Chapter 16
Iterative Usability Evaluation for an Online Educational Web Portal

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ABSTRACT

Online education is a popular paradigm for promoting continuing education for adult learners. However, only a handful of studies have addressed usability issues in the online education environment. Particularly, few studies have integrated the multifaceted usability evaluation into the lifecycle of developing such an environment. This paper will show the integration of usability evaluation into the development process of an online education center. Multifaceted usability evaluation methods were applied at four different stages of the MU Extension web portal's development. These methods were heuristic evaluation, focus group interview and survey, think-aloud interviewing, and multiple-user simultaneous testing. The results of usability studies at each stage enhanced the development team's understanding of users' difficulties, needs, and wants, which served to guide web developers' subsequent decisions.

INTRODUCTION

Online education is the most popular delivery mode of today's distance education. Online education employs multimedia products to improve the effects of teaching and learning and allows learners to participate in various class activities without the boundary of geographic location and time (Richardson & Swan, 2003). This particular form of pedagogy fits well with the increasingly busy lives of learners, especially adult learners who have great motivation to learn but are highly

constrained by space and temporal conditions. As such, the landscape of online education is ideal for the promotion of continuing education for adult learners.

Extension units at land-grant universities, a critical arena for expanding higher education, provide a range of scholarly and professional services to state citizens, communities and industries (McLean, 2007). Nowadays, an increasing number of university extension units have adopted various web-based technologies to deliver educational program content, training workshops, credit or non-credit courses, and online degrees to adult learners in order to fulfill students' lifelong learning objectives. University of Missouri Extension (MU Extension), a branch of the land-grant University of Missouri System, is one of these successful examples providing Missourians with a wide range of educational opportunities, informational programs, and materials that are based on university research. In addition, this organization has also employed the distributed learning strategies that use the internet to disseminate educational materials, news stories, video releases, online courses, and reviewed publications in multiple program areas such as agriculture, community development, human environmental sciences, business development, youth development and continuing education.

A great deal of research has been conducted to examine the effect of online education within formal educational settings (e.g., Bannan-Ritland, 2002; Jeong & Joung, 2007; Oh & Jonassen, 2007), while insufficient research has been carried out within professional development or informal learning environments where educational information and programs pertaining to the occupations of adult learners are offered. To date, much attention has been given to the design of online learning environments (e.g., Remidez, Stam, & Laffey, 2007; Scardamalia & Bereiter, 1994) and the potential of online learning to promote collaboration (e.g., Johnson & Johnson, 2008). However, only

a handful of studies have addressed usability of the online education environment (e.g., Ardito et al., 2006; Parlangeli, Marchigiani, & Bagnara, 1999; Saade & Bahli, 2005). Particularly, few studies have integrated the multifaceted usability evaluation into the lifecycle of developing such an environment.

Usability evaluation is vital to a web development team because developers must consider how major users, such as learners and educators, navigate through a web system to accomplish the tasks that lead to teaching and learning. If developers fail to consider the real users' needs and interaction behaviors, learning will be impeded because users' working memory is taxed with unnecessary cognitive load (Chandler & Sweller, 1991).

This paper describes the design challenges and the usability evaluation that was incorporated into the development process of an online continuing education center -- the MU Extension website. The MU Extension website had grown exponentially and chaotically since the first web pages were posted in the mid-1990s. Existing MU Extension websites did not meet the requirements for an ideal educational environment for learners and extension educators due to the lack of understanding of real users' needs. For instance, links and pages were added based on the internal organization of MU Extension rather than logical, content-based organization categories. To better serve the users of the site, the MU Extension web team intended to establish a new web portal that provided a centralized access point to a series of educational materials. The Information Experience Laboratory (IE Lab) of the University of Missouri worked closely with the web team and employed multifaceted usability evaluation methods at four different stages of developing this web portal: heuristic evaluation (Phase I: prototype), focus group interview and survey (Phase II: initial design), think-aloud interviewing (Phase III: detailed website design), and usability testing (Phase IV: website build).

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