TEACHING AND LEARNING ACTIVITIES THROUGH THE USE OF MOBILE PHONE TECHNOLOGY

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In the twenty-first century, mobile phone technology applications have been developed, tested and implemented in various mediums. The aim of the research was to investigate teaching and learning activities through the use of mobile phone technology. To achieve this aim, four objectives were identified and discussed along with the methodology used. A total of 23% of the students involved in the research demonstrated two types of learning by reflection (i.e. reflection-in-action and reflection-on-action). Furthermore, the research also suggests that teaching and learning activity through the use of mobile technology facilitated deeper approach to learning. Evaluation through questionnaire showed that mobile phone technology has helped students augment their learning objectives. The research concluded that three of the six board theory based activity: Learning and teaching support activities, Constructivist activities and Behaviourist activities have been embedded through the use of mobile technology. The other three theory based activity i.e. Situated activities, Collaborative activities and Informal and lifelong activities could be considered for future work.

Keywords: behaviourist activity, constructivist activity, mobile phone technology, reflection-in-action.

INTRODUCTION

The evolution of the mobile technology has seen dramatic changes in recent years. The use of mobile devices in learning is referred to as mobile learning (m-learning): this is the delivery of electronic learning (e-learning) materials on mobile devices such as personal digital assistants (PDAs), mobile phones, Tablet PCs, Pocket PCs, palmtop computers, etc. Quinn (2000) defined mobile learning as the intersection of mobile computing and E-learning. Mobile learning devices allow learners to learn wherever they are located and in their personal context so that the learning is meaningful (Sharples 2000). According to Tella (2003), mobile devices can be used to increase cognitive growth at the individual level, and an individual's motivation is enhanced when he or she is able to develop based on needs and context.

Bostock (2007) noted that blended learning design is an example of constructive alignment (a design for teaching to encourage deep engagement) where some teaching-learning activities (TLA) are technology based. It is interesting to note that Naismith *et al.* (2004) study revealed six board theory-based categories of activity and identifies several examples of mobile technology applications. They are:

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1. Behaviourist activities promote learning as a change in learners' observable actions. In the behaviourist paradigm, learning is thought to be best facilitated through the reinforcement of an association between a particular stimulus and a response. In a mobile learning context, examples of content delivery by text messages to mobile phones fall in this category (Thornton and Houser 2004).
2. Situated activities promote learning within an authentic context and culture. Situated learning posits that learning can be enhanced by ensuring that it takes place in an authentic context. Mobile devices are especially well suited to context-aware applications because they are available in different contexts, and so can draw on those contexts to enhance the learning activity. For example, the multimedia tours offered at the Tate Modern (Proctor and Burton 2003).
3. Constructivist activities the learner actively construct new ideas or concepts based on both their previous and current knowledge. Learners are encouraged to be active constructors of knowledge, with mobile devices now embedding them in a realistic context at the same time as offering access to supporting tools.
4. Collaborative activities promote learning through social interaction. Mobile devices can support mobile computer supported collaborative learning (MCSCL) by providing another means of coordination without attempting to replace any human-human interactions, as compared to online discussion boards which substitute for face-to-face discussions (Zurita and Nussbaum 2004).
5. Informal and lifelong activities support learning outside a dedicated learning environment and formal curriculum. Informal learning may be intentional, for example, through intensive, significant and deliberate learning 'projects', or it may be accidental, by acquiring information through conversations, TV and newspapers, observing the world or even experiencing an accident. Such a view of learning takes it outside the classroom and, by default, embeds learning in everyday life, thus emphasising the value of mobile technologies in supporting it.
6. Learning and teaching support activities assist in the coordination of learners and resources for learning activities. Mobile devices can be used by teachers for attendance reporting, reviewing student marks, general access of central school data, and managing their schedules more effectively. In higher education, mobile devices can provide course material to students, including due dates for assignments and information about timetable and room changes. Examples of using mobile technologies in this context include a mobile learning organiser which has been developed and tested at the University of Birmingham (Holme and Sharples, 2002; Sharples, 2003; Corlett *et al.*, 2004).

Learning and teaching with mobile technologies is beginning to make a breakthrough from small-scale pilots to institution-wide implementations. In order for these implementations to be successful, Naismith *et al.* (2004) suggests that educators and technology developers must consider the following key issues:

- Context: gathering and utilising contextual information may clash with the learner's wish for anonymity and privacy.
- Mobility: the ability to link to activities occurring in the outside world also provides students with the capability to 'escape' the classroom and engage in

activities that do not correspond with either the teacher's agenda or the curriculum.

- Learning over time: effective tools are needed for the recording, organisation and retrieval of (mobile) learning experiences.
- Informality: students may abandon their use of certain technologies if they perceive their social networks to be under attack.
- Ownership: students want to own and control their personal technology, but this presents a challenge when they bring it in to the classroom.

Considering the aforementioned key factors and activities that could be pursued using mobile phone technology, it is important to consider the learning aspect. The concept of surface and deep approaches to learning was first proposed by Marton and Saljo's (1976). Ramsden (2005) has highlighted seven differences between deep and surface approaches. Learning is about facilitation of understanding through critical reflection and discourse. It is the effectiveness with which information is transmitted. Deep learning uses reflective and collaborative teaching strategies to externalise meaning, provide alternative explanations, diagnose misconceptions and confirm meaning within a context that provides choice and respect (Evans and Nation 2000). A blended approach to enabling learning with mobile technologies is necessary as successful and engaging activities draw on a number of different theories (Skinner, 1968; Papert, 1980; Lave and Wenger, 1991; Vygotsy, 1978; and Eraut, 2000) and practices.

Few Universities have adopted different learning approaches to provide much of the information and interaction to students anytime and anywhere through mobile technology. Mobiles Enhancing Learning and Support (MELaS) is a Joint Information Systems Committee (JISC) funded project focused on the usage of Short Message Service (SMS) within education. The University of Wolverhampton was one of the first Higher Education Institutions in the UK to experiment with SMS and other forms of mobile learning. Along with this commitment, the University of Wolverhampton has adopted online methods for teaching and learning through the use of Wolverhampton Online Learning Framework "Wolf", "e-vision" and "Pebble Pad". The purpose of the research was to investigate teaching and learning activities through the use of mobile phone technology.

METHODOLOGY

Different research methods are suited to different problems involving teaching and learning. Until the 1950s, quantitative methods were considered by many to be the one and only means of scientific research both for confirmatory and exploratory research. However, the discourse on research methods has evolved since the 1950s to explore qualitative methods as a valid scientific approach. Interpretative and qualitative perspectives made their presence felt from the modernist or golden age (Denzin and Lincoln 2000). Subsequently, mixed method involving both the qualitative and quantitative aspects evolved. Punch (1998) stated that no particular method is necessarily superior. Furthermore, Creswell (2003) emphasised that the aim or objectives for a given research question determines the method used.

The aim of the research was to investigate teaching and learning activities through the use of mobile phone technology. To achieve this aim, four objectives were identified.

They are:

1. Plan how mobile phone technology will be used to enhance student interaction.
2. Explore different methods to support learning and teaching through mobile phone technology.
3. Analyse how many used the technology to improved learning experience.
4. Evaluate the use of the mobile phone technology for teaching and learning activities.

For this research quantitative, qualitative and mixed method were examined. Thereafter, quantitative method was adopted. The research started with literature review that focused on understanding the issues, challenges, and benefits relating to mobile phone TLA. A training session was attended to gain insight about the facilities available in MELaS. The following items were discussed during the training session:

- General information about the system
- Instructions to incorporate mobile phone numbers for students and staff
- Getting the students into a group for sending texts
- How to send (i) push messages; (ii) quiz questions (iii) text conferences
- Help procedures

PLANNING ASPECTS FOR USING MOBILE PHONE TECHNOLOGY

To achieve the objectives, there was a lot of prior planning done. Key aspects considered during the planning phase included

- Level of implementation (Postgraduate or undergraduate)
- Module for implementation
- Type of functions to be used in the MELaS

A postgraduate level module was chosen because of the following reasons:

- It has a diverse range of students (i.e. construction management and construction law background as well as part-time and full-time students).
- It includes students from developed, developing, and under developed countries.
- Students were mature and had been exposed to mobile phones only few years ago.

Needless to say, this phase involved many assumptions that needed to be validated and verified in the context of the proposed research. For example, the level of student exposure to mobile telephone technology, student background, cultural issues are very difficult to assess and quantify.

DIFFERENT METHODS TO SUPPORT LEARNING AND TEACHING THROUGH MOBILE PHONE TECHNOLOGY

The key function of MELaS is sending three types of text messages. They are: push messages, quiz questions and text conference. In this module, it was planned that only push message and quiz questions were used as it was deemed unsuitable to use text conference for a class which has more than 20 students. By using push messages and quiz questions, three of the six activities mentioned by Naismith *et al.* (2004) were used (i.e. Learning and teaching support activities, Constructivist activities and Behaviourist activities)

The students were informed about the use of mobile phone technology on week 1 of semester 2. This included the following:

- The system is for learning and teaching use only
- No student will see each others' numbers
- Students cannot contact tutor by text
- Students will be charged at normal rates for any messages sent
- No texts will go to students between 9 pm and 8 am
- Students without phones, or who have opted out, get an equivalent e-mail
- Students can opt out – in two ways
- There is an evaluation of the project

Students were given instruction on how they could enter their mobile phone numbers through "e-vision". During the first week, 23 students registered, the next week 32 students registered (25 mobile numbers and 7 email) and by week five 39 students had registered (37 mobile number and 2 emails). An increasing number of registrations indicate that it did help students to realise the benefits of using mobile phone for teaching and learning activities.

Four quiz questions and four push messages were delivered throughout semester 2 (January – May 2008). Therefore, embedding teaching through mobile phone technology every other week of the semester. Each of the quizzes had three questions. It was a combination of multiple choice and true/false type of questions. The feedback for these questions included information about what is correct and not correct, why that is the answer and tips on what to do if students gave an incorrect answer. Through the use of mobile phone technology the feedback is instant.

When a quiz is posted, the subscribed students receive a message which reads as follows: "Your tutor Subashini Suresh has set a quiz CN4040-Quiz 3 with three questions; it finishes on 18/04/08. To take part reply to this text with Q 287 join". Once the student replies through his/her mobile phone the first question is received. When the first question is answered, the students receive an automatic answer (i.e. feedback). Thereafter, it is followed by second and third question. Once the student has answered all the three questions he/she is assessed and receives a final text message stating, "You have completed quiz: Q 287. Your score was 2 out of 3". This text message is received if the student has answered 2 correct questions out of the 3 posted.

ANALYSIS

The module was taken by a total of 44 students at the University of Wolverhampton. Of these, 37 students have incorporated their mobile number at the appropriate place in the e-vision (a system used for students to register) to receive text messages. However, 2 students opted to receive email message and 5 did not participate.

Table 1: Number of quiz and student response rate

Quiz	Number of students who put their mobile number on e-vision	No. of takers	Percentage response rate
1	25	7	28%
2	37	10	27%
3	37	8	22%
4	37	4	10%

Of the participated students, 23% (Average of the percentage response rate in Table 1) showed reflection-in-action and reflection-on-action which was used as part of this exercise. Schön (1983) identified these as 2 main types of reflection. Thinking on the feet to answer the quiz question which can be referred as reflection-in-action and reflecting after the action when the answers were received can be referred as reflection-on-action.

Seven students had taken part in the first quiz (See Table 2). The first question was a true/false question followed by two multiple choice questions. Analysis of the seven students revealed that for question 1, six of the seven students got it correct. However, for question 2 only two of the seven got it correct and for question 3 only three of the seven got in correct. This could be that the multiple choice options were very close and students tend to assume the wrong option. It indicates that students need to pay attention to details.

Table 2: Quiz 1 responses to the questions n=7

Question	Correct	Wrong
1	6	1
2	2	5
3	3	4

EVALUATION

Evaluation of the use of the mobile phone technology for teaching and learning activities was conducted through a questionnaire at the end of semester 2. Twenty six students out of the 44 students (59%) participated in this exercise. The evaluation form consisted of 15 questions. Seven of the fifteen questions were on a 5 point Likert scale (1-Strongly agree, 2-Agree, 3-Neither agree nor disagree, 4-Disagree and 5-Strongly disagree) and one question was on 3 point Likert scale (1-preferred more, 2-about the right number, 3-preferred less). Six questions had yes and no options and one question was presented in an open-ended format.

The questions were written to gather various pieces of information that was be broken down into sections relevant to the research. It started with general questions regarding the ownership of mobile phone and the type of plan (contract or a pay per call). All the 26 participants in the evaluation owned mobile phones. Seventy seven (20 of the 26 students) percent of them were on contract plan and the rest had pay per call plan.

The next section consisted of questions that were relevant to student participation in the research. For example: did you “opt-in” to receive messages; did you “opt-out” of receiving messages; did you sent any messages to the system. All the 26 students participated in the evaluation had opted in to receive messages.

The next set of questions focused on student thoughts on the number of text message and quiz received. This was followed by intrinsic questions whether mobile phone technology helped students to learn. These questions were opinion questions using 5 points Likert scale, Table 3 shows the questions and the respective mean value. It can be inferred that mobile phone technology has helped students to learn because the mean value is between 1 - Strongly agree to 2-Agree on the Likert scale. It also shows that they like using mobile phone for learning and think that using text messages in learning is a good idea.

Table 3: Evaluation questions and their respective mean value

Sl. No	Question	Mean
1	I think using text messages in learning is a good idea.	1.92
2	The text message I received have helped my learning.	1.89
3	I like using my mobile phone for learning.	1.84

CONCLUSIONS

The research started with literature review focusing on teaching and learning activities through the use of supporting technology. As part of the MELaS project the research was conducted at the University of Wolverhampton. The research also suggests that teaching and learning activities through the use of mobile technology facilitated deep approach to learning. Of the participated students, 23% demonstrated two types of learning by reflection i.e. reflection-in-action and reflection-on-action. Evaluation through questionnaire showed that mobile phone technology has helped students to learn. The research concluded that three of the six board theory based activity: Learning and teaching support activities, Constructivist activities and Behaviourist activities have been embedded through the use of mobile technology. The other three theory based activity i.e. Situated activities, Collaborative activities and Informal and lifelong activities could be considered for future work.

The research provides a promising ground for future research and collaborations between institution of higher learning in the UK and beyond. Mobile phone technology presents educators with both promise and challenge. The interface between faculty and students requires that faculty are also assessed in terms effectiveness to deliver the subject matter. In this model, the interfaces can be defined by individual faculty. Future research may be focused on the interface between Teaching, Scholarship and Outreach, Professional Development and Service. Alternatively, they may represent transient or sustained discretionary activities meeting the ever changing state of technology. Therefore, mobile phone technology provides a richly diverse set of possibilities and alternatives to develop sound criteria for teaching paradigm of the future. Furthermore, these new methods of teaching provide educational institutions with the appropriate mechanism and needed flexibility to meet specific needs and missions.

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