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Augmenting the Design Thinking Studio

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Mobile social media can be used to augment physical learning spaces and bridge formal and informal learning contexts. This paper presents the ongoing implementation and impact of a mobile social media project, which aims to augment and enhance a Product Design programme underpinned by a Design Thinking methodology. The goal of the project is to enhance student-learning experiences, positively impact their Design Thinking expertise development, and to explore the future of Design Thinking education enhanced by mobile social media. In addition it provides an opportunity for a small university department to engage with implementing and sustaining pedagogical change enabled by technology through the establishment of communities of practice. The paper describes the underlying Design Thinking and learning and teaching frameworks, the establishment of the community of practice, comments from lecturers, and the first pilot project with students.

Keywords: Mobile Social Media, Design Thinking, Product Design, Constructivism, Heutagogy

Introduction

The Product Design programme at AUT University was developed in 2007, launched with the first intake of students in 2008 and has been implemented over the following years. In 2012, the programme has 75 undergraduate students, and 10 students at postgraduate level. The Product Design programme is underpinned by a Design Thinking innovation methodology, which emphasises empathic, human-centred research, ideation, concept development and evaluation.

The development of a new academic programme provides many organisational and operational challenges. It also presents a unique opportunity to develop new approaches to learning and teaching without the constraints of institutional history and tradition to better respond to the needs of industry, the graduates and the wider community (Withell & Reay, 2011). To support and facilitate the teaching of Design Thinking methodologies, the Product Design programme was established around a collaborative physical studio experience. This provides an excellent environment in which lecturers work closely with students to enable them to construct knowledge and develop creative skills and processes. A review of literature has indicated that there has been very little research on Design Thinking education, specifically on how to develop Design Thinking expertise, learning and teaching approaches, models and learning and teaching environments.

A call for Learning and Teaching Development Fellowships (LTDF), funded by the University's central Centre for Learning And Teaching (CFLaT), provided an opportunity and catalyst for investigating the potential to augment the physical studio environment via mobile social media. The LTDF provides funding for time release and dissemination of practice-based research. Previous research indicated that lecturer professional development is a key factor in successfully implementing and sustaining pedagogical change enabled by technology. In addition a Learning And Teaching Enabled by Technology (LATENT) grant provided funds for supplying mobile devices for the department lecturers.

The key aims of the project are:

- To develop staff and student capability in social media for Design Thinking education;
- To enhance staff and student experience, and to positively impact the students Design Thinking expertise development; and
- To implementing and sustain pedagogical change enabled by mobile technology.

Design Thinking and Mobile Social Media

The term Design Thinking describes a human-centred methodology for innovation, which has evolved from the study of the unique ways in which designers 'think', and 'practice' (Bauer & Eagen, 2008; Leavy, 2010; Martin, 2009). Research on Design Thinking includes the study of how designers approach and solve problems, the methods and processes they utilise, their styles (modes) of thinking, their knowledge, their skills, their attitudes and their values. In addition the principles of Design Thinking include the development of meta-cognitive skills; problem solving; collaboration; reflective practice; and multiple, alternative perspectives. Design Thinking is increasingly becoming recognised and utilised by range of design areas, as well as other disciplines including engineering, business, management, information technology (IT), and education. Reflecting the recognition of Design Thinking methodologies as a fundamental core for design, and the uptake of Design Thinking across a range of disciplines, many international educational institutions are incorporating the teaching of Design Thinking into curriculum and programmes.

Design Thinking is based on an iterative process that includes key stages from research, insight development, creative exploration and development through to the evaluation and testing of ideas and concepts. During the implementation of the Product Design programme at AUT, careful consideration was given to the development of excellent physical studio spaces, as essential to developing a programme culture supporting Design Thinking. Each year group is allocated a large, open plan studio space, with individual students provided with well-equipped personal workspaces (see figure 1). The programme encourages students to work as much as possible in the studio spaces, and to create an environment that is supportive while creating an atmosphere of positive critical reflection on design decisions and processes. To facilitate this students are encouraged to display their design process work, prototypes and display models throughout the design process.

While great physical studio spaces provide an excellent environment to support the formal learning and teaching of Design Thinking in such areas as group collaboration, brainstorming, drawing/ideation and 3D prototyping, studios have a danger of 'insulating' students from real-world contexts. In contrast, Design Thinking methodologies require human-centred observation, interviews and the testing of ideas and concepts in 'real-world situations. Design Thinking also requires students to collaborate, share and to reflect about their works 'on-the-fly', while mobile, and in less formal learning situations. The use of mobile social media, mobile phones and tablets, blogs, twitter and other social media tools has the potential to complement, augment and enhance great physical learning environments by providing the tools and mechanisms that encourage students to take their learning outside into the 'real world', and to work more collaboratively in new and effective ways. In essence this approach bridges the formal and informal learning contexts for Design Thinking.

Figure 1: Physical Design Thinking Studio at AUT

Pedagogical Change

The use of mobile social media to augment a physical design studio paradigm creates an ontological shift in the understanding of their roles in teaching and learning of both the lecturers and of the students. This includes not only how the physical learning space can be richly augmented, but also to enable and facilitate student-generated content and student-generated learning contexts. Chi and Hausmann (2003) describe an ontological shift as "the re-assignment or re-categorizing of an instance from one ontological category to another" (p432). This can then result in a move along what Luckin et al., (2010) describe as the Pedagogy-Andragogy-Heutagogy (PAH) continuum from Andragogy (student-centred learning) towards Heutagogy (student-directed learning), as lecturers and students collaboratively redesign learning activities and assessments (Brown, 2006).

Augmenting the Design Thinking Studio Project

In response to the key opportunities identified, the Augmenting the Design Thinking Studio was developed. The project uses a participatory action research methodology (Swantz, 2008) in which the project, and methods utilised evolve through the duration of the project in response to emerging issues and findings. A project framework was developed (see figure 2) to guide key components of the project. These include:

1. Developing staff and student capability through communities of practice (mobile devices and social media).
2. Reinventing learning and teaching processes, bridging the physical and virtual.
3. Developing Design Thinking online resources.
4. Developing 'smart' feedback and assessment tools.

Figure 2: Key elements of the Augmented Design Thinking Studio project

Communities of Practice

To develop staff and student capability in the use of social media, a number of Communities of Practice (COP) were established within the programme. Communities of practice are based on a social learning theory (Lave & Wenger, 1991; Wenger, 1998). Wenger (2006) describes communities of practice as "people who engage in a process of collective learning in a shared domain of human endeavour" (p1). The learning communities for this project include:

- A formal lecturer community of practice;
- Each student year cohort; and
- Individual student project teams.

Lecturer COP

The establishment of the lecturer COP involved the brokering of the concept to key Product Design programme lecturers. This was approached in number ways. An interactive mind-map using http://www.mindmeister.com was created for the first lecturer COP meeting to outline and define the scope of the COP. Participating lecturers were then invited to collaborate on further development and construction of the mind-map using their mobile devices and the Mindmeister app, available for iPad, iPhone, and Android devices.

Table 1: Outline of the Product Design Lecturer COP

Steps/Topic	Pedagogical Implications
Establishing a COP	What is a COP? Expectations Ground Rules Informed by Action Research
Mobile Devices	Personal appropriation of iPhone 4S and iPad3
Creating an mPortfolio	Establishing reasons for the use of: Blogging, via Wordpress.com Twitter
Enhancing Productivity	Basic connectivity, collaboration and productivity tools: Email Google Docs Mobile Web Evernote
Managing Social Media	Establishing tools for filtering, collating, and curating mobile social media, and developing metcognitive skills as essential new digital literacies: RSS subscriptions via Google Reader Creating an interactive visual experience via Flipboard
Enhancing Pedagogy	Exploring the potential for mobile social media to enable student-generated content and student-generated contexts - designing collaborative learning experiences.
The scholarship of teaching and learning	Establishing a framework for practice-based research outputs based upon the design and implementation of mobile social media to augment the design studio experience.

Lecturer Feedback

Lecturers participating in the COP were asked to provide reflective feedback in their blog posts throughout the project. The following provide some indicative posts from Product Design staff over a number of weeks:

> Owning an iPad immediately changed a particular work habit I had: coming home and starting my laptop to work, do research, check e-mails, have Skype conversations etc. I do not feel the need of a computer anymore apart from when doing some stuff which require a bigger screen (e.g. photographic work) or using office programs… In this past month mainly passed by getting used to particular auxiliary technologies which can be used in conjunction with our mobile devices such as Apple TV, a Bluetooth speaker etc. This week happened the most exciting learning for me so far: Our technology steward introduced us to Flipboard. I have been following blogs, tweeting, reading news etc. using all separate applications. The capability of Flipboard to bring all these material together, present in an aesthetically pleasing way and enable sharing any of these collated material in any social media of my choice is fascinating. Currently I'm playing with Flipboard and trying to figure how to further refine the material delivered by it to my particular priorities. We'll see. I realise though, Flipboard (or any similar application) simplifies the hard task of keeping up with multiple streams of information flow. Discovering Flipboard has been a cornerstone for me; for the first time since the project started I

> learned something new, experienced a new experience and maybe realised the scope of exciting learning's ahead. (Lecturer1 blog post, 2012)
>
> May 17: I admit being a little sceptical of the benefits from engaging with an online community. Can't get a cup of sugar from down the road by tweeting. Unless they are tweeting back. They are not.
> May 22: At today's session I made a giant step forward in grappling with managing these social platforms. Google reader is feeding flipboard. I can now cancel the herald subscription. It was full of trash anyway. Have been looking for an excuse to ditch it. Though it was Handy to light the fire.
> May 30: A summary?
> Dropbox. Has transformed the way I work. No files on a computer, and therefore accessible anywhere. Brilliant. Until an Internet connection is not available.
> Twitter. Slowly getting to terms with the potential as a means to filter and broadcast information.
> Qik. Got pretty excited about the possibility of live broadcasting a lecture across campus with the iphone. Thankfully prototyped it before the actual event - well and battery went flat. I see the potential for close up applications
> Google reader. Paired with Flipboard it is opening up a vast amount of data previously not easy accessible
> Flipboard. Lays it out beautifully
> Pages. Great, but the keyboard is not user friendly. Needs arrow buttons to move cursor. I think.
> Daily notes. A good way of recording meetings etc. I have now completely dropped visual diary. I do like a pen and paper, and can still use and photograph...
> Viber. Ringtone needs some improvement. So many calls missed. iPhone 4. A ton better than the last.
> iPad? Well I have to say it has been a pretty significant device. A few negatives around social interaction. In a physical sense.
> Not so keen on blogging and public/private cross over. (Lecturer2 blog posts, 2012)

Analysis of the lecturer feedback indicated that the initial impact of the mlearning project was on personal productivity, but this was then followed by the experience of critical incidents where conceptual shifts in the pedagogical implications of mobile social media became apparent. The appropriation of customizable designer-friendly tools used by the lecturers in the establishment of the lecturer COP was a stark contrast to their previously limited appropriation of the institutions Learning Management System (LMS), Blackboard, that was used mainly for administrative and course information delivery duties.

Student Survey

A total of 24 Product Design students were surveyed at the beginning of the project to establish a case for the introduction of mobile social media into the programme, and to establish students' personal ownership of mobile devices, and their prior use of mobile social media. As Figure 3 shows, the majority of the students were consumers of social media rather than creators of social media content prior to the project. Additionally there was a surprisingly low level of smartphone ownership among these students, with the majority owning feature-phones with built-in cameras. Computer and Internet access were almost ubiquitous, as was the use of Facebook and YouTube viewing. There was therefore scope to expand students' prior mobile social media experience by the integration of mobile social media to augment the design studio experience.

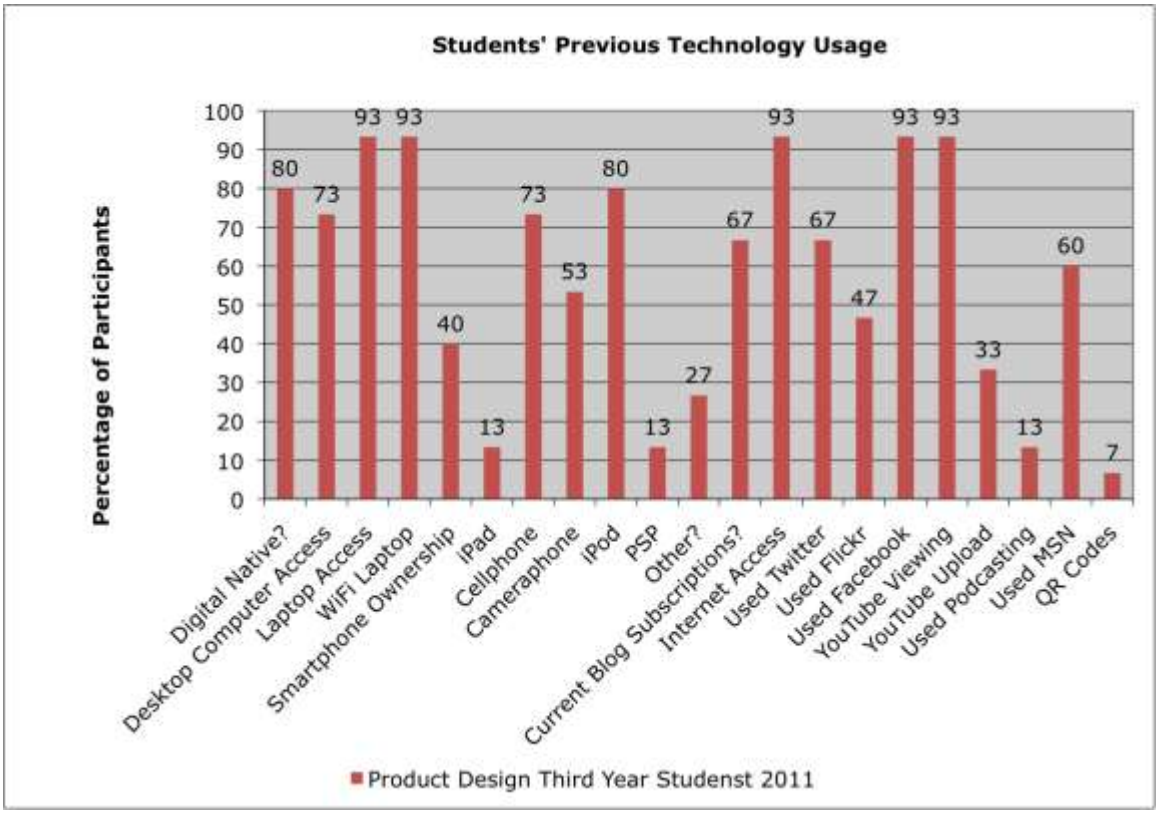

Figure 3: Product Design student previous technology experience

Students were also asked to identify the most useful functions of wireless mobile devices (WMDs). The results are shown in Figure 4.

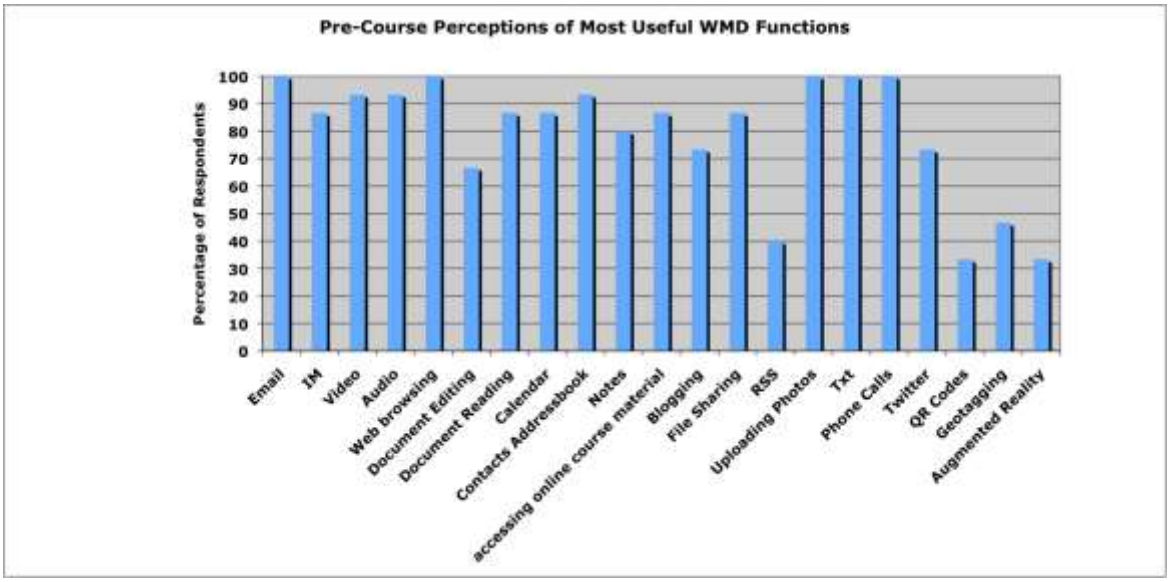

Figure 4: Product Design student perceptions of the most useful functions of WMDs.

The lowest rated functions represent the gaps in students' prior experience and use of smartphones, that is: the use of QR Codes, Geotagging (using the built-in GPS of smartphones), and augmented reality (using the built in GPS,

compass, and accelerometers of smartphones). Additionally, as students social media usage was dominated by Facebook usage which does not make standard use of RSS for subscribing to social media, the students had little concept of what RSS was or its use in managing social media information. These then are the areas that can be explored for augmenting the design studio.

Previously the extent of course online activity had been the administrative use of the institutions Learning Management System (LMS) Blackboard, and an institutionally hosted installation of Mahara for student e-portfolios. In comparison to the level of student engagement and student empowerment evidenced by the previous student use of the LMS and Mahara, the level of student engagement and critical thinking as well as team work building evidenced via their use of mobile social media was revolutionary for the course and for the Product Design programme. This is evidenced by two initial, six-week student projects including a third-year Product Design studio project discussed below, and a first-year Product Design studio project introducing the Design Thinking process. Through the implementation of the project, a radical conceptual-shift in the understanding of the affordances of mobile social media to augment the traditional physical studio environment is occurring. In this case mobile social media is reassigned from the category of a purely social tool for informal use into a powerful tool for student-generated content and collaboration within student-generated learning contexts.

Pilot Student Project

The first 'pilot' mobile social media project undertaken with students was a third year Product Design studio project. The students, working in groups of three (reflecting small communities of practice), were asked to apply Design Thinking methodologies and processes to the in-depth research, analysis and the design of one or more 'product' interventions that clearly improve and enhance the experience of bus patrons (users) in Auckland. The project was undertaken in conjunction with Auckland Transport, a division of the Auckland Council. The Design Thinking process was underpinned by observation and role-playing research to identify poor experience 'touch points' in the Auckland bus journeys.

Key to the implementation of mobile social media in the project was the formation of a collaborative blogging platform using Posterous.com and the use of student-owned smartphones to augment the formal studio aspects of the Design Thinking process. Posterous was selected as a appropriate mobile blogging platform because of its clear and simple interface, ease of use, the ability to upload images and text from email, and because it had a good mobile app for smartphones and tablets. In addition to the use of blogs, students were also asked to undertake some of their research using social media platforms such as Facebook and Twitter surveys to enlist feedback on bus users experiences, and on the ideas and concepts that students generated through the Design Thinking process.

Given that this was the first implementation of mobile social media in a Design Thinking studio project, it provided a useful initial focus for engaging student feedback and for critical discussion by lecturers to identify issues and opportunities, and to help prepare for a more integrated approach in integrating mobile social media in the Product design programme. From the discussions a number of key issues emerged from the pilot. Some of these include:

- Generally many students enjoyed reflecting and writing more 'freely' about how they were going throughout the Design Thinking process. It is also good for students to be able to look back over the entire process at the end of the project;
- Lecturers felt that students were writing more than that had than in other projects;
- The blogs were very good for capturing and communicating the practical design work happening in the physical studio (see figure 5);
- The blogs worked better the early (research) phase of the project and blogging tapered off towards the end. Students did not do a good job of documenting the final design proposals;
- It was good for lecturers to see how the students were progressing at various points in the project, and this helped them prepare for when they met them in person (in studio) this discuss progress and ideas; and
- There was a little bit of confusion around the role of the blog in the assessment of the project.

Overall there appeared to be more cohesion in each the student groups than in previous projects, and it was good to see each group communicating, sharing and developing ideas outside of the formal studio situation. More

importantly the use of social media in the project provided a platform that clearly extended the physical studio based learning environment, and demonstrated the potential of future development of the project with other student groups.

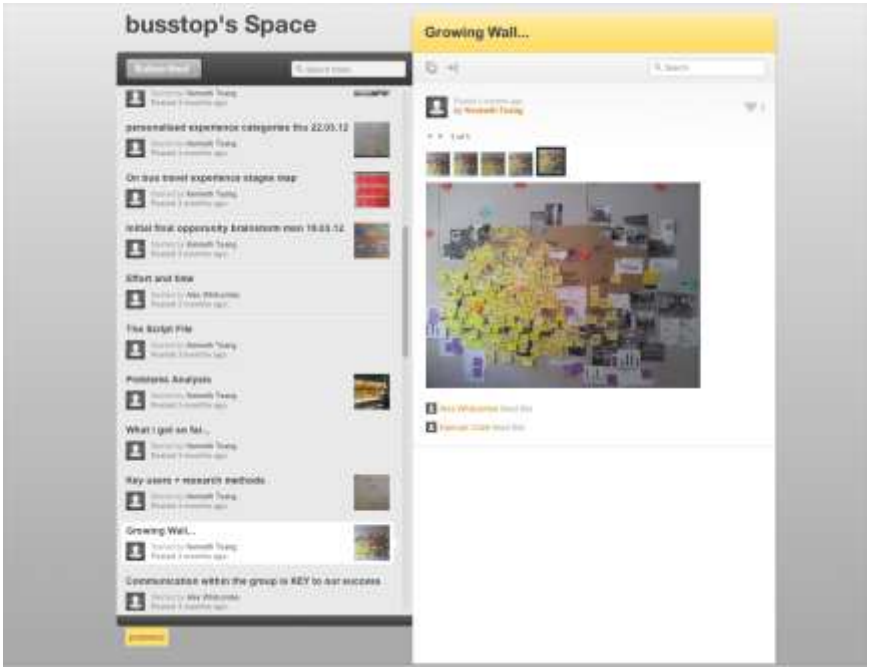

Figure 5: Example of one group's Posterous blog space capturing the work from physical studio

The results from the project were good, and feedback from the client was very positive.

> More importantly the substance, practicality and fresh thinking and concepts were outstanding. Please accept my congratulations to you and the faculty and also to the students themselves. Please encourage the students with the reassurance that their efforts will be incorporated into some of our new thinking.

Conclusions

This paper has described the ongoing implementation and impact of a mobile social media project to augment and enhance a Product Design programme underpinned by Design Thinking. A number of key themes have emerged from the research project to date:

Opportunity: Studios, while providing excellent environments for collaboration and creativity in the formal Design Thinking learning and teaching process, often insulate students from 'real-world' contexts required in Design Thinking methodologies;

Community of Practice: The establishment and nurturing of a lecturer community of practice investigating, experiencing and appropriating the use of mobile social media in the learning and teaching of Design Thinking has provided programme staff with a sound platform for engagement, discussion, and as a mechanism to develop capability and knowledge. This is the first step of what will be an ongoing process of ontological shift for the programme as the project develops;

Pilot Project: The first pilot project with students has provided both staff and students the opportunity to explore some of the key issues and opportunities for the implementation of mobile social media into the learning and teaching programme. Findings from the pilot project have indicated that mobile social media (tools and platforms) are beginning to, and have the potential to, further enhance the more formal aspects Design Thinking studio by

providing opportunities for collaboration, creativity and reflection in 'real-world' contexts, and to positively impact the students learning experiences and Design Thinking expertise development; and

Pedagogical Change: Overall the exploration of the potential of mobile social media to augment a physical design studio paradigm has led to the first stages of an ontological shift in the understanding of both the lecturers and the students of not only how the physical learning space can be richly augmented, but also to enable student-generated content and student-generated learning contexts. This represents a move along the continuum from Andragogy towards Heutagogy.

The Augmenting the Design Thinking Studio project continues to evolve and develop and the findings of the first two student projects will be used to further develop future student projects.

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