mLearning Journeys: Redesigning Teaching for mLearning

COCHRANE, Thom and BATEMAN, Roger <http://orcid.org/0000-0002-3086-6273>

Published version

COCHRANE, Thom and BATEMAN, Roger (2009). mLearning Journeys: Redesigning Teaching for mLearning. In: Teaching and Learning Conference 2009 : Teaching for Excellence --- Excellence in Teaching : eFest 2009, UCOL, Palmerston North, New Zealand, 30th September - 2nd October 2009. (Unpublished)

Copyright and re-use policy

mLearning Journeys: Redesigning Teaching for mLearning

Thomas Cochrane
Unitec, New Zealand
tcochrane@unitec.ac.nz

Roger Bateman
Unitec, New Zealand
rbateman@unitec.ac.nz

Abstract: The excitement surrounding the potential of web2.0 tools within education has continued to grow. While almost everyone has now heard of PODCasting and YouTube, there are many more examples of social networking and content sharing tools that can be harnessed for education. Recently Twitter (microblogging) has been popularised by the media, with a reported explosive growth rate (uptake by new users) of 1500% during early 2009. While this illustrates that there is undoubtedly phenomenal interest in web2.0, there are still few concrete examples illustrating how to integrate these tools using an explicitly social constructivist pedagogical model within contemporary tertiary education environments. This paper describes the purposeful integration of web2.0 and mobile web2.0 tools within a first year Bachelor of Product Design programme, based upon an under-pinning social constructivist pedagogy. Examples of the use of several web2.0 tools that support the development of collaborative student-centred learning environments are given. Initial feedback from lecturers and students are also reported.

Introduction

Studies of mobile learning in action show quite distinct, separate levels of learner engagement. These different levels are partially connected to the technologies, and partially to the wider learning model. They can be described as:

3. Shallow or supplementary learning: Typically, these may be SMS prompts, School-generated podcasts, and mobile games. They are good as a supplement to other activities.

4. Focussed learning: Typically these resemble a mobile-friendly version of classic "e-learning", with targetted nuggets of learning that can be engaged with while on the move - possibly context aware.

5. Deep learning: Deep learners are immersed in a mix of mobile technologies, as creators or originators as well as the more common consumers of mobile media, following a constructivist model. (Stead & Colley, 2008)

This paper focuses on the third approach identified by Stead above within the context of mobile web2.0 tools. While web2.0 tools are characterised by user-generated content and social networking, mobile devices add the extra dimension of user-generated contexts. "The intrinsic nature of mobile technologies is to offer digitally-facilitated site-specific learning, which is motivating because of the degree of ownership and control." (Laurillard, 2007, p. 157).

MLearning Project Overview

The project uses an explicit social constructivist pedagogy, facilitating a student-centred learning environment. Communication (student to student, student to teacher, and student to resources) and student content creation were identified as key elements in establishing a social constructivist learning environment. Mobile web2.0 technologies were then identified as potential tools to facilitate this. Web2.0 social software provides a close fit with the tenants of social constructivism, providing easy to use, interactive, collaborative content creation and sharing tools that are accessible worldwide in an online environment that can enhance both face-to-face and distance learning. To achieve deep learning and authentic integration of mlearning into the Bachelor of Product Design programme, an explicitly scaffolded approach to the integration of mlearning across the three years of the programme has been implemented in 2009.

Participants in the 2009 mlearning project encompass the entire three years of the Bachelor Of Product Design course:

1. Year 1.
    - 15 students (the entire Year1 class) –The average age of the students is 28 (19 to 49), and the gender mix is 4 female students and 11 male students.
    - 2 Course Tutors
    - Technology Steward (Thom Cochrane – CTLI)
2. Year 2.
    - 15 students (the entire Year2 class) – The average age of the students is 24 (19 to 46), and the gender mix is 4 female students and 11 male students.
    - 2 Course Tutors
    - Technology Steward (Thom Cochrane – CTLI)
3. Year 3.
    - 8 students (Volunteers from the 18 Year3 class students) – The average age of the students is 28 (20 to 45), and the gender mix is 3 female students and 5 male students.
    - 2 Course Tutors
    - Technology Steward (Thom Cochrane – CTLI)

What began as an investigation of the affordances of web2.0 in 2007 developed into a mobile web2.0 proof of concept project within the third year of the Bachelor of Product Design in 2008, then quickly spread to projects within the first and second year of the programme in semester2 of 2008. The success of these projects led to the implementation of integrating mobile web2.0 technologies (based on an explicit social constructivist pedagogy) across all three years of the programme in 2009 (http://www.youtube.com/watch?v=8Eh5ktXMji8).

This paper focuses on the design and progress of the first year Bachelor of Product Design course.

This case study is situated within a wider research project that has been investigating the potential of mlearning to enhance tertiary education over the past three and a half years. The research uses a participatory action research methodology. Three main reflection and feedback gathering tools were used with each of these courses:

1. Pre-project surveys of lecturers and students, to establish current practice and expertise
2. Post-project surveys and focus groups, to measure the impact of the wireless mobile computing environment.
3. Lecturer and student reflections via their own blogs during their courses. Thus using the technology that is an integral part of the trials to capture data on participant's progression.

Defining Mobile Learning

Definitions of mobile learning have focused initially upon the mobility of the devices and more recently the mobility of the learners. Sharples proposes a form of Laurillard's conversational framework, excluding the teacher, to define mobile learning by its contextual and informal learning characteristics. "The processes of coming to know through conversations across multiple contexts amongst people and personal interactive technologies" (Sharples, Taylor, & Vavoula, 2006). However, a key element in the conversational framework is the dialogue between teacher & student. In contrast to Sharples et al (2006), Laurillard (2007) emphasizes the teacher's input in mobile environments through good pedagogic design that facilities continuity between the face to face and remote peer learning contexts. Her definition of mobile learning incorporates the critical pedagogical design input of the teacher: "M-learning, being the digital support of adaptive, investigative, communicative, collaborative, and productive learning activities in remote locations, proposes a wide variety of environments in which the teacher can operate" (Laurillard, 2007, p. p172).

Social Constructivist Pedagogies and The PAH Continuum

Recent years have seen many attempts to reconceptualise pedagogical approaches within tertiary education. These have been driven by the emergence of new learning theories based broadly upon constructivist and social constructivist foundations, and the development of new learner-centred technologies that facilitate these newer pedagogies. For example, the appropriation of web 2.0 tools within a social constructivist pedagogy facilitates what has been termed "pedagogy 2.0" (McLoughlin & Lee, 2008). McLoughlin advocates the exploration of the potential of the alignment of web2.0 tools and emerging learning paradigms based loosely upon social constructivism such as 'navigationism', and 'connectivism'.

> the affordances of these technologies, coupled with a paradigm of learning focused on knowledge
>
> creation and networking, offer the potential for transformational shifts in teaching and learning practices,
>
> whereby learners can access peers, experts, the wider community and digital media in ways that enable
>
> reflective, self-directed learning (McLoughlin & Lee, 2008, p. 649).

Similarly, Herrington has proposed that mobile technologies can facilitate 'authentic learning' (Herrington, Mantei, Herrington, Olney, & Ferry, 2008).

Focusing even more explicitly on empowering independent learners, Luckin et al (2008) propose the concept of Learner Generated Contexts (LGC) as a potential framework for technology based learning based on the Vygotskian concept of 'Obuchenie'. Though not explicitly limited to mobile learning, the concept focuses upon learning within learners own environments that new technologies facilitate. 'Obuchenie' blurs the distinction between

teaching and learning, creating a two-way dyadic interaction within the Zone of Peripheral Development. Luckin et al see a reconceptualization of the level of influence the teacher plays in these contexts, and attempt to break-down the classical PAH continuum (Pedagogy – Andragogy – Heutagogy),

	Pedagogy	Andragogy	Heutagogy
Locus of Control	teacher	learner	learner
Educational sector	schools	adult education	doctoral research
Cognition Level	cognitive	metacognitive	epistemic
Knowledge Production Context	Subject understanding	Process negotiation	Context shaping

Table1: The PAH continuum, from Luckin et al (2008, p. 10).

They propose the 'obuchenie' context model as an integration of PAH with the Ecology Of Resources (EOR) model in a heterarchical self-regulated continuum, illustrated in figure1 below.
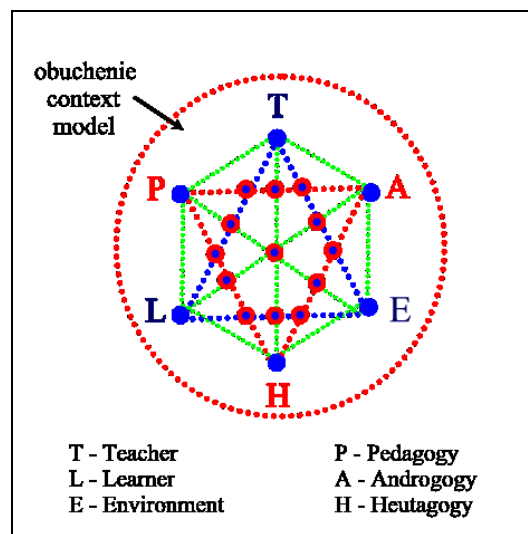

Figure 1: The Obuchenie Context Model.

According to Lucken et al "A context can be described as a situation defined through the relationships and interactions between the elements within that situation over time. For a learner, a context is a situation defined through interactions in and with the world that are themselves historically situated and culturally idiosyncratic."

The EOR comes out of Activity Theory, and defines context as "a set of inter-related resource elements, including people and objects, the interactions between which define a particular context". The archilles heel of this conceptualisation of learner generated contexts based on the PAH continuum and an Obuchenie model is that the approach is built upon the assumption that the students involved in the learning are "self-motivated" learners (Cook,

2007), and is based almost exclusively within informal learning contexts (Cook, Pachler, & Bradley, 2008). Student participants in these trials were pre-service teachers, who are usually highly motivated learners.

While the authors of this paper are not advocating a radical reconceptualising of educational pedagogy on the scale that is proposed by Luckin et al, we see similarities and useful alignment of our pedagogical approaches with 'pedagogy2.0', 'authentic learning' and some of the PAH continuum principles. The key point of difference is in the role that the authors assign to the lecturer within the formal and informal learning environments. We see the input and facilitation of the lecturer as a critical success factor in implementing mobile web2.0 technologies, and would agree with Laurillard's position that states "M-learning, being the digital support of adaptive, investigative, communicative, collaborative, and productive learning activities in remote locations, proposes a wide variety of environments in which the teacher can operate" (Laurillard, 2007, p. p172).

MLearning technologies provide the ability to engage in learning conversations between students and lecturers, between student peers, students and subject experts, and students and authentic environments within any context. It is the potential for mobile learning to bridge pedagogically designed learning contexts, facilitate learner generated contexts, and content (both personal and collaborative), while providing personalisation and ubiquitous social connectedness, that sets it apart from more traditional learning environments. Mobile learning, as defined in this paper, involves the use of wireless enabled mobile digital devices (Wireless Mobile Devices or WMD's) within and between pedagogically designed learning environments or contexts. From an activity theory perspective, WMD's are the tools that mediate a wide range of learning activities and facilitate collaborative learning environments (Uden, 2007).

The WMD's wireless connectivity and data gathering abilities (e.g. photoblogging, video recording, voice recording, and text input) allow for bridging the on and off campus learning contexts – facilitating "real world learning".

In order to achieve an explicit move to a social constructivist learning environment using mobile web2.0 tools, a staged, and scaffolded approach has been adopted. This staged approach allows the bridging of the PAH continuum, and the embedding of mobile web2.0 affordances that support each stage. Therefore the integration of mlearning (mobile web2.0) across the three years of the Bachelor of Product Design programme is structured as follows in table2:

Implementation Stage	Web 2.0 Tools	MLearning Tools	Course Timeframe and focus	PAH alignment
Level 1	Social Collaboration with peers and lecturer.	Introduction of netbooks and establishment of basic web2.0 sites	Semester1, Year1 Blogging	Pedagogy
Level 2	Student generated content.	Netbook plus mid-range smartphone (Nokia XM5800)	Semester2, Year1 Student VODCasts, geotagging, moblogging	From Pedagogy to Andragogy
Level 3	Social collaboration with peers and external 'clients'. Context Aware	Student-owned laptop plus mid-range smartphone (Nokia XM5800)	Year2 Social networking, Mobile Codes, geolocation	Andragogy
Level 4	Context Independent. Student generated contexts.	Student-owned laptop plus high-end smartphone (Nokia N97)	Year3 Microblogging, facilitation of 'virtual studio', location recording	From Andragogy to Heutagogy

Table2: Scaffolding the roll-out of mobile web2.0 throughout the Product Design course.

MLearning integration in the first year Product Design course

The students and lecturers are provided with a WiFi and 3G capable netbook and smartphone for the duration of their course. A weekly Community Of Practice comprising the students, the course lecturer, and a technology steward (Wenger, White, Smith, & spa, 2005) provides the focal technological support. Course assessments and outcomes are explicitly designed to integrate the use of the mobile web2.0 tools.

Pedagogical Design

The core activity of the project is the creation and maintenance of a reflective Blog as part of a course group project. Additionally a variety of mobile friendly web2.0 tools are used in conjunction with the smartphone. The project investigates how the smartphone can be used to enhance almost any aspect of the course. To minimise the level of technological load and scaffolding required by the students (and lecturers) the project uses the smartphone within a select range of activities (see the following diagram and table that attempt to illustrate the alignment of these activities with the projects underlying social constructivist pedagogy. Students create accounts on free web2.0 sites and then invite their lecturer and peers to collaborate within these environments. The institutional LMS (Learning Management System) is used to provide scaffolding tutorials and initial guidance in setting up their web2.0 environments from the technology steward and the course lecturer. For a fuller description,

there is an interactive online version of the project concept map available at
http://ltxserver.unitec.ac.nz/~thom/mobileweb2concept2.htm or mirror at
http://homepage.mac.com/thom_cochrane/MobileWeb2/mobileweb2concept2.htm.
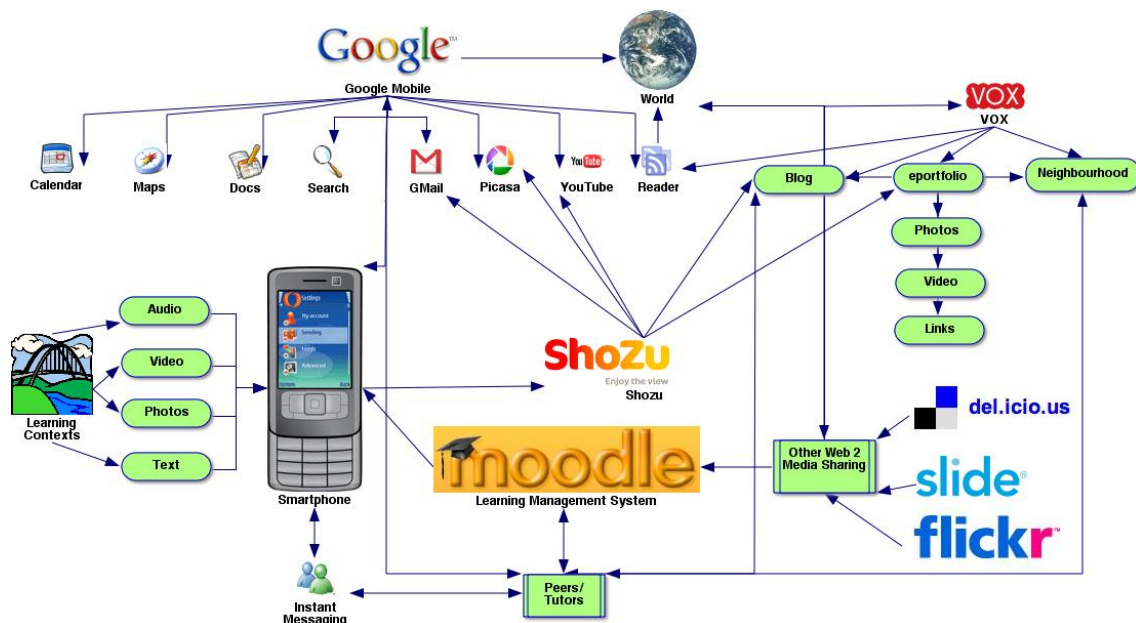
Fig 2. Mobile Web2 Concept Map.

Activity	Overview	Examples	Pedagogy
Video Streaming	Record and share live events	Flixwagon, Qik http://www.qik.com	Real-time Event, data and resource capturing and collaboration.
Geo tagging	Geo-tagg original photos, geolocate events on Google Maps	Flickr, Twitter, Google Maps http://tinyurl.com/5a85yh	Enable rich data sharing.
Micro-blogging	Post short updates and collaborate using micro-blogging services	Twitter http://tinyurl.com/2j5sz3	Asynchronous communication, collaboration and support.
Txt notifications	Course notices and support	Txttools plugin for Moodle and Blackboard	Scaffolding, learning and administrative support
Direct screen sharing	Video out to video projector, or large screen TV	Microvision Show http://tinyurl.com/celgot	Student presentations, peer and lecturer critique.
Social Networking	Collaborate in groups using social networking tools	Vox groups, Ning, peer and lecturer comments on Blog and media posts http://tinyurl.com/4uz6rj	Formative peer and lecturer feedback.

Table 3. Core mobile web2.0 activities aligned to social constructivist pedagogical outcomes.

The built-in microphone of smartphones can be used to record audio and then upload that
audio file to an online Blog or other web 2.0 site that supports audio. This uploaded audio
recording could then form the basis of an ongoing PODCast show. PODCasting is a popular
form of audio recording that has an associated RSS feed for subscribing to new audio

recordings. Students could record themselves reflecting or reporting on their progress in an assignment or project, or they could record an interview with an expert in the field etc... Almost all smartphones now include a built-in camera that is capable of capturing still images and video. Most smartphones also include a built-in GPS (Global Positioning Service) that works via satellites to provide longitude and latitude information for geo-tagging and geo-location. This facilitates Geo-tagging original photos, and the ability to geolocate events on Google Maps, adding a location dimension to captured images and video. Web 2.0 services that support geotagged photos include Flickr and Vox.

The built-in camera on smartphones can record video and audio at up to almost DVD quality. This facilitates students recording events, interviews, and reflections with a visual dimension, and sharing these online via a variety of mobile friendly video sites such as YouTube. Video streaming applications such as Qik and Flixwagon allow real-time sharing of video directly from smartphones to these web-based services. Qik and Flixwagon then archive the video stream for later viewing, sharing and commenting. Additionally video streaming sites integrate with other mobile web 2.0 technologies such as Twitter - creating an automatic announcement on Twitter regarding a live video stream that a student's Twitter followers could then watch in almost real-time. Qik and Flixwagon also feature the ability to forward video streams to a users YouTube account for sharing on that service as well. Qik supports the association of geolocation data with video streams, providing a Google Maps link to the actual location of the recorded event.

Microblogging is a cross between sms texting, blogging, and instant messaging. Microblogging is an asynchronous, collaborative communication technology, suited to use on mobile devices. The most popular microblogging service is currently Twitter.

Design of course assessments

Students and lecturers were provided with a wifi and 3G capable netbook for the first semester. At the end of the first semester the students and lecturers were also provided with a wifi and 3G capable smartphone that integrates a 3.2MP (megapixel) camera, video recording, GPS, touchscreen for text input, and multitasking operating system for a variety of Symbian based applications. Students and lecturers were encouraged to personalise the use of these mobile devices and treat them as if they owned them for the duration of the year.

The following provide practical examples of how the integration of mobile web2.0 tools is achieved within the course.

Semester1 Ergonomics Assignment

The goal of this assignment is for students to take into account the user, the product and the context of use within a product design project. The project is designed to give students an introduction to conducting a controlled research project and prototyping test rigs to measure quantitative and qualitative data. Students used their supplied netbook to create and establish an online journal/blog (http://www.vox.com) of their design investigation. Students invited their peers and lecturers into their 'neighbourhood' to facilitate sharing, commenting and critiquing. Thus students used web2.0 tools for social collaboration within their course, but also had the opportunity to share this process and content with a potentially world-wide audience. These blogs then become the core of students' online eportfolio that is developed over the next three years of their course.

Aims

- To introduce basic ergonomics research methodology, both in theory and in practice
- To explore data gathering methods and information analysis in a user-centred design context
- To develop an 'Ergonomics Approach' to the design of products and systems through prototyping and test rigs,

Deliverables:

- Data log / Web 2.0 documentation of research findings
- *Include video, photography, references, and hyperlinks to relevant websites or Blogs*
- Drawings,
- Test rig(s)
- Use interview/video analysis to document qualitative evidence such as tool performance and comfort
- Provide evidence (such as, data logs, drawings, photographs, questionnaire summaries etc) and analysis of your research in series of progressive weblog posts.
- Include a minimum of two cross referenced findings from the weblogs of your class colleagues
- Work in pairs to conduct the research and gather information. Collaborate to generate a range of data and findings.

Semester2 PIC Assignment1

Practice and Context 2 introduces students to some of the key exponents in contemporary product and furniture design history that help make up the textural fabric within which they will operate as practitioners. This assignment is ideally suited to students using web2.0 tools to explore and document key historical and current influences on their field of study. Students use their blog, accessed via the netbook, and upload photos (geotagged), video reflections and other original material captured using their smartphones. Thus the focus is upon shared student-generated content and critiques by their peers and lecturers.

Aims of PIC 2:

1. To introduce a range of issues, ideas and themes in the histroy of product and furniture design.
2. To enhance awareness of the intellectual environment with which contemporary practice operates.
3. To provide a range of theoretical and historical frameworks for product and furniture design.
4. To develop cognitive skills of analysis and critique
5. To encourage the attainment of skills, attitudes and methodologies essential for research and practice in product and furniture design.

Deliverables for Project 1:

A written assignment in the form of a Blog that further elaborates on the weekly introductions to the history of contemporary product and furniture design. Use VOX as your blog host and create a 'PIC Group' on your existing VOX Blog.

Students are required to:

Produce a VOX blog that runs throughout this project (and project 2). You should post to your blog at least weekly.

- Use your VOX blog to collate information about the people, movements, companies etc that are covered in the weekly lectures.
- Use your VOX blog to write up your self-directed research on the people, movements, companies etc that are covered in the weekly lectures.
- Regularly comment on each other's VOX blog posts – providing critique, feedback, and links to appropriate resources.
- Your VOX blog should include the following:
- At least 1 audio Podcast
- At least 1 Video VODCast
- Uploaded images to your blog and/or Picasa (include geotags if possible – i.e. Google Maps links of image locations) of the designers, their works, companies etc
- Links to Web2 multimedia site original content (e.g. create your own accounts on YouTube, Flickr, Google Docs, Picasa etc…)
- Electronic communication will be via GMail, MSN Messenger and RSS feeds (e.g. via Google Reader or Newsgator).

Semester2 PIC Assignment2

The second assignment builds upon the processes and affordances of mobile web2.0 that students will build up during the first PIC assignment. Once again focusing upon student-generated content, but using web2.0 tools to present to the rest of the class and the course lecturers.

Assignment Deliverables:

Create a chronological timeline (Design-Line) that identifies and discusses key moments in design through products, craft objects, fashion, cars, architecture, exhibitions, literature, music, politics, war, graphics, manifestos, design schools.

Your Design-Line must run from 1750 to the present day. Not all consecutive years need an entry e.g. you might leap from 1750 – 1775 – this all depends upon your findings but be sure not to spend all you time mining in one decade!

Your Design-Line must be visual as well as text rich. A clear use of graphical communication is required.

Highlight in your Design-Line key designs, design movements, manufacturers and/or design proponents that represent turning points in a century, half-century or decade and create 'feature sections' dedicate to these.

Source quotes from designers, industrialist, politicians etc and add these to your Design-Line.

Final submissions can take the form of a Google Docs hosted booklet, poster, or some form that produces a saleable end product – e.g. a Picasa or Flickr annotated slideshow from your online web album with geotagged data, descriptions, and mobile QRCodes for URL links for sharing via your smartphones etc...

You must mock up your final Design Line by printing it in full colour and add the design to your VOX blog using appropriate technology to do so (e.g. embedding your online slideshow within a post on your Vox blog).

Discussion

Unfortunately limited space precludes a written outline detailing the integration of mobile web2.0 within the second and third years of the Bachelor of Product Design course, however these follow the structure outlined in table2 and will be reported in later case studies. From the first year course, student feedback so far has been very positive. Compilations of student reflections on the use of mobile web2.0 tools within their course are available on YouTube: http://www.youtube.com/watch?v=Z6wN36H4TNo

Example lecturer feedback can also be viewed online:
- http://www.youtube.com/watch?v=Fy_rxIqEAFs
- http://www.youtube.com/watch?v=0H8AvrrHQuQ
- http://ondesigno.vox.com/library/video/6a00f48cdf734b00030110162f1180860c.html
- http://www.youtube.com/watch?v=mmTI7F_2tiU

Conclusions

The paper has presented the implementation of an mlearning model that is informed and driven by social constructivist pedagogies, with a scaffolded approach to transform the learning environment from lecturer-centred to student-centred, while maintaining the critical pedagogical guidance of the lecturer. The first year implementation (within a three year degree) of the model focuses on the first stage in this transformation, with a focus on student-generated content and collaboration. Examples of assessment alignment and integration of the mobile web2.0 tools within the course are outlined. It is hoped these examples will be useful touch-stones for other educators interested in implementing social constructivist mlearning scenarios.

References

Cook, J. (2007, 21-23 March). *Smells Like Teen Spirit: Generation CX.* Paper presented at the Ideas in Cyberspace Education (ICE3), Loch Lomond, Scotland.

Cook, J., Pachler, N., & Bradley, C. (2008). Bridging the Gap? Mobile Phones at the Interface Between Informal and Formal Learning. *Journal of the Research Center for Educational Technology (RCET), 4*(1), 3 - 18.

Herrington, J., Mantei, J., Herrington, A., Olney, I., & Ferry, B. (2008, 1 - 4 December). *New technologies, new pedagogies: Mobile technologies and new ways of teaching and learning.* Paper presented at the ASCILITE 2008, Deakin University, Melbourne, Australia.

Laurillard, D. (2007). Pedagogcal forms of mobile learning: framing research questions. In N. Pachler (Ed.), *Mobile Learning: towards a research agenda* (Vol. 1, pp. 33-54). London: WLE Centre, Institute of Education.

Luckin, R., Clark, W., Garnett, F., Whitworth, A., Akass, J., Cook, J., et al. (2008). Learner Generated Contexts: a framework to support the effective use of technology to support learning. *2008*(5 November). Retrieved from http://api.ning.com/files/Ij6j7ucsB9vgb11pKPHU6LKMGQQkR-YDVnxruI9tBGf1Q-eSYUDv-Mil6uWqX4F1jYA1PUkZRXvbxhnxuHusyL1lRXVrBKnO/LGCOpenContextModelning.doc

McLoughlin, C., & Lee, M. J. W. (2008). Future Learning Landscapes: Transforming Pedagogy through Social Software. *Innovate: Journal of Online Education, 4*(5).

Sharples, M., Taylor, J., & Vavoula, G. (2006). A Theory of Learning for the Mobile Age (pre-print) Retrieved February, 2007, from http://kn.open.ac.uk/public/document.cfm?docid=8558

Stead, G., & Colley, J. (2008, 7th to 10th October). *The Power of Me: Learning By Making Your Own Rich Media Mobile Resources.* Paper presented at the MLearn08: the bridge from text to context, Telford, Shropshire, United Kingdon.

Uden, L. (2007). Activity theory for designing mobile learning. *International Journal of Mobile Learning and Organisation, 1*(1), 81-102.

Wenger, E., White, N., Smith, J., & spa, K. R.-. (2005). Technology for communities Retrieved 14 July, 2006, from http://technologyforcommunities.com/