A Computer-Assisted Approach for Conducting Information Technology Applied Instructions

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ABSTRACT

The growing popularity of computer and network technologies has attracted researchers to investigate the strategies and the effects of information technology applied instructions. Previous research has not only demonstrated the benefits of applying information technologies to the learning process, but has also revealed the difficulty of applying them effectively. One of the major difficulties is due to the lack of an easy-to-follow procedure for inexperienced teachers to design course content with proper use of suitable information technologies. In this paper, a model for conducting information technology applied instructions is proposed. The novel approach can assist teachers in designing information technology applied course content based on the features of subject materials and the learning status of the students. An experiment on a Chemistry course in a junior high school was conducted to evaluate the performance of our novel approach.

Keywords: analytic hierarchy process; computer-assisted learning; computer-assisted tutoring; distance education; information technology applied instruction

INTRODUCTION

With the popularity of computers and information technologies, systems and learning theories have been developed for web-based learning in higher education, while the effectiveness of these implementations has been empirically evaluated as well (Barrett & Lally, 1999). New technologies are

presented each day in more activities and, of course, in education. This great innovation is changing the concept of information technology applied instruction, not only in terms of the teaching process itself, but also with respect to the methodologies applied. The new information age has changed the educational system, with the result being the birth of information technology applied instruction and computer-assisted learning.

Researchers have suggested that teachers examine the instructional strategies supported by various environments so as to determine the relative effectiveness of these environments. One of the major difficulties of information technology applied instructions is the lack of an easy-to-follow procedure for inexperienced teachers to design subject content such that suitable information technologies can be properly applied to the tutoring process. Chou (2003) indicated that teachers are the key to the successful use of the Internet for both teaching and learning. However, without any assistance, teacher's anxiety can often reduce the success of such technological and pedagogical innovations.

To cope with this problem, a systematic instructional design model is proposed to assist teachers in employing proper information technologies in the development of tutoring strategies and learning activities. The model provides a systematic procedure that guides inexperienced teachers to select proper information technologies or tools for the courses they teach by taking the features of the course content and the learning status of the students into consideration. With the help of this innovative approach, teachers can easily learn how to design a quality learning activity that employs proper information technologies to improve the learning performance of the students. An experiment on a Chemistry course in a junior high school was conducted to evaluate the performance of this novel approach. The results of this experiment show that the developed instructional design can significantly improve the learning performance of students, and hence we conclude that the present approach is desirable.

RELEVANT RESEARCH

The rapid progress in information technology can help instructors to teach more efficiently and effectively by employing new tutoring strategies with appropriate software tools and environments. Several studies have demonstrated the benefits of applying information technologies to instructions, such as Computer Scaffolding (Guzdial et al., 1996), CSCL (Computer-Supported Collaborative Learning) (Harasim, 1999), CSILE (Computer-Supported Intentional Learning Environments) (Scardamalia et al., 1989) and CiC (Computer-Integrated Classroom) (Eshet, Klemes, & Henderson, 2000).

The benefits of using Adaptive CAI (Computer-Assisted Instruction)

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