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701 E. Chocolate Avenue, Suite 200, Hershey PA 17033-1240, USA
Tel: 717/533-8845; Fax 717/533-8661; URL-http://www.idea-group.com

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Chapter X

The Role of Interactive and Synchronized Multimedia Content in E-Learning

Dongsong Zhang
University of Maryland, Baltimore County, USA

Lina Zhou
University of Maryland, Baltimore County, USA

ABSTRACT

Multimedia-based e-learning systems have become increasingly available. Many of them, however, do not provide sufficient interactivity to learners. E-learners have little control over learning content and process to meet their individual needs. Therefore, the challenges include how to integrate instructional material in different media, and how to provide flexible process control in an e-learning environment to enable personalized knowledge construction and improve learning effectiveness. We propose an e-learning system with interactive multimedia that can help learners better understand learning content and achieve comparable learning performance to that of classroom learning. The results from an empirical study provide significant evidence to support our proposition. The chapter also discusses several important issues towards building effective and sharable multimedia-based e-learning systems.

INTRODUCTION

Learning is a lifetime endeavor, especially in the current knowledge-based economy. Globalization requires new methods of delivering education and training, partly to enhance traditional methods of knowledge acquisition and to impart new skills and tools (Adam, Awerbuch, Slonim, Wegner, & Yesha, 1997). Traditional learning processes are characterized by centralized authority, lack of personalization, and linear/static learning process, which doesn't seem to fit well with the notions of lifelong and real-time learning. It is instructor-centric because instructors control the class content (e.g., topic, course material, and discussion) and pace (Baloian, Pino, & Hoppe, 2000). With the increasing use of networked computers and advance in telecommunication technology, learning methods and infrastructures are becoming more portable and flexible in order to enable anywhere, just-in-time, and self-centered learning.

According to the IEEE Learning Technology Standards Committee (LTSC), e-learning has become widely adopted, with solutions by individual institutions and standardizing initiatives for learning technologies. In this chapter, the term e-learning refers to the use of computers and network technology to create, deliver, manage, and support learning at anytime, anywhere. Moreover, dynamically changing business environment requires e-learning systems to be flexible and adaptive, and supports non-linear and personalized learning processes. With the latest advancement in multimedia technology, more and more e-learning systems use multimedia content to take advantage of its rich information cues. In many systems, however, multimedia content is presented in a static, passive, and unstructured manner without close association among material in various media. Learners have little flexible control over learning content and process to meet their individual needs. As a result, it is less likely to engage e-learners (Hiltz & Wellman, 1997; Piccoli, Ahmad, & Ives, 2001). Therefore, we face the challenges of how to integrate multimedia instructions and how to increase interactivity and flexibility in an e-learning environment. In addition, multimedia learning material created by different providers is usually not in a ready-to-share and interoperable format, preventing people from taking one of the greatest advantages of e-learning, namely, exchanging learning resources (Nilsson, Palmér, & Naeve, 2002).

In this chapter, we introduce an interactive multimedia-based e-learning system called Learning By Asking (LBA). It features synchronized multimedia instructions and a high level of learner-content interactivity. The difference in learning performance and learner satisfaction between a LBA group and a