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Enabling Teaching, Enabling Learning: How Does Staff Development Fit the Educational Technology Landscape?

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Abstract
The New Technologies: New Pedagogies Project is a nationally funded project to support the use of mobile learning in higher education to support student learning. We explore the staff development process of this larger project, where academics in a Faculty of Education investigate new pedagogies that are required to meet the needs of millennial learners. The staff development process addressed 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. We identified four key actions for participants which contributed significantly to the development of the authentic tasks for their pre-service student teachers to undertake as part of their assessment: an understanding of the theoretical frameworks, (authentic learning, action learning, and mobile learning); an understanding of the affordances of the technologies; active participation in authentic tasks which modeled the practice; and active participation in cycles of reflection based on the implications for the development of new pedagogies presented by the three initial understandings.

Keywords
mobile learning, faculty development, action learning, pedagogy, ipod, smartphone

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Enabling teaching, enabling learning: How does staff development fit the educational technology landscape?

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The *New Technologies: New Pedagogies Project* is a nationally funded project to support the use of mobile learning in higher education to support student learning. We explore the staff development process of this larger project, where academics in a Faculty of Education investigate new pedagogies that are required to meet the needs of millennial learners. The staff development process addressed 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. We identified four key actions for participants which contributed significantly to the development of the authentic tasks for their pre-service student teachers to undertake as part of their assessment: an understanding of the theoretical frameworks, (authentic learning, action learning, and mobile learning); an understanding of the affordances of the technologies; active participation in authentic tasks which modeled the practice; and active participation in cycles of reflection based on the implications for the development of new pedagogies presented by the three initial understandings.

Keywords: mobile learning, faculty development, action learning, pedagogy, ipod, smartphone

Introduction

The recent influx of computers in high schools in Australia (National Secondary School Computer Fund), a funding initiative of the federal governments' Digital Education Revolution, failed to plan for the management of the technology and the increased need for staff development to successfully integrate their use within the curriculum (DEEWR, 2008). We argue 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 the learners may be highly visible in the educational technology landscape, many of their teachers may be lost in a heavy fog, overwhelmed by heavy workloads and administrative requirements leaving them little time to keep up-to-date with new technologies, let alone spend time planning for their integration in learning activities.

This paper describes a project at the higher education level. It focuses on the use of mobile technologies in a Faculty of Education at a regional university in Australia. We provide an overview of an implementation strategy that not only engaged the teachers in personal use of new technologies but included a sustained staff development strategy over a period of six months. Following this the academic staff used the technologies in the classroom with their students, the future teachers identified above. We believe this goes well beyond addressing the Rudd government strategy that aims "to ensure that all new student teachers achieve competence in the use of ICT. From 2009, new teaching students will have to attain appropriate skills in this area before they are able to graduate." (Rudd, Smith, & Conroy, 2007, p. 11). It is essential that these pre-service teachers are not only prepared with skills to use future technologies in the learning and teaching arena, but they are also prepared to use them in innovative ways to enhance learning for their future students. It can only be through the preparation of higher education teachers to think differently about their teaching and model appropriate pedagogical approaches that we will impact on these future learners. The larger project of which this is a component aims to address this need to engage academics in a Faculty of Education to explore new pedagogies required to incorporate the use of mobile learning technologies in teaching and learning activities with their students. Project team members provide examples of implementation strategies (Ferry, 2008; Herrington & Herrington, 2008).

In this paper we describe three staff development activities that contributed to a holistic understanding of the affordances of the mobile technologies so their use could be integrated within assessment tasks in the following semester. We then identify four key understandings participants identified

Background

Anywhere, anytime communication technologies are in constant use by the tech savvy millennium generation but the affordances of these technologies are slow to be integrated in their educational environments. A recent initiative at the University of Wollongong, through funding support from the University and from the Australian Learning and Teaching Council (formerly the Carrick Institute for Learning and Teaching), provided opportunity for academic staff to engage with two technologies which were quite new for many of them. We describe the staff development phase of this larger project investigating the potential of a smartphone and a digital audio/video mp3 player. Using a design-based research methodology, this larger project aimed to:

- Investigate the potential uses or 'affordances' of mobile devices.
- Engage teachers from a Faculty of Education using an action learning professional development framework to explore and invent pedagogies appropriate to the use of a mobile device in completing a complex task within an authentic learning environment.
- Implement and evaluate the use of mobile technologies and authentic tasks in learning activities over a period of 3-5 weeks in a range of different subject areas.
- Describe, categorise and disseminate resultant pedagogies and professional development activities through a dedicated website and a published handbook.
- Implement the professional development activities for m-learning across other contexts, and disseminate in web-based template form to other universities across Australia and overseas (Herrington, A. & Herrington, 2006a).

We define mobile learning (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 learning*. We believe this reflects the current research in the area which initially focused on the mobility of the technology, but has moved more recently from this interpretation to recognise it is the mobility of the learner and the learning that is important (Sharples, 2006). O'Malley et al. (2005) 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' (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). Clark Quinn as early as 2000 had identified the exciting possibilities of the blending of mobile devices with elearning "independent of location and space" (Quinn, 2000, n.p.). By identifying new pedagogies the project aims to meet the needs of these students by identifying authentic learning tasks which incorporate the affordances of these technologies.

The focus of this paper is on the professional development aspect of the larger project, which was to support the participants in identifying learning activities that would support their students' learning using mobile devices.

Methodology

We used an action learning framework for staff development to provide opportunities to explore and develop new pedagogies to use mobile devices in a variety of subject areas in an appropriate way. We believe this allows 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).

Data were collected during the action learning program to address the research question:

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

Data was collected through reflections which 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 staff development (Zuber-Skerritt, 1993).

Participants

The twelve 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 pedagogy 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 a key driver for this project.

Devices

The selection of mobile technologies was difficult considering the rapid changes in the area and as always, the limits imposed by the budget. The initial proposal included three separate devices: a mobile phone; an mp3 player and a personal digital assistant (PDA) but after initial investigations into a range of devices the distinct nature of each became blurred. Issues such as connectivity (bluetooth and/or wireless), computer platform, ease of use, standard features and price were all considered. The final choice was to provide the best combination therefore we reduced this to an mp3 player - a 30 GB video iPod, with Extreme Micromemo voice recorder attachment, and a smartphone – the Palm Treo 680, allowing the combination of phone, voice recording and playback, calendar, camera and video recording. The technologies themselves were out of date before the project had finished but by focusing on the new pedagogies identified, the results are still useful for future teachers.

Action learning program

In a recent report on teacher learning with digital technologies there is an assumption that teachers will learn with digital technologies with a small but growing focus on how they will learn (Fisher, Higgins, & Loveless, 2006). Through a range of formal and informal activities we addressed this gap. Lecturers were encouraged to consider the use of the mobile devices as cognitive tools to support learning within an authentic learning environment and this process was modeled within the workshop program (Herrington & Herrington, 2006b).

Most importantly each of the lecturers was provided with one each of the devices to make their own. Some inserted their personal phone SIM card so they could become familiar with the devices in their everyday work. Others were hesitant to do this at first and initially carried both personal phone and the smartphone for the first few weeks. Whilst informal staff development occurred through their own support of each other and the discoveries and sharing involved in their everyday tasks, the action learning meetings were designed to facilitate regular collaboration, reflection and sharing of experiences. Over the university semester a series of meetings were conducted on campus in a non-specialised teaching space. This open classroom allowed for formal presentations by the staff developers and also an area for collaborative tasks between the attendees. Each meeting followed a semi formal structure with flexibility to provide staff considerable opportunities for group discussion and individual problem solving.

Activities and outcomes

Whilst the meetings regularly addressed such things as relationship building, device usage, technical issues, reflection on practice and development of shared understanding, there were four key understandings which contributed significantly to the development of the authentic tasks for pre-service teachers to undertake as part of their assessment. Firstly an understanding of the theoretical frameworks on which the larger project was premised (that is authentic learning and action learning) was necessary, and developing an understanding of mobile learning was essential. Secondly, developing an understanding of some of the possible affordances of the technologies at hand, and thirdly participating in authentic tasks which modeled the practice. Finally, within all meetings there was a cycle of reflection on the implications for the development of new pedagogies presented by the three initial understandings.

1. Theoretical frameworks for the overarching project

The first meeting provided an overview of authentic learning and action learning as used in the larger project (Cf., Herrington & Herrington, 2008). It then tackled the issues of what is meant by 'mobile learning' and how it is being applied in educational contexts. The theoretical bases for mobile learning

provided by Naismith, Lonsdale, Vavoula, and Sharples (2004) provided a useful framework to categorise the different approaches. A variety of studies were identified highlighting a lack of applications in higher education that adopt a situative or 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 as you are mobile (Sharples, Taylor, & Vavoula, 2007). The key focus for this activity was on sharing knowledge and developing shared understandings for future learning.

2. Affordances of the technologies

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 were 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 outside the square about what they could possibly do with the technologies. Examples are included in Table 1 and 2 of the scenarios and the responses by participants.

Table 1: Scenarios of student activity and summary of participants' responses

Scenario one: Student on campus
Xin Ro is enrolled in the first year of the primary program. She is involved in a collaborative assessment task about global warming. The team gathers at their first meeting and share the initial resources they have collected. They discuss and draft a plan for their project and identify their roles and responsibilities. They have recorded the discussion to make it easier to write the notes later and use this to draft individual action plans. Clearly the PDAs will be useful for administration tasks for their project, but how can their learning be supported? What kinds of learning activities are likely to be on their project plan? How can mobile devices support these kinds of activities?
- Collect data from around the world by connecting with others to graph trends and note changes. - Recording voiceovers of extreme weather events - Giving personal perspectives and understandings about the causes and solutions to the problem - Interview a range of ages for a range of perspectives
Scenario two: Student off campus
Kenny Cope is a third year student about to go on a practice teaching session. He's prepared five weeks of lesson plans for his Year 4 class after much discussion with the class teacher. He needs to reflect on his teaching and evaluate his lessons. He wants to collect evidence of his work and the work of the students to annotate for his teaching portfolio. What kinds of activities is he likely to engage in during practice teaching? How can the mobile devices support his learning in this context?
- Record Kenny teaching on video and analyse his teaching – wait time, questioning techniques, classroom management, small group strategies - Use of anecdotal records - Voice memos to reflect and make changes to his practice - Collecting work samples using photo, video etc and voice over kids and Kenny's comments as evidence of children learning then informing future teaching - saving documents as pdf then uploading as needed - Kenny could text his supervising teacher to organise practical aspects of teaching - Memos for learning journal - Audiovisual tool creating a product that shows his school from his perspective

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 (Kukulska-Hulme, Evans, & Traxler, 2005).

Table 2: Scenarios of teacher activity and summary of participants' responses

Scenario three: New academic
Dr Way T. Longtime is a new academic in her second year at the university. She must prepare a new first year subject focussed on indigenous education for the next semester. She wants to create an engaging subject that incorporates modeling a variety of teaching strategies. She would like to invite guest speakers from schools and local communities on various issues but with only a couple of weeks to go she realises this could be difficult. 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?
- Interview the visiting speaker and send it back to the speaker for editing - Phone calls to key people and recording for podcasting for student access and discussion - Audio comments - Set up ipod as database for others to draw on - Recording interviews for review of issues - Collecting reflective evidence of her own teaching to plan for future teaching
Scenario four: Experienced academic
Prof Noi Tall is an extremely popular academic and has been on campus for about 10 years. He has been extremely successful with 15 ARC grants and a publication record to die for. This semester is looking grim though. He loves teaching and has three classes this semester, including coordinating a new first year subject with about 100 students. He still has three ARCS to complete this year, a book draft to have ready half way though semester, and is guest editor for a very prestigious journal. Managing his time has always been one of his strengths but he realises that this semester it will be imperative to find some better ways to do this. What kind of activities is he likely to engage in for the new first year class? How can the mobile devices support him to do his job better, both in administration and teaching?
- preparing and carrying the items needed - retrieving information is easy as you have it there at the time/from last year - tutorial roles - easier distribution of information to students

3. Authentic tasks in action: Modeling the practice

Authentic tasks were introduced 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. 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. Prompts in the way of children's toys were provided 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 pre-service students

4. 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 3 provides an example of questions used after one activity. We used think-pair-share activity to encourage reflective activity and sharing with another helped 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 3 provides an example of a participant activity to encourage reflective practice, in this case to facilitate development of ideas for integration in assessment tasks and teaching strategies in the following semester. This groundwork led to the development of specific tasks as listed in Table 4.

Table 3: 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 modeled 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 up in your subject outline.

Discussion

We have discussed some perspectives of the theoretical frameworks and the affordances of the technologies in two earlier papers (Lefoe & Olney, 2007; Olney & Lefoe, 2007) and the issues identified included "attendance at and commitment to workshops; familiarity with devices; the need for informal and just-in-time support and separation anxiety. Some issues are common to other staff development activities such as attendance, time and commitment but the additional layer of device introduction, familiarity and retrieval indicate that these are areas that require further research" (Olney & Lefoe, 2007,

p. 802). We acknowledge the issues identified but focus on the use of authentic tasks as staff development activity as a successful aspect of the program, as evidenced by the final assessment tasks implemented by the academic staff in their subjects. From the scenario based activities, staff were able to predict possibilities for use that went beyond the usual assessment activity in the faculty. The real impact came from when the staff engaged in the authentic learning tasks themselves and realised how students could become engaged in such activities. As they became more aware of the affordances of the technologies, and engaged with authentic learning tasks in a supportive environment, they were able to identify the potential for their students. Table 4 provides an example of some of the assessment tasks that were implemented by different members of the larger project team. Full descriptions for each activity and possible implementation strategies are included on the website as indicated by the links and additional examples are included there.

Table 4: Examples of assessment tasks produced

Task	Context	Technology use	Further information
Talking picture books on iPods	Early Childhood	iPod for recording and sharing	*Jan Herrington, Ian Olney, Irina Verenikina* http://edserver1.uow.edu.au/mLearning/project_talkingbooks.html
Smart use of Palm™ Treo mobile phones	Primary Education	Palm™ Treo for communication, recording	*Brian Ferry* http://edserver1.uow.edu.au/mLearning/project_ferry.html
Teaching Episode: digital narratives	Postgraduate, mature –age students	Palm™ Treo smart phone, still and video photography; a computer with movie editing capabilities and teacher tube	*Tony Herrington* http://edserver1.uow.edu.au/mLearning/project_herringtonA.html
Using mobile technologies in multimedia authoring	Second year, Bachelor of Mathematics & Bachelor of Science pre-service teachers,	Palm Treo 680 Smart phone – containing email & messaging functionality, web access, MP3 player & VGA camera. included Word, Excel, PowerPoint and PDF support.	*Gwyn Brickell* http://edserver1.uow.edu.au/mLearning/project_brickell.html
Art on the Move: develop an innovative, interactive visual arts learning experience for students visiting local art gallery	Final year, Bachelor of Education pre-service teachers,	iPod used to create self guided, self paced experience using visuals (still), audio and videocasts	*Ian Brown* http://edserver1.uow.edu.au/mLearning/project_brown.html
Plan, record and edit an oral text to share teacher wisdom with other student colleagues	Final year, Bachelor of Education early career teachers,	iPod for recording plus GarageBand or Audacity software	Lisa Kervin, Jessica Mantei http://edserver1.uow.edu.au/mLearning/project_kervinMantei.html

Of significant importance was the ability 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 students with a greater knowledge of the devices or similar and the students then supported each other (and the staff member), with learning how to use them.
In summary, we identified four key actions for participants which contributed significantly to the development of the authentic tasks for their pre-service student teachers to undertake as part of their assessment. These included:

1. developing an understanding of the theoretical frameworks of authentic learning, action learning, and mobile learning;
2. through everyday use, developing an understanding of the affordances of the technologies;
3. active participation in authentic tasks which modeled the practice; and

4. active participation in cycles of reflection based on the implications for the development of new pedagogies presented by the first understandings.

Conclusion

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 (Kukulska-Hulme, Evans, & Traxler, 2005). Comprehensive staff development and support are key initiatives to ensuring effective use of educational technologies with a strong focus on pedagogy within the curriculum. Predicting what students will use in 10 years time becomes more challenging as mobile devices combine to become in some ways more complex but certainly more capable than anything available today. In order that today's pre-service 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. This 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; it can catalyse innovations in learning across generations." (Moore, Moore, & Fowler, 2005, p.11.1). By working with pre-service teachers there are many opportunities to engage in new pedagogies to influence changed practice from early childhood through to secondary and tertiary education.

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