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Engaging Students with Mobile Web2.0

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***Abstract:** Blogs, wikis, podcasting, and a host of free, easy to use web2.0 social software provide opportunities for creating social constructivist learning environments focusing upon student-centred learning and end-user content creation and sharing. Building on this foundation, mobile web2.0 has emerged as a viable teaching and learning environment, particularly with the advent of the iPhone (Nicknamed “the Jesus phone” (Goldman, 2007)) and iPod Touch. Today’s wifi enabled smartphones provide a ubiquitous connection to mobile web2.0 social software and the ability to view, create, edit and upload user generated web2.0 content. This paper outlines how mobile web2.0 technologies can be harnessed to enhance and engage students in a social constructivist learning environment. Examples of student and teaching staff feedback are drawn from several mobile learning trials that have been conducted at Unitec New Zealand. Additionally the presentation will involve mobile web2.0 demonstrations and facilitate a discussion around the practicalities of integrating and supporting mobile web2.0 within a tertiary course.*

Introduction

Pedagogical Foundations

Pedagogical approaches to teaching and learning environments range from teacher-centred (instructivism) to student-centred collaboration (social constructivism). Traditional tertiary education has followed an instructivist pedagogy. However, increasingly school leavers are entering tertiary education with content creation skills honed from their immersion in digitally facilitated social network sites (Boyd & Ellison, 2007). They have been nick-named the ‘net-generation’ and ‘digital natives’ (Oblinger & Oblinger, 2005; Prensky, 2005). These learners have also been named ‘generation C’, the content creation generation. As Bruns argues (2007), this is not necessarily age related, but “a loose but significant grouping of participants who (on average, and perhaps implicitly rather than explicitly) share a set of common aims and practices.” While this portrayal of today’s school leavers immersed in Web2 (current and emerging collaborative and reflective e-learning tools, e.g. blogs, wikis, RSS, instant messaging, podcasting, social book marking, etc... are often called social software or web 2 tools) use has been challenged (Kennedy *et al.*, 2007), it is in general their willingness (and in many cases preference) to adopt new technology (JISC, 2007) that sets them apart from previous generations of learners. There is potential to engage and guide these learners in education by leveraging Web2 tools within collaborative, technologically rich social constructivist environments.

The choice and integration of technology into a learning environment should firstly be based upon sound pedagogical foundations. The underlying foundation chosen for the following examples is social constructivism, facilitating a student-centred learning environment. Communication (student to student, student to teacher, and student to resources) and student content creation were identified as key elements in establishing a social constructivist learning environment. Mobile web2.0 technologies were then identified as potential tools to facilitate this. Web2.0 social software provides a close fit with the tenants of social constructivism, providing easy to use, interactive, collaborative content creation and sharing tools that are accessible worldwide in an online environment that can enhance both face-to-face and distance learning. Three courses at Unitec were chosen as likely candidates for benefiting from this scenario. Their choice was based upon the adage ‘good things take time’ – as the researcher had previously established a working relationship as an academic advisor/developer with the tutors on each of these courses over a period of two years, where all three had chosen to experiment with the potential of web2.0 technologies in their teaching, and now were willing to engage with a progression to mobile web2.0 technologies (Cochrane, 2007b). This paper focuses on the outcomes of the first two mobile trials, as the third trial is still in its early stages.

The three courses and volunteer student participants selected were:

1. Diploma of Landscape Design (2007).
 - 8 students (three teams) –The average age of the students is 28 (19 to 49), and the gender mix was 5 female students and 3 male students.
 - 2 Course Tutors
 - Technology Steward (Thom Cochrane – CTLI)
2. Bachelor of Product Design (Year3).
 - 8 students – The average age of the students is 24 (19 to 33), and all are male students.
 - 2 Course Tutors
 - Technology Steward (Thom Cochrane – CTLI)
3. Diploma of Contemporary Music.
 - 11 students – The average age of the students is 22 (17 to 32), and the gender mix is 6 female students and 5 male students.
 - 2 Course Tutors
 - Technology Steward (Thom Cochrane – CTLI)

Three main reflection and feedback gathering tools were used with each of these courses:

1. Pre-trial surveys of lecturers and students, to establish current practice and expertise
2. Post-trial surveys and focus groups, to measure the impact of the wireless mobile computing environment (See Appendix for examples).
3. Lecturer and student reflections via their own blogs during the trial. Thus using the technology that is an integral part of the trials to capture data on participant’s progression.

Defining Mobile Learning

Definitions of mobile learning have focused initially upon the mobility of the devices and more recently the mobility of the learners. Sharples proposes a form of Laurillard's conversational framework, excluding the teacher, to define mobile learning by its contextual and informal learning characteristics. "The processes of coming to know through conversations across multiple contexts amongst people and personal interactive technologies" (Sharples *et al.*, 2006). However, a key element in the conversational framework is the dialogue between teacher & student. In contrast to Sharples et al (2006), Laurillard (2007) emphasizes the teacher's input in mobile environments through good pedagogic design that facilitates continuity between the face to face and remote peer learning contexts. Her definition of mobile learning incorporates the critical pedagogical design input of the teacher: "M-learning, being the digital support of adaptive, investigative, communicative, collaborative, and productive learning activities in remote locations, proposes a wide variety of environments in which the teacher can operate" (Laurillard, 2007).

Context Bridging

It is the potential for mobile learning to bridge pedagogically designed learning contexts, facilitate learner generated contexts, and content (both personal and collaborative), while providing personalisation and ubiquitous social connectedness, that sets it apart from more traditional learning environments. Mobile learning, as defined in this paper, involves the use of wireless enabled mobile digital devices (Wireless Mobile Devices or WMD's) within and between pedagogically designed learning environments or contexts. From an activity theory perspective, WMD's are the tools that mediate a wide range of learning activities and facilitate collaborative learning environments (Uden, 2007).

The WMD's wireless connectivity and data gathering abilities (e.g. photoblogging, video recording, voice recording, and text input) allow for bridging the on and off campus learning contexts – facilitating "real world learning".

The learning outcomes for students include:

- Developing critical reflective skills
- Facilitating group communication
- Developing an online eportfolio
- Developing a potentially world-wide peer support and critique network
- Learning how to maximise technology to enhance the learning environment across multiple contexts

MLearning Examples

The trials are using a variety of smartphones and situated in three different schools within the institution. Students and teaching staff are provided with a 3G smartphone. Initially Nokia N80 smartphones were used, which were later updated to Nokia N95's for the second half of the Bachelor of Product Design trial. The first trial relied upon prepaid SIM cards and students paying for 3G data costs, while the second trial (Product Design) were provided with a 1GB/month mobile broadband account plus a personal voice account (Students are responsible for paying for voice calls and txt messages, while the 1GB data plan costs are reimbursed by the project) for the duration of the trial. Internet connectivity is also available

via the Unitec WiFi network while on campus. As the Diploma of Landscape Design trial in 2007 indicated that the limitations of text entry on the smartphones was significant in hindering student reflection, participants in the 2008 trial are also provided with a folding Bluetooth keyboard that can be paired to their smartphone. Also student interaction and collaboration were significantly increased by switching from Wordpress (Automattic Inc, 2007) to Vox blogs (Six Apart Ltd, 2007), therefore Vox is used as the blog/eportfolio host of choice in 2008.

Pedagogical Design

The core activity of each trial is the creation and maintenance of a reflective Blog as part of a course group project. Additionally a variety of mobile friendly web2.0 tools are used in conjunction with the smartphone. The trials investigate how the smartphone can be used to enhance almost any aspect of the course. The project uses the smartphone within a wide range of activities (see the following diagram and table that attempt to illustrate the alignment of these activities with the projects underlying social constructivist pedagogy. There is an interactive online version available at

<http://ltxserver.unitec.ac.nz/~thom/mobileweb2concept2.htm> :

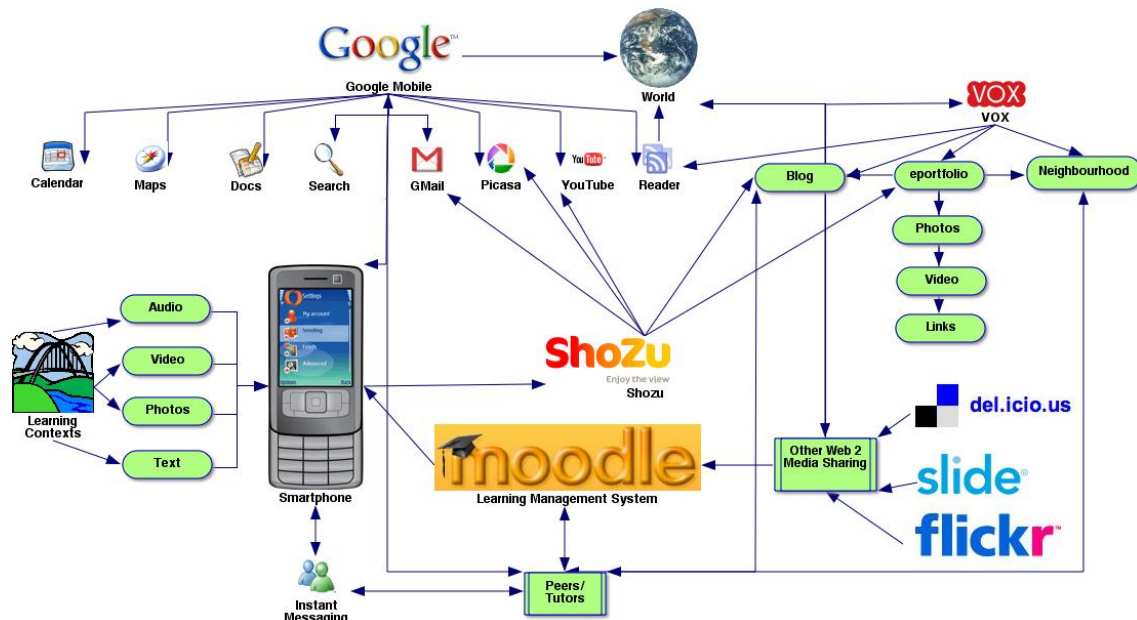


Fig 1. Mobile Web2 Concept Map.

Activity	Overview	Pedagogical outcomes
A reflective Blog	A blog post (including media) can be uploaded directly to VOX using the Vox client on Nokia smartphones, or ShoZu (http://www.shozu.com), or emailed to VOX xxxxxxx@moblog.vox.com	Developing critical and reflective thinking
An eportfolio	VOX (http://www.vox.com) includes media sharing (video, audio, documents, images, links...) and linking (YouTube, Flickr etc...) as well as social networking.	Collaborative sharing of media and peer critique, also forms the basis for a career portfolio.

Email	GMail (http://gmail.com) provides a free email account that can be used on almost any Internet capable device. A GMail account also opens free access to all other Google web services. The Google Java application optimises GMail for phones.	Communication and collaboration
RSS	RSS enables subscribing and tracking/sharing of online activity. It provides a link between all your web 2 media sites. Google reader (http://reader.google.com) is a great web based RSS reader, while Newsgator (http://www.newsgator.com) also provides RSS clients for synchronisation via PC, Mac or mobile.	Collaboration
Shared Calendars	Google Calendars (http://calendar.google.com) can be shared between groups of people via invitation. Google Calendars use an open format that provides interoperability between many calendar systems – e.g. iCal on Mac OSX	Time scheduling and collaboration of activities
Image Blogging	Dedicated image sharing repositories such as Flickr and picasaweb offer more interactive features than Vox’s image repository, and are linkable to Vox and other Blogging systems. Direct mobile upload to Flickr can be achieved via either the Vox client, or email. Picasaweb mobile is supported via Shozu destination uploads.	Event, data and resource capturing and collaboration. Creativity.
Video Blogging	YouTube (http://www.youtube.com) is currently the most popular video-sharing site. The mobile version supports viewing of videos online in the mobiles web browser, or via a downloadable Java client for specific phones. Uploading mobile videos to YouTube is achieved via email attachments.	Event, data and resource capturing and collaboration. Creativity.
Shozu	Shozu is a service for linking all your online mobile Blog and Media sites together via either the Shozu client application, or an email sent to go@m.shozu.com	Shozu provides links between all the pedagogies described.
Podcasting	Uploading an audio file to Vox creates a podcast episode that others can subscribe to via an automatically created RSS feed.	Interviews, critiques, reflections, shared collaboration.
Instant Messaging and Skype	Fring (http://www.fring.com) is a free Instant Messaging and Skype client for most mobile phones. It allows messaging between the most popular IM systems. It works best over a WiFi connection, or good 3G connection.	Communication and collaboration
Shared Bookmarks	Delicious (http://del.icio.us) is a social bookmarking site – allowing the creation and sharing of Internet bookmark libraries and searching via tags (descriptive keywords). Mobilicious (http://mobilicio.us) a mobile optimised version.	Collaboration
LMS	Moodle is a mobile friendly Learning Management System, hosted on a production level Unitec server.	Scaffolding and support

	Course notes, discussion forums, and various activities can be hosted on Moodle.	
Mobile Google	A gateway into the Google Mobile services (http://mobile.google.com) via the phones web browser. iGoogle (http://www.google.com/ig/i) is a customisable mobile Google Homepage.	Links to tools that support all of the mentioned pedagogies.
Mobile Codes	Mobile Codes (Datamatrix codes in this case) provide sharing of URLs, text and messages via scanning using the smartphones built-in camera. Codes can be created and downloaded from http://mobilecodes.nokia.com and scanned using either a compatible scanning application on the mobile phone.	Scaffolding, support, collaboration.
Web Browsing	The Built-in Web Browser is very good, but in some cases Opera Mini may work better, and Opera Mini has several tools built-in (RSS feeds, synchronisation with Opera on a PC etc...)	Research skills
Document Reading & Editing	Google Docs (http://docs.google.com) is Microsoft Word, Excel and PowerPoint compatible. Documents can be uploaded and shared and edited by a group. They are viewable online in a web browser without MS Office. Docs can be created on mobile devices by emailing the document to a private Google Docs address. To edit uploaded documents you need a full PC web browser, or a full version of 'QuickOffice' on your smartphone – a mobile version of MS Office (~\$60).	Documentation, reflection, critique, description, and collaborative document publishing etc...

Table 1. Table of trial activities aligned to social constructivist pedagogical outcomes.

Discussion

The first trial (Diploma Landscape Design 2007) provided a basis for informing the second trial (Bachelor of Product Design 2008). A full report of the first trial can be found on Google Docs (Cochrane, 2007a). The first trial highlighted the disruptive nature of mobile learning technologies, and their potential to move teachers and learners from an instructivist to a social constructivist pedagogy. The second trial attempted to better scaffold this pedagogical change and address the key technological shortcomings highlighted in the first trial.

The success of these trials is illustrated by the Bachelor of Product Design teaching staff requesting that similar mobile learning trials be established throughout the entire course – i.e. within first, second and third years in semester2 2008, with the aim of complete course integration for 2009. Additional internal funding (\$10080) to expand the mobile learning trial within the Bachelor of Product Design was successfully obtained for semester2 2008.

Staff and student feedback has been extremely positive, with significant gains in student output and engagement noted, and a desire for further use of the technology within their courses.

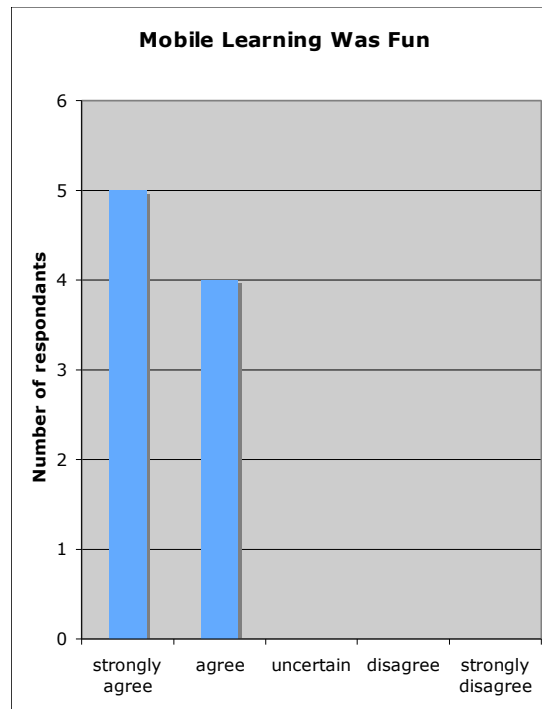


Fig2. Survey Feedback from BDesign students and staff June 2008.

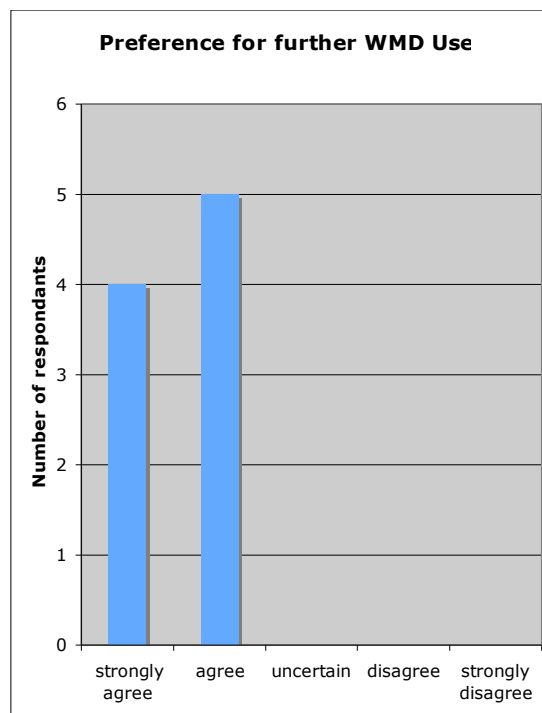


Fig3. Survey Feedback from BDesign students and staff June 2008.

Other schools within the institution are also showing interest – e.g. the School of Screen and Performing Arts, and the School of Architecture. Innovation in programme delivery is a strategic direction for the institution in 2009.

The anticipated learning outcomes from the mlearning trials for students were met.

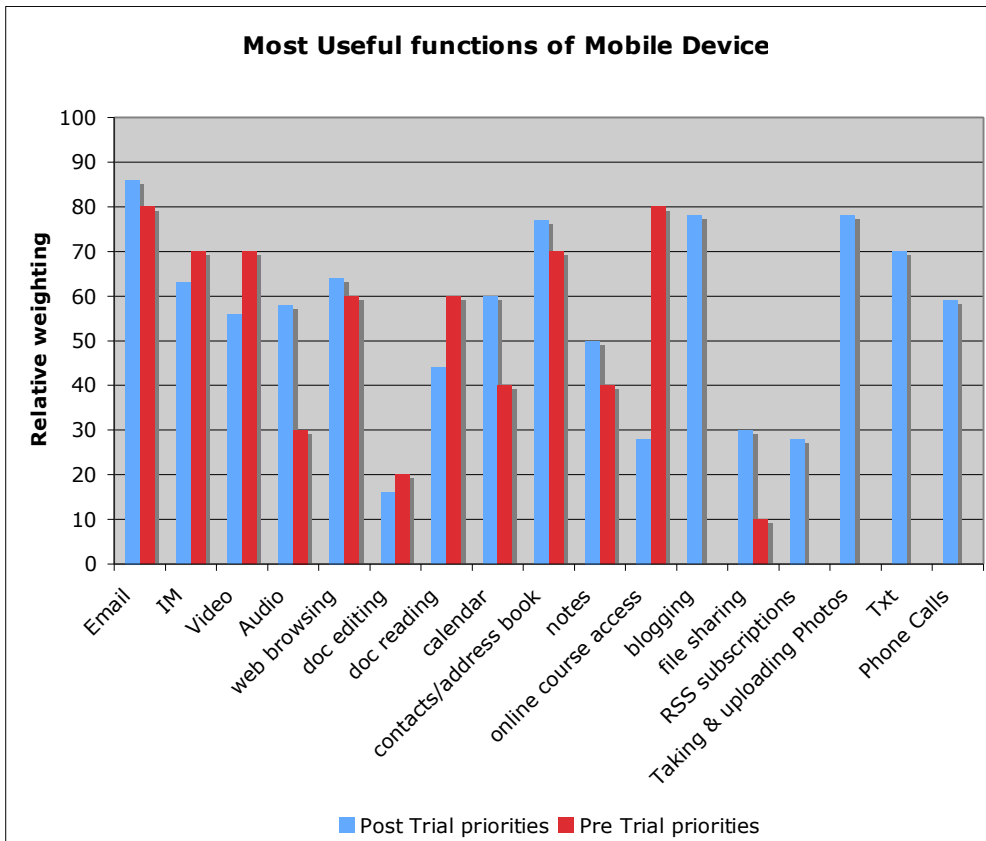


Fig5. Student perceptions of most useful mobile functions.

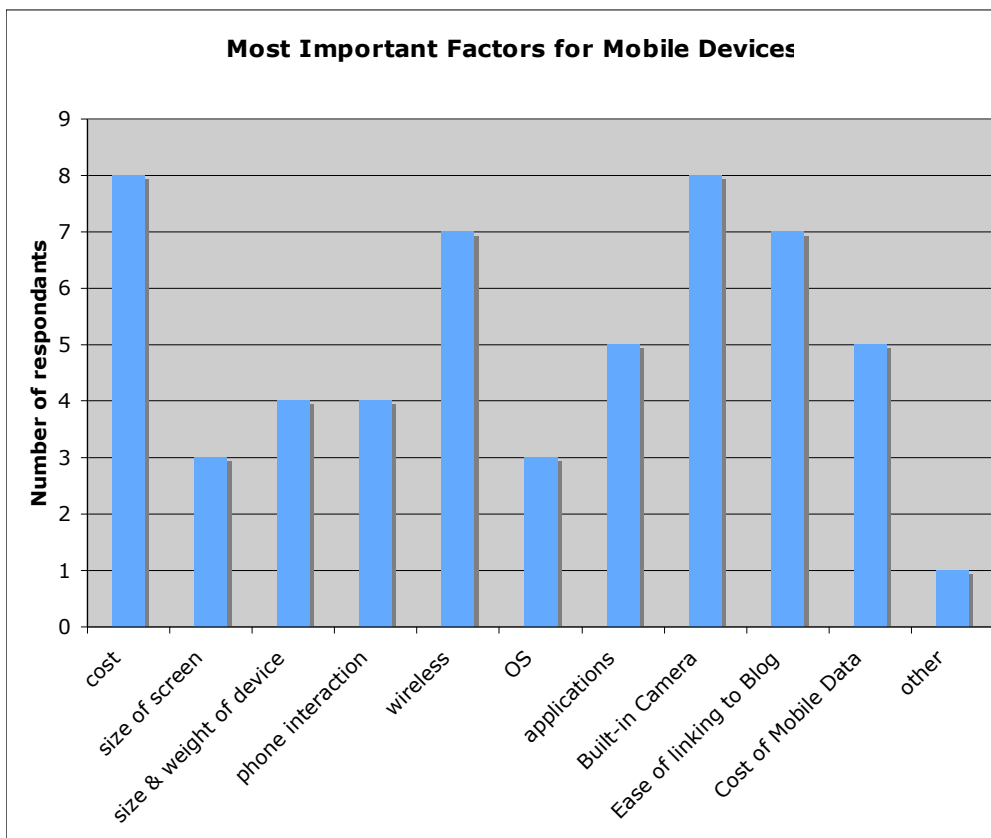


Fig6. Most important factors in considering mobile purchase by students.

When asked in what situations the WMDs were most effective, students replied

As a mobile computer – instead of a laptop, and as a communication tool for a team who are in different places all the time, too busy to meet, to transfer information, pictures, documents etc. (Diploma Landscape Design student 2007)

Spur of the moment, spotting something inspirational, documenting an idea when a PC is not around. (Bachelor of Product Design student 2008)

Staff feedback:

While integration into the courses required significant rethinking of staff pedagogies and assessment procedures, all the staff involved in the trials were very positive at the results (Cochrane & Bateman, 2008a; Cochrane & Clifflin, 2007).

Once I learnt how to use the technology I then moved on to be able to work with the students. I modified an elective exercise that we didn't formally teach, but was an opportunity for students to put their studies into practice by creating a design for the Ellerslie Flower Show. We decided to make it a course, that doesn't have to have content, but a process, synthesizing all aspects of their Landscape Design course and we can bring in all these learning technologies to support it, including blogs, wikis, and an eportfolio instead of presenting it the traditional way. So in 2006 we trialed it and have built on the idea since then. Thom helped us along the way with this... The Community of Practice that was fostered and the new skills that the students gained in the e-world were fantastic and contributed to them doing so well. It's been a great success and we get savvier every year continuing to experiment with new technologies. Students are feeling more satisfied with the capabilities of the tools they are using and I'm going to keep learning too! (Diploma Landscape Design staff 2007)

It isn't 'easy' working in this way but it is immensely valuable and exciting. I think that it would be very hard go back to traditional teaching only methods now I have begun to use blogging and mobile blogging. (Bachelor of Product Design staff 2008)

Now that I have mastered using WMDs as integrated teaching and learning tools: using up to date technologies to suplliment the studio teaching process, I am looking for the next innovation that we can bring to bear on the programme. (Bachelor of Product Design staff 2008)

When asked in what situations the WMDs were most effective, staff replied

Very useful for blogging so increased interactivity. (Diploma Landscape Design staff 2007)

As an aid to studio based design projects. WMDs allow staff and students to stay in contact outside of the studio as well as allowing staff to point students to on line resources to aid the learning process. (Bachelor of Product Design staff 2008)

WMDs assist when the students are working on live or industry based projects. The clients or companies can easily keep track of the individual students projects thus meaning that when face-to-face meetings do occur, no time is lost getting up to speed. Students seem to take a more professional approach to logging and communicating their projects when they know their client or sponsor company can look at their work at any time. (Bachelor of Product Design staff 2008)

Transformability/Sustainability

The two different trials demonstrated the transferability of the mobile web2 pedagogies developed. A general process for successful integration of wireless mobile devices using web2 social software within tertiary education courses has been developed and will be further refined and tested with subsequent projects throughout Unitec. The researcher's conceptual understanding of the definition and benefits of wireless mobile learning has developed significantly during these trials. Below is a generic outline of the mlearning trials that will be used and further developed in subsequent trials in other courses at Unitec.

Project Steps	Project Milestones
1. Pre trial	1.Brainstorm project goals and course integration with course Tutors
2. Pre trial	2.Purchase folding Bluetooth keyboards for smartphones 3.Investigate best option for providing voice and data connectivity 4.Configure the smartphones with software appropriate for the trial (e.g. Vox client, GMail client, Shozu client, Google Mobile and Moodle shortcuts etc...) 5.Setup Moodle support course
3. Pre including students in trial	6.Provide course tutors with smartphone and tutorials on setup.
4. Trial setup with students	7.Blog and Web2 setup session with Students and Staff
5. Trial official start with students	8.Provide students with smartphone and begin weekly technology support sessions.
6. On going, weekly throughout trial	9.Support students and staff during trial via weekly 'technology workshops' 10.Monitor student progress via their Vox Blogs/eportfolios
7. Mid trial and end of trial	11.Student and staff surveys 12.Focus group 13.Data analysis and report write up. 14.Re-evaluation of Trial for second semester
8. End of trial	15.Final Data gathering, analysis, and report write up.

Table 2. Typical Trial Process and Timeline.

The trials were made possible by the funding from the Elearning Guidelines (ELG) project. In their current form this is not sustainable in the future. The success of the trials has prompted investigation of alternate funding for 2009 and following. Options include negotiating a yearly educational data plan with free smartphone handset for students and staff from Vodafone New Zealand.

Conclusions

The symbiotic relationship developed between the academic advisor (technology steward) and the academic teaching staff involved in each of the mobile learning trials has proven a rich environment for harnessing educational technology to design social constructivist learning environments for different groups of tertiary students. It is hoped the insights gained will be useful for other academic staff wanting to implement pedagogical innovation, and for professional development staff seeking insights for facilitating academics to integrate educational technology into their pedagogies.

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Appendix

Wireless Mobile Study – end of trial questionnaire (DipLSD2007 Students):

QUESTION: (This is an anonymous questionnaire)	Your Answer: tick or circle most applicable answer/s, or write your answer in the space provided below.					
1. What is your Student ID number?						
2. What is your age?						
3. What is your gender?	Male	Female				
4. What has been your experience of group work facilitated by Blogs and RSS?	Very Good	Good	Not Bad	Neither Good nor Bad	Not Good	Terrible
6. It was easy to use the smartphone (Nokia N80)?	Strongly agree	Agree	Uncertain		Disagree	Strongly disagree
7. This mobile learning experience was fun.	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree	
8. Based on my experience during this trial, I would use a smartphone in other courses	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree	
9. I would be willing to purchase my own smartphone?	Yes	No				
10. Where did you use the Smartphone? Circle all that apply.	a. At home b. At Unitec in class c. At Unitec not in class d. While Travelling e. On site while investigating or building your project f. Other (specify)					
11. In your opinion, does mobile learning increase the quality of learning?	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree	
12. Mobile blogging helped create a sense of community (group work)?	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree	
13. Accessing your course blog was easy using the mobile device?	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree	

14. Mobile learning increases access to education?	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
15. Communication and feedback from the course tutor/lecturer was made easier?	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
16. Mobile learning is convenient for communication with other students?	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
17. Rate the usefulness of the following applications using mobile devices? (0 = no use, 10 = extremely useful).	a. Email b. Instant Messaging c. Video d. Audio e. Web Browsing f. Document editing g. Document Reading h. Calendar i. Contacts/Addressbook j. Notes k. Accessing online course material l. Blogging m. File sharing n. RSS subscriptions o. Taking and uploading photos p. Txt q. Phone calls				
18. What factors would be most important in deciding upon mobile learning?	<ul style="list-style-type: none"> • Cost of device • Size of the screen • Size & weight of the mobile device • Phone integration • Wireless capability • The operating system: PocketPC, Palm OS, or Symbian • Availability of installable applications • A built-in camera • Ease of linking to your Blog • The cost of mobile data • Other 				
19. Do you have any other comments on the mobile project?					

Questions for discussion

The main purpose of the focus group is to provide critical reflective feedback on the design and implementation of the learning activities and enhanced communication facilitated by the Wireless Mobile Device (WMD) used in the 'trial'. This feedback will provide valuable insights into the design of the following trial, and forms a critical reflective action research cycle of evaluation.

Focus Group Questions:

1. How would you rate the effectiveness of the WMD (N80 Smartphone) for accessing your/your students' blogs?
2. How user friendly was the interface of the WMD?
3. How would you rate the effectiveness of the WMD for increasing communication:
 - a. Between students
 - b. Between Students and Tutors/lecturers?
4. How useful were the WMDs for accessing course content?
5. Describe how the integration into the course of the WMDs may be improved.
6. (For Tutors) How would you rate the usefulness of the WMDs for your own teaching?
7. What level of interactivity did the WMDs provide?
8. What were the benefits of wireless connectivity?
9. What were the support requirements for the WMDs?
10. What other uses did you find for the WMD?
11. In what situations would the WMDs be most effective?
12. What do you think worked well, and what would you do differently another time?