

## Chapter 3

# M–Learning Generations and Interview Study Results of a Mobile Context–Aware Learning Schedule Framework

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### **ABSTRACT**

*Mobile learning applications can be categorized into four generations – ‘non-adaptive’, ‘learning-preferences’-based adaptive, ‘learning-contexts’-based adaptive and ‘learning-contexts’-aware adaptive. The research on our Mobile Context-aware and Adaptive Learning Schedule framework is motivated by some of the challenges within the context-aware mobile learning field. These include being able to create and enhance students’ learning opportunities in different locations by considering different learning contexts and using these as the basis for selecting appropriate learning materials for students. The authors have adopted a pedagogical approach for evaluating this framework – an exploratory interview study with potential users consisting of 37 university students. The authors targeted primarily undergraduate computing students, as well as students within other departments and postgraduate students, so that a deep analysis of a wider variety of users’ thoughts regarding the framework can be gained. The observed interview feedback gives us insights into the use of a pedagogical m-learning suggestion framework deploying a learning schedule subject to the five proposed learning contexts. Their data analysis is described and interpreted leading to a personalized suggestion mechanism for each learner and each scenario, and a proposed model for describing mobile learning preferences dimensions.*

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## 1. INTRODUCTION

The importance of the deployment of learning contexts into mobile learning (m-learning) applications, and making these applications aware of the context (or circumstances) it is being used in, is currently a very significant part of their development (Sharples, 2006). Since portable mobile devices can be used for learning anywhere and at any time, learners have the flexibility to choose practically whichever location that suits them. For a full-time university student living on campus, this choice may not seem as crucial as for another part-time student who has family and work commitments and commutes onto campus every day, for example. The latter student has typically much more limited time than the former, and because of this constraint, it is much more important and necessary for the latter student to be able to use any time that they have and to be able to learn/study at any location. For example, it might be necessary for them to make use of the time when they are commuting each day on public transport. Becking *et al.* (2004) also noted similar difficulties that distance learning students face because of this time constraint.

Given the possible different circumstances surrounding the learner at the point of learning/studying (such as the location, length of time available, their concentration at that point in time, or the frequency of interruption at the location), there may be pedagogical benefits to the learner if their m-learning application were to be aware of these circumstances and able to suggest appropriate materials for the learner based on these circumstances. Our research is motivated by the fact that students may want to carry out their learning tasks and activities at every given opportunity with sufficient time available. Naturally, this may not always hold true; however as argued by Kukulska-Hulme and Traxler (2005) “*Learning outside a classroom or in various locations requires nothing more than the motivation to do so wherever the opportunity arises*”.

In this chapter we describe the design of a theoretical framework to support those students who wish to carry out their learning at different locations with variable amounts of time available to them. Our goal is to recommend (the most) appropriate activities to them, given the particular circumstances, in an attempt to maximize their learning productivity. In achieving this goal, the following three research questions will need to be resolved; the motivation for resolving these is also described.

1. *Can a proactive method of retrieving learning contexts, without the use of context-aware sensor technologies, be successfully established?*

Our theory investigates the possibility to substitute context-aware sensor technologies with a simple, yet efficient, technique: the learner’s learning schedule. This relies on the self-discipline of students to tell their mobile device their probable learning schedule ahead of time. The device will then suggest to the user appropriate study measures at each particular point in time.

The methods used for retrieval of learning contexts is currently under investigation in many related m-learning works and are divided into *direct* and *implicit* retrieval methods. Direct retrieval from the user (for example in Cui and Bull (2005)) requires time and effort and may interfere with what the user is doing. Alternatively, retrieval may be done implicitly by using sensors to detect the values of different learning contexts (for example in Schmidt (2002)).

2. *Which learning contexts are necessary attributes of a pedagogical mobile learning framework?*

Through our literature survey, we identified five learning contexts which are highly significant pedagogically – these are learning styles, knowledge level, the student’s concentration level, the

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