Chapter LXIV
Evaluating Learner Satisfaction in a Multiplatform E-Learning System

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ABSTRACT

The main objective of this chapter is to present a comparative evaluation between two e-learning systems from the end user (learner) perspective. The evaluation instrument is based on a multiplatform e-learning systems framework and a modified version of the Questionnaire for User Interface Satisfaction (QUIS). First, the evaluation intends to compare the achievable level of overall the learner satisfaction score between a Blackboard e-learning system and a multiplatform e-learning system with three different accessing devices. Second, the evaluation intends to explore the degree of influence and identifies grouping relationships among the factors that influence learner satisfaction while engaged in a multiplatform e-learning system. Lastly, the evaluation determines the gain in the learner satisfaction score between the two systems with respect to three different accessing devices. The findings and the process of evaluation can play an important role for the designer to improve the adaptation process and to enhance the level of learner satisfaction in future multiplatform e-learning systems.
INTRODUCTION

With the advent of mobile devices and wireless infrastructure, mobile devices can provide learning opportunities anytime and anywhere. However, using mobile technology for e-learning is not widely adopted. One factor is the adaptation of content from PC to mobile devices (W3C, 2001). In e-learning systems, content adaptation not only requires the layout, format, and structure of the content to be modified, it is also compounded by the problem of adapting interactive multimedia content. Interactive multimedia content is less likely to be accessible via mobile devices without appropriate content adaptation. Even if the content has been adapted for different devices, it is still not clear how adaptation and other factors influence learner satisfaction. However, without appropriate adaptation for various accessing devices, adoption of technology is less likely according to the technology acceptance model (Davis, 1989, 1993).

This chapter first provides a brief review in content adaptation techniques and W3C independence activities (DIA). Subsequently, the chapter discusses the multiplatform e-learning systems framework. It should be stressed that the formulation of the multiplatform e-learning systems framework involves other important research areas such as device identification, bandwidth estimation, e-learning system architecture and frameworks, and many more. Due to the focus of the chapter, only work on content adaptation and W3C independence principles were reviewed. Subsequently, a comparative evaluation is presented on a multiplatform e-learning system and a Blackboard e-learning system to assess learner satisfaction with three accessing devices. The Blackboard e-learning system is a popular learning management system adopted by many universities (Blackboard, 2006). The results and findings based on statistical analysis are presented. These findings and the process of evaluation can play an important role for the designer to improve the adaptation process and to enhance the level of learner satisfaction while engaging in multiplatform e-learning systems. Finally, limitations and recommendations for future research conclude the chapter.

BACKGROUND

Content Adaptation

One of the main issues for a multiplatform e-learning system is the requirement to provide meaningful access to an increasing number of accessing devices. Most Web-based systems including e-learning systems use server-side designs that are oriented towards clients with standard screens and standard HTML browsers such as a PC. These designs are unlikely to be acceptable for personal mobile devices such as mobile phones or PDAs. In order to provide meaningful access and learning, the content (including multimedia), structure, and navigation must be able to adapt. Thus a multiplatform e-learning system needs adaptivity, that is, the ability of a system to adapt itself to different client needs. For the case of a multiplatform e-learning system, this includes the ability to cope with bandwidth, memory and power limitations, restricted presentation capabilities, and different user profiles. Content adaptation techniques are examined first to understand and appreciate how different techniques can be helpful in the multiplatform e-learning system implementation process. One should aware that some of these techniques, because of their inherent assumptions, may not always be suitable for the current implementation.

The Adaptive Web Content Delivery (AWCD) framework (Chen, Yang, & Zhang, 2000; Ma, Bedner, Chang, Kuchinsky, & Zhang, 2000) provides a useful overview of the problems that have to be addressed in adaptive systems. Firstly, the system must be able to detect the parameters needed for adaptivity. This includes the automatic measurement of the network bandwidth and the loading and registration of used end-devices and user preferences. One approach to the latter is to use Web forms. More sophisticated inference mechanisms based on user behaviour patterns can also be adopted. And secondly, the system must provide a decision engine for determining when and how to adapt content. In the multiplatform e-learning system, an XML document string for each factor was adopted. The advantage of using
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