Chapter XXXI
An Integrated Evaluation Approach for E-Learning Systems in Career and Technical Education

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ABSTRACT

As E-learning is gaining popularity in higher education, its evaluation becomes more critical than ever, to ensure the achievement of intended learning outcome. The effectiveness of E-learning system evaluation under current practices, however, remains questionable. One reason for such uncertainty is the lack of direct measurement while learning occurs since most evaluation data is collected after the learning process. Thus this chapter proposes an integrated evaluation approach for E-learning systems based on Cognitive Load Theory and grounded in the 4C/ID-model. Both direct and indirect measurements will be deployed in the integrated approach in the context of cognitive load. Furthermore all evaluation data can be translated into practical E-learning design solutions by triangulating with the 4C/ID-model. This chapter also suggests that future evaluation framework on E-learning should include factors from attitudinal and social aspects of learning process.

INTRODUCTION

According to Aragon (2003) advances in technology during the last decade have brought challenges and opportunities to the ways in which individuals are educated and trained, in particular through online instruction. This Internet-based form of distance education delivery has changed the landscape of how instruction is designed, delivered, and evaluated. In addition, online instruction has

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redefined the role of the instructor in the learning process. Aragon (2003) states "[i]nstructors do not 'teach' in the traditional sense but now have increased responsibilities in course design and communication management (p. 1). Advocates of Internet-based education and training see it as a means for facilitating the exchange of information and expertise while, at the same time, offering opportunities for all types of learners in distant or disadvantaged locations. One such area that is seeing the increased use of Internet-based instruction is the field of Career and Technical Education (CTE). However, because of limited methods for evaluation E-learning systems, the impact of these innovations on career and technical education (CTE) has not been explored.

CTE can mean many things to many people. As Johnson and Benson (2003) note "[t]o some people, it refers to a single course that provides specific skill training for job employment or advancement, while to others, it refers to a lifelong learning pathway that is used to obtain, update, and extend the knowledge, skills and attitudes required to pursue a career successfully" (p. 5). According to the National Center for Education Statistics (2000), CTE helps students develop both the specific occupational and academic skills needed for work and further postsecondary education. These descriptions include courses and programs commonly called vocational education and technical education, occupational education, or workforce education. While CTE includes what can be thought of as traditional program areas including agriculture, family and consumer sciences, and automotive repair/maintenance (Aragon, Woo, & Marvel, 2004), it has also evolved to include new areas such as computer-aided design, respiratory therapy, and mortuary science (Johnson & Benson, 2003). According to the Association for Career and Technical Education (ACTE):

Career and technical education is about helping students, workers and lifelong learners of all ages fulfill their working potential. First and foremost it's about high school and college education that provides students with:

- *Academic subject matter taught with relevance to the real world, often called contextual learning.*
- *Employability skills, from job-related skills to workplace ethics.*
- *Education pathways that help students explore interests and careers in the process of progressing through school.*

But career and technical education is also about:

- *Second-chance education and training for the unemployed and those seeking to upgrade their employability skills.*
- *Education to earn additional degrees, especially when related to career advancement.*
- *Corporate training, continuing education, skills upgrades and refresher courses for those already in the workplace.* (ACTE 2008, p. 1)

BACKGROUND

What is E-learning? Horton (2006) defines E-learning as the *"purposeful use of communication and information technology to enhance learning experience"*. Clark and Mayer (2003) include all possible means of delivering instructional programs via digital formats as E-learning (e.g., CD-ROM, Internet, and Intranet). The field of E-learning therefore encompasses all instructional applications that are designed and developed with, and delivered by computer, information, and communication technologies (CITs). Due to E-learning's accessibility and relatively low cost for development and delivery, it is gaining popularity and recognitions across organizations. One such organization in which E-learning is gaining population is that of the community college.

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