

STUDENT REVISING FOR A TEST USING SMS

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ABSTRACT

In this paper an experiment involving mLearning using Short Message Service (SMS) is described. The experiment was designed after a study of the readiness of the participants in terms of mobile device ownership, mobile technology preferences, and learning styles. Qualitative data was gathered and analysed using an activity theory framework. The SMS scenario developed for the experiment is content-specific and was provided as a commercial service in 'pull' mode. The study allowed to conclude that mobility support, information density, and information relevance were the factors which contribute most to creating mLearning value while cost was a major detractor.

Keywords

SMS learning scenario, mobile learning, mLearning, mobile business, activity theory, value, just-in-time learning.

INTRODUCTION

As Short Message Service (SMS) is arguably the most accessible mobile data service, it is viable platform for mobile learning (Sharples, 2005; Taylor, Sharples, O'Malley, Vavoula, & Waycott, 2006). Additionally SMS adds to mobile learning (mLearning) features of just-in-time learning (Hall, 2001), and can blend easily into courses delivered in mixed or flexible) learning environments (Divitini, Haugalokken, & Morken, 2005; Wuthrich, Kalbfleisch, Griffin, & Passos, 2003; Song & Fox, 2005). A classification of mLearning scenarios involving SMS is proposed in (Petrova, 2007b). Examples of a contextualised learning experience with participants engaging in activities facilitating knowledge acquisition can be found also in (Petrova & Suttedjo, 2004; Evans & Taylor, 2004). Specific scenarios for using SMS in tests, quizzes, and questions and answer sessions are reported in (Capuano, Gaetta, Miranda, & Pappacena, 2004; Iliescu & Hines, 2005; Mellow, 2005; Ng'ambi, 2005; Riordan & Traxler, 2003; Tretiakov & Kinshuk, 2005; Silander & Ryttonen, 2005). Most of the reviewed scenarios are not tied to a particular event timeframe and are driven by the provider ('push' mode) rather than by the learner. This paper presents and discusses an SMS scenario which is both learner-driven (i.e. it works in 'pull' mode) and context-dependent (students are studying for a pre-scheduled, assessed test).

BACKGROUND AND METHODOLOGY

In 2004, a study of the mLearning readiness, preferences and learner styles of selected undergraduate students from the Auckland University of Technology (New Zealand) was carried out (Petrova & Suttedjo, 2004). Data about the ownership and the use of mobile devices indicated that students were ready to participate in mLearning and that their mLearning technology of choice was SMS. Students surveyed identified themselves as either 'concrete experimenters' or 'active experimenters/decision makers'. Based on these results an experiment with a scenario for SMS-based mLearning was designed (Petrova, 2007a). Two separate research projects were conducted a) an independent quantitative study of mLearning adoption applying an acceptance model, and b) a qualitative study investigating how mLearning adds value to the learning process (using the feedback provided by the participants in the experiment). The experiment design and the research framework used to analyse the data collected in the second study are presented next.

Experiment Design

The scenario chosen was that of SMS-based test revision. In this scenario students would still have to construct their own knowledge based on independent work with resources but they would be also able to check whether they had understood and applied the concepts correctly. The mLearning scenario was implemented as a cost-incurring mobile business service, but participants were reimbursed up to a certain limit. The experiment was piloted first in 2005, with second year undergraduate students. Valuable observations about participant recruitment and the timing of the experiment helped fine-tune the set up prior to the final run in the second half of 2006 (the second semester of the academic year).

The platform used (StudyTXT©) was developed independently (Mellow, 2005). It allows a 'pull' type SMS study service to be set up, as follows: The revision material (i.e. the answers to revision questions) is packed in the form of short, up to 150 character messages hosted on a dedicated SMS server. Users can request the answer to a question or to a group of questions by texting a unique code to the server. The server responds by sending back the response(s) to the student's phone. As messages can be stored, the answers to the questions, once received, can also be shared with others. Formal user

enrolment is not required - the platform payment model utilises the existing billing or pre-payment mechanisms of the interoperating mobile subscriber networks. The conceptual design of the experiment is shown in Figure 1.

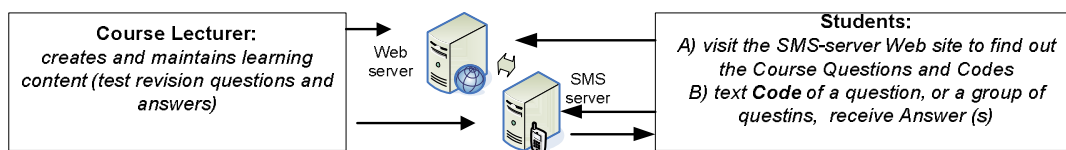


Figure 1. The conceptual design of the 'SMS-revision for test' experiment.

Research Framework

Activity Theory (AT) provided a framework for the research. An activity can be represented as a set of interactive components (Figure 2, adapted from Koszalka & Lu, 2004). The aim is to reach a goal with the subject motivated to achieve the object by using the tool in a specific context (rules, community factors, division of labor).

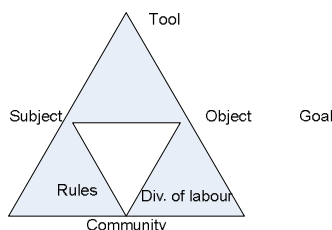


Figure 2. The Activity Theory framework (adapted from Koszalka & Lu, 2004).

As AT emphasizes the mediating role of the context and the tool, it provides a suitable framework for studying the dynamics of technology enabled learning (Scanlon, Jones, & Waycott, 2005; Sharples, Taylor, & Vavoula, 2005; Uden, 2007). The AT components of the experiment interpreted as an activity are identified and described in Table 1.

AT components	SMS-based revision mLearning experiment
Tool	The SMS-based test revision as set up by the lecturer.
Subject	The student participants; the lecturer.
Object and Goal	The object is to facilitate revision. Intended goal: success in the test. Any negative experiences during the experiment are 'unintended' goals (possible barriers to learning).
Rules	Paid service, available anytime anywhere. Funded by UUU to a set limit.
Community	Answers can be shared among student participants.
Division of labour	Learning content is prepared by the lecturer; students assume that it is relevant to the test.

Table 4. Activity theory framework applied to the SMS-revision experiment.

Data collection

Qualitative data from 50 student subjects (second year undergraduate students enrolled in two information technology related courses) were gathered at the end of the semester through an anonymous course evaluation form. The participants were asked to comment on how they felt SMS revision had helped them, how and when they used it, what problems had occurred, and what might need to be changed for better results.

Findings

In the evaluative feedback students reflected on their experiences. It was found that student responses referred to four AT components: a) the tool; b) the object and the goal; c) the rules, and d) the community factors.

Tool

With regard to using SMS as a technology, student participants particularly appreciated its 'anytime and anywhere' aspects: Comments include "I found it most useful when I was on the bus and in bed", "this feature is useful when you are not at your computer or in your study area", "convenient to have answers in the mobile and have a look at it at anytime", "mobile phone is natural", "actually having the answers on your phone is handy", "I could keep the answers on my phone, allowed for revision on the bus etc. So it was great I could study in places I usually could not"). Some negative experiences were related to interruptions in the connection ("facing technical problems not helpful when you have exams close", "the service seemed to be inaccessible ...when I wanted to use most"), to the need to store large amounts of data ("message box exceeds capacity", "I receive a lot of txt in very short time and my phone is out of memory"), and also to the need to access the Web server to retrieve the revision questions ("it seems funny to get the ...list off the web and then text"). However there were also comments positively evaluating the combined use of the Web and SMS ("I think a combination of SMS and web revision would work the best", "it could be developed to be used together with Internet to provide longer answers and explanations").

Object

Most students had understood the object well and felt that the object did help them achieve the goal ("I think it must be stressed though that it provides a foundation for studying more rather than covering the entire line of topic"). The format was found appealing ("particularly useful in obtaining short definite answers", "I loved SMS. I especially liked the definite, to the point answers", "It was good how it stated the question in the answer", "saves time", "if you do not know the answer, quickly to find – for just in time, reasonable", "responses covered a good selection of material and were of a good length, and clearly explained the question without over elaboration"). Negative experiences included dissatisfaction with the perceived level of difficulty ("some questions – their answers were not simple to remember"), and the relative brevity of the answers ("useful, however answers need to be explained in depth", "could expand questions and add supplemental sources").

Rules

Students needed to be proactive during a predefined time interval in order to make use of the service; the experiment timeframe and the mode were perceived as appropriate ("Good way to study for revision", "Goes through the topic, given the opportunity to try to answer for yourself, or if you do not have the time – to do it quickly"). Most of the critical comments referred to the cost of the service ("Good idea, would definitely use if it were cheaper", "I would only use it if it was free or near free", "50 cents per question is too expensive", "I would not pay 20 cents per message", "I think it should be around the 2-5 cents mark").

Community

The positive effect of community factors was evidenced by the evaluation of the opportunity to share question answers with others ("it is very good because it is very easy to exchange with others"). However not all participants seemed to value the option to share too highly ("did not share as though [we] were not friends"); some were prevented from sharing by the cost barrier ("I doubt students would collaborate together to exchange txt-s, as most people are on different networks so it would still cost 20 cents").

DISCOUSSION

An mLearning application offered as a paid service can also be categorised as mobile business informational application. The defining feature of a mobile business application is the provision for user mobility which involves seamless and uninterrupted use of an 'always on' service. The two other features playing a critical role are 'information density' (specific, precise and concise information) and 'information relevance' (expected and anticipated information, needed to support a concrete activity) (Petrova, 2007a).

The findings of the study confirm that support for user mobility (using the ubiquitous 'texting') was most highly valued by students, consistent with with Sharples et al. (2005) and Scanlon et al. (2005) who underline the importance of enabling the mobile user to learn anywhere and anytime. The service was perceived as useful because it provided specific information in a condensed format and was available when expected. Therefore mobility support, information relevance and information density can be construed as value contributors in the context of the experiment.

The analysis of the data using the AT framework revealed some contradictions related to the components: With respect to the object, not all participants had fully understood the object and its relationship with the stated goal (i.e. not so much new knowledge acquisition but checking and improving one's knowledge in order to prepare and gain confidence for the test). With respect to the tool, network problems may have caused interference and as a consequence the information may have not been available when expected.

Further contradictions were identified within the context: First the usefulness of the service was offset by what was perceived to be the 'unreasonable' cost. Secondly, information sharing did not occur on a large scale although it was technically feasible and might have been cost-decreasing. Reasons for not sharing as provided by the participants included the cost, and the lack of a pre-established social network. Finally device limitations (memory) may have prevented downloading groups of responses which would have been cheaper compared to receiving individual texts.

To summarise, two groups of barriers to mLearning were identified: technological (network availability, device features) and socio-economic (cost and the lack of a learner community). The pedagogical approach was successful with respect to the informational features of the service (density and relevance), however a better 'promotion' of the expected outcomes might have led to a higher level of acceptance. The AT model used to analyse the contradictions between and within the model components provided a mechanism for identifying some of the barriers and the success factors to the adoption of the specific SMS mLearning scenario. As Uden (2007, p. 86) noted "activity theory sees contradictions not as problems but as sources of development". The process of working through contradictions in a specific context may therefore help design and develop new mLearning scenarios and models and extend the object to meet better the learner's needs. .

CONCLUSION

The AT model applied in this study allowed to identify mobility support, information density and information relevance as the most significant mLearning value contributors, and cost – as the major detractor. Even the sporadic lack of network reliability may play a critical role in a time-critical context. The experiment was successful and could be even more useful if participants had already formed an active social group and if all participants had completely understood the object of the mLearning revision activity.

The study has a number of limitations: Despite the efforts it was not possible to conduct a sufficient number of in-depth interviews with students. Secondly, as participants were studying the same discipline (information technology), the results may be biased towards a certain type of a student. Data about lecturers' experiences were not collected. However it is hoped that the results presented here will encourage further research as well as practical mLearning endeavours.

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