

MOBILE LEARNING: USING SMS TO ENHANCE EDUCATION PROVISION

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ABSTRACT

This paper offers a framework for implementing successful mobile learning systems. The framework is based on established learning theory but contextualises this theory in the light of the issues and challenges of mobile technology. The paper then uses this framework to evaluate an SMS pilot project currently being conducted at a UK university.

Keywords

m-learning, SMS, messaging, learning.

1. INTRODUCTION

This paper reviews a project designed to support the education of students in a university with SMS messages. The paper does this by first introducing a framework for guiding the successful implementation of m-learning environments in the education sector. The framework is in turn built on the principles discussed in a brief literature review, which encompasses a number of learning theories, some of the current thinking relating to e-learning, and some of the key principles which apply to the m-learning domain.

2. LITERATURE REVIEW OF LEARNING THEORIES

There are many learning theories that are connected to the m-learning paradigm but we will briefly review some which are most relevant to the Harrow SMS Pilot Project as follows.

2.1 Collaborative learning

Many approaches to thinking about learning were developed in the 1990s, and a number of them are

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rooted in Vygotsky's socio-cultural psychology. Vygotsky (cited in Hsiao [1]) argues that learning is a process of social interactions, which allow people to learn effectively. Vygotsky has identified two phases of social process. The first is related to problem solving, where students encourage, support, and guide each other. In the second phase, students come to their own conclusions based on experimental evidence, and resolve their conflict by argumentation.

McClean believes that there has been a growing interest world wide in the use of m-learning technologies to enhance learning through formal and informal collaboration between groups of students with common interests in particular learning topics [2].

2.2 Constructive learning

Jerome Bruner argues that learning is an active process in which learners construct new ideas or concepts based upon their current and past knowledge [3].

The main principles of the constructivist approach are:

- Teachers are expected to provide active, self regulating, reflective learning strategies in this type of environment.
- Motivation is a required element in constructivism as students learn to motivate themselves in their own ways.
- A constructivist learning environment provides multiple representations of reality.
- McDonald believes that constructivist learning environments support "collaborative construction of knowledge through social negotiation, not competition among learners for recognition" [4]

2.3 Informal and lifelong learning

Research on informal and lifelong learning recognises that learning happens all of the time and is influenced both by our environment and the particular situations we are faced with.

The main characteristics applied in these learning settings are:

- According to Beddie the learning environment requires interaction and encourages dialog [5]
- Teachers can draw upon the learning experiences of their students and this will provide a useful resource in the learning environment; people can use their experiences and knowledge
- Self direction is very important with life long learning; but not all have the ability to direct themselves, or motivate themselves
- Imel states that in the learning environment collaboration must be fostered as each person has something to teach; we all learn from each other [6].

2.4 E-Learning

Ron Kurtus defines E-learning as “the use of various technological tools that are either web-based, web-distributed or web-capable for the purposes of education” [7].

Clark and Mayer’s principles for online collaboration are [8]:

- Assignments should be made to meet collaboration objectives so that students can collaborate online
- Students should be assigned to groups so that interaction can take place
- Group assignments should be structured
- There are certain models that can be used in structured learning and these include structured controversy, problem-based learning, and peer tutoring.

2.5 M-Learning

Mobile learning is defined as “a new m-learning architecture [which] will support creation, brokerage, delivery and tracking of learning and information contents, using ambient intelligence, location-dependence, personalisation, multi-media, instant messaging (text, video) and distributed databases” [2].

According to Barker there are many stakeholders in m-learning [9]. She believes that these stakeholders need to be involved in decisions made by educational institutions to ensure that the institutions will be able to handle the support needed for staff once the system has been implemented.

Mclean believes that there are certain drawbacks with using technology for learning; these include high security problems, high start up costs, and the fact that multiple permissions may be needed in terms of access to certain information [2].

2.6 SMS in Education

There are a number of examples of SMS being used as an educational support tool [10]. What is also

becoming clear is that SMS can be used in more interesting ways. It can be used to support student collaboration [11,12] and community building [13]. In principle, SMS can be used to both complete exercises which facilitate learning and to complete assessed work [14]. And it can play a role in student retention but, in order for retention efforts to be effective, staff may have to devote more time and energy to the cause than many are able to [15].

In short, SMS can play a useful role in supporting and facilitating student learning in a number of ways. We clearly need to think carefully about how we evaluate such exercises [16] but otherwise there are many options open to staff when applying this technology.

3. THE FRAMEWORK GUIDELINES

The framework consists of six guidelines all of which are derived from the literature. In principle, adhering to the framework should offer the best prospects of enjoying a successful m-learning implementation.

The specific guidelines are as follows:

- (1) The cost for students is an important issue. It is estimated that many students are not willing to pay more than £120 pounds or so for m-learning technology; anything more than this could be become problematic for the m-learning environment.
- (2) Generally, it is more effective if the choice of technology is focused on mobile phones. According to the Department for Education and skills, 75% of students own a PC, 29% of them are on the internet, and 100% of the students have mobile phones [17]. However, none of them (in the survey) has a PDA. This suggests institutions should choose technology that is familiar to students and, better still, a device that they already have.
- (3) Support for teachers in these kinds of circumstances is vital, as the nature of communication and the teacher-student relationship change. Training must be provided as well as continuous support in case problems occur.
- (4) All the stakeholders involved must be given careful consideration. Students, teaching staff, administrative staff, support staff, parents, the managers of the education institution, and others. All involved must be provided with the information and support they need.
- (5) Another important issue is data protection and security. It is vital that institutions review who has access to the system and what security measures need to be implemented for handling the more sensitive student data such as phone numbers, grades, etc.

(6) The final guideline relates to collaboration. This should be encouraged and supported in the m-learning paradigm.

4. THE SMS PILOT PROJECT

The framework will now be used to assess a project currently taking place at the University of Westminster.

In principle, the framework should be used to guide the framing of the project at the outset but this project had started before the framework was devised so we will use the guidelines as a project evaluation tool.

4.1 Project Description

This project provides a system, which improves communication between course staff and students. Specifically, it provides a facility to communicate with students via their mobile phones.

The system is designed to complement Blackboard, the university's VLE system (Figure 1). It provides critical announcements to students by way of SMS (text) messages.

This is likely to be particularly beneficial to students from lower income families (one of the motivations behind the project). These students are less likely to have computers at home, thus restricting their out-of-university access to course material. Mobile phones, by contrast, are owned and used by all sections of society and all income groups.

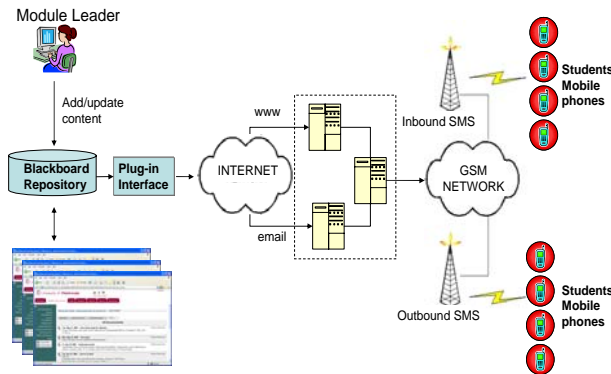


Figure 1. Integrating SMS with Blackboard VLE.

Students at risk of not completing the programme are another target group we are particularly interested in helping.

There are currently three members of the academic team involved in this assignment. We were also collaborating with another team made up of the four Campuses Computing and AV Managers (CCAVMs).

4.2 Actions Completed by the Team

There were a number of activities involved in the project as outlined below.

The team evaluated similar projects completed by other institutions, assessed the functionality of the software used/developed and short listed those which seemed most in line with our requirements. We then worked closely with CCAVMs on integrating the software with Blackboard/SRS/SAP.

Three modules were chosen to be used as a test bed for the new facility, namely: 2BIS401 (IT/IS Support for Business Functions); 2BIS651 (Internet and Intranet Design and Development) and 2BIS653 (Implementing E-Commerce). Students were invited to take part in the project (explaining what the project was about and what would be required of them) by submitting their details to the online database. Eventually 90 students signed up for the project: 25 from 2BIS401, 31 from 2BIS651 and 34 from 2BIS653.

Eleven students on the MA Global Business course also subscribed to the service and the course leader used the facility to keep them updated on relevant developments.

An online database was set up to collect the required information from participating students on these modules.

The CCAVM team was given access to this database in order to enable inclusion of students details in the SMS transmission exercise.

A number of bulk messages, mostly announcements were then sent over the period of several weeks.

In order to evaluate the effectiveness and usefulness of the SMS facility, an online questionnaire was set up. Students on two of the three selected modules were invited to complete the online questionnaire, the results of which were analysed. (The third module, 2BIS653 and others, will be the subject of a second, later survey)

4.3 Online Resources Used

There are a couple of (free) online resources which were used during the course of this project. These made the tasks of data collection as well as survey facilitation and analysis a lot simpler and more straightforward than would otherwise have been the case.

The sites used were www.server.com – for the database and for facilitating the collection of student details; and www.advancedsurvey.com – for the questionnaire creation, response collection, and survey analysis.

The use of www.advancedsurvey.com web site posed a problem for some of the students however. The site requires the user's browser to support cookies and JavaScript. Some students were unable to complete the online questionnaire. It is likely that

this will have had some impact on the number of responses; it is not clear however how much of an impact that will have been.

4.4 Project Difficulties

There were a number of difficulties experienced during the project. These were as follows.

Clickatell's (the SMS gateway chosen) command driven interface is not the most user-friendly. However, a new much more friendly interface is currently being implemented (Figure 2).

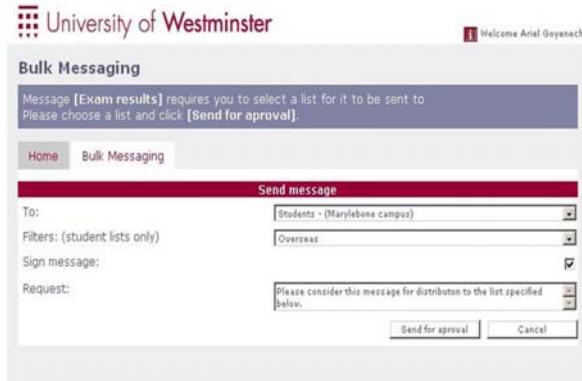


Figure 2. SMS Integration of bulk messaging

The planned integration of the sourced SMS software with Blackboard/the Student Record System/SAP is not yet complete. The delay is due to the new version of SRS/SAP systems being rolled out across university and the impending upgrade of the Blackboard VLE. While individual functionalities have been tested, there are still integration problems. We believe these will be resolved once all new systems upgrades are complete across all campuses. On the project, we worked around this by collecting the information we needed from the students ourselves. However, this is being addressed over the summer. If all goes according to plan, the integrated system will be ready for the September semester.

The data on SRS relating to mobile phone numbers is often incomplete, with the student's mobile number missing. Again, as part of the roll out of the new SMS facility, students are being urged to fill in their mobile numbers.

4.5 Survey Results

The images in Figures 3 and 4 summarise the survey results obtained using the analysis tool on the www.advancedsurvey.com site.

4.6 Interpretation of Results

This was a reasonably sized pilot (with 101 students in total) but (at the time of writing) only 23 students responded to the online survey. This number is rather small and is arguably not statistically significant. We should be careful therefore not to conclude too much from this diminutive sample.

A second survey will be done later with the students from the third module (and others) and it will be interesting to see how the two sets of results compare.

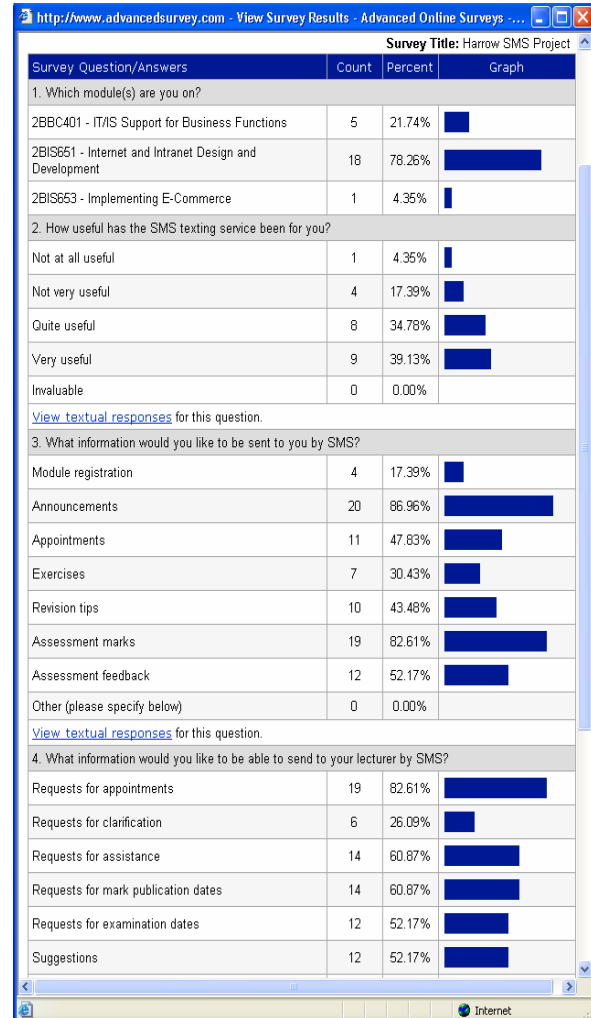


Figure 3. The survey results for questions 1- 4.

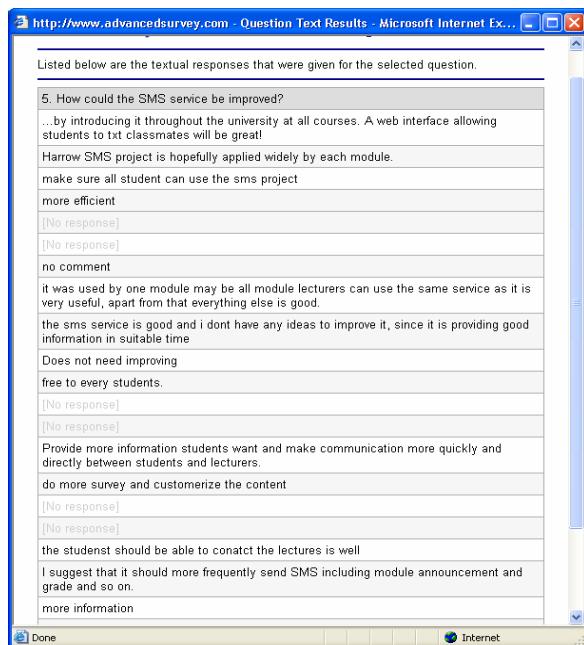


Figure 4. The survey responses to question 5.

Nonetheless, it is clearly noticeable that the response rate for 2BIS651 was markedly better than that for 2BBC401. It is not apparent why this is (and with no ancillary data it is not worth speculating) but the difference is evident.

However, students do seem to find the SMS messages useful and they seem keen to use it in a number of ways to enhance the out-of class communication between lecturers and learners. One might even speculate that if we had substituted the descriptor 'extremely useful' for 'invaluable' in the second question, the student response might have been even more favourable.

Announcements and assessment marks are apparently the two pieces of information which students most want provided by SMS, followed by assessment feedback, appointments and revision tips. Module registration was not seen as particularly important though the survey was conducted towards the end of the semester; module registration information would probably be much more highly valued at the start of the semester.

Equally, students seem keen on being able to contact staff by SMS message, primarily to make appointments but also to request assistance, and marks publication dates, and examination dates. Perhaps a little surprisingly, students also seem quite keen on offering module/course related suggestions.

And when it comes to suggestions on how the SMS service offered during the project could be improved, the main concern is that it is made available across all modules.

5. CONCLUSIONS

The six guidelines offered relate to the cost of the technology for students, the choice of the technology for students (mobile phones), support for teaching staff to help students, consideration of all stakeholders involved, security issues and collaboration.

There is a large degree of commonality between these guidelines and the student feedback from the survey. This suggests that adhering to these guidelines is likely to lead to effective implementations which are popular with the target audience.

These guidelines could, in other words, have a significant impact on the way teacher-student relationships work as well as how teaching is conducted. They provide a more structured way for m-learning to be adopted in learning establishments, leading to considerable but effective changes. Although the learning may be (largely) distant, relationships could be closer and students should have more of the control over their education.

6. RECOMMENDATIONS

It is clear from the comparison of the project performance with the framework that there is much that can and should be done to enhance and extend the provision of SMS learning support.

Each shortcoming against the framework represents a potential research project which is likely to offer some useful benefits to the university as the organisation moves step by step towards offering a complete m-learning environment.

So there are a number of areas worthy of close investigation. These include:

- (a) Deciding on how the more extensive use of SMS should be funded (what are the options, what are their relative advantages and disadvantages, which seems preferable for the students and the institution)
- (b) What kind of training and support is most appropriate for staff in order to facilitate this kind of transition (what impacts will the provision of m-learning services have on the roles, responsibilities, and time pressures of staff; what kind of training and support is likely to be most beneficial) ?
- (c) What are some of the wider implications of a more m-learning intensive mode of operation (what impact will this have on administrative and support staff)?
- (d) What additional security provisions are likely to be necessary (what additional security systems will

be required; and what additional procedural and policy measures will be necessary)?

- (e) How can we encourage the kind of collaboration that would greatly enhance the student experience (what kinds of activities should we set students to facilitate this; what are the pedagogical implications of this kind of development; what additional systems and software resources will we need to acquire)?
- (f) And there are a whole range of additional questions to do with the choice of (mobile phone related) technology; whether we develop most of the m-learning material or acquire it externally or apply some combination of both approaches; what kind of method we apply to the development of any m-learning material we decide to source internally; etc; etc.

There is much to be done but we have little option. Sooner or later we will have to tackle these issues. We may do it systematically and in advance of the full roll out of the associated systems, or we may do it on the fly by trying to cope with these implementation problems at the same time as we roll out. What is without doubt is the need to take action in this increasingly important domain.

Acknowledgements

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