



Chapter XV

The Role of User Characteristics in the Development and Evaluation of E-Learning Systems

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Abstract

This chapter presents a multi-phase cyclical model of designing, developing, and evaluating instructional technology (IT) learning systems based on inclusion of users' characteristics (experience with technology, familiarity with content, adaptability, learning style, gender, professional level). The model was developed and piloted over the course of seven years in more than 50 learning communities and has resulted in documentation of stages in which user variables interact with the process. Key elements of the model are presented in detail and supported by samples of development and related evaluation. The authors hope that the chapter contains excellent recommendations for the practice of designing and evaluating IT learning systems that meet the varied individual, cultural, and contextual needs of users.

The role of technology as a support to instruction and curriculum is now a major component of global educational systems; an increasing number of organizations are using technology, both in and out of traditional learning settings, as a means of transferring knowledge, skills, and abilities to students, employees, and consumers around the globe. As IT systems that support this transfer are being integrated and implemented, managers, designers, and evaluators are being asked to provide evidence of successful outcomes (Gallupe & Tan, 1999). Only limited efforts have been made to establish overarching evidence of valid ways to improve learning as it occurs or to document the impact of learners' cultures on the process (Nemeth, 2004). As managers and decision makers allocate an increasing amount of resources to IT development, implementation, and sustainability, there is a need to document successful efforts, especially in areas related to training and professional development (Gonyea, 2005).

Overview

The theory of information processing, or how “we convert information from stimuli into interpretations of what we are perceiving and what it means” may serve as an underlying model for investigating the interrelationship of users' learning schemata and technology use (Hill, 1997, p. 113). According to Mayer (1996), the best learning occurs when it is active; that is, when learners can select and attend to features of the environment, transform and rehearse information according to their own backgrounds, relate new information to previously acquired contextually based knowledge, and organize that knowledge in a way that makes it meaningful to their own context. According to Myers and Tan (2002), this requires looking at the process as one that is dynamic, interactive, and culturally based, bounded by temporal as well as emerging user needs. In this process, the learner can relate his or her existing knowledge and experience to the new knowledge, and as a result, retention will be enhanced.

This view of learning far exceeds the original concept of IT systems based on behavioral models in which learning occurred in sequential stages between receipt of an external stimulus and the production of a response (Skinner, 1954); instead, information processing and cognitive psychology emphasize the interaction of internal mental processes that result in learning. This approach recognizes and incorporates variations in acquiring, processing, storing, and retrieving information and how they are influenced by internal as well as external cultural stimuli (Greeno, Collins, & Resnick, 1996; Schunk, 2000). Instructional scaffolding or controlling the presentation of task elements so that learners can focus on and master those that are appropriate to their current level or strategy of learning is an important part of this process (Bruning, Schraw, & Ronning, 1995). Scaffolding is derived from

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