Design and Evaluation of a Project-Based Learning Ubiquitous Platform for Universal Client: PBL2U

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ABSTRACT

Mobile technologies are more and more present in students’ lives. Therefore, it is interesting to see how these technologies enable students to learn beyond their courses. In this paper, the authors describe some ongoing work funded by their institution. The authors are developing a prototype of a project-based learning ubiquitous platform which aims at helping students learn some skills and knowledge about project management. In accordance with project-based learning theories, their platform also teaches students how to collect knowledge and introduces them to lifelong learning skills. The software is designed to be reused and adapted to various situations of ubiquitous and collaborative learning, for universal clients (smartphones, tablets, laptops, PCs, etc.). They have designed the technical architecture of the authors’ platform so as to make it easily extendable and maintainable. The technical and pedagogical evaluation of the authors’ platform has been done with students in real life conditions, during a period dedicated to a project to create innovative business. At the end of the paper, the authors describe this experimentation and discuss the pros and cons of such a platform.

Keywords: Collaborative Learning, Lifelong Learning, Project Based Learning, Real Life Experimentation, Ubiquitous Learning

1. INTRODUCTION

In the framework of learning for higher education, our institution is a recognized expert in project-based learning (Gilliot & Landrac, 2008; Rouvais et al., 2006; Rouvais, Mallet, & Vinouze, 2010), which is identified as a rich pedagogical modality in terms of mobile and ubiquitous learning. Every year, a whole week is devoted to a transversal project (Challenge Projet d’Entreprendre®), involving students with various profiles (from engineering and
management schools, of various nationalities, with various pedagogical origins). The major educational goal is to integrate a professional attitude: organize work, distribute tasks, abide by a contract (delivery, quality of deliverables), produce and share one’s production within a team, and communicate in a professional manner within a collaboration context to present one’s results. The second objective, based on the students’ curiosity, is for them to run a complete project, to learn to identify their knowledge, to be able to use it, to identify the needs for information, to acquire new knowledge and integrate it into a coherent entity. The objective is therefore to teach students how to “build bridges” between their different areas of knowledge in order to rebuild an integrated entity.

In this context, students must juggle many activities, including imposed appointments and external constraints (extra-curricular activities for example). Being in this situation, they integrate the effective management of multiple activities. Periods of time are becoming more and more intimately intertwined: activities are no longer homogeneous, based on long term perspectives, or localized. They have become rhythms, organizations and modes of interaction that turn activities into plural and mobile micro-activities (exchange of information is handled by email, text messages, twitter, where messages are very short). In a project-based learning approach, students can also integrate learning methods they will need throughout their lives. They must take opportunities for integrating new information, thus training, between their other activities (i.e., regardless of their location and the moment of the day), but also for learning while doing their other activities.

After a needs analysis of the project-based learning approach, collaboration and cooperation appear to be the cornerstones of educational issues. The significant recent progress in mobile and even ubiquitous computing, respectful of the individual (leaving them in control and adapting well to their profile), allows us to consider leveraging situated learning theories (Sharples, Arnedillo-Sánchez, Milrad, & Vavoula, 2009; Siobhan, 2007). Our ambition is to create a platform to support ubiquitous learning, which enables any user, regardless of their mobile or desktop equipment, their network infrastructure, and their software, to participate in a project. This platform should remove as many technical and software constraints as possible. We decided to use a rapid application development strategy (Martin, 1991) and we managed to propose a genuinely operational platform which has been evaluated in real conditions during the latest session of the transversal project in 2011.

In this paper we first describe the state of the art in mobile and ubiquitous learning, then we describe our platform, and finally we present the experimentation and its results.

2. STATE OF THE ART

In this section we describe the state of the art in mobile and ubiquitous learning. We first define mobile learning, and then we discuss its challenges and prospects.

2.1. Mobile Learning

We are first going to analyze the meanings of the words mobile, pervasive and ubiquitous in the field of computer science, so as to then give a definition to the phrases mobile, pervasive and ubiquitous learning, which may represent mobile learning environments of the future. Lyytinen and Yoo have suggested the following definitions of mobile, pervasive and ubiquitous computing (Lyytinen & Yoo, 2002): i) Mobile computing’s main purpose is to improve our ability to physically move our computer applications with us, either by reducing the size of computers or by remotely accessing computing resources; ii) Pervasive computing enables to get information from the environment in order to interact with it in a given place. One of the issues is to acquire and handle the models of the environment and the aims of the users (context models) enabling these interactions. Detection, discovery and modeling of the context becomes here a major issue; iii) Ubiquitous computing aims at integrating high scale mobility with pervasive computing functionalities. There seems
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