Chapter 8
mLearn:
Designing a Platform for Mobile Learning

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ABSTRACT

This chapter presents the findings of the first phase of a four-phase research study that involves the design and development of an integrated architecture for a mobile learning platform. During this phase, a high-level architecture was designed for a mobile learning platform called mLearn. The architecture of the mLearn platform allows XML multimedia content delivery over a HTTP protocol. It also uses J2ME on the client side in support of computer-aided learning approaches used in mobile learning. In addition, the mLearn platform uses several SMS delivery methods including Push, Pull and WAP Push, which enable learners to interact with each other and to share content. In this study, three defined learning approaches were chosen for the mLearn platform: exposition, exploration, and communication.

1. INTRODUCTION

Mobile learning, also known as m-learning or mLearning, is evolving rapidly. With new capabilities constantly being incorporated into mobile devices, one major challenge and opportunity, is creating innovative services to enrich the learning process used with mobile learning. People can use mobile learning as an important instrument for lifelong learning thereby utilizing their time more efficiently. Furthermore, mobile learning could bring important benefits to schools by supporting classroom teaching, assisting in the educational process and enabling personal and group learning. This new approach to learning could revolutionize the way people learn in the future (Ally, 2009; Koole, McQuilkin, & Ally, 2010). The mobile devices used in this new approach require smart interfaces and modification

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to ensure that the user can view the content in an optimal manner.

This study extends e-learning to mobile handheld devices within the scope of a mobile learning environment. In the context of a four-phase project (design, development, testing and deployment), this study involves the design and development of a mobile learning platform called *mLearn* that allows users at an institution or within a learning situation to participate in electronic learning sessions via mobile devices including smart phones. With *mLearn*, users will also be able to share content and interact with each other using synchronous and asynchronous methods for communication.

The article presents the findings of the first phase of this study, in which the high level architecture of the *mLearn* platform is designed. The proposed *mLearn* platform uses extensible markup language (XML) content over a hypertext transfer protocol (HTTP) with the Java 2 platform micro edition (J2ME) on the client (Parsons, 2006; Majumder & Dhar 2010). The integration of these technologies allows the delivery of rich multimedia and interactive content to a wide range of mobile devices using different operating system platforms. J2ME works across a large proportion of mobile devices including personal digital assistants (PDAs), Blackberry Smartphones and Windows mobile phones. This means that the *mLearn* platform will have wide continuous deployment in the future even when the operating systems keep changing.

The *mLearn* platform uses three short message service (SMS) delivery methods: Push, Pull and wireless application protocol (WAP) Push. The last method combines both SMS and web browsing over the HTTP protocol in one service. This study recommends the use of SMS methods in several learning contexts that require short- and in-time content delivery. In this regard, one could use the Push and the WAP Push methods to send multicasting messages to a group of mobile learners with a common interest or involved in a common assignment. In addition, the Pull method could also be used for sending content as SMS messages when requested by an end learner involved in an interactive SMS session. On the other hand, one could use J2ME on the client for large volume of content delivery involving a learning object such as course content, training material or online tests. The *mLearn* platform supports several learning approaches useable in mobile learning including exposition, exploration, construction and communication (Kerres, 2001; Meisenberger, 2004). For the purposes of this presentation, we will not include the construction approach as an appropriate learning model for mobile learning. The construction approach is based on interactive, high-speed, large memory, large-screen devices such as those used in computer-aided design, which are not available for mobile handsets.

2. MODELS FOR MOBILE LEARNING

Mobile learning is the next generation of the computer-aided learning. It refers to the use of mobile devices such as smart phones, personal digital assistants (PDAs), laptops and e-books in learning situations. In recent years, mobile learning has gained in popularity as it provides learners with learning content wherever they are and at any time they choose. They can utilize unused periods for efficient and effective learning.

The major difference between e-learning and m-learning is that content intended for e-learning is, in most cases, inappropriate for small handset devices because of their small screens and limited memory. Moreover, such content is inappropriate for the typical context that is useful in mobile handsets. In most mobile learning situations, people use the mobile device on a casual basis or as a tool to obtain knowledge instantaneously. Therefore, course content intended for mobile learning must be packaged in concise and focused learning units. In addition to the above, a learning application that runs on the mobile handsets would have several restrictions including limited processing power and speed, limited memory and storage capac-