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Publication Details

This book chapter was originally published as Lefoe, G, Olney, I, Wright, R and Herrington, A, Faculty development for new technologies: Putting mobile learning in the hands of the teachers, in Herrington, J, Herrington, A, Mantei, J, Olney, I and Ferry, B (editors), *New technologies, new pedagogies: Mobile learning in higher education*, Faculty of Education, University of Wollongong, 2009, 138p.

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CHAPTER 2

Faculty development for new technologies: Putting mobile learning in the hands of the teachers

Geraldine Lefoe, Ian Olney, Rob Wright and Anthony Herrington

Abstract:

This chapter identifies staff development strategies for the use of mobile learning technologies in higher education. We discuss how staff members were engaged in using the technologies for six months prior to introducing them to their students for learning activities within a Faculty of Education. We explain key concepts of authentic and mobile learning to underpin a methodology involving an action learning process. We identify five key strategies to support this learning: a shared understanding of the theoretical frameworks and philosophies; both an understanding of affordances of the technologies and time to develop skills; participation in authentic tasks; development of a shared language, knowledge and understanding of new pedagogies; and a cycle of reflection. Our findings support the notion that a social-constructivist framework provides an exemplary approach for staff development.

Introduction

In the last few years there has been an explosion in worldwide developments of new mobile technologies as the integration of visual and communication technologies associated with text, sound, audio, picture, and internet access collapse into single devices. Usage of such devices, which might have been out of the reach of the majority of students even 10 years ago, has significantly increased as costs tumble and firms claim their market niche.

Educators have been keen to incorporate the use of such devices in teaching and learning activities. Notwithstanding, we identify a need to move beyond training to use the technology, to examining new pedagogies for enabling their use to support learning more effectively.

While funding for the purchase of new technology is often forthcoming, funding for the development and support of new pedagogies and aspects of staff development is often left to chance. This was highlighted in a recent Australian initiative with a multi-million dollar funding initiative of the federal government's *Digital Education Revolution*. Initially the program failed to plan for the increased need for staff development to successfully integrate the use of these new computers within the curriculum indicating that this would be incorporated in preservice teacher training (DEEWR, 2008). However, by June 2008, the Minister acknowledged this gap and allocated significant funding to address the need of current teachers in 2009 while continuing to support the development of preservice teachers' skills through their university education.

It is this need to engage future teachers with new pedagogies that supports our argument that the supply of tools is not sufficient to ensure improved learning outcomes for our students at any educational level when no changes are made to current pedagogical practice. Whilst many students may be quite engaged with recent innovations in technology, many of their teachers indicate they are overwhelmed by heavy workloads and administrative requirements

leaving them little time to engage with new technologies, let alone spend time planning for their integration in learning activities or reflection on new pedagogies.

It is no surprise then that new technologies have not had a large impact on pedagogy when faculty find it challenging to engage in new ways of thinking about their teaching within current workload structures. The focus of this chapter is to provide an overview of a staff development program that addressed this gap through engaging staff with personal use of mobile technology for six months prior to implementation in their teaching; and the evaluation of the program's implementation through the eyes of the participants. This chapter describes and analyses the staff development process used to engage academics from a Faculty of Education in a regional university in Australia in an exploration of pedagogies for using mobile technologies in their teaching.

Background

The focus for this paper is the staff development phase of a larger project that investigated the potential of two mobile devices, a smartphone and digital audio/video player. Thompson (1999) argues that it is often difficult to convince academic staff that 'investment of their time in learning to use new technologies effectively will provide long-term gains, most especially in the current climate of competing priorities and demanding deadlines' (p.159). It was therefore a major design consideration to make the faculty development activities worthwhile and relevant to those involved. An action learning approach was adopted to immerse the faculty in the technologies and prepare them to meet the needs of millennial learners. This project sought to address ways to incorporate the everyday technologies their students are using with their courses and related assessment processes.

Changing teaching practice through engagement with new technologies is often carried out by enthusiasts, individuals working on their own projects influenced by the latest trends in technologies. Often this 'lone ranger' may allow the technology to drive the changes in teaching practice instead of allowing pedagogy to drive the changes required to improve learning outcomes (Taylor, 1998). More recently, the literature on faculty development has identified a key aspect of such activity should be based on a combination of practice and theory and that many successful faculty development activities move beyond the idea of 'one-off' workshops to integrated long term programs that focus on developing relationships and reflection as well as skill and knowledge development (Carew, Lefoe, Bell, & Armour, 2008). Of significance is a scholarly approach to this practice that provides avenues for the participants to reflect on their practice and disseminate through collegial sharing activities such as teaching forums and through publication in one of the many teaching and learning publications now available (Kreber & Cranton, 2000).

The basis for the design of the faculty development program required a process that would support the need for staff to own and use mobile technology in their professional and personal contexts in order to think differently about engaging their students in pedagogically sound ways. Many of the staff involved were hesitant about the preparation

required for such a project and had experienced more traditional approaches to faculty development.

Theoretical framework

The approach was guided by social-constructivist thinking that considers learning as an active process of building knowledge and skills within a supportive group or community. In particular we focused on the social construction of knowledge underpinned by the Vygotskian view that through enabling and supporting communication, interaction and collaboration, knowledge can be co-constructed (Kim, 2000; Oliver & Herrington, 2001; Vygotsky & Cole, 1978).

The approach was inclusive of notions of the development of a community of practice (Wenger, McDermott, & Snyder, 2002) and the role of reflection in learning (Schön, 1983). We identified that communities of practice are collectives where people share and co-construct knowledge and experiences in the workplace (Lave & Wenger, 1991). In order for this to happen we acknowledged the need for: mutual engagement, shared repertoire, and joint enterprise (Wenger, 1998). Mutual engagement implies that ‘each member of the community contributes to a shared activity; the evolving community negotiates meaning by developing a shared repertoire; and learning results from the full joint enterprise of contributing to activity, negotiating repertoire and working with common purpose’ (Carew, Lefoe, Bell, & Armour, 2008, p. 57). Reflective practice is identified as an important component of faculty development but it is ‘only at the higher, critical levels of reflection that we expose and explore the values, beliefs and assumptions underlying our practice’ (Carew, Lefoe, Bell, & Armour, 2008, p. 56).

These ideas were then used together with principles associated with mobile learning and authentic learning as the basis for the design and implementation of the faculty development activities.

Mobile learning

The research on mobile learning initially focused on the mobility of the technology, but has moved more recently from this interpretation to recognize that it is the mobility of the learner and the learning that is important (Sharples, Taylor, & Vavoula, 2007). Others have defined mobile learning as taking place when the learner is not in a fixed, predetermined location or when the learner ‘takes advantage of the learning opportunities offered by mobile technologies’ (O’Malley et al., 2005, p. 6).

This shift in focus from the device to the learner being mobile is also noted by Seppälä and Alamäki (2003) in their clarification of mobile learning as an extreme form of flexible learning where the ‘mobile environment integrates studies that take place on campus, at home or outside universities facilities into one shared, flexible learning environment’ (p. 330). Quinn (2000) has identified the exciting possibilities of the blending of mobile devices with e-learning ‘independent of location and space’. The rapid increase of mobile learning tools coupled with the convergence of the technologies means improved access for many students.

We have considered these efforts to define and categorize these new environments and for the purpose of this paper we define mobile learning or m-learning as:

Personal access to mobile technologies providing learners with opportunities to be flexible in the way they collect, store and share information to support their problem solving.

Authentic learning

In order to support knowledge construction and application as opposed to inert knowledge acquisition it was important in our context to model this within the faculty development activities through the provision of authentic real world tasks where ‘meaningful learning can only take place if it is embedded in the social and physical context within which it will be used’ (Oliver & Herrington, 2001, p. 78).

Authentic activities comprise *complex tasks* to be investigated over a sustained period of time; activities are completed in days, weeks and months rather than minutes or hours. They require a significant investment of time and intellectual resources. Herrington and Oliver (2000) suggest that there are a number of critical characteristics of authentic learning that have an impact on the way in which we design for instructional environments. They suggest that authentic learning environments should:

- Provide an authentic context that reflects the way the knowledge will be used in real-life;
- Provide authentic activities;
- Provide access to expert performances and the modeling of processes;
- Provide multiple roles and perspectives;
- Support collaborative construction of knowledge;
- Provide coaching and scaffolding at critical times;
- Promote reflection to enable abstractions to be formed;
- Promote articulation to enable tacit knowledge to be made explicit;
- Provide for integrated assessment of learning within the tasks.

The key concepts of mobile learning and authentic learning provided a common ground for discussion and development of the faculty based program and the iterative evaluation design. Combined with the theoretical underpinnings they guided the framing of our research question, namely:

What are appropriate strategies for the professional development of higher education teachers in the pedagogical use of mobile-learning devices?

We address a gap in the literature identified in a recent report on teacher learning with digital technologies that there is an assumption that teachers *will* learn with digital technologies but there is little research on *how* they will learn (Fisher, Higgins & Loveless, 2006). The following section describes the methodology used for the research.

Methodology

We used an action learning framework over a period of six months to provide opportunities to explore and develop new pedagogies for mobile devices in a variety of subject areas. We believe this allowed for the concerns and needs of individuals to be met through inquiry learning rather than a fully pre-planned scope and sequence of activities and is appropriate for professional learning needs in this context (Revans, 1982; Zuber-Skerritt, 1993).

During the following twelve months, the participants implemented their projects with their students. This chapter focuses on the first six months only, though acknowledges the ongoing role of informal faculty development through interaction with peers and support staff over the next year.

Data were collected through reflections that were recorded during the meeting sessions and feedback was sought through anonymous evaluations. The cycle of plan, act, observe, reflect was used to continuously review the process of faculty development (Zuber-Skerritt, 1993).

We expanded our research question to include the following sub-questions:

- How can an action learning approach support staff professional development in using mobile learning technologies?
- How do the workshop activities support participants' understanding of the affordances of mobile learning technologies?

Using a qualitative approach these data were collected and analysed, as indicated in Table 1.

Table 1: Data collection matrix

	Primary sources	Secondary sources
Sub-Question 1 How can an action learning approach support staff professional development in using mobile learning technologies?	Semi-structured interviews during regular meetings Observation and informal discussions	Individual reports on project website Institutional documents including subject outlines and assessment tasks
Sub-Question 2 How do the workshop activities support participants' understanding of the affordances of mobile learning technologies?	Anonymous feedback surveys Observation and informal discussions	Individual reports on project website Institutional documents including subject outlines and assessment tasks

The data were used in an iterative way to redesign further support and activities to meet the needs of the group. The secondary sources provided rich descriptions of the learning design and environments in which the faculty members worked and interacted with students. It provided a detailed picture of the environments in which the devices were to be deployed and helped clarify the purpose and possible outcomes of the intended projects.

Participants

The twelve voluntary participants in the staff development process included a range of teacher educators from a Faculty of Education in a regional university. They were skilled lecturers in a range of disciplines including mathematics, science, physical and health education, curriculum, visual arts, educational psychology, literacy, early childhood and educational technology. They brought a diverse and solid understanding of educational pedagogies but with a varied understanding of how new technologies can impact on the learning of their students. Some participants were experienced users of a variety of technologies with a student-centred learning focus. Their enthusiasm and commitment to the project, willingness to change and adapt their understandings to improve student outcomes through the development of new pedagogies was an important contribution to the overall project.

Learning activities: formal and informal

An overview of the staff development activities, both formal and informal, is provided in Table 2.

Whilst the meetings regularly addressed such things as relationship building, device usage, technical issues, reflection on practice and development of shared understanding, there were five key understandings required for implementation. Firstly, an understanding of the theoretical frameworks of the larger project (that is authentic learning and action learning) was necessary, and developing an understanding of mobile learning was essential. Secondly, developing an understanding of the affordances of the technologies at hand, and thirdly identifying the new pedagogies for learning that were emerging and the implications for the practice and teaching role. The fourth key was being able to model the practice through the use of authentic tasks and finally, within all meetings, there was a cycle of reflection on the implications for the development of new pedagogies presented by the five initial understandings.

Table 2: Framework for staff development

Meetings	1	2	3
Activities	Discuss theoretical underpinnings of project Review technology skills and develop through introduction of the smartphone and iPod	Reflection on use of devices and affordances between meetings Identification of pedagogical viewpoints Further technology skills development	Reflection on use of devices and affordances between meetings Modeling group activities Reviewing pedagogical viewpoints Planning student activities and implementation plans

Meetings	1	2	3
Focus	Familiarity with new device and improved confidence with technology Engaging with related theory for authentic learning and mobile learning	Examining mental models Engaging in scenarios for use Enhanced skills development	Authentic learning activities to model possible uses
Outcomes	Relationship building Common agreed goals and shared language development Getting 'buy in' for project activities Technology skills development	Relationship building Changing mental models Reflection on action Enhanced technology skills development	Reflection on action Identification of new pedagogies for learning Enhanced technology skills development through identifying relationships between devices and computers Planning for implementation within subjects

Results and discussion

1. The relationship of mobile learning and theoretical frameworks

The first meeting provided an overview of authentic learning and action learning as used in the larger project (Herrington & Herrington, 2006). It then tackled the issues of what is meant by 'mobile learning' and how it is being applied in educational contexts. A variety of studies were identified highlighting a lack of applications in higher education that adopt an authentic learning perspective. An exploration of the term 'mobile learning' from a number of sources reflected a definition that recognised the convergence of learners using mobile technologies and learning while mobile (Sharples, Taylor & Vavoula, 2007).

The key focus for this activity was on sharing knowledge and developing shared understandings for future learning. After an introduction to the iPod and the Palm Treo the group identified their preliminary thoughts on possible affordances of the technologies in their teaching. Many activities related to personal use for managing and administrating teaching at this stage rather than students as constructors of their learning for example. The focus was very much on learning to use the technologies themselves but the evaluations indicated the usefulness of the meeting: 'Being new to the project and hearing about the design and theoretical frameworks consolidated the reading I had done' (Meeting 1 participant). Another indicated, 'Thanks for the effort put into planning and implementing the first session. It's nice to have the opportunity to be part of a team'. This was reiterated by others, 'An informative morning; I feel my brain is stretched; and obviously well thought through'. And the inevitable, 'thanks for the great food', as the project leader and manager contributed to the relationship development through the provision of homemade cakes for each meeting. This allowed for the informal discussions and reflections during a break, which further supported the learning of the participants.

In the second meeting, we were conscious of the importance of modelling inquiry-based practice for using the devices, and based on the feedback from participants about their needs, designed interactive activities that allowed sharing of knowledge and practice across smaller groups. The third meeting built on this model through authentic learning tasks to engage participants in the kinds of activities they might use with their students.

2. Understanding the affordances of the technologies

The initial meeting provided the first use of the technologies for a number of the participants. Some indicated a need for more support to use the devices in their feedback, ‘[I need] time to explore the Treo.’ Another indicated their concern about using the devices with students ‘I am a little anxious about introducing the technology to the students – will [name] and [name] be available☺? With a six week time frame [for the teaching activity] we can’t afford to waste time’.

As faculty became familiar with the devices that they had access to, they developed better understandings of the affordances of these technologies. Participants found that discussion between meetings, and the general ability to support each other through ‘corridor conversations’ and ‘at elbow’ support was critical in the early stages. However, they tended to focus more on using the technologies for existing practice. We developed scenarios of use to encourage people to think more broadly about how they might use the technologies. We were mindful that for faculty to engage with mobile technologies they needed to ‘Be[ing] confident in its use and undergo[ing] training where necessary’ (Becta, 2004, p. 1).

3. Identifying new pedagogies for learning

Each meeting included an opportunity for participants to reflect on the learning activities they may engage in with their students and the usefulness of the devices to support this learning. The variations in responses indicated the disparity in the group in terms of depth of understanding and experience in using such devices: For example, clarifying concepts, recording preservice teachers explaining and demonstrating; then sharing with others for reflection; collectively constructing a story; and supporting group work. Our response to this was to plan the next meeting to engage the participants in group activities to share their knowledge through discussion of possible scenarios of use. Examples are included in Table 3 of two of four scenarios and the responses by participants (cf, Lefoe & Olney, 2007; Lefoe, Olney & Herrington, 2008 for discussion of the scenarios).

Table 3: Scenarios of student activity and summary of participants’ responses

Scenario one: Student on campus	Participants’ response
<p>Xin Ro is enrolled in the first year of the primary program. She is involved in a collaborative assessment task about global warming. ...</p> <p><i>What kinds of learning activities are likely to be on their project plan? How can mobile devices support these kinds of activities?</i></p>	<ul style="list-style-type: none"> • Collect data from around the world with others to graph trends and note changes • Recording voiceovers of extreme weather events • Give personal perspectives and understandings about the causes and solutions to the problem • Interview a range of ages for a range of perspectives

Scenario three: New academic	- Participants' responses
<p>Dr Way T. Longtime is a new academic in her second year at the university. She must prepare a new first year subject focused on indigenous education for the next semester.</p> <p><i>What strategies could she use to add perspectives from the local schools and community to her subject? How could mobile technologies support her or her students to do this?</i></p>	<ul style="list-style-type: none"> • Interview the visiting speaker • Recording phone calls to key people for podcasting • Audio comments • Set up iPod as database for others to draw on • Recording interviews • Collecting reflective evidence of teaching to plan for future teaching

Feedback from the participants through evaluation and reflection indicated that the scenarios were a positive experience and that having a point of focus for their discussions was an important component of identifying possible uses in student learning. Whilst participants could clearly see the potential for new uses within student learning activities they did not demonstrate an understanding of significant changes required to the current practices of academics. We concluded that making the devices their own is an important facet of staff development for using mobile technologies, a concept supported in the literature (Kulkulka-Hulme & Traxler, 2005).

4. Modeling the practice through authentic tasks

Authentic tasks were introduced during the third formal meeting to engage participants with further understandings of the affordances of the technologies, for example through using the camera and video tool on the smartphone, and voice recording using the iPod. It also provided a model for different ways of thinking about the pedagogies with which they would engage their students. One activity aimed to give participants an example of the way the smartphone could be used to create digital narratives or stories that could then be used with their students in authentic contexts.

Digital narratives is an activity described by Patten, Arnedillo Sanchez & Tangney (2006) as one that 'embodies a collaborative, contextual, constructionist approach to learning with handheld devices' (p. 303). The task involves creating a 2 to 3 minute video using the smartphone's video, picture and audio functionality, saving the media to an SD memory card, transferring the media to a computer, then creating the story using movie editing software such as iMovie. Workshop participants were shown an example of a digital narrative and arranged in pairs to develop their own. Children's toys were provided as props and participants were asked to plan the story using a storyboarding template that required sketching scenes in chronological order and indicating dialogue and or possible voiceovers. They completed this task within a one hour timeframe and then presented their movie to the group. This provided an excellent example of how the devices could be used within a learning context in the classroom as the participants quickly became familiar with the combination of movie, photo and sound recording. The next activity used the iPods for interviewing people about their place of work and the resultant recordings were then transferred to the computer and published as podcasts to share with the other participants.

Even though most participants had only a developing knowledge of the smartphone and movie editing software all were able to achieve a satisfactory outcome and could see the potential for such an activity with their preservice students, as indicated in the feedback, '[Best thing about today was] the introduction to the possibilities available from the software offered. The greatest challenges faced included: having time to fully explore the software presented'.

5. Reflections on implications for learning and teaching activities

Throughout the meetings the devices were used to support the learning and reflective aspects of the activities. For example, photos were taken during the meetings by all participants engaging in various activities and frequently shared with each other and on the project website.

During the reflective stage of each meeting the iPods were used to record the reflections for later analysis by the researchers. Questions were used to focus reflection towards the end of each meeting and Table 4 provides an example of questions used after one activity. We used think-pair-share activity to encourage reflective activity and sharing with another to help clarify ideas. Individuals then shared with the larger group and these were recorded to assist people later when they were identifying learning activities to use with their students.

Table 4: Example of reflective activity

MLearning Workshop Reflection	
Please jot down points for discussion and hand in after discussion – feel free to keep adding to it during the discussion.	
1.	Today's workshop has modelled a number of teaching activities using the iPod and mobile phone. What have you learnt today that you might practice with a student group? How might these kinds of tasks be used within one of your subject assessment tasks?
2.	List some related assessment tasks you think might be relevant for your subject and students.
3.	Expand on two possible assessment tasks – frame them in the way you would write them in your subject outline.

The responses to the reflective activity (Table 4) conducted during the third meeting indicated a number of areas where important learning had occurred over the faculty development activities. The following comments are from the participants indicating they had:

- A developing awareness of the different contexts in which adult learning occurs;
- Used group work in the past but liked the storyboard approach;
- Become more confident with the technologies, the mechanics of transfer for files and the 'language' to use to explain this to their students;
- An understanding of how to break the assessment tasks into more manageable chunks;
- Clarity of instructions and support framework;
- Wondered why the cellular aspects of the phones weren't being used; and

- A need to allocate time to understanding the additional features of new software not yet on the devices.

Participants also clarified the kind of assessment tasks they might use in their subjects.

Conclusions

Engagement and interaction through technology is an essential aspect of many of our students' lives. Our findings conclude that just as students need to 'own the technology' if they are to make effective use of it then so do the teachers (Kulkulska-Hulme & Traxler, 2005). Comprehensive staff development and support are key aspects of ensuring effective use of educational technologies with a strong focus on pedagogy within the curriculum.

Our overarching research question sought to identify strategies for the professional development of higher education teachers in the pedagogical use of mobile-learning devices. Our findings show that the social constructivist approach to support an active and collaborative community, where the learner is in control of the activities and is able to question and plan the appropriate strategies relevant to the environment and the new technologies, has been most suitable for this project. We believe the action learning approach provided a suitable framework to support this learning.

Of significance was the ability for faculty to be able to use the devices in their everyday work and to become familiar with them to such an extent that they were then able to incorporate their use in the curriculum. Once in the classroom there were often students with a greater knowledge of the devices or similar and the students then supported each other (and sometimes the faculty member), with learning how to use them.

We identify five important strategies to support such an implementation:

1. A shared understanding of the theoretical frameworks and philosophies of the project were essential for all engaged in the project.
2. Developing an understanding of some of the affordances of the technologies at hand, and having a significant amount of time to develop these skills before using with students, is an important component of using new technologies.
3. Participating in authentic tasks which modeled the practices being discussed provided opportunity for insights into new pedagogies that assisted the move from theory to practice.
4. Developing a shared language, knowledge and understanding of new pedagogies and the implications for practice and teaching role.
5. The cycle of reflection on the implications for the development of new pedagogies presented by the four initial understandings.

In order that today's preservice teachers are able to meet the needs of their future students we need to develop and understand different ways of teaching and learning. We need new pedagogies to support this. The staff development aspect of this project has provided some useful insight and strategies as to how we can better support faculty to engage with new technologies, and they in turn have used this to engage their own students in different and creative ways. We feel that this is absolutely essential as 'Faculty development for existing and future faculty is a pivotal investment for integrating technology in higher education' (Moore, Moore & Fowler, 2005, p. 11). By working with preservice teachers there are many opportunities to engage in new pedagogies to influence changed practice from early childhood through to secondary and tertiary education.

Acknowledgments

Support for this project has been provided by the Australian Learning and Teaching Council, an initiative of the Australian Government Department of Education, Employment and Workplace Relations. The views expressed in this report do not necessarily reflect the views of the Australian Learning and Teaching Council Ltd. This research was also funded by support from the Office of Teaching and Learning at the University of Wollongong.

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Cite as: Lefoe, G., Olney, I., Wright, R. & Herrington, A., (2009). Faculty development for new technologies: Putting mobile learning in the hands of the teachers. In J. Herrington, A. Herrington, J. Mantei, I. Olney, & B. Ferry (Eds.), *New technologies, new pedagogies: Mobile learning in higher education* (pp. 15-27). Wollongong: University of Wollongong. Retrieved from <http://ro.uow.edu.au/>

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