



**Beyond the Yellow Brick Road: Mobile web 2.0 informing a new institutional elearning strategy**

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## Beyond the Yellow Brick Road: Mobile web 2.0 informing a new institutional elearning strategy.

Mobile Learning (mlearning) has moved beyond the realms of fantasy to become a viable platform for contextual learning that bridges formal and informal learning environments. This paper overviews how mobile web 2.0 has been instrumental in facilitating pedagogical change and informing an institutions new elearning strategy that focuses upon social constructivist pedagogies. The project developed an intentional Community Of Practice (COP) model for supporting new technology integration, pedagogical development, and institutional change. Beginning with a small selection of early adopter trials, the results of the research are now informing a wider integration of wireless mobile computing.

Keywords: mlearning; web 2.0; case study

### Introduction

This paper reflects upon how the integration and support of mobile web 2.0 projects have transformed a tertiary education institution's approach to elearning. This transformational journey is based upon four years of research on appropriating the pedagogical benefits of web 2.0 and pedagogy 2.0 (McLoughlin and Lee 2008) anywhere anytime using mobile web 2.0 and wireless mobile devices (or WMDs), in particular WiFi (wireless ethernet) and 3G (third generation mobile 'broadband') enabled smartphones, and 3G enabled netbooks. A series of participatory action research (Swantz 2008; Wadsworth 1998) mlearning projects were used to draw out implications and strategies for facilitating social constructivist learning environments. These mlearning projects were situated within a variety of educational contexts, at different educational levels, and took place longitudinally across one to three years of implementation, involving cycles of reflection and refinement with earlier project results informing the design of the following projects. The learning contexts included: Bachelor of Product Design (2006 using Palm Lifedrive, 2008 using Nokia N80, N95, 2009 using Nokia XM5800, N95, N97), Diploma of

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3 Landscape Design (2006 Using Palm TX, 2007 using Nokia N80, 2008 using  
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5 Sonyericsson P1i, 2009 using Dell mini9 netbook), Diploma of Contemporary Music  
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7 (2008, 2009 using iPod Touch, iPhone 3G), Bachelor of Architecture (2009, using Nokia  
8  
9 XM5800 and Dell Mini9 netbook), and the Bachelor of Performing and Screen Arts  
10  
11 (2009 using Dell Mini9 netbook and Nokia XM5800). Overviews of these projects are  
12  
13 available online:  
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- 18 • <http://prezi.com/kr94rajm9u/>
- 19 • <http://www.youtube.com/watch?v=FcwL8kQoRSI>
- 20 • <http://www.youtube.com/watch?v=5vGNWMwEypY>
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24 Aaaa is New Zealand's largest tertiary Technical Institute  
25  
26 (<http://www.Aaaa.ac.nz>). The institutions previous default model for lecturer professional  
27  
28 development was delivery of an annual series of generic workshops, with very low  
29  
30 attendance levels and invisible outcomes in students' educational experiences. The  
31  
32 entrenched instructivist pedagogical teaching model has also been challenged and  
33  
34 disrupted (Sharples 2001) by the implementation of mobile web 2.0, creating a shift to  
35  
36 social constructivist teaching and learning paradigms. The resulting mobile web 2.0  
37  
38 support and implementation models developed from the research have been influential in  
39  
40 informing the development of the institutions new elearning strategy, with many of the  
41  
42 pedagogical and support strategies developed during these projects becoming integrated  
43  
44 into this new elearning strategy. Thus the outcome of using an action research  
45  
46 methodology has met the researcher's goal of having significant positive impact on the  
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48 institution and the associated learning community.  
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54 The mlearning project research questions were:  
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- What are the key factors in integrating Wireless Mobile Devices (WMDs) within tertiary education courses?
- What challenges/advantages to established pedagogies do these disruptive technologies present?
- To what extent can these WMDs be utilized to support learner interactivity, collaboration, communication, reflection and interest, and thus provide pedagogically rich learning environments that engage and motivate the learner?
- To what extent can WMDs be used to harness the potential of current and emerging social constructivist e-learning tools?

Data gathering consisted of:

- Pre-trial surveys of lecturers and students, to establish current practice and expertise
- Post-trial surveys and focus groups, to measure the impact of the wireless mobile computing environment, and the implementation of the guidelines.
- Lecturer and student reflections via their own blogs during the trial.

### **Literature Review**

This section contextualises some of the core concepts underpinning the mlearning projects that then informed the institutions elearning strategy.

#### ***Communities Of Practice***

An intentional communities of practice model (Langelier 2005) was developed by the researcher (Aaaaaaaa 2007; Aaaaaaaa and Kligyte 2007) and used to provide longitudinal lecturer professional development and technological support, and to provide pedagogical and technological scaffolding for the students throughout the length of the projects.

#### ***Social Software and Communities of Practice***

Wenger (2005) discusses the contribution that technologies can make to communities of practice (COPs), in particular web 2.0, social software tools.

Social software (or web 2.0) tools make a natural companion to COPs. The key characteristics of social software fit well with social constructivist pedagogies, enabling a natural and relatively simple approach to creating collaborative learning communities (McLoughlin and Lee 2007; Mejias 2006). Web 2.0 is about moving beyond content

1  
2  
3 delivery to an interactive collaborative environment with an emphasis upon sharing, ease  
4 of use, customization and personal publishing (Alexander 2006). Thus in an educational  
5 setting, web 2.0 provides opportunities for students to be involved in the learning process,  
6 to create their own unique collaborative environments that can be shared globally (JISC  
7 2009b).

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Wenger's exploration of the use of web 2.0 tools to enhance COPs (Wenger *et al.*  
2009; Wenger *et al.* 2005) paralleled the early development of the researcher's research  
methodology. Wenger's largest influence on the research project was the development of  
the concept and role of the 'technology steward' within COPs.

### *The Technology Steward*

Communities of Practice can be enhanced with the use of appropriate communications  
technologies when under the guidance of a Technology Steward. The Technology  
Steward (Wenger *et al.* 2005) is a member of the community with a grasp of how and  
what technologies can enhance the community. They act as a guide to the rest of the  
community as the community learns to utilize and benefit from technology. The  
technology steward thus forms a pivotal role in the successful integration of technology  
into the groups practice. As the research project has developed, and in particular with the  
development of an intentional COP model to support the pedagogical and technological  
integration of WMDs into each project, so has the understanding of the crucial role of the  
technology steward in supporting these projects. At the same time, Wenger also  
continued to develop his understanding of this key role within COPs in the twenty first  
century technological environment.

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3 Wenger et al (2009) see technology stewardship within COPs as an emergent role  
4 that is clearly distinguished from traditional information technology (IT) support.  
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8 The role of the technology steward was appropriated by the researcher within the  
9 context of COPs for lecturer professional development, followed by student communities  
10 of practice for scaffolding their learning during the mlearning projects. These were  
11 effectively 'intentional' communities of practice (Langelier 2005), focused on the  
12 pedagogical and technical support of the mlearning projects.  
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### 19 20 21 *Intentional Communities of Practice*

22 While classical COPs form organically and spontaneously, they can also be created  
23 intentionally and cultivated for specific purposes. Intentional communities of practice  
24 share the same characteristics as organic communities of practice, but have at their core a  
25 plan (Langelier 2005, p. 31). These are similar to semi-formal learning communities  
26 (Kukulska-Hulme and Pettit 2008) but more longitudinal throughout the length of the  
27 mlearning projects, and therefore creating collaborative projects between the 'technology  
28 steward', the course lecturers, and the students on the course.  
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### 40 *Mobile Web 2.0*

41 The author of this paper proposes that mlearning can support and enhance both the face  
42 to face and off campus teaching and learning contexts by using the wireless mobile  
43 devices as a means to leverage the potential of current and emerging collaborative and  
44 reflective e-learning tools (for example: blogs, wikis, RSS). These are often called social  
45 software or web 2.0 tools, facilitating student-generated content (Bruns 2008) and  
46 student-generated learning contexts (Cook *et al.* 2007). The WMD's wireless  
47 connectivity and data gathering abilities (for example: photoblogging, video recording,  
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3 voice recording, and text input) allow for bridging (Vavoula 2007a) the on and off  
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5 campus learning contexts – facilitating “real world learning”. In particular, the context  
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7 bridging and media recording capabilities of today’s smartphones make them ideal tools  
8  
9 for mobile blogging. Smartphones allow a user to send text, photos, video and audio  
10  
11 directly from the site of recording to the users online Blog. The integration of mobile web  
12  
13 2.0 within the courses has formed a catalyst for pedagogical change that the researcher as  
14  
15 the technology steward within each community of practice has been able to explicitly  
16  
17 capitalise upon.  
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### 22 23 **2009 Case Studies**

24  
25 The thirteen mlearning projects represented within the five case studies referred to herein  
26  
27 provide rich examples of practical pedagogical integration of mlearning within a variety  
28  
29 of tertiary education courses. In this section we briefly summarize the main lessons learnt  
30  
31 from the three longest-running case studies.  
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34  
35 The core activity of each of the projects is the creation and maintenance of a  
36  
37 reflective Blog as part of a course group project, effectively creating student eportfolios.  
38  
39 However the smartphone or netbook can be used to enhance almost any aspect of the  
40  
41 course, as was illustrated by the range of activities used in the projects. Several unique  
42  
43 affordances of the new generation of smartphones were focused on in the 2009 projects  
44  
45 (Aaaaaaaa and Bateman 2010c). These affordances facilitate student created content and  
46  
47 formative lecturer and peer feedback, core aspects of a social constructivist pedagogy that  
48  
49 is foundational for the institutions new elearning strategy.  
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### 54 55 ***Case Study1: Diploma of Landscape Design 2007 to 2010***

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3 The mobile web 2.0 project with the Diploma of Landscape Design was born out of a  
4  
5 desire to provide flexibility and enable situated learning environments for students who  
6  
7 are predominantly part-time, and to create authentic teams of students who work on real-  
8  
9 world projects as part of their final year course. The course lecturer envisioned mobile  
10  
11 web 2.0 tools as potential facilitators of this pedagogy, but required technological and  
12  
13 pedagogical support to implement these ideas. In 2007 students used Nokia N80  
14  
15 smartphones to document and share their design for an exhibition garden at the annual  
16  
17 Ellerslie Flowershow. The 2008 project integrated the use of smartphones for reporting a  
18  
19 field-trip to Japan. The short-term nature of these projects and the wide-range of student  
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21 experiences and capabilities in the increasingly mature and part-time student  
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23 demographic of the course led to a rethink of the mobile web 2.00 integration in 2009,  
24  
25 and a focus upon 3G enabled netbooks for creating student eportfolios.  
26  
27 Beginning in 2007, the first mlearning project (Aaaaaaaa 2009b) paved the way for the  
28  
29 following projects, highlighting a range of technical and implementation issues that could  
30  
31 be improved upon. The project also emphasized the disruptive nature of mlearning  
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33 (Sharples 2001; Stead 2006), illustrating the process of lecturer pedagogical  
34  
35 reconceptualisation of teaching, and the process of student reconceptualisation of  
36  
37 learning required as the course moved from teacher-centred (pedagogy) to social  
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39 constructivism (andragogy to heutagogy). Thus the importance of a robust yet flexible  
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41 technical and pedagogical support strategy was highlighted. The unique student profile  
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43 (all the students were aged between 43 and 69) of the 2008 iteration of the Landscape  
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45 Design mlearning project highlighted the importance of choosing appropriate WMDs for  
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47 the needs of each unique student group. Thus the 2009 Landscape Design mlearning  
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3 project used netbooks to minimize the cognitive load for the students, and highlighted the  
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5 importance of learning community formation to be integrated into the course (Aaaaaaaa  
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8 *et al.* 2009a).

### 11 *Lecturer Feedback*

14 We found that the 'e' and mlearning component of our project worked really well this year –  
15 we've had extremely high participation from our students. They seem to really enjoy the  
16 ability to contribute to the discussions at any time digitally, and we had each group  
17 performing really well, the conversations between groups was good, and the  
18 multidisciplinary work with Design worked very well for us. So the group work was  
19 fantastic. The second aspect I wanted to mention was the learning environment that we setup  
20 with Thom's time. We set ourselves up in the back of Long Black Café in an open learning  
21 situation with the notebooks around a big table. It seemed to work very well. They liked the  
22 access to food, they enjoyed the aspect of all getting together once a week to blog and it  
23 seemed to spur them on to get going independently as well. (Lecturer, May 2009)

### 26 ***Case Study2: Bachelor of Product Design 2008 to 2010***

28 Aspects of this case study have been published in various peer-reviewed papers  
29  
30 (Aaaaaaaa and Bateman 2009b; 2010a; b; Aaaaaaaa *et al.* 2009a; Aaaaaaaa *et al.* 2009b;  
31  
32 c; Aaaaaaaa *et al.* 2009d). One of the key drivers for the introduction of mlearning into  
33  
34 the course was the development of a flexible, context independent teaching and learning  
35  
36 environment. The 2008 mlearning project was initially envisioned as a voluntary project  
37  
38 involving two lecturers and eight students investigating the potential for bridging the on  
39  
40 and off campus learning contexts using Nokia N95 smartphones. The enthusiastic  
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42 response from the participants led to the implementation of mlearning projects across all  
43  
44 three years of the course in semester two of 2008. These projects were followed up in  
45  
46 2009 with the full integration of mlearning with all of the students and lecturers in the  
47  
48 three year classes of the course in a staged and scaffolded project with first year students  
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50 using 3G netbooks and Nokia Xpressmusic 5800 smartphones, second year students  
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3 using Xpressmusic 5800 smartphones and their own laptops, and third year students  
4  
5 using Nokia N97 smartphones plus their own laptops.  
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8 The Product Design mlearning projects achieved significant progress in course  
9  
10 integration, pedagogical reconceptualisation, and development of a staged and scaffolded  
11  
12 implementation model for developing learning communities facilitated by intentional  
13  
14 communities of practice across each year of the course. The case study illustrated the  
15  
16 potential to stage and scaffold mlearning integration across all three years of a Bachelor  
17  
18 level course, starting with establishing a learning community culture involving both the  
19  
20 students and the lecturers and facilitation of a progression of teaching paradigms from  
21  
22 pedagogy to heutagogy (PAH) (Luckin *et al.* 2008) following the first year to third year  
23  
24 of the course. The PAH continuum maps well with the progression of mobile web 2.0  
25  
26 course integration from web 2.0 appropriation (JISC 2007; 2009a) in first year to student  
27  
28 mobile facilitated content creation (Bruns 2007; JISC 2009b) in second year, and finally  
29  
30 the context independence and bridging affordances of mlearning (Luckin *et al.* 2008;  
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32 Vavoula 2007b) leveraged in the third year 'nomadic studio' (Aaaaaaaa *et al.* 2009a).  
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#### 40 *Lecturer Feedback*

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42 The standard Atelier Method or studio teaching environment of one communal space and one  
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44 timetable is unlikely to offer the best support and learning opportunities for today's creative  
45  
46 students; it does not mirror the 'real contemporary world'. Over the last two to three years, the  
47  
48 introduction of mobile web 2.0 tools into the Bachelor of Product Design has facilitated  
49  
50 significant flexibility for students allowing them to stay connected, share their ideas widely,  
51  
52 participate in world wide creative communities and choose to work in virtually any context  
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54 on and off campus (Lecturer 2009).  
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#### 51 ***Case Study3: Diploma of Contemporary Music 2008 to 2010***

52 This project was centred on preparing students for the music technology paper that is part  
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54 of the Diploma of Contemporary Music, which was scheduled to run for the first time in  
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3 semester one of 2009. In this course students experiment with and evaluate current music  
4 creation and delivery technologies, including podcasting and sharing via blogs,  
5  
6 eportfolios, and social networking. The goal of the project was to illustrate the potential  
7  
8 of a PLE (Personal Learning Environment), facilitated by mobile web 2.0 technologies,  
9  
10 that was unconstrained by the limitations of the institutional learning management system  
11  
12 (LMS). For semester one of the project lecturers and students were provided with an iPod  
13  
14 Touch (16GB) each, which was upgraded to a 3G iPhone in semester two when they  
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16 become officially released in New Zealand.  
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22 It became clear that the iPhone project needed to be embedded in a course, with  
23  
24 clearly related assessment tasks, for the students to participate more fully in it (Aaaaaaaa  
25  
26 2009a). In particular 2009 projects were designed to investigate the use of MySpace,  
27  
28 student created podcasts, and microblogging as authentic mobile learning environments  
29  
30 within the context of music delivery, promotion and critique.  
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34 The 2009 project was explicitly linked to two courses, one within the second year  
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36 of the Diploma of Contemporary Music, the other within the first year of the course with  
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38 second year students as peer mentors. Thus the integration of mlearning was staged  
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40 across the two years of the course, and the use of mobile web 2.0 tools were integrated  
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42 into the course assessment.  
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46 The Diploma of Contemporary Music mlearning project developed from an initial  
47  
48 exploration of the potential of mlearning to engage students and enhance the course to an  
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50 example of successful course integration and student adoption and appropriation of  
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52 mlearning. During the first iteration of the mlearning project students and lecturers were  
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54 enthusiastic and engaged by the tools, but skeptical as to the potential impact on the  
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3 course and learning outcomes (Aaaaaaaa 2009a). The second iteration of the mlearning  
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5 project integrated the mlearning tools into the course assessment leading to adoption and  
6  
7 appropriation by the students beyond personal and social use, leveraging the learning  
8  
9 context bridging (Vavoula 2007b) affordances of mobile web 2.0 for facilitating authentic  
10  
11 (Herrington and Herrington 2007) course-related learning environments beyond the  
12  
13 classroom. This case study also demonstrates the need for significant time for lecturer  
14  
15 pedagogical reflection for the necessary ontological shifts (Chi and Hausmann 2003;  
16  
17 Hameed and Shah 2009) in their pedagogical conceptions to be able to integrate  
18  
19 mlearning authentically.  
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#### 24 25 *Lecturer Feedback*

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28 I think we're starting to see the students working in very different ways than what we've seen  
29  
30 before. I think it's a very gradual process for them to adapt to this way of learning and what  
31  
32 may help it is a lot more time and experience, but it's starting to work (Lecturer, 2009).  
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34

#### 35 **Institutional Implications**

36 The impact of the integration of a community of practice model facilitated by a  
37  
38 technology steward for pedagogical and technological support for the mlearning case  
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40 studies is illustrated by the following lecturer feedback.  
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44 I can't say enough about your contribution to our Year 3 New Technologies mobile learning  
45  
46 project this year. You facilitated it seamlessly, laying the initial groundwork by up-skilling  
47  
48 the staff – all the while imbuing your training with the social-constructivist applications of  
49  
50 the gear. This provided an initial context for these new communication tools, with which the  
51  
52 Screen Arts staff involved shall always associate and use them. Next, you rolled-out the  
53  
54 mobile tools to the students – well in advance of the actual classes (your suggestion) - and  
55  
56 provided hands-on training (for the 19 students) in a very caring manner. At the end of their  
57  
58 online presentations, you debriefed them in such a way as to allow them to look inside and  
59  
60 assess the substantial value they derived from the project. Your attentiveness to the entire  
61  
62 process demonstrates to me a thorough practitioner who cares very much about innovative  
63  
64 facilitation and student outcomes (Lecturer, 2009).  
65  
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3 A limitation of the participatory action research methodology of the research is the  
4  
5 significance of the input of the researcher as the technology steward for the projects. The  
6  
7 partnerships developed between the researcher and the participants (particularly the  
8  
9 lecturers) have been critical in supporting and providing direction for the projects. In  
10  
11 order to create a transferable model to other learning contexts involving different  
12  
13 technology stewards the role of eLearning Community Coordinator (eLCC) has been  
14  
15 established within each department of the institution as a core part of the new elearning  
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17 strategy.  
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### 23 ***Introducing Unitec's eLearning Strategy (2010)***

24 Learning technologies or eLearning are critical components of a reconceptualised  
25  
26 approach to teaching and learning at Unitec. The new strategy involves the utilisation of  
27  
28 a range of learning technologies as integral parts of contemporary and engaging teaching  
29  
30 and learning experiences. It is based on one powerful pedagogical idea – that the  
31  
32 eLearning strategy will support Unitec's decision to reconceptualise all programmes  
33  
34 within a commitment to a social constructivist pedagogy, or 'living curricula' .  
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39 The strategy includes the following objectives:

- 40  
41 1. To create authentic learning conversations that enable graduates to succeed in the  
42  
43 21st century.
- 44  
45 2. To provide accessible environments and creative solutions for students' access to  
46  
47 online tools via Wireless Mobile Devices (WMDs).
- 48  
49 3. To enhance wireless computing infrastructure.
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53 The strategy focuses on three key areas: staff capability, student capability and access,  
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55 and infrastructure changes. The community of practice model developed during the  
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3 mlearning action research projects forms a core element of the new elearning strategy.  
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5 Staff capability is enhanced by the establishment of eLearning Community Coordinators  
6  
7 (eLCCs) within each department who facilitate departmental communities of practice.  
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9  
10 The eLCCs take on the role of technology stewards within these COPs as modelled  
11  
12 within the mlearning projects. The eLCCs report to the institution's central professional  
13  
14 development unit, of which the researcher is the elearning team leader. The establishment  
15  
16 of the eLCCs role was launched in February 2010 with a week-long workshop facilitated  
17  
18 by Etienne Wenger and Beverly Traynor  
19  
20  
21  
22 (<http://www.youtube.com/watch?v=U18BbjfK4Iw>), modelling a COP approach to staff  
23  
24 professional development, and authenticating the researcher's model.  
25  
26

27 As part of the elearning strategy, student access is facilitated by the specification  
28  
29 of appropriate student-owned WMDs and the integrated use of these for class, tutorial  
30  
31 and study sessions. Students with genuine hardships will be provided with institutionally  
32  
33 owned WMDs for use in their courses.  
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36 The use of WMDs within each course is led by an evaluation of the potential  
37  
38 pedagogical benefits to each course and how the utilisation of various learning  
39  
40 technologies will be scaffolded across the length of the course. Investment in wireless  
41  
42 infrastructure is being made to improve coverage, capacity and connection speed, and the  
43  
44 sequential movement of staff computers from desktops to WMDs will be undertaken.  
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## 49 **Conclusions**

50 Participatory action research (McLoughlin and Lee 2007; Wadsworth 1998) has  
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52 proven to be a useful methodology for this research, allowing the researcher to take on  
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54 the key role of the 'technology steward' (Wenger *et al.* 2009; Wenger *et al.* 2005) to  
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3 guide the projects as well as receive and act upon direct participant feedback, reflections,  
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5 and critique, and subsequently modify the research process throughout the length of the  
6  
7 research. The researcher has thus created an inter-related feedback loop between all of the  
8  
9 mlearning projects across a variety of disciplines and contexts, channeling findings and  
10  
11 reflections between each project. Significant beneficial change has been achieved for the  
12  
13 various participants and stakeholders involved in the research, including demonstrable  
14  
15 transformation in pedagogical strategies and pedagogical reconception from participating  
16  
17 lecturers, increased engagement and collaboration from participating students, and  
18  
19 strategic input into the institution's new elearning strategy (Aaaaaaaa and Bateman  
20  
21 2009a; 2010a; b; Aaaaaaaa *et al.* 2009a). While requiring time-intensive input from the  
22  
23 researcher as the technology steward, the outcomes have been very rewarding, with the  
24  
25 development of a sense of trust and collaboration between all the participants, and  
26  
27 between the researcher and the course lecturers in particular. The researcher's role in  
28  
29 facilitating these pedagogical changes is now being replicated throughout the institution  
30  
31 with the development of the eLearning Community Coordinators within each department.  
32  
33 The longitudinal exploration and implementation of a series of participatory action  
34  
35 research mlearning projects has provided a model and momentum for transforming the  
36  
37 professional development and student scaffolding models of the institution. The  
38  
39 mlearning projects have also provided proof-of-concept that the pedagogical integration  
40  
41 of WMDs into course curricula can provide a catalyst for pedagogical change towards a  
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43 social constructivist pedagogy facilitating student-generated content and student-  
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45 generated learning contexts beyond the classroom. The integration of the identified  
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strategies and principles into the new elearning strategy provides an exciting opportunity for the institution.

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