Chapter 11
Context-Awareness and Distributed Events in Mobile Learning

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ABSTRACT

This chapter presents a system called MILE (Mobile and Interactive Learning Environment) which is used to support a blended approach to learning and teaching with mobile devices. The system has a modular and extensible system architecture which aims at supporting different platforms and devices both for students and for teachers. To better adapt to its users the system uses so called contextual widgets-components which gather, process, and store contextual data. To disseminate education-related events, specifically designed distributed events protocol (DEP) is used. Various applicative modules for mobile connected devices can be implemented upon the described architecture. They are, together with the experience gained in the project, described towards the end of the chapter.

INTRODUCTION

Technology enhanced learning has always been of the great interest to educators. The capabilities of modern information and communication technology (ICT) have been perceived as a valuable force in dealing with mundane daily tasks such as exam correction or surveying. Even more intriguing has been the possibility of actually enhancing education so that students learn better (McCormack & Jones, 1997).

Still, computers can enhance educational process only if used correctly - in itself, the technology is neither good nor bad. ICT should be used so that it naturally adapts to its users. They shouldn’t be overwhelmed with the capabilities a system offers and they should be able to completely focus on the learning and teaching activities. Therefore, a term
named context—awareness becomes a buzzword in modern user—oriented systems.

The new technologies need to be complemented with modern teaching practices so today’s e-learning forms are more oriented to communication, collaboration, and interactivity (European Commission, 2001) in both face-to-face (f2f) and virtual environments, overcoming the drawbacks of early versions of e-learning which used ICT primarily to improve learning content distribution.

Blended learning is becoming an increasingly popular form of e-learning, particularly suitable in the process of transition from traditional forms of learning and teaching towards e-learning (Alonso, López, Manrique & Viñes, 2005; Thorne, 2003). It combines traditional, or face-to-face teaching with ICT all wrapped in a pedagogically designed courses. Therefore, technology is seen as just one of many elements contributing to the successful teaching and learning.

Miniature mobile devices, ever-rising power and possibilities of communication (e.g. WiFi, 3G etc.) support an area of human activity that has long been technologically neglected: the life on the move. In addition to being used by individuals outside of their living and working environments, mobile technology is used by certain professions in order to acquire contextualized knowledge while on the move (Boticki, Mornar & Andric, 2006; Holzinger & Errath, 2007; Kukulska-Hulme & Traxler 2005).

In addition to desktop computers, mobile technologies begin to influence everyday activities and communication more and more and inevitably enter the world of education. The newest generation of mobile devices combines the power of yesterday’s desktop computers with the unique characteristics of being personal, ambient and pervasive. Mobile technologies as a tool can support discursive elements of learning but should be built with the context—awareness in mind (Boticki, Mornar, Hoic-Bozic, 2006). A system designed in such a way can support education and give its social elements a completely new, mobile component.

The research on mobile learning at the Department of Applied Computing, University of Zagreb, Croatia was started in 2004 (Boticki, Mornar & Andric, 2006; Boticki, Mornar & Hoic-Bozic, 2006). After initial implementation dealing with specific, independent applications (e.g. mobile surveying), the need for a systematic approach to mobile learning environment was recognized. A multidisciplinary team had to be gathered in order to provide a pedagogical perspective on one hand and to include deep technological expertise on the other.

In order to support mobile learners in their contexts the system MILE (Mobile and Interactive Learning Environment) has been designed. The main purpose of this system is to support the didactic and the discursive approach to learning (Kukulska-Hulme & Traxler 2005). Students equipped with mobile devices of various kinds (laptops, tablets, PDAs and mobile phones), are connected to the system via faculty or campus wireless networks. They benefit from the central server component which distributes learning—related events to the tools available as a client side MILE application.

MILE’s architecture is designed specifically by having mobile learners in mind. Users are not overwhelmed with technological tasks, such as the configuration of the system, filling in server addresses etc., since the system takes care of these in an intelligent way. Furthermore, a core component of the system, context engine, was built to take into account users’ context and adapt system’s behavior according to it. To achieve that, our context engine utilizes the concepts of subscriptions and contextually triggered actions.

Students using the system benefit from various tools, called modules, whose main aim is to enhance learning by enticing interaction and collaboration in a blended approach to learning. Some of the modules are MCollaboration, MNotebook and MWhiteboard and can be used...
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