Chapter 17

Empowering Students in Computer–Supported Education

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ABSTRACT

In the past two decades, computers and web-based technologies have created a computer-based focus in the field of education. The computer-supported teaching and learning has revolutionised the concept of education around the world, which creates both opportunities and challenges in the field of education. It is believed that computer-based technologies have developed to augment the traditional learning and teaching at all educational levels. Computer-supported education empowers learners by promoting the notions of learner-centred learning approach, encouraging interactions among students or between students and lecturer, and addressing the individualized learning needs. This chapter explains some important concepts in computer-supported education, and presents the learning theories that underpin this area. Furthermore, it discusses the benefits of web-based technologies for students at various levels and issues that require further research.

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INTRODUCTION

In recent years, computers have been widely used across cultures, countries and levels of education. It is hard to imagine an educational institution without computer-supported facilities in an industrialised society. Computer and its related technologies supplement the traditional teaching mode, and empower students at different levels to enhance their learning effectiveness (Adrian, 2000). In particular, it is believed that computer-assisted education will allow schools or universities to design curricula that are individualized to each student, and enable students to become independent learners. This chapter aims to discuss some important concepts in computer-supported education, such as Computer Assisted Learning (CAL), web-based education, and computer micro-world, and examine their contributions to enhancing learning outcomes. In addition, theories in relation to computer-supported learning, including the constructivist theory, learner-centred theory, individualised learning were discussed in-depth. The discussion also was moved on to the ways, in which computer technologies encourage learner-centred teaching philosophy. Issues and further research directions were also suggested in the chapter.

COMPUTERS AND EDUCATION

When discussing about the roles of computer in education, there are many terms which need to be addressed. Some of these terms are overlapping. To begin with, the concept of Computer Assisted Learning (CAL) is one of the important notions in computer-supported education. The notion is also known as computer-mediated learning (CML) or e-learning (Zhang, Zhao, Zhou, & Nunamaker, 2004). CAL includes two components, the computer micro-world and the virtual learning environment. According to Parikh (2003), the computer micro-world refers to a self-contained computer-based learning environment, where students learn according to their own pace by means of a computerised learning system, such as intelligent tutoring systems. On the other hand, a virtual learning environment, as is suggested by Parikh (2003), aims to provide a learning context in which students have much freedom to learn what they want to learn. Combing these two components, CAL brings incredible benefits to learners and education institutions, and also serves to support the traditional classroom-based learning approach (Shanker & Hu, 2008).

Web-based learning (WBL) is another crucial subcomponent of CAL, which can be defined as learning delivered wholly or partly through the Internet or an Intranet (Trombley & Lee, 2002). It is suggested that WBL is one form of e-learning, and involves the internet and web-based technologies to deliver distance education and instructions (Pilgrim & Creek, 1997). For instance, instead of handing out in-class materials face-to-face, instructors can post lecture notes, course information, class schedule and assignment tasks on the course website to assist students’ learning (Parikh, 2003). According to Alessi and Trollip (2001), there are two types of WBL, on-site learning (people learn on campus using Internet resources) and distance learning (people who study off-campus and entirely online). As a result, WBL provides opportunities of communicating with both teachers and students, and expands the access of education for learners with different needs. Furthermore, Raisinghani (2003) suggests that WBL has developed itself into a unique culture, which enables students to continue their education at their own will.

The Internet is commonly considered as a powerful tool in education (Downing, 2001; Jain & Getis, 2003). At the very beginning, the Internet, or World Wide Web, was invented in 1960s for the military purposes (Grey, 2001). However, starting from 1990s, many educators have realised...