Chapter XII
An Architecture for a Personalized Mobile Environment to Facilitate Contextual Lifelong Learning

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ABSTRACT

In response to the ever-increasing need of private and public organizations for lifelong learning, research in technology-enhanced learning has been geared towards the provision of systems that will better support those who pursue education at a number of different stages in their life, move between institutions while pursuing a course of study, or make use of resources and facilities from more than one institution/organization. The new generation of mobile phones can support applications that would facilitate contextual learning through life. This chapter presents our approach to designing a mobile application for contextual lifelong learning and the prototype created. The application assists learners to access, compose and manage their learning in a range of institutional, informal and work-based settings by keeping them connected with content that is relevant to their studies, and its use is demonstrated in three lifelong learning scenarios.

INTRODUCTION

Lifelong learners increasingly look for more intelligent services and support in order to better meet their learning goals and needs (Baajour, Magoulas, & Poulavassilis, 2007). As Sharples (2000) points out, in lifelong learning it is important to make learning contextual, that is:
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- Facilitate learning at different times and places, when a person tries to solve a problem, share an idea, gain an understanding or reflect on the current situation; and
- Allow people to continually enhance their knowledge to address immediate problems and to participate in the process of professional development.

In everyday life, a lifelong learner tries to solve problems, share ideas, or understand situations. In order to accomplish their goals, learners need information to clarify the current situation, or a way to communicate with other members of their community in order to share ideas. Furthermore, they might want to enhance their knowledge by attending courses, which follow specific schedules that have to match with their busy lives. This generates new requirements for delivering learning content, accessing information, learning on demand, and for support at the workplace, in the classroom or in the current situation.

Mobile learning appears to be a promising approach to enable learning in context and analysis of real world problems with the use of mobile devices and applications to better support the learning process. In this vein, Miertschin and Willis (2004) used tablet PCs in a freshman introductory computing course. Although a tablet PC might be a good choice regarding the goals of the project presented by Miertschin and Willis, its size and dependability on wireless networks, mainly on campus, does not fulfill the requirements for a type of learning that is not restricted to specific places. On the same wavelength, Valiquette, Williams, Kutner, and Seeger (2005) proposed a mobile application that requires a laptop PC as the mobile device and is also restricted to the campus. These approaches serve their purpose well, but do not accomplish the features of contextual lifelong learning, which according to Sharples (2000) requires applications to be highly portable, personalized, unobtrusive, available anywhere, persistent, useful and easy to use.

These requirements make us revisit mobile phones as the medium for lifelong learning education. While it was not very long ago that mobile phones were used just to make calls, the advent of the 3G standards and technology has provided additional features which may transform mobile phones into communication facilitators suitable for contextual lifelong learning.

In particular, with mobile phones being owned by most of the students (Lindquist, Denning, Kelly, et al., 2007), the creation of mobile applications that present and manage the knowledge needed by lifelong learners seems apparent. A mobile phone by definition is highly portable, personal, available anywhere and unobtrusive. A thick mobile application can be created that adapts to the user needs, is persistent, useful and easy to use. Lastly, mobile phones also support context awareness, a highly desirable feature for the learning process (Lonsdale, Baber, & Sharples, 2004).

This chapter presents our approach to the design of a personalized mobile learning environment for lifelong learning and our prototype, demonstrating its use through usage scenarios. The environment interacts with a personal learning space, giving back information to the user, either specific to the situation she is in, or relative to the courses she is attending (Dimakopoulos & Magoulas, 2006). It comprises server side middleware that performs the intensive calculations that could not be executed on a mobile phone, and connects the information in the database with the mobile client that runs a mobile application. Building on our previous work (Dimakopoulos & Magoulas, 2006), here we extensively discuss design considerations for mobile learning systems, proposing solutions to the usability issues of small mobile phone screens and we demonstrate a design that adopts hierarchical menus and lists of items to map the tasks and activities that a lifelong learner can do. The tasks and activities can be formed as categories, subcategories and items in the personal learning space of a student. The issue of the limitations on processing power,
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