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TEACHING SYSTEMS ARCHITECTURE BY USING MOBILE LEARNING ENGINE (MLE) AS A PLATFORM FOR A MOBILE LEARNING PROJECT

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ABSTRACT

This paper explores the idea of using Mobile Learning Engine (MLE) as a platform for a mobile learning project to form part of the systems architecture course for second year Information Systems undergraduates. We believe that the use of this platform will not only support the learning outcomes of the systems architecture course, but will also result in a useful product that could be used for community development.

Keywords: Mobile learning, systems architecture, open source

I. INTRODUCTION

The Department of Informatics at the University of Pretoria in South Africa introduced a second year course called Systems Architecture from 2005. The planners of the module decided to use this course to introduce systems architecture concepts through two main topics: open source software and mobile technology. Furthermore, it was decided to link this module to community service by letting students do a project whereby they assemble PCs, load open source software, and donate the PCs to disadvantaged schools.

The project addresses some of the learning objectives of the course, but some gaps remain:

- The focus of the project is on hardware and open source software, without

- integrating the mobile technology theme;
- Students do not get any experience of distributed application services (client-server etc);
 - Although the intention was that the PCs should be donated, it has not happened yet (mainly because of maintenance concerns).

One of the authors was one of the initial planners of this module. Both authors are involved in mobile learning, and it was in the process of working on the MLE for a mobile learning project, that they came to the realisation that the MLE environment will form a great environment for use in IS education. The project of the Systems Architecture course came to mind. The paper explores the possibility of using the MLE as a platform for a project in the mentioned course. The next section of this paper gives a short overview of mobile learning, after which the MLE is explained. The last section of the paper shows how the incorporation of mobile technology as a project in this course would serve its objectives well and address the identified shortcomings.

II. MOBILE LEARNING

M-learning (or mobile learning) is seen as an extension of e-learning where the focus is on the use of mobile devices such as cell phones, PDAs, and iPODS (Brown, 2005). Laouris and Laouri (2006) describe the move from e-learning to m-learning as a revolution since it implies not only a change in terminology but a change of mindset when designing and planning learning environments and goals. Sharma and Kitchens (2004) assign this unavoidable change in paradigm to the unique facilities provided by mobile technology such as the provision of communication facilities at any time or location and the provision of learning content dynamically dependent on the learner's location, context and device. This necessarily implies a change in classroom culture. Despite all the hype surrounding mobile learning, however, it has yet to make a significant impact on the teaching and learning support offered by educators. Although there may be a variety of factors contributing to this, such as non-standardized operating

systems, limitations to mobile architectures, screen sizes, memory, user interfaces, band width limitations, etc, one additional factor is surely the difference in the way in which the competing manufacturers implement cross-platform software such as J2ME. This makes it extremely difficult to create device-agnostic mobile educational software. However, recently eLibera, a company specialising in mobile platform development, decided to release its Mobile Learning Engine (MLE) under the GPL (General Public Licence 3).

III. WHAT IS THE MOBILE LEARNING ENGINE?

According to the MLE website it is not simply a mobile learning tool, but rather “a comprehensive learning application” which “transfers computer-aided and multimedia-based” learning content to a mobile environment. The complete MLE suite consists of the following software applications: The MLE Mobile Client, The MLE Gateway and messaging server, and the WYSIWIG MLE editor.

THE MOBILE client is the Java application (J2ME) which runs on the mobile phone.

THE GATEWAY AND MESSAGING SERVER:

These two Java servers (J2SE) are installed on a standard server with internet access. They are used by the mobile client to access the Internet in a more efficient way and for instant messaging. A great advantage, especially for novice users of the system, is that there are public gateway and messaging servers available which can be used for own or projects, so that one does not really need one's own root-server!

THE WYSIWYG-EDITOR (MLE EDITOR):

This is a "What You See Is What You Get"-Editor to create content (whole content packages) for the mobile client. This might be just some formatted text with images or a whole learning-object with interactive questions. This editor was designed for people with very little or no programming skills, and therefore have no idea on how to create contents with XML. Obviously this has huge advantages

for anyone wishing to deliver mobile content without wanting to constantly do a lot of programming.

IV. THE MLE AND THE SYSTEMS ARCHITECTURE COURSE

The preceding description provided by the MLE, leaves one with the impression that this is a really easy-to-use tool for delivering and hosting mobile learning content. Doing the Systems Architecture project using the MLE as platform, supports the objectives of the course in different ways of which the most obvious is letting students experience mobile technologies from a designer's perspective. Other ways include:

- The platform is *open source and free*, allowing students access to the source code for making changes where in whichever way they wish while it is not limited to the Linux environment (it has also been tested on Windows XP)
- It consists of a ready-made *client-server architecture* on two levels – the MLE client which interacts with the server to render content onto a mobile device, but also the MLE Editor which interacts with the server in delivering content. Students will obviously have to master a working knowledge of client-server interaction while at the same time being able to directly observe the impact of changes to the software at any of the different levels of the MLE system.
- The MLE currently supports about 1100 mobile devices, which means that it creates a unique software version (midlet) for each device, depending on its capabilities. This will provide students with a vivid example of how Information Systems design is impacted on by end-user devices – especially in a *mobile environment* where standardisation is still in its infancy.

Apart from this, the MLE consists of its own mobile emulator which is easy to install and which allows for easy testing of any code changes. Also, the MLE was designed in such a way that it allows users to interact with it on various

levels. Novice programmers will be able to make changes to the way in which content is displayed, menus deployed, etc, while those with programming background and knowledge of, XML, for example will be able to make in depth changes to the software. These features make the MLE an ideal tool in a collaborative learning environment where students with varying skills can cooperate on the same IS project, each making her/his own contribution.

V. THE PROPOSED PROJECT

Students will work in groups where they will have to develop a mobile learning application based on the MLE platform. The learning content must be one of the themes from the Systems Architecture course (e.g. software, hardware, networks etc). This theme must be adjusted to the grade 10 – 12 curriculum (which covers the same themes on a lower level). (The targeted schools often do not have qualified information technology teachers). Once finished and evaluated by the lecturers, the application and content can be donated to one of the target schools. Teachers at these schools can now integrate the mobile learning application and content in their teaching. The servers of the current mobile learning project of the authors will be used by the school(s) to make use of the learning content. In this way, the problem of ongoing maintenance of the community project is addressed. Also, the concept of mobile learning will be introduced to different schools where mobile phones are often far more prevalent than any other ICTs. It is foreseen that students can guide teachers in the use of the MLE in order to create their own content.

VI. REFERENCES

Brown, T.H. Towards a model for m-Learning in Africa. *International Journal on E-Learning*, 4(3), (2005), 299 – 315.

Laouris, Y. and Laouri, R. Can Information and Mobile Technologies serve to close the gap and accelerate development? In *Proceedings of MLearn 2006*, Alberta, Canada, 22 – 25 October (2006).

Sharma, S.K. and Kitchens, F.L. Web Services Architecture for M-Learning.
Electronic Journal on e-Learning. 2(1), (2004), 203 – 216

The Mobile Learning Engine

<http://www.elibera.com/index.php?page=mLiberator&lang=en>., (Current 31
August 2008).