may still be various problems faced by both students and teachers in relation to their basic computer literacy, English language competence and a resistance towards using new technology and changing the pedagogical approach. Reviewing the reasons for failure of computers in schools, Bork¹³ claimed that more emphasis on hardware acquisition, little focus on learning and students, inadequacies in learning software and lack of effective teacher education as some major issues which must be addressed.

It is evident that computer technologies offer significant advantages to teaching and learning in educational settings. CAL supports the teacher's role as a facilitator of learning, making learning more enjoyable, interactive and meaningful for the students. Yet, CAL also raises several issues that may be related to physical as well as human factors. In addition to the infrastructure and technical problems, there are other social issues such as inequity in access, and unwillingness of teachers and learners to change from their established practices of teaching and learning. Both teachers and learners need adequate time to feel comfortable about integrating CAL in to the teaching-learning process. Implementation of CAL thus requires careful planning, adequate resource allocation, appropriate integration with existing curricula, adequate training of teachers and enhancing collaborative work.

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