STUDENT PERSPECTIVES ABOUT USING MOBILE DEVICES IN THEIR STUDIES

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ABSTRACT

Universities all around the world are striving to enhance learning through the use of innovative information and communication technologies. The high level of student ownership of mobile devices means that ubiquitous learning (anytime, anywhere) is becoming a possibility and universities want to engage with the generation of 'digital natives' who now comprise the majority student cohort. This paper reports on the results of a survey of four hundred and forty two postgraduate and undergraduate students at an Australian university about their positive and negative attitudes to the use of mobile technology in education. An analysis of the qualitative survey findings is presented focusing on the ramifications for m-learning practices in university learning and teaching environments.

KEYWORDS

mobile learning, education technologies, student perspective

1. INTRODUCTION

In recent years there has been a growing recognition of the disparity between the educational needs of the current generation of university students and much of the formal classroom education that takes place at universities. Ways of acquiring new knowledge for 'digital natives' have been strongly influenced by the information and communication technologies - ICT - with which they have grown up. As well as being adept with desktop computers, digital natives are high users of an ever increasing range of mobile devices. Mobile phones are almost ubiquitous with 97.3% of university students born since 1980 - the digital native's generation - having some sort of access to a mobile phone (Kennedy et al, 2006, Litchfield et al, 2007).

Studies (Bradley et al, 2005; Cao et al, 2006; Kennedy et al, 2006) have tried to define the preferred learning approaches of this generation. Marc Prensky who coined the term 'digital natives' describes their learning as 'short burst, casual, multi-tasking'. For them the small screen of the mobile phone is 'a window to an infinite space' through which they are able to undertake the following learning processes: listening, observing, initiating, questioning, reflecting, trying, estimating, predicting, practicing and 'what-ifing' (Prensky, 2005).

Digital natives' learning style can be characterized by: a preference for receiving information quickly, coupled with the ability to process it rapidly; a bias towards multi-tasking and non-linear access to information; a heavy reliance on ICTs for information access and communication; and a preference for active involvement in learning over passive learning in lectures (Kennedy et al, 2006).

There is a strong imperative to develop a new educational approach which will take into account the needs of the digital natives' generation, while also providing for the diversity of learning needs in the student population. Examples include mature 'digital immigrant' students (older students who have not grown up with the technology) and international students whose first language is not English.

Mobile learning is the facilitation of learning and delivery of educational materials to students using mobile devices via a wireless medium. There have been an increasing number of studies of mobile learning over the last few years, mostly in the USA, Asia, the UK and Scandinavia. Several researchers have used

surveys of students and university lecturers as their starting point for investigating mobile learning. Their objective has been to ascertain the extent of mobile learning in university education and also to investigate the potential for leveraging mobile educational practice from existing mobile use.

With the exception of a few notable large-scale implementations of podcasting in the USA (Thomas, 2006), and leaving aside many short-term projects, the university sector has *not* adopted mobile learning extensively. Interviews of professors at eight universities in Australia, New Zealand and the USA conducted by Al-khamaysah et al (2006) showed that none had adopted mobile learning despite widespread use of e-learning.

Most surveys of students show that few students use their mobile phones for learning - 1 in 6 according to Pettit and Kukulska-Hulme (2007). Mobile learning is currently in an exploratory phase with universities unclear about the case for investing in a new set of expensive technologies, and educators still testing different delivery applications. Other surveys have concentrated on the issue of 'threading innovative uses of technology into the existing fabric of behaviour' (Pettit & Kukulska-Hulme, 2007). These user-centred studies have focused on uncovering students' existing patterns of use and making these the basis for mobile education (Kennedy et al, 2006).

However, the aim of our survey was to find out what the students thought about the use of mobile devices in their learning environment. We tried to avoid the presumption that all university students could be treated like 'digital natives' who wanted to use their mobile devices as learning tools. Instead, we wanted to ask students themselves how they felt about the issue and what they thought about using some mobile technologies in their studies. We were interested to find out where students would see the useful and/or useless aspects of mobile devices in their learning and hear their side of the story. It was important to our mobile learning research group to first understand the students' perspectives before implementing actual mobile learning trials in our teaching. It may be very pertinent for any future implementations of mobile learning to know why and where students may appreciate the use of mobile devices. It is also important to know what objections and doubts students have about mobile learning and take these opinions into account in any mobile learning implementation.

The paper is set out as follows. Section 2 discusses the methodology of the study. The results and discussion are presented in Sections 3 and 4. The conclusions are contained in Section 5.

2. METHODOLOGY

The research involved the deployment of a web based survey to students who were invited to participate anonymously. An online survey was chosen as the most efficient and economic method to collect a large number of students' opinions. Since this study was exploratory in nature, it was important to uncover a wide array of issues, and a web-based survey with its wide reach seemed an ideal tool for that. Anonymity ensured that students felt free to express both positive and negative comments about mobile learning.

2.1 The Survey Instrument

The web-based Survey Manager provided by the University of Technology, Sydney was the survey instrument. During 4 months (December 2006 to March 2007), invitations (including a web link to the study's anonymous survey) were sent to students in various faculties (such as Information Technology, Design Architecture and Building as well as Business). The web-based survey consisted of questions concerning demographic data as well as a series of questions on the types of mobile devices they used and their attitudes to using these devices in lectures and tutorials. Because of the exploratory nature of this survey, the questions asked were quite open, allowing the respondents to express a wide range of opinions. The students were asked what advantages and disadvantages they see in using mobile devices in their studies, whether and why they would like to use such devices for communication with lecturers or other students, and whether they had any other general comments about using mobile devices in their studies.

The ages of the respondents ranged from seventeen years of age (17) to fifty-three years of age (53) and they came from a wide range of countries from Asia, Europe, Australia, North and South America. Seventy-eight percent (78%) of the respondents were male and twenty-two percent (22%) were female whilst ninety-one percent (91%) were full time students whilst nine percent (9%) were part timers.

We used stratified purposive sampling as it illustrates characteristics of particular subgroups of interest, in this case, over 400 university students from a number of faculties (Purposive Sampling, 2007) This stratified purposive sampling technique enables gathering of a variety of opinions and perspectives, in addition to enhancing the credibility of data collected from several sources (different faculties, part time and full time students, different ages and backgrounds). Accordingly, because it is not used to generalize to the large population, this sampling technique does not need to be statistically representative. Stratified purposive sampling aims to create rich, in-depth information (Liamputtong, 2005; Zmijewska & Lawrence, 2005).

As purposive sampling is used to the point of redundancy (Liamputtong, 2005), the sample size, which is the number of participants, is less important than the richness of data. Therefore, we stopped collecting more data (N= 442) when we realised that the new answers did not seem to provide any new insights, not mentioned earlier. We also followed another strategy suggested by Johnson (1997) to promote the validity of qualitative research such as our open ended questions. Verbatims (direct quotes) are a commonly used type of low inference descriptors. Such examples of data not only validate the conclusions, but also provide rich illustrations of the topic (Zmijewska & Lawrence, 2005), and therefore this paper utilizes numerous direct quotes from the subjects. Accordingly, this paper deals with both the negative and positive comments made by the students about the use of mobile devices in university learning environments, using the students' own words to better illustrate their opinions.

3. RESULTS

As can be seen from Figure 1, over 94% of the students owned mobile phones. Other types of mobile devices (such as PDAs, iPods and MP3 players) were owned by fewer than half of the respondents. This leads to an important issue to consider in any future mobile learning implementation: who would cover the cost of devices for the remaining students? Mobile phones seem the best device to use in terms of high student ownership, yet a requirement to use them in a course would disadvantage a small percentage of students who do not own or use a mobile phone.

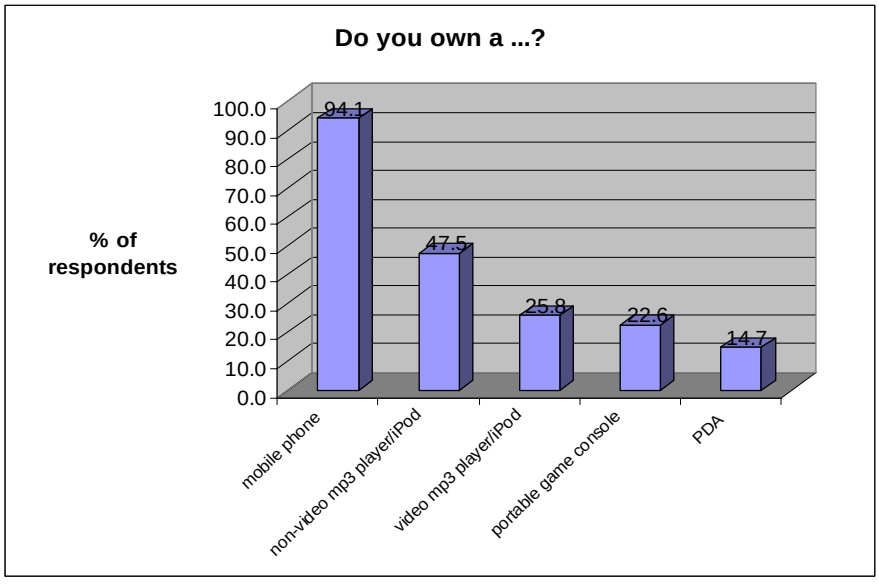

Figure 1. Ownership of mobile devices

Table 1 shows the type of activities for which the students use their mobile devices. The uses reported were quite varied, but making phone calls and sending SMS messages were the only activities practised by the majority. Listening to music was also a major activity reported by almost half of the students surveyed.

Table 1. Main uses of mobiles

What are your main uses of mobile devices? (more than 1 answer allowed)		
TOTAL	**442**	%
To make phone calls	407	92.1
To SMS	369	83.5
To listen to music	217	49.1
To download emails	50	11.3
To play games	126	28.5
To read news	55	12.4
To browse the Internet	70	15.8

Additional (voluntary) answers included:
to use as an organiser (7), to watch movies (5), to take photos (5), to use as an alarm clock (4), to use as portable storage (2), and to make video calls (2)

3.1 Positive Comments on Uses of Mobile Devices in Education

One important finding from the survey was what students thought about using SMS for communication at university. The participants considered SMS an excellent way to communicate urgent and short messages, or, as put by one respondent, "for small but important information" and "if there is immediate need to communicate" (otherwise, email should be used). They had very specific situations in mind where mobile communication would be very handy, and they included alerts "if a tute [tutorial] or lecture were cancelled or moved at short notice", "change in room number", "reminders of due assignments", "getting my assignment marks", "assignment/test/exam extension or amendment", "important changes in the timetable" or any other significant course notices so "you never miss important information" as "students almost always have access to their mobile phones and signal, whereas only sometimes have access to email".

Another recommendation was using an SMS to "notify you that an e-mail has been sent", and many stressed that SMS should only be used "in addition to email", which is best summarised in the following quote: "I would be interested in receiving notifications via SMS, but as an addition to email rather than a replacement". This seems to be the most preferred option, with many other students stating that "SMS can alert you first, with basic info, and then you can go check your email to read the actual announcement, or just if you want more detailed information".

Some students also thought that "all lectures should be available via podcasts". "Lecturers could record their lectures and podcast them", which would "enable me to listen anywhere". Students did not think podcasts would replace lectures, as expressed in the following comment: "Yes I'd still attend lectures as the podcast would only be a reflective tool". Students could listen to them, for example, on the train and could "playback if I miss some points".

Some students commented on the convenience factors of mobile devices. Others liked the idea of using a mobile device for communication with lecturers "to reduce embarrassment of asking questions" "because a lot of students are too shy to ask out aloud", "and some people are afraid to comment because they could be wrong".

The use of mobile devices in learning can also make it "more practical" and makes it, for example, possible to "fully apply the study theory on the real gadget for practice". Mobile devices therefore can be "a tool for practical studies" and "give students a more hand-on experience of the topics" and "get people more technology oriented".

Mobile devices can also make learning "more interesting", and create "additional learning opportunities". Some participants thought that mobile devices provide more ways of communication, and increase availability of information.

3.2 Negative Comments

Many respondents were against the educational use of mobile devices, especially in class, but also in their free time. The use of mobile learning communications could be "just annoying", "invasive", and "you can get disrupted by a message at any time". As one respondent put it, "you don't want to be receiving SMS messages from lecturers when you're on a date or out with your friends". Phones "demand my attention when they dictate regardless of what I am doing. I prefer email and discussion room posts because they wait until it is convenient for ME to attend to them". Some respondents would prefer to use their phones "for personal use as much as possible" and not let course-related mobile communication disrupt their free time.

When used in classes, mobile phones could also be distracting to both students and lecturers. As expressed in one comment, "I don't think that phones (in particular) should be used within a lecture as it provides too much potential for distraction". This distraction could be "of mobile phones constantly ringing", or "distraction of having the temptation to do other things with the mobile phones".

Cost was seen as a major barrier in the use of mobile devices for learning. The issue of getting a new device was often mentioned: "this would place poorer students without such devices at a disadvantage", or "people who may not be able to afford a phone with the necessary capabilities may be disadvantaged". Another issue was the cost of an SMS. Many participants would simply "not SMS lecturers unless it was free". This seemed an important issue to students as "Uni is expensive enough without extra phone bills".

Another issue that was often raised in the survey is that mobile devices in learning could be "another bloody hindrance to open human communication". They would weaken "the social aspects of talking and interacting with others" and cause "disengagement from social situations". The threat of losing face-to-face interactions and "more general human modes of communication" was mentioned particularly often, and the issue of "de-personalised interactions that could be done face-to-face". The respondents also thought that "it is a misuse of the technology if we start to communicate via the technology and we are in the same room / lecture theatre with the person".

The participants thought that it was hard to convey ideas using mobile devices. As they expressed it, "it seems hard to me to explain a concept by using SMS". Some asked: "why ask questions via a mobile device when you can speak to them [lecturers] face to face - they can diagram on paper and explain things better". Additionally, on a mobile phone "you sometimes don't get the same details or the question doesn't come across the right way via SMS". Mobile questions could only be very short, "due to word limits" and "it's deliberately shortened". The answers expected from lecturers might be “longer and more complicated than can go in an SMS", and "the solutions may require a very long explanation" and therefore not be suited to mobile communication. The respondents also pointed out that communication by mobile devices is still "too limited because of screen size" and "it is not good for my eyes because of the screen size". Additionally, "input is much slower on mobile phones" and "inputting data using a mobile device is not as easy/fast as that using a computer", and "more tedious compared to a keyboard".

Instead, the respondents often preferred face-to-face communication or email. Email was liked because "I find people tend to communicate much more clearly using email, compared to SMS" and "email can be more explanatory than SMS". Another factor was that email messages do not have size limitations of SMS: as one student put it, "most SMS are limited to 160-ish characters before it breaks off into another SMS. If message is large, I would prefer an email". Other issues with mobile communication included the inability to keep track of all messages and the difficulty to maintain an audit trail. On the opposite side, "email is good because you can easily get a hard copy of information sent to you, or even just save it to a more permanent location rather than a message inbox".

Another concern could be "receiving non-subject relevant messages from the university and from any third party who has access to these details" and privacy issues, as well as unauthorised access to students' stored phone numbers.

4. DISCUSSION OF THE STUDY

A number of practical findings were uncovered during the study, as revealed in Section 3. Students provided many useful observations that should be taken into account when designing and implementing new mobile learning solutions.

Positive suggestions for mobile learning included:

- Many students agreed that a mobile device could be very useful in learning if it was used for receiving short messages with important and timely course alerts. Some existing implementations of such systems support our findings. The Famborough College, for example, uses SMS to communicate with students and parents about day to day college information, including timetable details, assignment due dates, parents' evenings and college events. At the University of South Africa, SMS is also used to inform students about the due dates of their examination results or closing dates for semester registration (Nonyongo, 2005). The authors of these studies report on students' approval of such communication between themselves and their institutions. Students were pleased, or pleasantly surprised to receive such messages, and they saw such contact from the university as reassuring and motivating (Nonyongo, 2005). It is important to note, however, that according to our respondents, such messages should only be used to supplement email messages that would provide more detailed information.
- Providing lectures as podcasts also seemed useful to students who did not see it as replacement of lectures, rather as an additional tool to be able to reflect on the material or listen to it again in their free time. This is supported by the case of several California State University campuses that offer their students podcast downloads of lectures, campus news, and class notes into their portable iPod systems. The reported benefits include students being able to control when and how they can access provided resources; the system also helps lecturers who find it hard to make themselves available outside the classroom (CSU, 2006).
- Mobile devices could also be used in class for students who are too shy to ask questions aloud. This may be more significant for international students from Asia where the concept of saving face results in a strong avoidance of asking questions in class (Nataatmadja et al, 2007; Liu, 2001).
- Mobile devices may make learning more interesting.
- They may also make learning more practical. Where students learn how to program a mobile device, the use of actual devices was seen as more practical than the use of simulations. Milrad et al (2004), for example, deployed mobile and wireless technologies to support hands-on scientific experimentation and learning. They concluded that the experiences of learners were enriched as the system brought them closer to the real activities.

On the other hand, it is most important not to overlook the many challenges and issues that students discussed in the survey. Since students thought phone messages may be disruptive and invasive in their free time, it is an important issue to consider in future implementations of such mobile learning systems. One possibility could be students pre-registering their preferences in terms of hours and days when they do not wish to receive any messages at all. They could also register their preferences in terms of what kinds of messages they wish to receive. For the sake of equity, it is important to ensure that such messages are also given to students via the Web so that those who opt out of the messages or do not own a mobile phone may still have access to the information

Cost was a very important issue to the respondents. Students seem to be willing to accept only systems where they would not have to bear additional costs. It seems then that systems where they would be receiving messages would be viable for them, but not one where they would be required to send and pay for messages themselves. Additionally, as mentioned earlier, the only mobile device that the majority of students have is a mobile phone, and even this does not mean that 100% of students can be expected to have one. Ownership of PDAs and other mobile devices commonly used in mobile learning is low amongst our students, who may not be prepared to buy one to accommodate their lecturers. Similarly, one university in the USA found that the cost of a PDA was prohibitive for some students even though the students saved money in other ways, such as by eliminating a prescribed textbook (Rawlinson & Bartel, 2006). While there is a well accepted notion that students incur the costs of textbooks, study materials and stationary themselves, and also pay phone charges for keeping in contact with fellow students outside class, there is no expectation by students that they will also have to pay phone charges for activities that take place in the classroom or buy new mobile devices for their education.

Students provided many perspectives about the communication potential of mobile devices. Mobile technology was viewed as designed for people on the move, unable to speak to each other in person. Students would not like to replace human-to-human communication with mobile phones, and they thought that mobile communication can only be very limited. The problem is reinforced by the input and output limitations of mobile devices. It is also easier to save a large number of messages on the computer than on a mobile phone.

This again confirms that the type of communication chosen for mobile devices in learning needs to be very carefully considered, and it can only be the kind of communication that favours short and simple

messages - urgent alerts, as mentioned earlier, seem very suitable. The April 2007 case (Hauser & O'Connor, 2007) of a student shooting staff and other students at Virginia Technical University provided a graphic example of how university management could have warned students that a gunman was on campus had such an alert system been in place. Mobile communication should not, however, replace personal contact between teachers and students, or between one student and another.

Another important issue that would need to be considered is ensuring the privacy of students' data, and protecting them from spam.

5. CONCLUSION

This paper has reported on the attitudes of 442 university students to mobile learning via an anonymous web based survey. The authors have analysed the answers to the qualitative questions in the surveys in an attempt to gain an understanding of how current students view the use of mobile devices in a learning environment. Although the respondents identified positive feelings to the use of mobile devices in learning environments, such as limited use of SMS messages for alerts and the use of podcasts for lectures, they also identified potential problems. Students were afraid that the use of mobile devices in the learning environment could weaken interpersonal communication, cost too much and were not sufficiently advanced for describing complex tasks. Further research on effective, appropriate and low-cost use of mobile devices in student learning and management will be the focus of our future work.

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