

Exploring Integration Issues in A Blended Mobile Learning Model context oriented applied to an Information Systems course curriculum – Mobility, Context And Cloud

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Abstract

The increasing number of mobile devices in day-to-day of general population and particularly among younger people, leads to the emergence of new paradigms in several areas of activity, particularly in education. As an example of a new paradigm in the teaching-learning can be invoked that mobile learning, such as technologies did not stop and progressed to become part of the Blended Learning Mobile model. In this paper and in the context of three-year courses Bologna Process European Degree structure at school, in Portugal, following the Curriculum Guidelines for Undergraduate Degree in Information Systems from ACM/AIS, we intend to extend our BML Context Oriented Model to an Information System course, i.e. cover different areas of expertise of these courses, including Requirements Engineering.

Keywords: Blended Mobile Learning, m-learning, learning context.

1. Introduction

The Information and Communication Technology (ICT) and higher education have suffered a large (r) evolution. On the one hand, the growing number of mobile users, according to the ITU (International Telecommunication Union), increases exponentially and the number of devices connected to the Internet and their utilization increased between 2000 and 2009, around the world 342%, 274.3% in Europe and around 79% in Portugal¹. On the other hand, higher education has had a major evolution with regard to approaches used in teaching-learning process. These approaches range from traditional classroom lecture, going through eLearning, and the combination of the two forms – Blended Learning (bLearning) model, and more recently, the development of a traditional bLearning to Mobile Blended Learning (BML) model [Khaddge 2009].

Thus it is necessary to, firstly, examine whether the solutions are in according to the pedagogic aspects needed to be considered for a training [Menezes 2011] and, secondly, determine which type of content and how they should be available to students, i.e. to identify the learning context.

In this paper and in the context of three-year courses Bologna Process European Degree structure at school, in Portugal, following the Curriculum Guidelines for Undergraduate Degree in Information Systems from ACM/AIS, we intend to extend the BML Oriented Context Model [Moreira et al. 2010] to an Information Systems (IS) course, i.e. cover different expertise areas of these courses, including Requirements Engineering (RE). With the proposed model, firstly, the teacher will have the necessary information to evaluate and revise the available tools in the area that teaches and, secondly, the student will have complementary tools that allows not only acquire new knowledge but also test those skills.

¹ Internet usage statistics, <http://www.internetworldstats.com/stats.html> (available in 2012/05/18/)

Currently the problems of space and sharing of documents has become a reality facilitated through the use of a cloud.

There is no consensus on the definition of cloud computing [Armbrust 2010], [Mei et al. 2008], however it is commonly agreed that the definition proposed by the National Institute of Standards and Technology is the closest and the more accurate [Mell 2009]. The National Institute of Standards and Technology (NIST) defines cloud computing as "a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction."

In [Wang et al. 2010] authors focus on finding interesting topics for future research in the cloud computing field: i) pluggable computing entities, ii) data access transparency, iii) adaptive behavior of cloud applications and iv) automatic discovery of application quality. Our work is closely related with adaptive behavior of cloud applications.

With this work, we intend to develop the initial model [Moreira 2011a] to support the use of the benefits offered by a cloud.

The paper is organized as follows. In section 2 presents related work, section 3 presents the ongoing research and Section 4 presents concluding remarks.

2. Related work

The teaching/learning process based on a BML model, whatever their field of knowledge, on one hand, leads to the (1) necessity of the existence of applications for mobile and fixed devices, and (2) the study of learning context, i.e., when? where? and why? a student intends to study with the support of a mobile device. On the other hand, since the introduction of mobile devices in teaching/learning process, a large number of software applications for different domains have been identified. In most cases this software are represented in a 'flat' fashion making their use difficult especially when there is a large number of applications to consider in a particular area and/or scenario.

In this context a Web-based architecture was developed from a BML-CO model, for the programming [Moreira et al. 2010] and computer networks [Moreira 2011b] areas. The proposed model allowing the teaching/learning process takes place on several platforms, offering content tailored to each platform, in the appropriate context and using only open source software. The model ensures that a student has the necessary conditions to access the contents (text, picture / video, audio) at a given time and with a controlled cost. Information is stored at the end of the learning activity. This information will allow knowing, on one hand, the moment, location and the activity time duration, and on the other end, the student knowledge assessment.

In order to provide a positive learning experience the Learning Management System (LMS) must be effectively integrated with other specialized systems typically found in an educational environment.

The BML-CO [Moreira et al. 2010] uses two types of tools: the Learning Management System Moodle (version 2.0.1) with integration of MLE-Moodle (Mobile Learning Engine – MOODLE) and two specific tools, one for the Algorithms and Programming [Moreira et al. 2010] and other to Computer Networks [Moreira 2011b].

3. Research progress

The study intends to add a tool to the model presented in section 2, that allow to support the teaching/learning process in a RE course. RE is a set of activities concerned with identifying and communicating the purpose of a software system, and the contexts in which it will be used. Hence, RE acts as the bridge between the real-world needs of users, customers, and other constituencies affected by a software system (stakeholders), and the capabilities and opportunities afforded by software technologies [Kaur 2010].

Identify requirements in RE is an arduous task for a student in an initial phase of his studies.

We have identified Mobile Google Docs (MGD) [Google 2011] as a good system to learn and experience this topic. The MGD is a free Web-based word processor, spreadsheet, presentation and form editor whose data storage service is provided by Google. MGD serves as a collaborative tool for editing documents so that they can be shared, opened, and edited by multiple users at the same time.

We will follow the set of techniques proposed in [Gutwin 2002]. These techniques, allows us to be aware of the other user's cursor position and whether they have selected a text fragment or not, that text represents a catalog of requirements. Thus, when a remote user is writing other users can observe it in real-time. Additionally, if the user selects some text, it is highlighted by marking it with the user's color.

MGD shows a list of participants that are editing simultaneously the same document. By using this list, users can communicate with each other by using a chat.

This technique expressing information about authorship/about the past are used to make available to the users the history of changes carried out. They have been implemented by MGD by using a revision history. It allows the system to keep track of all the changes made by the users to the different types of documents being edited. In addition, if the change made is a deletion, then the text will be also in strikethrough style. In this context we intend to use the system capabilities to identify and write requirements in a collaborative way.

After the requirements identification phase, it is proposed that a teacher creates a form with Google forms where he/she can measure the degree of knowledge/skills acquired in the learning activity. In this way it is proposed an approach to support the model presented earlier (see Figure 1).

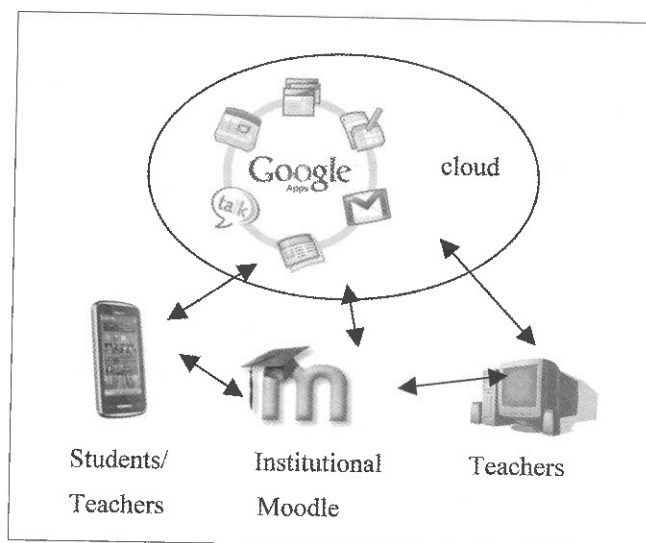


Figure 1 – Proposed approach.

4. Research questions

We define three research questions to understand the BMLCO model viability when the MGD system is introduced into the teaching/learning process. The target of this research is RE students of an IS undergraduate degree.

- Which learning material should be provided to the student in accordance with the learning place?
- Which learning material should be provided to the student in accordance with the moment of learning (i.e., day, night, week, weekend ...)?
- Which learning material should be provided to the student in accordance with his knowledge stage in the course?

5. Methodology for evaluation the model

Our evaluation method is split into two phase: an interview research activity and a system prototype evaluation. We are currently into the first phase, so we don't have any results, yet. Achieved the results of the study presented, we could both concluded which material should be available to students and to answer the research questions raised. A system prototype will then be implemented and we will ask a number of students to evaluate the model with MGD system included. With the feedback obtained from students, improvements to the BML-CO model will be made.

6. Final considerations

In this paper it is proposed the use of the MGD system into the developed BML-CO [Moreira et al. 2010] model in a RE course context. The proposed solution takes into account costs, by using open source software, and the learning context. We aim to increase the scope of the BML-CO model, not only to the RE teaching, but to others courses in the IS area.

7. References

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