

Mobile learning in higher education: Authentic tasks, assessment and Web 2.0

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Abstract: Increasingly ubiquitous and smart devices have enabled learning opportunities away from established learning places, as students have extended the means and the spaces in which they learn. In this paper, we describe the evolution of a project conducted to explore mobile learning, lessons learned and the changes in web participatory technologies that now enable a more open approach to the use of mobile devices. Web 2.0 and social media now facilitate the ready implementation of mobile devices into higher education, particularly through authentic learning environments and tasks, where they can be used in learning activities, research contexts and for the publication of student generated products. The paper concludes with key implications for practice.

Introduction

Mobile learning has captured the imaginations of many educators in higher education as they have capitalised on the features and tools embedded within powerful mobile devices (Hung & Zhang, 2011). More and more, learning is taking place outside the confines of the 'controlled classroom' using 'an environment- and time-independent pedagogy' (Solvberg & Rismark, 2012, p. 24).

Increasingly ubiquitous and smart devices have enabled learning opportunities distinct from those occurring in established learning places, as students have extended the means and the spaces in which they learn. The power, capacity and features of mobile phones continue to increase exponentially. But they often remain as powerful, yet unused, computers, switched off (usually at the teacher's request) in the pockets of students in higher education.

The project *New Technologies, new pedagogies* (Herrington, Herrington, Mantei, Olney, & Ferry, 2008) went some way towards addressing this problem by creating authentic and engaging pedagogies for mobile learning. Web 2.0 and social media now facilitate the ready implementation of mobile devices into higher education, particularly through authentic learning environments and tasks (Cochrane & Bateman, 2009). In this paper, we describe the evolution of the project, and describe the changes in web participatory technologies that now enable a more open and less structured approach to the use of mobile devices. The combined affordances of mobile devices with authentic pedagogy is described, together with suggestions for productive alignment of pedagogy, Web 2.0 tools and delivery platforms.

New technologies, new pedagogies

The *New Technologies: New Pedagogies* project endeavored to take an innovative approach not only in the creation of new, authentic pedagogies for mobile devices but also in the action learning approach adopted for the professional development of participants. The project involved 19 people including teachers, IT and PD personnel. It was a large and ambitious project that resulted not only in a range of innovative pedagogies, but in the creation of more knowledgeable and confident users of mobile technologies among teachers and students.

The project investigated the educational potential of two hand-held, ubiquitous mobile devices: Apple iPods and Palm Treo smartphones (combined mobile phones and PDAs). The project was conducted over 2 years, and the timing was (unfortunately) immediately prior to the release of the now readily available and more powerful internet-enabled mobile devices that have proliferated since the introduction of the iPhone. These internet-enabled phones now incorporate the functionality of all of these devices—telephone, PDA, music players—and much more, principally in the form of apps.

Specifically the project aimed to achieve the following:

- Investigate the potential uses or ‘affordances’ of two personal mobile devices (iPods and Smartphones).
- 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 the use of mobile technologies and authentic tasks in learning activities over a period of 4-6 weeks in a range of different subject areas.
- Describe, categorize and disseminate resultant pedagogies and professional development activities through a dedicated website and a published handbook.

The project activities were framed by the following questions:

- (1) What are the technology affordances of smartphones and iPods for teaching and learning in higher education?
- (2) What are appropriate strategies for the professional development of higher education teachers in the pedagogical use of m-learning devices?
- (3) What pedagogical strategies facilitate the use of m-learning devices in authentic learning environments in higher education?
- (4) What pedagogical principles facilitate the use of m-learning devices in authentic learning environments in higher education?

The project was guided by two key theoretical frameworks. *Authentic learning* (Herrington & Oliver, 2000) provided the basis for the pedagogical activity, while *action learning* (Revans, 1982) was adopted as the framework for professional development. Authentic learning situates students in learning contexts where they encounter activities that involve problems and investigations similar to those they are likely to face in real world professional contexts (Brown, Collins, & Duguid, 1989; Lave & Wenger, 1991). Action learning typically involves a small group of colleagues solving workplace problems utilizing their own processes of sharing, reflection and facilitation (Zuber-Skerritt, 1993), an approach that contrasts with traditional professional development that relies on the transfer of ‘outside’ expertise. Both theories reflect a constructivist epistemology emphasizing group collaboration in the creation of further knowledge and understanding.

A design-based research approach (also known as *development research* or *design experiments*) was used following Reeves’ (2006) four phase model. Teachers explored and invented pedagogies that made appropriate use of a mobile device for different subject areas. Each teacher used one or more mobile devices in depth, to explore the full range of affordances, and worked within the workshop environment to plan an authentic learning environment that comprised 4-6 weeks of student time (about a third of a semester). Resulting pedagogies and

professional development activities were shared through professional networks, workshops, a dedicated website and an edited e-book (Herrington, Herrington, Mantei, Olney, & Ferry, 2008). A final 2-day conference was held after all cases had been implemented and evaluated at the end of the second year of the project. The project website also includes succinct case study descriptions and exemplars of the pedagogies developed for the mobile devices. A practical edited book (free to download) also offered advice and modeling of the practical implementation and pedagogy of mobile devices, using the theoretical foundation of authentic learning, rather than a transmissive, technology-driven perspective. The project appeared to successfully move beyond established approaches to create new pedagogies for mobile technologies that promoted their use to focus on their use as cognitive tools in authentic learning environments.

Success factors in the project

Patten, Arnedillo, Sanchez and Tangney (2006) argue that the benefits of mobile learning can be gained, through collaborative, contextual, constructionist and constructivist learning environments. Authentic learning environments in higher education also typically involve these characteristics (Herrington & Herrington, 2006), and this was observed in the mobile learning project. The project was successful primarily for the following reasons:

- It provided the environment to create innovative activities using interesting and engaging technologies
- It had access to effective and accessible technical and PD support
- It was based on a sound method of professional development that relied on an internal action learning approach rather than buying in outside experts
- It responded to learning needs of participants as appropriate, rather than fixed and inflexible schedules of workshops
- It resulted in sound pedagogies that benefited students
- It was collegial, professionally rewarding and enjoyable!

While there were few factors that managed to actually impede the success of the project, there were challenges that needed to be resolved to ensure that the project proceeded in a timely and effective manner. These and other issues are discussed in the next section.

Factors that impeded success of the project

In addition to logistical challenges (such as course closures), and personnel challenges where teachers commenced in the project but then withdrew (such as retirements and staff moves), the management of the technology presented some problems.

The University purchased devices (Smartphones and iPods) for the project to issue to students. However, it quickly became apparent that further items were required to ensure the devices could be protected and presented in a suitable and safe form for the tasks (e.g., USB card readers, protective cases for the devices, storage cards, sim cards and replacement earphones to meet occupational health and safety standards). Thus, further funds were required, in addition to the substantial amounts already provided to purchase the devices. The devices were provided in class sets to students, so they were issued and returned within the 6 week period of their use. There was only one week between implementations to prepare the devices for the next class, and this was quite a time consuming job. It was necessary to check all the components and peripherals, and remove existing data from all the devices. There were also unforeseen technical problems, such as problems with downloading audio files and difficulties associated with using mobile phone provider sim cards in students' names because of security concerns.

Lessons learned

In relation to the management of the project and the devices used, some interesting lessons were learned.

Substantial peripheral costs, in addition to the time-consuming maintenance of the devices, led the project team to the conclusion that the purchase of class sets of devices was not sustainable, nor desirable. Students who were

issued a mobile phone could not effectively use it 'as their own' for such a short period of time, nor incorporate their own tools and resources (such as their own address books or calendars) into a device that they would ultimately need to return.

It is now our view, both on practical and theoretical grounds that mobile learning must rely not on institution-issued devices but on the use of the students' own devices, not only for functional purposes, (succinctly summarized as *portability*, *connectivity*, and *convenience* by Kukulska-Hulme, Evans, & Traxler (2005)), but also for the pedagogical value of phones. Given that the vast majority of students in western countries own a mobile phone (cf, various reports e.g., http://www.huffingtonpost.com/2010/06/28/998-of-college-students-h_n_628161.html), the use of these devices, especially if used in groups, could easily be incorporated into normal classroom activities, and for more complex tasks and problem-solving.

Further, while almost all implementations in the project generated genuine and polished student products—as would typically be required in authentic learning tasks—there was limited sharing of these products, something that can now be readily accommodated through Web 2.0 platforms.

Mobile learning and the affordances of Web 2.0 publishing

Web 2.0 and social media now facilitate the ready implementation of mobile devices into higher education, particularly when they are used in authentic learning environments and tasks, where they can be used in learning activities, research contexts and for the publication of student generated products (Cochrane & Bateman, 2009). Web-based tools such as wikis, blogs, microblogs (*Twitter*), video and text publishing (*YouTube*, *iBooks*, etc.), and video conferencing and podcasting (*Skype*, *iTunes*, etc.) facilitate communication and the distribution and publication of ideas. Gray, Thompson, Sheard, Clerehan, and Hamilton (2010) have noted that student Web 2.0 authoring is thought to 'improve learning in a variety of ways, such as to engage and empower learners, to increase peer learning and creative expression, to develop literacy and communication skills, and to inculcate lifelong learning' (p. 106). Its use in conjunction with mobile learning provides many pedagogical opportunities, with advantages that also extend beyond graduation (Gray, et al., 2010).

However, the assessment of student-generated products in Web 2.0 environments has caused some concern, Sener (2007) has noted that while student-generated content has been part of educational assessment for many decades, its role has been highly marginalised. Gray et al. (2010) agree, noting that: 'To date Web 2.0 authoring seems to be offered chiefly for optional enrichment or for formative, low stakes assessment' (p. 112). Nevertheless, increasing opportunities exist for students to create polished and professional products that are useful not only for students in the construction of an artefact of learning, but also as genuinely appealing and useful resources (e.g., Kateroo3D's animated movie on authentic assessment was clearly submitted as an assignment task but is a useful sharable resource, cf. http://www.youtube.com/watch?v=c_gibuFZXZw). Further, assessment strategies can be adapted to provide authentic assessment of authentic products, through the alignment of assessment and task (Herrington & Herrington, 2006), and through the use of Web 2.0 facilitated portfolio assessment (Barrett, 2007).

In order to facilitate the use of such strategies, the *New Technologies, New Pedagogies* site will be revised to include a community of practice to share such ideas. The existing project website is currently lacking in those features now associated with more dynamic web presence, such as networking facilities. Such revision would create a valuable resource for any academic wishing to promote the teaching and learning potential of mobile devices, to facilitate alternative assessment of Web 2.0 products, to provide not only a wide range of examples and resources, and also a venue for the creation of community and collaboration. McLoughlin and Lee (2010) stated in relation to Web 2.0 publishing that: 'The challenge for educators is to enable self-direction, knowledge building and autonomy by providing options and choice while still supplying the necessary structure and scaffolding' (p. 33) which, they point out, does not need to be provided by the teacher but can be supported by community engagement facilitated by social software tools. The facility for students and teachers in higher

education to upload their own mobile learning pedagogies will provide opportunities for peer review of pedagogies facilitated by mobile devices, and a platform to share and develop their use with students.

Conclusion

Solvberg and Rismark (2012) noted recently that ‘Students in m-learning environments make choices as to *when* they want to access the resources for learning purposes, *where* they will learn and *how* they will use the learning materials’ (p. 24). Colleges and universities will need to address the issues associated with the Bring Your Own Technology (BYOT) in order to provide the environment that are conducive to the devices and associated Web 2.0 tools. The lessons learned in the *New technologies, new pedagogies* project have also highlighted the need to constructively align tasks with planned assessments. This suggests that we should also add to this list ‘*where* they will publish their mobile learning products’. This may take considerable rethinking of the type of closed assessment that is frequently found in higher education, and perpetuated through institutional learning management systems (Craig, 2007). Further, although many people now freely contribute their ideas and products among peers through the urge to connect (Lee & McLoughlin, 2007), it may take some courage and effort on the part of students to create mobile learning products and to share them publicly. However, as noted by Bruns, Cobcroft, Smith, and Towers (2007): ‘The challenge of academic managers is to acknowledge that new ways may be unpredictable and beyond immediate comprehension, though blatantly obvious in hindsight’.

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