

iARCHI[TECH]TURE: HEUTAGOGICAL APPROACHES TO EDUCATION FACILITATED BY MLEARNING INTEGRATION

Thomas Cochrane and David Rhodes
Unitec
New Zealand

Abstract

This paper reflects upon two iterations of mlearning integration into the Bachelor of Architecture programme, and the implications for future integration. The 2010 Architecture mobile Web 2.0 project was informed by reflections upon a 2009 mlearning project instigated across the second year Bachelor of Architecture course at Unitec, involving 115 students and 6 lecturers. The Architecture mlearning projects were situated within an action research study spanning four years and seven different course contexts (or case studies) within the Faculty of Creative Industries and Business at Unitec, including: Architecture, Performing and Screen Arts, Landscape Design, Product Design, Contemporary Music, Computing and Information Systems, and Accountancy and Finance. The 2010 eCV Architecture mlearning project represents an action research cycle within the Architecture case study. The multiple projects provided opportunities for reflection and refinement with the earlier project results informing the design of subsequent projects.

Introduction

Architecture education is traditionally modelled upon an Atelier Studio-based approach where students work in physical group spaces, guided by an expert lecturer, and culminating in face-to-face presentations of their designs critiqued by their lecturers. In this paper we investigate the potential for transforming the traditional architecture learning environment into a context bridging social constructivist model by the integration of mobile Web 2.0 tools. The goal is to facilitate a move to a heutagogical learning environment that is a student-directed, collaborative, flexible, and context-bridging learning environment that empowers students as content producers and learning context generators, guided by lecturers who effectively model the use of the technology. In the 2010 eCV Architecture mlearning project, students and lecturers leverage the unique affordances of mobile Web 2.0 tools to create an online digital identity, develop an e-portfolio, and establish the basis of a life-long international peer and professional support network, including: blogs, social networks, location aware (geotagged) image and video sharing, instant messaging, microblogging, and augmented reality applications. This effectively bridges the formal learning environment of the

Architecture Studio and the informal learning environments of situated authentic practice. Brown (2006) calls this “Dewey for the digital age” (p. 23).

The 2009 and 2010 Architecture mlearning Projects were part of a wider mlearning research project begun in 2006 and spanning almost thirty completed projects by the end of 2010 (Cochrane, 2010a). The goal of these projects was to introduce mlearning as a catalyst for pedagogical change, moving from instructivist pedagogy to social constructivist pedagogy, bridging the Pedagogy-Andragogy-Heutagogy (PAH) continuum (Luckin et al., 2010). Luckin et al. (2010) argue that heutagogy (student-directed learning) need not be the domain of post-graduate research students only and propose the concept of learner-generated contexts as a framework to help achieve this. The 2009 Architecture mlearning Project was an initial exploration of mlearning integration into the Architecture programme. The following 2010 Architecture eCV mlearning Project attempted to model the process of moving from pedagogy (teacher-directed) to andragogy (student-centred, student-generated content), and towards heutagogy (student-directed or negotiated learning) using mlearning enabled projects focusing upon student-generated learning contexts.

Scaffolding Social Constructivist Pedagogy

The research has shown that significant technical and pedagogical support is crucial for both the lecturers and students appropriating mlearning (Cochrane, 2010b). Surveys of all the participants’ previous usage of mobile and Web 2.0 technologies revealed that they were in general consumers of these technologies but very few were producers. The integration of mobile Web 2.0 within the courses disrupted both the lecturers’ conception of teaching and the students’ conception of learning, and these re-conceptions required sustained interaction over time. The case studies illustrated that technological and pedagogical support for mlearning integration must be provided longitudinally during mlearning project planning (lecturer professional development) and during its implementation with students. A short series of introductory support workshops is unlikely to achieve this. The establishment of supportive learning communities in the form of intentional Communities of Practice (COP) was found to best meet the need of this longitudinal support.

Initial pedagogical and technical supports for each mlearning project began with the establishment of a lecturer COP focusing upon investigating the pedagogical use of the tools and developing lecturer competency and personal appropriation of the tools. This was then followed by the establishment of a combined lecturer and student COP for implementing the mlearning project. The 2006 to 2010 projects highlighted the critical role of the ‘technology steward’ to guide the integration of mlearning within the COPs. A strategy for pedagogical and technological support for the integration and implementation of mobile Web 2.0 was developed using an intentional COP model (Cochrane, 2007; Cochrane & Kligyte, 2007). Using this model, the mlearning projects were guided and supported by regular ‘technology sessions’ (COPs) facilitated by an appropriate technology steward who provided

guidance to the group, while also interacting as a peer group member in this learning community. These mlearning projects therefore became collaborative projects between the technology steward, the course lecturers, and the students on the course.

Mlearning a Catalyst for Pedagogical Change

The unique potential impact of Wireless Mobile Devices (WMDs) on education is founded upon their rise to almost ubiquitous ownership (ITU, 2009) and their primary functionality as ubiquitously connected communication devices. These two characteristics of wireless mobile devices enable their use as disruptive devices to act as catalysts for pedagogical change by mediating student-generated learning contexts and sharing student-generated content as key elements of social constructivist learning or Pedagogy 2.0 (McLoughlin & Lee, 2008). The 2010 JISC mobile review (Belshaw, 2010) concludes that mobile learning presents the potential to drive innovation in education:

Mobile learning may mean different things to different people, but it is the dialogue that an institution begins with itself, its staff, its learners, its community — that matters. It is certainly not time for ‘business as usual.’ It is time to define and start driving innovation. (p. 63)

This potential for innovation is both driven and hampered by the rate of change in mobile technologies. Although the rate of change of mobile technology is very high the choice of a pedagogical framework and foundational pedagogical theory can guide the appropriate pedagogical use of current and future WMD developments. The rise of mobile application ecosystems (e.g., the iTunes Store for dissemination of iOS WMD applications and media, the Android Market for Android WMD devices, and the Nokia Ovi Store for Symbian-based WMDs) that bridge information, content and productivity with laptop or desktop computing via Web 2.0 platforms has created a mobile learning framework that can be easily appropriated by a wide range of educators without requiring specialist computing skills, creating the potential for mainstream adoption of mlearning in tertiary education. WMDs can be used as content creation devices for students’ online e-portfolios, and for establishing a digital identity that can become a key element of their on-going professional careers. WMDs can also be used as communication and collaboration tools within an increasing range of social networking tools. Mobile Learning (mlearning) has moved beyond the realms of fantasy to become a viable platform for contextual learning that bridges formal and informal learning environments in and beyond the classroom.

Research Methodology

The research involved a partnership between the researcher, the course lecturers, and the students involved in each successive mlearning project. The researcher’s role was that of the primary collector of data, and the technology steward (Wenger, White, Smith, & Rowe, 2005) within the communities of practice

developed for to support each project. The research approach was thus participatory action research (Wadsworth, 1998).

The core data gathering tools used in this research consisted of:

- Pre-project surveys of lecturers and students to establish current practice, expertise and experience.
- Post-project surveys and focus groups to measure the impact of the wireless mobile computing environment, and to identify emergent themes.
- Lecturer and student reflections via their own blogs and e-portfolios during the project, collated via RSS feeds. The research used the technologies that were an integral part of the projects, such as participant blog posts, peer blog comments, and VODCast reflections to capture data on the progression and impact of mobile Web 2.0 on the participants' learning experience.

The 2009 Architecture mLearning Project

An initial pre-project survey of the 2009 architecture students revealed that contrary to the notion of digital natives (Prensky, 2001) their previous technology use indicated that they were predominately consumers of Web 2.0 rather than producers. The introduction of mlearning and student-generated e-portfolios was therefore a completely new experience for both the lecturers and students. All of the second-year architecture students and lecturers were supplied with a Nokia smartphone (the Xpressmusic 5800), and a 3G/wifi capable netbook (the Dell Mini9), which they used throughout the duration of the course.

As reflections on the previous mlearning projects had established that critical success factors for implementing mlearning included the level of integration of the technology into the course and assessment (Cochrane, 2010b), the negotiated plan was to include the use of mblogging within the second-year architecture compulsory studio course as a new form of documenting, sharing, and critiquing students' individual and group design projects. However, the studio-coordinator lecturer responsible for setting the assessments for the course declined to be involved in the lecturer COP and decided not to allow the integration of mlearning into the course assessment. Discussions held between the researcher, the COP participants, and the studio coordinating lecturer did not manage to bridge this impasse. The reasons cited by the coordinating lecturer were: "Architecture is not interested in process, only the final design, and therefore design journaling will not benefit the course," and, secondly, "In the Studio course the face-to-face interaction is of primary importance." While both of these assumptions were hotly debated, the coordinating lecturer refused to be persuaded. From the researcher's perspective, it appeared the root of the dispute

was really the threat of the project because of the centralized control imposed upon the course by the coordinating lecturer. Within the context of the research, the ontological leap (Chi & Hausmann, 2003) from lecturer-focused pedagogy to a social constructivist student-centred pedagogy facilitated by mobile Web 2.0 was too much for the coordinating lecturer to bridge. Also the potential for mobile Web 2.0 to create or enhance context-independent learning communities was beyond the lecturer's experience and ability to conceptualise. Thus the 'disruptive' nature of mlearning was viewed by the coordinating lecturer in a negative light, rather than positively as it had been found to be within previous projects. However, the lecturers who had been involved in the COP were keen to continue the project. Thus, the mlearning project became a voluntary option for the second-year architecture students rather than integrated into the course assessment as had been planned, but was promoted and supported by the lecturers involved in the architecture COP (six of the nine second-year lecturers). While this was a definite setback for the 2009 project, it was decided to go ahead as a proof-of-concept exploration. The project resulted in a positive student response with around a third of the students voluntarily engaging with mobile blogging. Reflections on the 2009 mlearning project led to a re-think of the approach to get the non-participating lecturers on board for 2010.

The 2010 eCV Project

A smaller sized mlearning project (20 students and 3 lecturers) was subsequently developed and implemented in 2010. This project was centred on an elective course in which students had previously been taught how to create an electronic CV (curriculum vitae) using Flash and HTML. This elective course was rewritten as a collaborative project between the researcher and the key Architecture lecturers from the 2009 project. The new focus of the 2010 eCV elective course became the development of a learning community that modelled a progression from pedagogy to heutagogy using mlearning as a catalyst. The 2010 eCV10 Architecture mlearning Project investigated bridging student generated e-portfolios and digital storytelling facilitated by the latest generation of mobile devices, allowing the capture and organization of this content to be contextual and based in authentic environments beyond the classroom. Lecturers and students were provided with an Android smart phone (HTC Desire) and an Apple iPad for the duration of the semester-long project. Students worked in four negotiated teams, initially proposing a group e-portfolio project that used the unique affordances of the mobile tools. The student groups then used the smart phones to capture geotagged photos and videos and to digitally augment the real world with augmented reality applications such as creating points of interest for augmented reality browsers Wikitude and Junaio, QR Codes, and Google Maps. Media captured via the smart phones was then collated and edited using the iPads while on location, previewed using mobile laser Pico projectors, and uploaded to their e-portfolios from the point of capture using 3G connectivity facilitated by mobile broadband hotspots enabling the students to connect in small teams, sharing

resources and connectivity. Additionally, student project designs were previewed and pitched to clients on location using these mobile technologies, creating a direct connection between the site and the design.

Building a Learning Community

Within the eCV course the students were involved in negotiating the parameters of both the projects and the assessment. New mlearning technologies (the iPad and HTC Desire smart phone were only just released at the start of the course in NZ) were used as catalysts of pedagogical change: both for the lecturers' conception of teaching, and for the students' conception of learning. A key component was the development of a supportive learning community, i.e., an intentional community of practice including the course lecturers, the students, and a technology steward — creating sustained technological and pedagogical support throughout the course, leading to sustained engagement and pedagogical paradigm shifts for the participants across the length of the course. The COP began as weekly lunchtime meetings of the participants to learn and explore the affordances of the Android smart phones. This was followed by a week-long intensive workshop during the semester break where the student teams and team projects were negotiated by the students with their lecturers. During this week the participants also learnt how to use the iPads and investigated a variety of mobile Web 2.0 tools such as Twitter, Picasaweb, Qik, Wordpress, geotags, and QR Codes. Two days of the workshop week were spent with the student teams dispersing around Auckland city capturing their ideas and content using the mobile devices and staying in communication with the other teams and their lecturers via regular Twitter messages. The weekly lunchtime COP continued after the semester break and culminated in the student teams presenting their projects to the group, followed by presentations to the wider public during the end of year Graduation Show.

Examples of Student-generated Projects

Projects using a combination of iPads and HTC Desire Android smart phones in the context of this third year Architecture eCV course at Unitec New Zealand included:

- Archichur <http://archichur.wordpress.com/>
- OneManaBach
http://www.youtube.com/watch?v=zWmbNKumKMw&feature=player_embedded
- Archifail <http://prezi.com/byy1rnidvw-i/archifail/>
- Undiscovered Auckland
<http://undiscoveredauckland.wordpress.com/about/>

These team projects were brainstormed and negotiated by the students with the course lecturers — an approach that represented a paradigm shift from pedagogy (teacher-directed) towards heutagogy in tertiary education.

Archichur. The Archichur team created a series of mobile videos featuring interesting Architectural sites around Auckland. These were then shared via YouTube and their Wordpress blog. This was a creative way of injecting some light-hearted flare into the formalism often associated with Architectural studies.

OneManaBach. The Onemanabach team used their mobile devices to record and share (via Wordpress and YouTube) the design and building of a sustainable beach Bach (holiday home) built on site by the students at Unitec. This was a real world project with real clients and a real budget. The completed Bach was transported to Onemana beach for the paying clients, who could follow the progress of the design and build via the students' Wordpress Blog.

Archifail. The Archifail team project captured images and mobile videos highlighting and critiquing poor Architectural design around Auckland City. The team created a Wordpress portfolio and also created a layer for the Wikitude augmented reality mobile browser. This Wikitude layer included geographically tagged locations of failed Architectural design, supplemented with images and a short critique by the students of the design failures. Anyone with a compatible smart phone could then download the Archifail layer to Wikitude and use the smart phone's built-in camera coupled with its GPS and compass to locate these points of interest overlaid as digital information on the real-world viewed through the smart phone's camera.

Undiscovered Auckland. This team project involved the capturing and sharing (via Wordpress) of interesting Architectural artefacts around Auckland City. The team promoted a social learning experience by inviting others to contribute content by emailing mobile photos from camera phones to their blog portfolio.

These 2010 student collaborative projects and the framing of the elective course around a community of practice with both the students and lecturers (alongside the researcher) represented a significant change to the pedagogy of the Architecture programme, and enabled bridging student-generated learning contexts beyond the traditional physical Architectural studio space. The student team e-portfolios created as a result of each project became boundary objects (shared artefacts) of the supporting community of practice that were then used to gain interest from students and lecturers on the periphery of this COP within the rest of the Architecture department.

Discussion

This section discusses the impact of the 2009 and 2010 mlearning projects upon the Architecture programme and the implications for a subsequent 2011 project.

A Journey from Pedagogy to Heutagogy

The 2009 Architecture mlearning Project was the first attempt at integrating mlearning into the architecture curriculum, and, as has been found with each mlearning case study throughout the length of the research, the impact of the first mlearning project within a new context is predominantly in creating awareness of the pedagogical potential of mlearning and awakening the lecturers and students to the necessary ontological shift towards social constructivism that mobile Web 2.0 facilitates (Cochrane, 2010b). As Herrington and Herrington (2007) have observed, when introducing the use of new technologies into a course “educators revert to old pedagogies as they come to terms with the capabilities of new technologies, referred to by Mioduser, Nachmias, Oren, and Lahav (1999) as “one step forward for the technology, two steps back for the pedagogy” (p. 758). The non-participating lecturers reacted by strongly asserting the appropriateness of the traditional architectural design studio.

However, the mlearning project did present a window into the potential of a design studio pedagogy that was not bound by a predetermined physical space. So while the first mlearning project implementation did not transform the pedagogy of the course, it set the foundation on which to build this transformation in subsequent iterations. Although voluntary establishment of a supporting virtual learning community was achieved involving almost a third of the Architecture students, the lack of integration into the course assessment limited the impact of the mlearning project. Key lecturers who did not engage with the pre-project mlearning COP presented a gap that could not be bridged during the implementation stage of the project. Finding an appropriate way of bringing these lecturers from the periphery of the mlearning community of practice and into the core of the COP required some creative thinking. Thus the subsequent 2010 Architecture mlearning project focused upon developing a core group of lecturers and students within the programme to become a hub of technology stewards (both lecturers and students) from which others can be drawn in from the periphery of the mlearning community of practice.

The participants of the 2010 eCV COP created an air of excitement around the project, drawing interest from other students and lecturers. This will be built on in 2011.

Architectural Affordances of mLearning

The mlearning research projects (2006 to 2010) indicated that mlearning projects needed to focus upon the unique affordances of WMDs rather than replicating what can be done on a laptop computer on a smaller screen. The 2009 Architecture mlearning project looked at general mobile blogging affordances of

smartphones. The 2010 Architecture mlearning project focused upon the unique affordances of smart phones with relevance to Architecture and student e-portfolio generation facilitating situated learner-generated content, including: geotagging of images and video, Augmented Reality (e.g., Wikitude), microblogging (e.g., Twitter), and mobile codes (e.g., QR codes).

Informing the 2011 iArchitecture Project

The 2011 mlearning project builds upon the success of the 2010 Architecture mlearning Project. The 2011 project aims to produce a significant core group of mlearning evangelists from lecturers and students within the Architecture department. The 2011 project will also widen the scope of the 2010 project by incorporating international collaboration between the architecture elective course students in New Zealand and groups of students in both the UK (Sheffield University) and Spain (Taragona University) where the researcher has established partnerships with lecturers keen to explore the potential of mlearning integration. This international collaboration will add another dimension to student teamwork and students will utilize the communication and collaboration affordances of smart phones (e.g., Twitter, and Qik mobile video streaming) as they form these international teams and negotiate learning outcomes and team projects with the lecturers in all three countries. Thus each local physical community of practice will also be augmented by a virtual community of practice made up of the participants from all three countries. It is hoped that this international project will facilitate pedagogical shifts towards heutagogy within each of the participating countries context.

Conclusions

The 2009 and 2010 Architecture mlearning Projects represent two action research iterations illustrating a journey from traditional physical face-to-face studio based pedagogy towards heutagogy via mlearning enabling learner-generated contexts. The 2010 mlearning project built upon the lessons learnt during the 2009 project, resulting in significant pedagogical change. The willingness of the core participating lecturers to become involved in a transformative collaborative community of practice with their students presents both exciting opportunities and challenges for continued pedagogical transformation throughout the department of Architecture, and potentially beyond into other countries in 2011.

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