Chapter 2.41
Frameworks for CMS Design and Evaluation

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ABSTRACT

In recent years, institutions of higher education have been migrating to the Web for instruction in record numbers. While Web-based course management systems (CMS) offer many exciting possibilities for instructors and students, their efficacy in terms of teaching and learning has not been thoroughly evaluated. This chapter explores the inherent capabilities and limitations of five models of conceptual frameworks for the design of CMS. The chapter concludes with a discussion of CMS evaluation instruments, advice for instructors transitioning to CMS, and a call for more research in this growing area.

INTRODUCTION

The next big killer application for the Internet is going to be education. Education over the Internet is going to be so big it is going to make e-mail usage look like a rounding error. (John Chambers, reported by Friedman, 1999, p. A25)

John Chambers, the chief executive officer of Cisco Systems, made this prophetic statement six years ago. Although his prediction has not yet come to be in any sector of education, there has certainly been movement in this direction in higher education. The use of the Internet to deliver instruction at all levels of education has increased steadily from the beginnings of the Web but has recently exploded partly due to the advent and proliferation of CMS in the last few years.

Part of the popularity of CMS is due to the simplicity with which instructors can create and deliver digital content online, administer tests online, manage student data, engage students in interactive activities, and provide opportunities for students to participate in meaningful asynchronous and real-time conversations without

needing knowledge of programming or Web development skills.

Over the years, a number of frameworks have emerged to guide the design of CMS. A few models have been borrowed from other fields, others have new roots, and there may be others still that have value and potential in consideration for CMS design. The fourth wave of CMS (Boettcher, 2003) spurred by the formation of the Open Knowledge Initiative (OKI) boasts even more design standards and flexibility, and future generations of CMS hold even greater design promises as described in other chapters in this book.

The combination of escalating costs and increasing use of CMS has renewed interest in examining the return on investments (ROI) issue as university administrators search for solid evidence to justify and support their decisions to invest so heavily in CMS. These significant instructional costs have helped focus attention on the important question: *How effective are CMS in impacting teaching and learning?* In turn, these costs have also sparked some research in the development of CMS evaluation instruments.

One of the reasons for a paucity of research in CMS evaluation instruments may be the absence of robust theory and rigorous research in Web-based instruction (WBI) and the resulting lack of appropriate WBI models on which to base these instruments. As a result, educators and researchers have turned to other sources, borrowing and adapting existing research and models for use in this context. This chapter explores conceptual frameworks for the design and evaluation of CMS. In addition, it provides examples of how these frameworks can be used to support instructional activities in course management systems. It is important to note that the CMS tools that are listed in this chapter as supporting components of each model are not meant to represent an exclusive list, nor do they necessarily support model components as is suggested. Ultimately, the manner and strategy in which each of the CMS tools are employed will determine how effectively they will support and facilitate various components of each model.

INTERACTIVE LEARNING DIMENSIONS MODEL

To help guide research in the design and evaluation of WBI in CMS, a more comprehensive and richer understanding of Web-supported interactive learning dimensions is needed. To address this need, Reeves and Reeves (1997) proposed a model that describes ten pedagogical dimensions that the Web can support (Figure 1). The authors have grounded and couched the dimensions in research, theory, and literature from the domains of adult learning, cognitive science, and instructional technology. In addition, the authors provide examples of the dimensions with respect to WBI.

In this model, each dimension is represented on a two-ended continuum, with contrasting values at either end. Although Reeves and Reeves (1997) acknowledge that the set of pedagogical dimensions in this model is not exhaustive, they suggest their model can serve as the foundation for constructing an instrument that can be employed in studies of the effectiveness and impact of WBI. Ultimately, the effectiveness of WBI in CMS is a function of the degree to which it supports appropriate pedagogical dimensions since these dimensions—rather than the technological aspects of the Web—influence learning most directly (Clark, 1994; Reeves & Reeves, 1997; Reeves, 2000).

THE INTERACTIVE LEARNING DIMENSIONS MODEL SUPPORTED IN CMS

According to Reeves and Reeves (1997), the location of a learning environment on any individual dimension is not as important as the overall profile

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