Technical Feasibility of a Mobile Context-Aware (Social) Learning Schedule Framework

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ABSTRACT

The purpose of this paper is to show the technical feasibility of implementing their mobile context-aware learning schedule (mCALS) framework as a software application on a mobile device using current technologies, prior to its actual implementation. This process draws a set of compatible mobile and context-aware technologies at present and can be used as a reference point for implementing generic mobile context-aware applications. The authors’ mCALS framework retrieves the learner’s location and available time contexts via the built-in learning schedule (i.e., electronic organizer) on a mobile device. These contexts together with the learner’s learning styles and knowledge level (on a selected topic) are used as the basis for the software application to suggest learning materials that are appropriate for the learner, at the time of usage. This retrieval approach eliminates the use of context-aware technologies and the need to directly request the user to enter context information at the time of usage. The authors develop a fully functional prototype of this framework for learners to plan their individual as well as social learning activities amongst one another to make their individual learning processes collaborative and as a way to enhance individual and social learning experiences.

Keywords: Context-Aware, Context-Aware Technologies, Mobile Context-Aware Learning Schedule Frameworks (mCALS), Mobile Learning, Technical Feasibility

1. INTRODUCTION

The aim of our study is on mobile learning (hereafter, abbreviated as m-learning) and mobile social learning, particularly learning in different locations and under various contextual situations, from the perspective of university students, individually or collaboratively with others. We initially derived and designed a theoretical mobile context-aware learning schedule (mCALS) framework (Yau, 2011) from an extensive literature review. The objective of the framework is to recommend appropriate learning materials to students based on their current locations and circumstances. The framework uses a learning schedule (i.e. the built-in electronic organiser on mobile devices) to record learners’ study-related and unrelated events, as well as information regarding the events (including the location, start and finish times) are stored. Subsequently, this information is used to inform the location and available time a student has for learning/studying at specific points in time. Additionally, a number of factors are taken into consideration for the
recommendation of appropriate learning materials to students. These are the student’s learning styles, knowledge level, concentration level, frequency of interruption at that location and their available time for learning/studying. The suggestion mechanism suggests to learners appropriate learning materials from the learning object (hereafter, abbreviated as LO) repository within our framework, for learning at that length of time and type of location. We propose that this learning schedule retrieval approach can be 1) a successful self-regulated learning strategy as the act of pre-planning of studying events can be motivating for self-regulated learners to carry out their studies; 2) an effective method for eliminating the use of context-aware technologies and the need to directly request context information from users, at the time of usage; and 3) a successful environment in which to facilitate social learning opportunities. Figure 1 shows the conceptual model of mCALS.

In order to determine the potential deployment of the framework as an m-learning application by intended users, we carried out six feasibility studies. First, a pedagogical study was conducted using interviews to explore together with students (a) what their learning requirements were when studying in a mobile environment, (b) whether the framework could potentially be used effectively to support their studies and, (c) using this user-centred understanding, refined user requirements of the framework. Second, a diary study was conducted where we collected data and analysed the usability feasibility of the framework by (a) determining whether students could plan their daily schedule ahead and keep to it, (b) ascertaining which learning contexts were important and, (c) establishing which learning materials were appropriate under which situations (Yau, 2011). The results from our completed diary study suggested that participants were mostly in their planned locations as the planned and actual locations had matched entirely. There were discrepancies between the planned and actual start and finish times, suggesting that the actual available time of a learner may not always be retrieved accurately. In the light of this, we propose to use the retrieved location and available time as default values which will then be verified by location-detecting technologies and by the learner. More precisely, two verification methods can be added to strengthen our framework – 1) GPS and Wireless LAN technologies to verify the learner’s location, and 2) a request for learners to confirm whether the retrieved available time is accurate.

Two validation studies relating to the framework were also conducted. The first one was an online experiment utilizing Java LOs.
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