Equipping Lecturers for the iRevolution

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In this paper we explore several critical factors influencing educational technology adoption including teaching staff buy-in and the critical nature of lecturer professional development within educational technology adoption projects (Kukulska-Hulme & Pettit, 2007, 2008; Learning and Skills Network, 2009; Moser, 2007). The paper outlines and critiques the methods used to achieve this staff buy-in as the second phase of a larger longitudinal eLearning and mLearning participatory action research project (Cochrane, 2010). The overall project makes use of social constructivism as the underlying pedagogical theory driving and informing the changes taking place. A community of practice (COP) model (Wenger, 1998; Wenger, White, & Smith, 2009) has been developed as a means of guiding and supporting lecturers as they develop their eLearning skills together. Artifacts created through this process (boundary objects) were then used to bring the lurkers into the core group from legitimate peripheral participation into full participation within the project's supporting COP.

Keywords: iPad, Community of Practice, mLearning

Introduction

The key issues driving the implementation of this research project are explored in the following sections.

The modern student faces a complicated balancing act in order to succeed in tertiary study. Students are often under financial pressure, studying many courses at once while working part time. Rising prices for transportation, food and textbooks, all key expenses for students, are compounding those pressures. While this poses challenges for the students, it also poses significant challenges for those teaching them.

Business education in New Zealand is funded at a lower rate per student than many other disciplines. This causes both internal and external funding pressure for business classes to maintain large numbers; in many cases, these classes take place in tiered lecture rooms with a strong teacher focus. These conditions generally result in a didactic teaching process reinforcing instructivist pedagogy where the students are largely passive learners. Attempts to move beyond instructivist pedagogy and improve the situation by engaging students through group work, interactive discussion and activities are hampered by the layout, size and fixed nature of tiered lecture rooms that impose many challenges towards such attempts.

Within the context of business education, textbooks are often heavily relied upon as they provide a concise body

of knowledge for students to build their foundations with. Lecturers tend to expect students to bring these books to class in order for the students to refer to the content and to complete exercises in a drill and practice approach. However, a quick glance around the classroom often reveals a greatly reduced number of textbooks from that seen in past years. Comments such as "the books are too heavy" and "I can't afford it" are common reasons given when students are asked why they didn't bring the book. In many cases and for many students, these reasons are absolutely valid. Textbooks costing below one hundred dollars are becoming rare; more often than not, prices come closer to two hundred dollars. And one has to question whether it is reasonable to expect and/or require a student weighing forty kilograms to lug ten kilograms of textbooks around with them. Technology is seen as one way of dealing with these two practical challenges (Deslauriers, Schelew, & Wieman, 2011), thus providing a potential catalyst for pedagogical change. The impact of the integration of mLearning technologies on teaching staff motivation is examined in this study.

A combination of the 'wow' factor generated by unprecedented consumer interest in the iPad, and its affordances of serious computing power combined with mobility, give this device the potential to be what many other electronic devices have failed to be in education: a game changer and capable of becoming a catalyst for pedagogical change bringing about the iRevolution. The iPad is much smaller and lighter than traditional tablets, while providing battery life better than the vast majority of competitors. It has an extremely intuitive interface, a large library of Apps and is very responsive thanks to its streamlined operating system and solid state storage. During the keynote address for the 2011 Worldwide Developers Conference, Steve Jobs announced that Apple had sold 25 million iPads in the fourteen months they had been on sale. Demand for the iPad comfortably out strips supply at the time this article was written. Despite a widespread lack of availability in New Zealand, a number of students bring their own iPads to class without any formal interaction with the devices. Media hype and vast sales indicate the extreme popularity of the iPad and this was one of the many reasons for its selection in this project.

This paper has two main goals: it attempts to answer the question of whether teaching staff will "buy in" to and see value in the idea of iPads in the classroom, and it proposes a model for the introduction, education and adoption of an eLearning technology (such as the iPad) to a group of teaching staff. Based upon the experience and reflection of the implementation of two semester-long student iPad projects within the Business Departments, and a longitudinal lecturer community of practice (COP) investigating and supporting the integration of the iPad into the curriculum, a generic model for technology adoption is proposed. This will be tested in further iterations of the project in the future.

Literature Review

The following sections discuss some of the foundational concepts of this research project: social constructivism, communities of practice, and mLearning.

Social Constructivist Pedagogy

According to social constructivist theory, assumptions exist around three core aspects of life. These relate to reality, knowledge and learning. It is assumed that reality is constructed purely through the activities of members of society. Knowledge is assumed to be socially and culturally constructed through interactions between individuals. Learning is assumed to take place through social activities where learners are engaged (Kim, 2001).

Social constructivism talks of the concept of intersubjectivity, where individuals form a shared understanding of ideas with others (Ernest, 1999). Intersubjectivity encourages members of the group to share their conceptions of content with the others (Vygotsky, 1978). Within the theory of social constructivism, there are said to be four general perspectives: cognitive tools perspective, idea-based social constructivism, pragmatic or emergent approach, and transactional or situated cognitive perspectives. Each of these perspectives provides a different approach to how learning is facilitated as part of the general social constructivism framework (Gredler, 1997).

The pragmatic or emergent approach was chosen for the community in this study. It is centred on the idea that there are some times when an individual approach to learning may be appropriate and other times when the collective approach will be more effective. The combination of the affordances of mobile devices and the nature of content covered pointed to this perspective as being the most appropriate. Members of the group were able to make the most of the mobility of the iPads and learn by doing on their own, or by reviewing the materials available to them. After gaining a grasp of how the devices and various applications worked, the members were

able to discuss the pedagogical possibilities. This discussion, either face-to-face or electronically, generated new knowledge about how the iPads could be used in various educational scenarios. The social constructivist theory expects a significant part of the student's (and staff) learning to be achieved through group collaboration. Two key drivers in the user acceptance of technology based collaboration methods are training and social presence (Brown, Dennis, & Venkatesh, 2010). These drivers are achieved in this case through the use of the Community of Practice model discussed below.

Communities of Practice

'Communities of Practice' (COP) is a social learning theory. The concepts were proposed by Lave and Wenger (1991) while studying the apprenticeship model of learning. Wenger (1998) later further developed the concepts, and then simplified the concepts for wider contexts: "Communities of practice are formed by people who engage in a process of collective learning in a shared domain of human endeavor" (Wenger, 2005, p. 1). Though not originally intended as a pedagogical strategy or teaching technique, rather an analytical viewpoint on learning (Lave & Wenger, 1991), the concepts of communities of practice have found popularity within educational contexts. Learning supported by peers is seen to be particularly useful in a technological context as traditional centralized support structures are regularly overwhelmed and lacking in domain expertise (Sykes, Venkatesh, & Gosain, 2009).

COPs are formed by like-minded peers brought together by a common interest. The core of a COP draws in peripheral members into full participation over time, and the community's practice is reified by the production of boundary objects that can be used to broker participation within the COP with the wider community. While communities of practice often form organically and spontaneously, they can also be created intentionally and cultivated for specific purposes. Wenger's (2005) definition of communities of practice "allows for, but does not assume, intentionality" (p. 1). Intentional communities of practice share the same characteristics as organic communities of practice, but have a plan at their core, as described by Langelier (2005):

> Certain virtual communities of practice emerge spontaneously and effortlessly from the organization, while the organization intentionally creates other communities… In this instance, the organization defines and controls the community's objectives, initial activities and support and leaves it up to the community to organize itself and elaborate its own rules… Knowledge management is not left to the chance spontaneous emergence of "natural" communities but is, to the contrary, a deliberate, planned approach. (Langelier, 2005, p. 31)

The concept of intentional communities of practice has found many applications, often forming a juxtaposition between the organic nature of COPs and a specific foundational goal. Head and Dakers (2005) argue for the use of intentional COPs to form the basis for a new approach to technology education. The concept of intentional communities of practice is similar to semi-formal learning communities (Kukulska-Hulme & Pettit, 2008) but are of a more longitudinal nature, as can be seen throughout the length of the mLearning projects described herein. The concept was foundational in developing a support strategy for the research. Intentional COPs formed the hub of the collaborative mLearning projects throughout the research, linking the researcher as the 'technology steward', the course lecturers, and the students on each of the courses.

Mobile Learning

An ever-widening body of research exists in the area of mobile learning (mLearning). As with most theoretical constructs, there are many different variations on what mLearning is and what its most critical aspects are. mLearning provides the learner with an increased ability to take their learning environment with them as they move (Barbosa & Geyer, 2005). mLearning is said to have two distinct aspects to it: the use of mobile learning devices, and the mobility of the people and the knowledge themselves (Sharples, Taylor, & Vavoula, 2007). Sharples et al. (2007) provide the following definition for mobile learning: "the processes of coming to know through conversations across multiple contexts amongst people and personal interactive technologies" (p. 225).

Traditionally, the mLearning research field has centred on the use of mobile phone and PDA (Personal Digital Assistant) devices. Previous research into the use of these devices in an educational context has indicated that students can have difficulties using these devices due to their small screen size (Corlett, Sharples, Bull, & Chan, 2005; Waycott, 2004). Traditional keypad and stylus methods of data input have also proven to be restricting factors for students' use of smaller devices (Corlett, et al., 2005; Smordal & Gregory, 2003). Limited capacity memory storage is another constraining factor (Corlett, et al., 2005) identified in earlier studies, as small scale storage was previously very expensive and particularly limited in older devices. These limitations led to users

finding innovative ways to overcome them (Clough, Jones, McAndrew, & Scanlon, 2008). The specifications of newer mobile devices have addressed many of these limitations, with smartphones now featuring specifications similar to desktop computers a few years ago, while adding significant unique affordances beyond fixed computing platforms (Cochrane & Bateman, 2010).

Increased flexibility and improved efficiency are two significant advantages of mLearning in its simplest form (Dellaportas, Perera, & Richardson, 2010). Students are able to carry far more digital information with them in the form of a mobile learning device than in a traditional format.

Findings of a 2005 study as part of the MOBIlearn project show that approximately half of learner's personal learning experiences occur outside of work, class and other formal learning areas. Thus, mLearning enables bridging the formal and informal learning contexts and brings opportunities for augmenting situated learning experiences (Cook, 2010).

Method

This section outlines the formation of the lecturer community of practice surrounding the iPad project within the Business departments.

Teaching staff in the two departments primarily responsible for teaching Business were offered the opportunity to use an iPad for three months over the summer of 2010/2011. Twenty one out of thirty staff opted to take part in the study, while the majority of the remainder were unavailable due to holiday and personal commitments. These iPads were the entry-level model, featuring 16 gigabytes of internal storage and wifi-only connectivity to the Internet and other networks. The iPads came with Apple's standard software, allowing staff to write emails, write notes, browse the Internet, store and play video and audio files, manage calendars, contacts and the ability to download new applications (Apps) or media. Physically speaking, the iPads were light-weight (680gm), featured long battery life (up to 10 hours of actual usage time) and were stored in simple slip-on cases. It is important to note that these iPads were first generation devices and did not include a camera.

The staff that took up the offer formed the nucleus of an informal community of practice. The staff were all based in the same building, although a number of tools were used by members to communicate with each other. In addition to face-to-face communication, members found the iPad to be useful for communication through email, Skype and discussion forums.

One of the authors assumed the role of Technology Steward within the community (Wenger, et al., 2009), supporting the members through regular drop-in sessions and via a customised Moodle learning management system course. The Moodle course included a variety of resources outlining the features, useful Apps and guides for the use of the iPads. It also served as the central point for communication amongst the community of practice.

Community members were introduced to a range of Apps and device use cases throughout their time with the iPads. Some related to communication, such as the use of Skype, email, polling (Poll Everywhere) and Twitter, providing the members with different options and encouraging them to explore these options in terms of their potential use with students. Others were about content consumption, such as iBooks, Newspaper Apps (NZ Herald) and PDF viewing (Goodreader). The group was also able to experience some Apps which are designed for content creation, such as image editing (Photoshop), blogging (WordPress) and mind mapping (Mindmeister).

Within a very short timeframe, a number of community members became confident with their iPads, and began helping the others. The informal drop-in sessions became a group activity, where time could be spent with others, sharing amongst the group the interesting things they had found, as well as the experiences and achievements they had made. This sharing spread beyond the community as the members found opportunities to discuss ideas and use their iPads around the campus, in classes, meetings, the staff room and places outside the institution.

At the end of the three month loan period, the iPads were returned to be used in other projects. Given the positive feedback of the staff involved, a full set of iPad2s were ordered for a future project and continued staff development, towards the goal of integrating the use of iPads in the Business School courses. All staff involved answered a questionnaire to capture their experiences, thoughts and perceptions of the use of the iPads. Five of

the staff involved in the study were randomly selected to take part in a focus group to delve deeper into the positive and negative aspects of that experience.

Results

Survey Pre Results

An important factor to be considered in the approach of this study is the previous experience of the participants with mobile technologies. Significant experience with mobile technologies prior to the study should make the transition to the iPad easier, while limited prior experience means participants will likely have more to learn. Participants were given a questionnaire to complete at the beginning of the study to evaluate their starting point in terms of mobile learning. All twenty one of the staff participating completed the pre survey.

All staff involved in the study work with a computer regularly, either a desktop or laptop, used primarily in the office. All staff own a personal cellphone of some sort, the majority being a simple cellphone (57%) or cameraphone (33%). A small number (19%) own a smartphone, which likely share similarities with the iPad in terms of use and functionality.

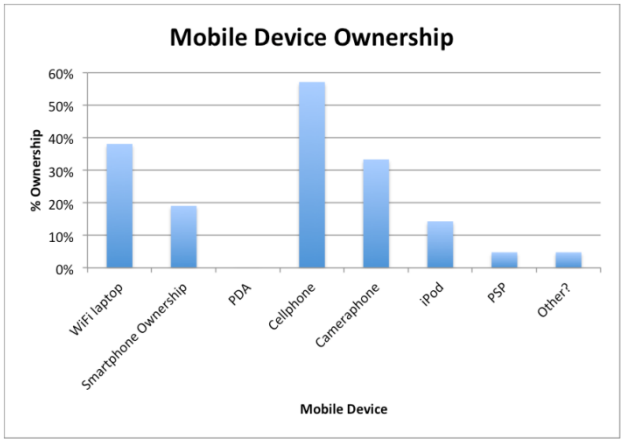

Figure 1: Participant Mobile Device Ownership

The participants' perceptions of the usefulness of the iPad are shown in the graph below. Over 80% of participants felt the iPad would be useful for productivity and collaborative applications: email, web browsing, contacts, calendars and video.

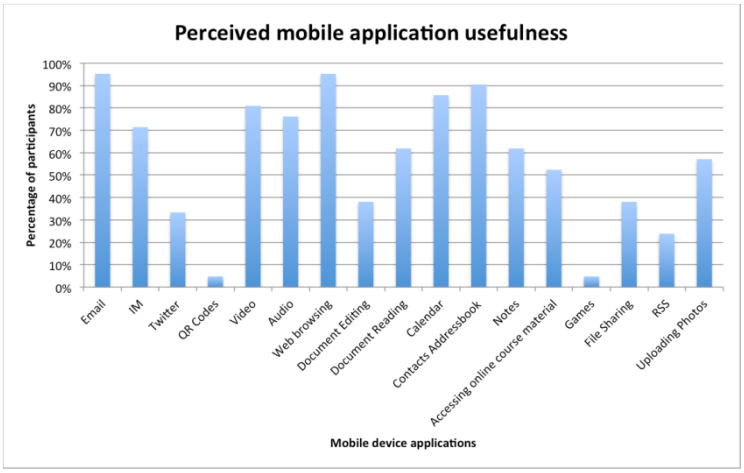

Figure 2: Participant Mobile Application Usefulness Perceptions

Overall, the participants of the survey appear to have a relatively limited experience with mobile devices to begin with.

Survey Post Results

At the end of the study the participants were asked to fill in a second questionnaire to gauge their usage and perceptions about the iPad and its affordances. All staff involved with the project completed the post survey, unfortunately a number of participants did not fill out the ID number portion of the survey. This made it impossible to analyse the change in their perceptions from the beginning of the trial to the end. All participants used the iPad at home and 91% used it at work outside of class. Only 64% of the participants used the iPad in class and 55% used the iPad while travelling. General feedback about the value of the iPad was very positive with 78% of participants either strongly agreeing or agreeing to further iPad use. The remainder of the participants were uncertain, with none of the participants ruling out further iPad involvement. More than half of the participants (64%) indicated that they would buy an iPad of their own, while several others indicated they felt the institution should be responsible for buying one for them. As part of this questionnaire, participants rated a number of iPad applications (or features) with a score out of 10. A score of 10 indicated that an App or feature was most effective and a score of 0 indicated it was least effective.

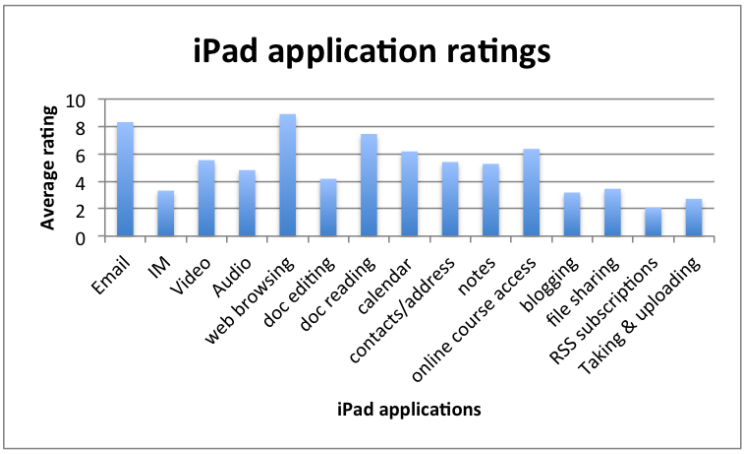

Figure 3: Participant iPad Application Ratings

Participants were also asked to indicate which of a series of mobile device factors they would find critical when purchasing a device. Cost and wireless connectivity were both found to be critical factors by 86% of the participants. Phone interaction (18%), operating system (18%) and ease of linking to a blog (18%) were all seen as the least important factors of the mobile device.

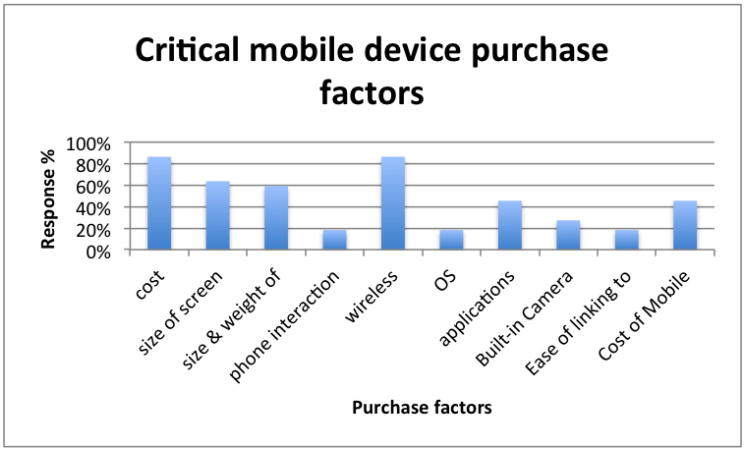

Figure 4: Mobile Device Factors Critical to Participants

All participants were given the opportunity to add comments relating to their experience. When asked how they used the iPad, some staff found it very useful for accessing content, others for creating their own material and some found it useful for interacting and sharing with others. The following examples give a guide to the responses of the participants:

> Taking relevant notes in class while attending lectures and then being able to email them, cut and paste into course assignments instantly has definitely enhanced my learning. In my lectures/classes I used the iPad to mark student presentations while they were underway and then used the marks immediately to upload into gradebook. (Participant, 2011)

> Use in meetings to keep notes, access material electronically. Google forms used on device to record interviews with students. Very effective and time saving access to all email accounts - has really streamlined my electronic life! (Participant, 2011)

> I used the WMD to facilitate in-class research projects and also to allow for Moodle based quizzes with instant results and feedback. (Participant, 2011)

Focus Group Results

Five participants of the study were chosen at random to participate in a focus group to gather a more in-depth perspective of their experience. The focus group was facilitated by an experienced researcher, unrelated to the project, in order to decrease the risk of interviewer bias. Participants were asked a range of questions relating to their previous experience with mobile technologies, their experiences with the iPads and their thoughts on the value that these devices can bring to education. Participants were asked how they had made use of the iPad over the three month trial period, they provided the following responses:

> In class I have my students negotiating via email and creating contracts with collaborative documents. So on one side the employer side is preparing a sample contract and then emailing it to my employee side and they then have to make amendments to the document and email it back, this forms the negotiation. The other useful thing for negotiation is that if somebody says "we simply can't afford this", or "this is required by law" then the other side can say, "well actually...", pull out the legislation and see that it is required. (Participant 1, 2011)

> I would use my iPad on average for 2.5 to 3 hours a day, and if I am teaching I would use it then too. As an example, if students are doing presentations I use the notes facility to mark them while they are talking and then email them back to myself in the office. (Participant 3, 2011)

> I decided when I got my iPad to completely give up my normal extras that I carry around with me. I normally carry around a red book about the size of the iPad. So with the iPad I decided to proactively use it for everything that I would use my red book for. So I used it for taking notes, photographs, emails, I used a lot of things. So it was ubiquitous, I just had it everywhere, I would take it everywhere. Sometimes I was actively using it and other times it was using me in the sense of reminding me things such as the calendar, which was a crucial thing. (Participant 5, 2011)

Participants were asked about the impact (if any) that the iPad has had on their teaching, they provided the following comments about the iPad use, providing indications of the beginnings of a pedagogy change:

> I think one of the key points there is that I don't think we have even scratched the surface on how we can use these things. That's what excites me. My gut feel is that with this I would get 90 minutes of work in to 60 minutes. (Participant 3, 2011)

> Perhaps we need to get beyond them using the device and taking notes, to them using the device and you encouraging them to use the device and designing your activities so that you are getting them engaged using the device. (Participant 1, 2011)

> I was quite disconcerted with students using laptops in class because I had a guest lecturer in and I sat at the back of the class and realised that half the students were using Facebook. So I stopped them. But then I thought from when I was a student, why wouldn't you let them take notes using these devices on the understanding that you are not on Facebook, you are not trading shares, you are sitting there taking notes. I have had a paradigm shift in my thinking, but it is about setting down the law at the beginning of the class. (Participant 3, 2011)

Participant's were asked their thoughts on the best way forward, towards developing their understanding and usage of the iPads:

> I think to me it's not about the training, it's about getting everybody practicing something and then getting everybody together sharing their ideas, so that you can get some inspiration "Oh that's what they are doing there, I wouldn't have thought of doing that". Which I find so much more valuable than someone saying here is everything you can do with it. (Participant 1, 2011)

During the focus group, when asked if there were any perceived barriers to the use of iPads in education, a number of comments were made relating to issues with the adoption of iPads:

> Infrastructure is the problem. The other thing is the cost side, and you compare with the sort of students we have in terms of affordability. Or is it freely available? If the institution buys it then it is a good way to get people to buy-in to the project, but if people have to buy it then support their studies then you need to provide them with a good cost benefit analysis. (Participant 4, 2011)

> I'm still using Mac, PC and iPad. But are our students requiring that much? For some of them they may need iPad and that is it. (Participant 1, 2011)

> I'm not really a social networker, I blog like crazy, but I find it difficult to use Tumblr. However, this is a machine that gets better and better every week because somebody comes up with an App, and I think that is fantastic. (Participant 5, 2011)

Discussion

The iPad as a device

Feedback from lecturers involved in the project suggests that the iPad, and perhaps other devices with a similar form factor, have addressed a number of the usability issues surrounding mobile devices evaluated in previous mLearning studies. The comparably large screen of the iPad was clearly favoured when it comes to reading content, such as email, web pages, documents and other course material. The iPad was also seen as a useful device for traditional mobile device applications, namely calendaring, contact management and note taking. Additional comments from participants showed they were impressed by the wide range of other features offered by the iPad in areas relating to their professional and personal lives. Powerful applications exist to support social networking and personal entertainment that have clearly had a strong and positive effect on the lives of participants. Being light-weight, having a very long battery life, and with immediate capability give the iPad some significant advantages over a traditional laptop or netbook in an educational context.

While it was generally accepted that the iPad is not the perfect device for all computing tasks, it is continually changing as new Apps are released regularly, many of which provide new and exciting ways to use the device. The second iteration of the iPad has addressed a number of issues found with the first generation device, including the addition of a camera and enhanced video and screen sharing capabilities, which were seen as crucial in an educational environment. In a short space of time, many of the participants found their own ways of integrating the iPad into their work and personal lives according to its affordances as they perceived them. The feedback from this project can and will be used to inform suggested workflows with the devices to deal with any issues perceived in the educational context.

Discussion of the model

The formation of a community of practice supporting and investigating the affordances of the iPads was critical to generating lecturer buy-in to the project. The various outputs from the COP formed reified experiences that became boundary objects, utilised for brokering the project beyond its core participants. A key in this model is the critical role of an appropriate Technology Steward to guide and support the COP, particularly during the tentative early phases of general familiarity and learning the tools, to assist in getting the participants into their comfort zones. Core boundary objects that achieved this included: participants' blog posts which formed honest diaries of their experiences and achievements, and the physical use of the iPads throughout their everyday activities, the Moodle forum, and lively discussions around their experiences.

The impact of the iPad on lecturer's pedagogy and student's learning experience

For the majority of the participating lecturers, this experience was their first serious foray into the realms of

mLearning, and represented the first steps in appropriating the affordances of the iPad for pedagogical change. As Herrington and Herrington (2007) note, lecturers generally revert to their default pedagogies when first approaching the use of new technologies in their teaching, effectively translating tried and true assessment activities onto the new technology. Exploring the unique affordances of new technologies to reinvent pedagogy usually involves several iterations of implementation and reflection. However, some significant changes in pedagogy have been achieved with the integration of the iPads. For example: a significant focus upon student group activities has been achieved in the two courses where iPads were provided to students within the Bachelor of Business. A mix of formative and summative group activities were used, encouraging the students to form robust groups and to support each other's learning through conversation.

Outline of the plan for 2012 iPad adoption

The community is to be reactivated when a set of iPad 2 devices (on order at the time of writing) arrives for staff to continue their development. Comments suggested that participants felt they had "only scratched the surface" with what they can do with the iPads in the short time they had them. A general excitement exists within the staff surrounding the project and the potential of the new devices. The sharing of practice and experiences of members of the community was seen to be a critical and successful part of the community members' learning and development. A large proportion of staff had limited experience with mobile devices beyond a basic cellphone, which caused there to be a significant spread in the progress made with the devices across the community. The Moodle course was a useful feature for actively-involved members as well as those on the periphery. Additional material is planned, with a more clearly defined structure, to provide training support in a blended fashion. It is expected that this will help those staff with more limited previous experience with mobile devices, especially those operating on the periphery.

Providing that the staff continue to explore the potential of the iPads and their impact on pedagogy, the plan is to make the iPad a recommended device for all Business School students. Unlike the trial projects to-date and some initiatives in other institutions, it is envisaged that students will be responsible for purchasing and owning their iPads. As recommended by focus group participant 4, a detailed financial breakdown will be developed to help justify the expense to students. It is expected that the pedagogical changes combined with the affordances of the iPad will eliminate the need for text books in some courses, enable a change to cheaper eBooks in others, and drastically reduce the volume of printing required by students. Over time this change from traditional to eBooks will become easier as availability and the quality of the eBook offerings improves (Johnson, Smith, Willis, Levine, & Haywood, 2011). Beyond this project it will be helpful to extend the model to staff in discipline areas other than business to improve it's generalisability.

Conclusion

This paper focused on the experiences and reflections of members of a community of practice on the use of the iPad as an educational tool. Members of the community were encouraged to learn about the iPad using a social constructivist pedagogy with the intention that it will also prompt them to embark on their own journey towards educating through the same pedagogy. Overall staff enjoyed their experience with the iPads and want to continue using them beyond the initial three month trial. Some of the staff involved indicated the experience has already caused a change in their own teaching practice.

References

Barbosa, D. N. F., & Geyer, C. F. R. (2005). *Pervasive personal pedagogical agent: A mobile agent shall always be with a learner.* Paper presented at the IADIS International Conference Mobile Learning,, Malta.

Brown, S. A., Dennis, A. R., & Venkatesh, V. (2010). Predicting Collaboration Technology Use: Integrating Technology Adoption and Collaboration Research. *Journal of Management Information Systems, 27*(2), 44.

Clough, G., Jones, A. C., McAndrew, P., & Scanlon, E. (2008). Informal learning with PDAs and smartphones. *Journal of Computer Assisted Learning, 24*, 13.

Cochrane, T. (2010). Beyond the Yellow Brick Road: Mobile web 2.0 informing a new institutional elearning strategy. *Special Issue 'The Transformational Impact of Learning technology' of ALT-J, Research in Learning Technology, 18*(3), 221–231.

Cochrane, T., & Bateman, R. (2010). Smartphones give you wings: Pedagogical affordances of

mobile web 2.0. *Australasian Journal of Educational Technology, 26*(1), 1-14.
Cook, J. (2010). Mobile Phones as Mediating Tools Within Augmented Contexts for Development. *International Journal of Mobile and Blended Learning, 2*(3), 1-12.
Corlett, D., Sharples, M., Bull, S., & Chan, T. (2005). Evaluation of a mobile learning organiser for university students. *Journal of Computer Assisted Learning, 21*(3), 162-170.
Dellaportas, S., Perera, L., & Richardson, P. (2010). *m-Learning in an off-campus environment: using iPods in accounting education*. Paper presented at the AFAANZ.
Deslauriers, L., Schelew, E., & Wieman, C. (2011). Improved Learning in a Large-Enrollment Physics Class. *Science, 332*, 3.
Ernest, P. (1999). *Social Constructivism as a Philosophy of Mathematics: Radical Constructivism*. London: The Falmer Press.
Gredler, M. E. (1997). *Learning and instruction: Theory into practice* (3rd ed.). Upper Saddle River: NJ: Prentice-Hall.
Head, G., & Dakers, J. (2005). Verillon's Trio and Wenger's Community: Learning in Technology Education. *International Journal of Technology and Design Education, 15*, 33-46.
Herrington, A., & Herrington, J. (2007). *Authentic mobile learning in higher education.* Paper presented at the AARE 2007 International Educational Research Conference, Fremantle, Australia.
Johnson, L., Smith, R., Willis, H., Levine, A., & Haywood, K. (2011). *The 2011 Horizon Report*. Austin, Texas: The New Media Consortium.
Kim, B. (2001). Social Constructivism. In M. Orey (Ed.), *Learning, Teaching, & Technology*. http://www.coe.uga.edu/epltt/SocialConstructivism.htm: The University of Georgia College of Education.
Kukulska-Hulme, A., & Pettit, J. (2007, 16-19 October). *Self-service Education: Smartphones as a Catalyst for Informal Collective and Individual Learning.* Paper presented at the MLearn 2007 - Making the Connections 6th International Conference on Mobile Learning, Melbourne.
Kukulska-Hulme, A., & Pettit, J. (2008). Semi-formal learning communities for professional development in mobile learning. *Journal of Computing in Higher Education, 20*(2), 35-47.
Langelier, L. (2005). *Working, Learning and Collaborating in a Network: Guide to the implementation and leadership of intentional communities of practice*. Quebec City: CEFIRO (Recherche et Études de cas collection).
Lave, J., & Wenger, E. (1991). *Situated Learning: Legitimate peripheral participation*. Cambridge: Cambridge University Press.
Learning and Skills Network. (2009). MoleNET. *2009*(30 July), MoleNET web site. Retrieved from http://www.molenet.org.uk/about/
Moser, F. Z. (2007). Faculty Adoption of Educational Technology. *Educause Quarterly, 1*, 66-69.
Sharples, M., Taylor, J., & Vavoula, G. (2007). A Theory of Learning for the Mobile Age. In K. Littleton & P. Light (Eds.), *The Sage Handbook of E-learning Research* (pp. 221-247). London: Sage.
Smordal, O., & Gregory, J. (2003). Personal Digital Assistants in medical education and practice. *Journal of Computer Assisted Learning, 19*(3), 320-329.
Sykes, T. A., Venkatesh, V., & Gosain, S. (2009). MODEL OF ACCEPTANCE WITH PEER SUPPORT: A SOCIAL NETWORK PERSPECTIVE TO UNDERSTAND EMPLOYEES' SYSTEM USE. *MIS Quarterly, 33*(2), 13.
Vygotsky, L. (1978). *Mind in Society*. Cambridge, MA: Harvard University Press.
Waycott, J. (2004). *The appropriation of PDAs as Learning and Workplace Tools: An Activity theory Perspective.*, Open University.
Wenger, E. (1998). *Communities of Practice: Learning, Meaning, and Identity*. Cambridge: Cambridge University Press.
Wenger, E. (2005). Communities of Practice: a brief introduction. (17 July). Retrieved from http://www.ewenger.com/theory/index.htm
Wenger, E., White, N., & Smith, J. (2009). *Digital Habitats: stewarding technology for communities*. Portland, Oregon: CPsquare.

Please cite as: Oldfield, D**.** & Cochrane T. (2011). Equipping Lecturers for the iRevolution. In G. Williams, P. Statham, N. Brown & B. Cleland (Eds.), *Changing Demands, Changing Directions. Proceedings ascilite Hobart 2011*. (pp.919-929).

http://www.ascilite.org.au/conferences/hobart11/procs/Oldfield-full.pdf