

## Riding the wave of BYOD: developing a framework for creative pedagogies

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Moving innovation in teaching and learning beyond isolated short-term projects is one of the holy grails of educational technology research, which is littered with the debris of a constant stream of comparative studies demonstrating no significant difference between innovative technologies and traditional pedagogical approaches. Meanwhile, the approaching giant wave of the bring your own device (BYOD) movement threatens to overwhelm education practitioners and researchers pre-occupied with replicating current practice on mobile devices. A review of the literature indicates that there are yet few well-developed theoretical frameworks for supporting creative pedagogies via BYOD. In this paper, we overview the development of a framework for creative pedagogies that harness the unique affordances of BYOD. This framework has been used across multiple educational contexts and scale from short workshops through to full courses and international collaborative projects. Our key design principles for supporting creative pedagogies via BYOD include modelling collaborative practice via establishing teacher communities of practice to learn about the affordances of mobile devices in relation to new modes of student learning, collaborative curriculum redesign in response to shifts in conceptions of teaching and learning, and collaborating with ICT Services for infrastructure development across the campus.

**Keywords:** Mobile Learning; augmented reality; creative pedagogies; communities of practice; social media

### Introduction

The ubiquitous ownership and connectivity of mobile devices (smartphones and lightweight tablets) coupled with the collaborative affordances of social media and the contextual awareness of Global Positioning System (GPS) based augmented reality (such as Wikitude or Layar) provide a rich platform for creative student-directed learning experiences. However, lecturers invariably default to using these new technologies within established teaching paradigms that are predominantly teacher-directed and focus upon content delivery (Belshaw 2010; Cochrane 2013; Herrington and Herrington 2007; Reeves 2005; Rushby 2012). As a group of like-minded researchers, we were interested in exploring ways of transferring our experiences of designing new pedagogies enabled by mobile social media into wider educational contexts. In our experience, higher education is dominated by a Web 1.0 teaching

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paradigm that focuses upon teacher-directed content locked within the confines of an institutional learning management system. This information delivery approach to online learning has been termed ‘digital myopia’ (Herrington, Reeves, and Oliver 2005).

Some of the most valued attributes of higher education graduates by prospective employers are that they are creative self-directed learners who can also work effectively in collaborative teams. An education system that focuses upon content delivery and learning measured by examinations and essays does not inspire creativity. Creative pedagogies are concerned with a holistic approach to education focusing upon the learner becoming part of a professional community, involving the dimensions of knowledge, performance and becoming (Danvers 2003). Such a framework will be focused upon cultivating creative pedagogies within the context of the curriculum. We find the concept of learner-generated contexts (Bruns 2007; Cook 2007; Luckin *et al.* 2010) to be a useful frame for measuring a curriculum change towards creative pedagogies. The authors of this paper see our roles as stewards and practitioners wanting to move higher education towards creative pedagogies, moving along a continuum from teacher-directed pedagogy, to student-centred andragogy, towards student-determined learning (heutagogy) termed the Pedagogy–Andragogy–Heutagogy (PAH) continuum (Luckin *et al.* 2010). Heutagogy is a relatively new term (Hase and Kenyon 2001), but it has similar roots in social constructivist learning to Reggio Emilia (Learning and Teaching Scotland 2006), Dewey (1916) and Vygotsky (1978). Blaschke (2012) highlights three key characteristics of heutagogy, including: learner-centred (involving a flexible curriculum with flexible and negotiated assessments), reflective practice (typified by establishing learning journals or eportfolios) and collaborative learning.

Mapping the PAH continuum onto a web-based technological development timeline results in what we call the post Web 2.0 continuum. The post Web 2.0 continuum represents a pedagogical change timeline reflecting key technology developments and their pedagogical affordances from the rise of the Internet, Web 2.0 and the virtually ubiquitous uptake of mobile devices such as smartphones and small format touch screen tablets. We illustrate this continuum in Table 1.

The dates attached to our post Web 2.0 continuum indicate the emergence of three different foci of the web, and we have associated pedagogical approaches with each of these according to their affordances. These do not represent value judgments or exclude any of these approaches, but provide an illustration of the potential of

Table 1. Post Web 2.0 continuum.

1995	2005	2013
Web 1.0	Web 2.0	Mobile
Teacher	Student	Collaboration
LMS	eportfolio	Connectivism
Content delivery	Student generated	Student generated
PowerPoint	Content	Contexts
Pedagogy	Slideshare	Mobile social media
	Andragogy	Heutagogy
	Social learning	Creativity
	Building learning communities	Active participation in professional communities

new technologies to support new pedagogies. Unfortunately, this timeline is not reflected in the general practice of teaching and learning in higher education. Generally educators implement new technologies by replicating current practice rather than leveraging the unique affordances of new technologies to redefine the possibilities of assessment and learning activities. In order to do this, we need a culture shift or as Balsamo (2011) puts it, higher education institutions need an epistemological reboot. However, lecturers need to be convinced of the necessity and benefits of changing tried and true practice, and Hase and Kenyon (2007) argue that pedagogical change requires a catalyst. We believe that mobile social media provides such a catalyst, enabling a redefinition of the role of the teacher and learner (Kukulska-Hulme 2010). However, educators do not often like being told how to teach, therefore we brainstormed ways of surreptitiously introducing a culture change by integrating the unique affordances of mobile devices that our students own such as mobile movie production and mobile augmented reality into the curriculum, thus enabling new pedagogies rather than replicating previous practice on a small screen device.

### ***Mobile movie production***

With the rise of camera phones and now smartphones to almost ubiquitous ownership, the novelty of mobile phone filmmaking has entered mainstream cultural practice. The iPhone became the dominant camera used for Flickr photo uploads in 2010, and smartphones have virtually replaced compact digital cameras for the majority of casual users. Exploring the unique affordances of smartphones for movie production, editing and sharing have become very popular. Smartphones have been used to record music videos, advertising campaigns and even full-length movies. Recently, a new wave of short format mobile video Apps have become widely popular such as Vine and Instagram videos. The collaborative potential of mobile filmmaking is leveraged in Apps such as Vyclone and MixBit. Innovative mobile film editing is facilitated by Apps such as Magisto. However, the predominant usage of mobile movies in education is still focused upon distribution of lecture capture via PODcasts and iTunesU.

### ***Mobile augmented reality***

Mobile augmented reality ranges from using the built-in camera of mobile devices to trigger interactive 3D models and multimedia via scannable markers, through to overlaying the real world in real time with digital information triggered by geolocation data through a smartphone's GPS. The educational affordances of mobile geolocation and mobile augmented reality have been flagged for several years (Alexander *et al.* 2006; Cook 2010; Johnson, Levine, and Smith 2009), but have yet to become mainstream educational technologies. This is partly due to the complexity involved in 3D modelling and the skills required for the development of mobile applications, and partly the cost of AR capable smartphones. The application of mobile augmented reality has also been predominantly in the form of content delivery to student devices, rather than in the facilitation of student-generated content (Butchart 2011; Cook 2010; FitzGerald *et al.* 2013). Fitzgerald *et al.* (2012) categorise the predominant mode of mobile augmented reality educational projects as passive/assimilative whereby students are viewers of pre-packaged AR content. In general, the uptake of mobile AR in education has been 'very modest' (Butchart 2011), with a focus upon content delivery via: 'training, discovery based learning, educational games, 3D models, and

augmented books' (Butchart 2011, p. 36). In contrast to the passive/assimilative use of AR, Butchart highlighted the potential of smartphone AR browsers as accessible tools for authoring and hosting AR content. However, he found no educational examples of student-generated content for smartphone AR browsers. This is the gap in current educational practice that we explored with the MARMWorkshop (Mobile Augmented Reality Movie Workshop), building upon our first mobile AR explorations in the context of Architecture education (Cochrane and Rhodes 2013). We then extrapolated this process into wider and longer-term curriculum contexts.

### *A framework for creative pedagogies*

Our creative pedagogical curriculum design framework is essentially a blend of several interrelated learning frameworks. The frameworks include: the PAH continuum (Luckin *et al.* 2010), Puentedura's (2006) SAMR model (Substitution, Augmentation, Modification, Redefinition) of educational technology transformation and Sternberg, Kaufman, and Pretz's (2002) view of creativity involving incrementation (or modification of a current idea) followed by reinitiation (or redefinition). The premise of the PAH continuum is that student-determined learning (heutagogy) need not be the solo domain of post graduate education, but has degrees of relevance at all levels of education, and we can scaffold the introduction of student-determined learning environments. The SAMR framework argues that technology adoption in education can move beyond the substitution of existing educational activities and assessment practices to create new experiences previously impossible or difficult with prior technology. Aligning these frameworks with the unique affordances of mobile social media provides a simple framework (Table 2) for designing new course activities and assessments that leverage new pedagogies. Table 2 applies the columns of the PAH continuum aligned with the levels of the SAMR framework and three levels of creativity to example affordances of mobile social media, providing a curriculum design rubric.

The framework represents a continuum of pedagogical approaches that can be scaffolded across the length of a course or project, building upon students' and lecturers' previous educational experience as we explore new pedagogical strategies that move towards heutagogy. Other new learning metaphors that have been developed to support new modes of global learning communities (for example cMMOCs) include connectivism (Siemens 2004) and rhizomatic learning (Cormier 2008; McAuley *et al.* 2010). Two of the key elements of Table 2 include the change in cognition and the ontological shifts that result as lecturers and students reconceptualise learning and the role of technology from information delivery towards enabling a transformative conception of the role of both the learner and the teacher as collaborators in this process.

### *Implementing the framework*

We have argued that implementing an effective framework for creative pedagogies must meet three goals (Cochrane, Narayan, and Oldfield 2014): it must model a community of practice (COP), focus upon redefining pedagogy and provide an appropriate technology support infrastructure. Mobile social media leverages the ubiquity of mobile device ownership and enables the formation of professional networks and

Table 2. A framework for using mobile social media to enable creative pedagogies.

	Pedagogy	Andragogy	Heutagogy
Activity types	Content delivery Digital assessment Teacher-delivered content Teacher-defined projects	Teacher as guide Digital identity Student-generated content Student-negotiated teams	Teacher as co-learner Digital presence Student-generated contexts Student-negotiated projects
Locus of control	Teacher	Student	Student
Cognition	Cognitive	Meta-cognitive	Epistemic
Course timeframe and goal	Initial establishment of a course project and induction into a wider learning community	Early to mid-course: Student appropriation of mobile social media and initial active participation	Mid to end of course: Establishment of major projects where students actively participate within an authentic community of practice
SAMR (Puentedura 2006)	Substitution and Augmentation Portfolio to eportfolio PowerPoint on iPad	Modification Reflection as VODCast Prezi on iPad	Redefinition In situ reflections Presentations as dialogue with source material Community building
	Focus on productivity Mobile device as personal digital assistant and consumption tool	New forms of collaboration Mobile device as content creation and curation tool	Mobile device as collaborative tool
Creativity (Sternberg, Kaufman & Pretz, 2007)	Reproduction	Incrementation	Reinitiation
Knowledge production	Subject understanding: lecturers introduce and model the use of a range of mobile social media tools appropriate to the learning context	Process negotiation: students negotiate a choice of mobile social media tools to establish an eportfolio based upon user-generated content	Context shaping: students create project teams that investigate and critique user-generated content within the context of their discipline. These are then shared, curated and peer-reviewed in an authentic COP
Supporting mobile social media affordances	Enabling induction into a supportive learning community	Enabling user-generated content and active participation within an authentic project COP	Enabling collaboration across user-generated contexts, and active participation within a wider professional COP
Ontological shift	Reconceptualising mobile social media: from a social to an educational domain	Reconceptualising the role of the teacher	Reconceptualising the role of the learner

Modified from Luckin *et al.* 2010.

serendipitous learning. Mobile learning provides powerful tools for enabling the nurturing of learning communities across varied contexts that previously would have been impossible. Focusing upon student-generated eportfolios created from a blend of best-in-class mobile social media platforms enables student creativity and collaboration that is in stark contrast to the typical 'digital myopia' enforced by the reliance upon institutional learning management systems. Mobile social media is inherently collaborative but requires a significant rethink of assessment design, using collaborative user-content generation tools such as Vyclone for collaborative video.

Second, lecturers must engage with and model the educational use of mobile social media within the curriculum. This requires reconceptualising mobile social media from a purely social domain to an academic and professional domain of use. Assessment activities need to leverage the unique affordances of mobile social media. Mobile social media can use a variety of collaborative presentation and interaction tools, such as Prezi, and wireless screen mirroring via an AppleTV connected to a large screen display. For example, Google Maps or Google Earth can be used as a collaborative platform to collate/curate student projects from around the world, where student teams link their geotagged content within a shared Google Map. This adds the dimension of authentic context to student projects, with the ability for students around the world to share in the experience of learning of others within the original context.

Linking geotagged content from a variety of new and emerging mobile Apps enables a relatively simple yet dynamic and collaborative experience. Example Apps include Vyclone for collaborative video recording; the online YouTube video editor for collaborative video editing and annotation; Flickr, Instagram and Picasa for collaborative photo sharing/curation; Junaio for embedding QR tags within augmented reality. Academic rigour can be achieved by requiring students to annotate their content using accepted referencing styles, yet turning this into a collaborative curation activity via creating shared Mendeley or Zotero libraries for example. Specific activities will depend upon each students' context, and should be student negotiable; however, the collaborative element of such projects needs to be clearly defined, as student experience of being active members within an authentic professional global COP is one of the goals of such projects.

### *Research questions*

As an interdisciplinary group of lecturers and educational technologists, we are primarily interested in exploring pedagogical change in higher education and we find a qualitative research methodology the best match to our goals. While using mixed methodologies to gather and analyse participant activity and feedback data, we use action research (Greenwood and Levin 2005) to inform iterative development of the implementation of our mobile social media framework with the goal of developing transferable strategies and design principles.

- (1) Based upon our emergent framework for creative pedagogies, how can mobile social media be used as a catalyst to introduce new pedagogies and assessment strategies within a variety of higher education contexts?
- (2) What generic bring your own device (BYOD) strategies and design principles can we identify from a variety of institutional contexts?

The data gathered are a collection of participant feedback via reflective blog posts, and curation of participant social media activity via hashtags from YouTube videos, Twitter, Google Plus, Vine and Instagram videos. In this paper, we focus upon the analysis of the curated social media outputs using tools such as TAGSExplorer (Hawksey 2011) and tagboard (for example, <http://tagboard.com/moco360>) for collating project content tagged with a pre-defined hashtag (#marmw2013, and #moco360). Within the context of both projects, the participating lecturers discussed with the participating students the nature and ethical issues of creating online digital identities, public eportfolios and the appropriate sharing of mobile social media. Thus, the lecturers negotiated a shared understanding of the communities and protocols around each project, and attempted to model appropriate behaviour to their students.

### Example framework implementations

In this section, we illustrate the implementation of our framework for creative pedagogies in two contexts including a 1-week intensive workshop, followed by curriculum integration within an international project spanning a variety of course contexts.

#### *Framework implementation 1: Intensive workshop*

In the first implementation of our framework, we formed an international (New Zealand, UK and France) COP comprising two mobile learning experts and two mobile film making lecturers to design a week long workshop for lecturers at Auckland University of Technology to explore the potential of mobile augmented reality in their own teaching. The workshop was structured to model a COP of the participants that they could then transfer to their own teaching practice. This workshop aimed to give participants an experience of creating innovative mashups of three of the unique affordances of today's smartphones, tablets and phablets:

- (1) Augmented Reality (locating)  
Using geotagging via smartphones' in-built GPS enables mobile movies to be located within a geographical context, linked to collaborative *Google Maps* and viewed in *Google Earth*. This adds a rich layer of contextual information to mobile movies, effectively augmenting a mobile movie with geographical data.
- (2) Mobile Media Production (creating)  
Adding new mobile video applications such as *Vyclone*, *Vine* and the *YouTube Online Editor* for collaboration can enhance the creation of mobile movies and add a unique perspective.
- (3) Mobile Social Media (sharing)  
Mobile social media provides a way to publish and share creative output with a global audience, using tools such as *Twitter*, *Google Plus* and *Wikitude*.

The workshop explored scenarios for innovative and collaborative team projects using these tools. The participants were expected to create an augmented mobile movie in a collaborative team and explore the application of augmented mobile movie projects within their discipline context. This was supported by the discussion and

critique of examples of collaborative mobile movie production and mobile augmented reality, an introduction to the body of literature surrounding mobile learning, mobile movie production and mobile augmented reality in higher education.

The workshop involved the participants forming production teams of up to four members to create an authentic augmented mobile movie project using a mashup of YouTube/Vimeo/Vyclone/Vine and Google Maps, and then creating a Wikitude world from this content. These projects were then presented to and critiqued by the entire workshop participants, and shared for feedback from global experts via live Google Plus Hangouts. A common hashtag was used to collate the social media throughout the workshop (#marmw2013). The participants were required to bring their own iOS or Android smartphone or tablet device, and a laptop.

Table 3 outlines the core mobile social media (msm) tools used throughout the workshop.

The workshop began by introducing a few short projects that were curated via a shared Google Map (<http://goo.gl/maps/pkldm>) and then participants formed teams to create their own projects. Participant projects produced throughout the workshop ranged from a mobile-mentary of the massively multiplayer geolocation mobile app game Ingress ([http://youtu.be/-SP16YVXs\\_A](http://youtu.be/-SP16YVXs_A)) to a selection of mobile films linked into a Wikitude world layer (<http://youtu.be/C4dwvdp8vTo>).

Participant feedback after the workshop indicated significant impact on their conceptions of mobile social media within their own curriculum contexts, for example:

The #marmw2013 workshop has been a great exercise in exploring new ideas and discovering different approaches to filmmaking, sound recording and the relevance location can have on this content. It has given me the opportunity to try out new ways of working and to test some of my knowledge of mobile geo-spatial and augmented reality. Most of all, the workshop has put me in contact with some extremely switched on people who have opened up a huge body of ideas to pursue with my students and hopefully through further collaborative projects in the coming year. (Participant G+ post 2013)

**Framework implementation 2: International project**

The second implementation of our framework involved an international project titled MoCo360. MoCo360 is a non-funded international group of like-minded educators exploring the potential of mobile social media – and in particular mobile film making,

Table 3. Example mobile social media tools.

MSM applications	Affordance	Example URL
Google Plus	Establishing a community hub	<a href="http://bit.ly/1fFBhYT">http://bit.ly/1fFBhYT</a>
Twitter	Asynchronous collaboration and content curation via the hashtag #marmw2013	<a href="http://bit.ly/1fnEmw8">http://bit.ly/1fnEmw8</a>
Bambuser	Live video streaming of workshop activities	<a href="http://bit.ly/1i2jbUz">http://bit.ly/1i2jbUz</a>
Vyclone	Collaborative video production	<a href="http://bit.ly/1bdR8c5">http://bit.ly/1bdR8c5</a>
YouTube and Vimeo	Video hosting and sharing	<a href="http://youtu.be/-SP16YVXs_A">http://youtu.be/-SP16YVXs_A</a>
Google Maps	Geolocating participant projects	<a href="http://goo.gl/maps/pkldm">http://goo.gl/maps/pkldm</a>
Wikitude	Mobile AR production and sharing	<a href="http://arlink.wikitude.com?dk=bzngxym">http://arlink.wikitude.com?dk=bzngxym</a>



for collaborative design of transformative student learning experiences. MoCo360 was established by inviting several mobile learning researchers and practitioners across the globe to form a COP focused upon exploring new forms of student collaborative projects, giving their students an authentic experience of collaborating on mobile film production. This COP was formed out of a re-envisioning of a prior collaborative project (Cochrane, Antonzak, and Wagner 2013) and was based upon our newly developed framework for creative pedagogies. Currently participants are drawn from New Zealand, Columbia, France and the United Kingdom (<http://goo.gl/maps/mlXEV>). A Google Plus Community (<http://bit.ly/1fZPnUd>) is used as a hub to coordinate the activity and resources of the participating lecturers, who meet weekly via a Google Plus Hangout to brainstorm ideas and curriculum activities. A public face to the project is maintained via a WordPress blog with all of the lecturers as authors and editors (<http://moco360.wordpress.com>). Twitter is used extensively for asynchronous communication and sharing across the different geographic timezones, and activity and mobile social media resources are collated via a common hashtag (#moco360).

Using a common hashtag enables automatic visual analysis of communication and collaboration via Hawksey's TAGSExplorer Twitter analysis tools: <http://bit.ly/1bwBNog>, and is then exported to a Google Map providing a geographic view of the collaboration at <http://bit.ly/1nfFhE2>. Another tool used for curation and community building includes tagboard which collates Twitter, Vine, Google Plus, Instagram and WhatsApp activity (<https://tagboard.com/moco360/155769>).

The MoCo360 project began with the lecturers participating in the COP collaborating on designing several shared activities and assessments for their students (outlined on a Google Docs spreadsheet) and then developed into brokering student-generated collaborative projects between the participating student groups using a project Facebook page (<https://www.facebook.com/groups/MoCo360/>). The MoCo360 lecturers also collaborated with mobile social media App developers Vyclone to enable their App to collate video clips using the #moco360 hashtag. Examples of student collaborative mobile social media activity include: an international Vyclone movie megamix ([http://youtu.be/JhSUzTY\\_ezE](http://youtu.be/JhSUzTY_ezE)), and a student-initiated project illustrating forced perspective (<http://theforcedperspectiveproject.wordpress.com/>).

## **Discussion**

The two different iterations of implementing our framework for creative pedagogies using mobile social media highlight the three key elements of this framework: modelling a COP, redefining pedagogy and designing an appropriate technology support infrastructure.

### ***Modelling a COP***

Using Google Plus Communities has provided a visually powerful way of farming the various groups of participants' interactions as a COP, and provides a simple way of brokering this concept to students.

Figure 1 is a screen shot of the MARMWorkshop Google Plus Community that provided a model for the participants to later explore with their own student cohorts.

Comparing snapshots of TAGSExplorer visual Twitter analysis between the start of the #moco360 project (Figure 2) and after the project has developed (Figure 3)



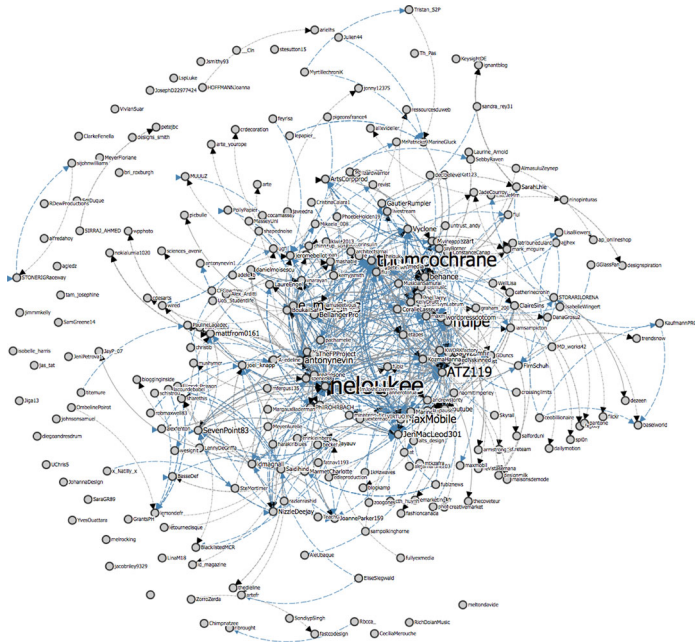


Figure 3. TAGSExplorer Twitter analysis mid #moco360 project.

social media. This has been a collaborative exercise, supported by the establishment of lecturer COPs around each project. As Cormier (2008) notes, redefining pedagogy around learning communities represents a significantly new role for most lecturers, involving the creation of an ecology for community interaction and brokering student participation within wider networks beyond the confines of a single class. Blaschke (2013) also identifies design strategies for redefining pedagogy towards heutagogy (student-determined learning). These strategies are similar to those that we have embedded within our mobile social media framework, including a focus upon learner negotiation, reflective practice and collaborative learning.

### *Designing an appropriate technology support infrastructure*

Implementing the framework is predicated upon a robust institutional WiFi network empowering connectivity and enabling lecturer and student small screen mobile devices to become collaborative tools via wireless screen mirroring. This requires working with an institution's IT department to enable wireless screen mirroring via the institutions' WiFi networks using Apple Airplay, Google Chromecast and Microsoft's WiDi mobile protocols. As part of our framework development we have designed and built low-cost Mobile Airplay Screens (MOAs) that facilitate student teamwork via their personal mobile devices (Cochrane, Munn, and Antonczak 2013; Cochrane and Withell 2013). These MOAs can be wheeled into any space that has wireless network coverage and a power point for students to turn into a collaborative space (Figure 5).

We have also worked with our IT department to enable classroom presentation systems to provide wireless mirroring access from lecture and student mobile devices. As we partner with other institutions in developing our mobile social media

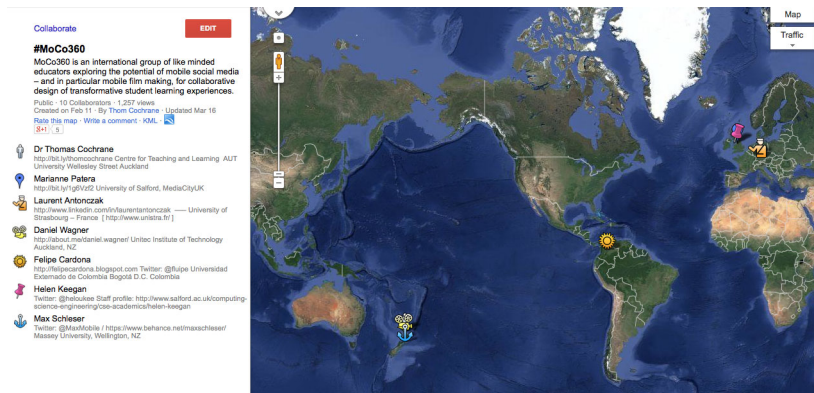


Figure 4. Google Map of #moco360 lecturers.

framework for BYOD we also share how we have enabled infrastructure changes to support the implementation of this framework, including the custom designed MOAs.

### Future research

Space has limited us to the inclusion of only two examples of how we are implementing our framework for creative pedagogies within wider contexts. Both the #marmw2013 and the #MoCo360 communities of practice are on-going and in the early stages of development, but we can already see evidence of a significant impact on the multiple curriculum contexts involved as they apply our framework for creative pedagogies using mobile social media. Driven by our two research questions, an in-depth evaluation of these two projects will be undertaken at the end of 2014, and this will inform the development of a set of design principles for implementing a framework for creative pedagogies using mobile social media and student-owned devices.



Figure 5. Mobile Airplay Screen.

## Conclusions

In order to transform students into creative professionals, educators' need to focus upon ontological pedagogies that deal with the process of becoming, rather than pedagogies that focus upon knowledge transfer. Having developed a framework for creative pedagogies using mobile social media, we have discussed two examples of case studies illustrating how we are beginning the process of implementing and evaluating it within a wider range of higher education contexts. This approach could also be extended to other fields beyond creative industries and design, as critical engagement with new technologies, including mobile social media, grows into a core 21st century literacy in a world where a new wave of students come to our institutions with ubiquitous ownership of a wireless mobile device of their own choosing.

## References

- Alexander, B., et al., (2006) *The Horizon Report 2006 Edition*, The New Media Consortium, Austin, TX.
- Balsamo, A. (2011) *Designing Culture: The Technological Imagination at Work*, Duke University Press, Durham, USA.
- Belshaw, D. (2010) *Mobile and Wireless Technologies Review*, JISC infoNet, Newcastle upon Tyne, UK.
- Blaschke, L. M. (2012) 'Heutagogy and lifelong learning: a review of heutagogical practice and self-determined learning. [Research Article]', *The International Review of Research in Open and Distance Learning*, vol. 13, no. 1, pp. 56–71.
- Blaschke, L. M. (2013) 'E-learning and self-determined learning skills', in *Self-Determined Learning: Heutagogy in Action*, eds. S. Hase & C. Kenyon, Bloomsbury Academic, London, pp. 55–68.
- Bruns, A. (2007) 'Beyond difference: reconfiguring education for the user-led age', *Paper presented at the ICE3: Ideas in Cyberspace Education: Digital Difference*, Ross Priory, Loch Lomond, Scotland, Mar 21–23.
- Butchart, B. (2011) *TechWatch Report: Augmented Reality for Smartphones*. Observing trends in innovation. 1.1 ed. JISC, Bristol, UK.
- Cochrane, T. (2013) 'A summary and critique of M-learning research and practice', in *Handbook of Mobile Learning*, eds. Z. Berge & L. Muilenburg, Routledge, New York, pp. 24–34.
- Cochrane, T., Antonczak, L. & Wagner, D. (2013) 'Post web 2.0 pedagogy: from student-generated content to international co-production enabled by mobile social media', *International Journal of Mobile and Blended Learning*, vol. 5, no. 4, pp. 1–18.
- Cochrane, T., Munn, J. & Antonczak, L. (2013) 'Design thinking for M-learning: herding a flock of MOAs', *Paper presented at the 3rd Mobile Creativity and Innovation Symposium*, AUT University, Auckland, New Zealand, Nov 20–22.
- Cochrane, T., Narayan, V. & Oldfield, J. (2014) 'Emerging technologies in New Zealand: a pedagogical framework for mobile social media', in *Activity Theory, Authentic Learning, and Emerging Technologies: Southern Perspectives*, eds. V. Bozalek, D. Ngambi, A. Amory, J. Hardman, D. Wood, J. Herrington, et al. Routledge, New York, pp. 126–143.
- Cochrane, T. & Rhodes, D. (2013) 'iArchitect[ure]: developing a mobile social media framework for pedagogical transformation', *Australasian Journal of Educational Technology*, vol. 29, no. 3, pp. 372–386.
- Cochrane, T. & Withell, A. (2013) 'Do 21st century students dream of electric sheep? A mobile social media framework for creative pedagogies', *Paper presented at the Electric Dreams: Proceedings 30th Ascilite Conference*, Macquarie University, Sydney, Australia, Dec 1–4.
- Cook, J. (2007) 'Smells like teen spirit: generation CX', *Paper presented at the Ideas in Cyberspace Education (ICE3)*, Loch Lomond, Scotland, Mar 21–23.
- Cook, J. (2010) 'Mobile phones as mediating tools within augmented contexts for development', *International Journal of Mobile and Blended Learning*, vol. 2, no. 3, pp. 1–12.

- Cormier, D. (2008) 'Rhizomatic education: community as curriculum', *Innovate*, vol. 4, no. 5. np. Available at: <http://davecormier.com/edblog/2008/06/03/rhizomatic-education-community-as-curriculum/>.
- Danvers, J. (2003) 'Towards a radical pedagogy: provisional notes on learning and teaching in art & design', *International Journal of Art & Design Education*, vol. 22, no. 1, pp. 47–57.
- Dewey, J. (1916) *Democracy and Education*, New York, The Macmillan Company.
- FitzGerald, E., et al., (2012) 'Augmented reality and mobile learning: the state of the art', *Paper presented at the 11th World Conference on Mobile and Contextual Learning (MLearn 2012)*, Helsinki, Finland, Oct 16–18.
- FitzGerald, E., et al., (2013) 'Augmented reality and mobile learning: the state of the art', *International Journal of Mobile and Blended Learning*, vol. 5, no. 4, pp. 43–58.
- Greenwood, D. & Levin, M. (2005) 'Reform through action research', in *The SAGE Handbook of Qualitative Research*, 3rd edn, eds. N. K. Denzin & Y. S. Lincoln, Sage Thousand Oaks, pp. 43–64.
- Hase, S. & Kenyon, C. (2001) 'From andragogy to heutagogy', *ultiBASE Articles*, (December), pp. 1–10, [online] Available at: <http://www.psy.gla.ac.uk/~steve/pr/Heutagogy.html>
- Hase, S. & Kenyon, C. (2007) 'Heutagogy: a child of complexity theory', *Complicity: an International Journal of Complexity and Education*, vol. 4, no. 1, pp. 111–118.
- Hawksey, M. (2011) 'Twitter: how to archive event hashtags and create an interactive visualization of the conversation', [online] Available at: <http://mashe.hawksey.info/2011/11/twitter-how-to-archive-event-hashtags-and-visualize-conversation/>
- Herrington, A. & Herrington, J. (2007) 'Authentic mobile learning in higher education', *Paper presented at the AARE 2007 International Educational Research Conference*, [online] Available at: <http://researchrepository.murdoch.edu.au/5413/>
- Herrington, J., et al., (2005) 'Online learning as information delivery: digital myopia', *Journal of Interactive Learning Research*, vol. 16, no. 4, pp. 353–367.
- Johnson, L., Levine, A. & Smith, R. (2009) *The Horizon Report: 2009 Edition*, New Media Consortium, Austin, TX.
- Kukulka-Hulme, A. (2010) 'Mobile learning as a catalyst for change', *Open Learning: The Journal of Open and Distance Learning*, vol. 25, no. 3, pp. 181–185.
- Learning and Teaching Scotland. (2006) 'The reggio emilia approach to early years education', [online] Available at: [http://www.educationscotland.gov.uk/earlyyears/images/reggioaug06\\_tcm4-393250.pdf](http://www.educationscotland.gov.uk/earlyyears/images/reggioaug06_tcm4-393250.pdf)
- Luckin, R., et al., (2010) 'Learner-generated contexts: a framework to support the effective use of technology for learning', in *Web 2.0-Based E-Learning: Applying Social Informatics for Tertiary Teaching*, eds. M. Lee & C. McLoughlin, IGI Global, Hershey, PA, pp. 70–84.
- McAuley, A., et al., (2010) 'The MOOC model for distance practice', [online] Available at: [http://oerknowledgecloud.org/sites/oerknowledgecloud.org/files/MOOC\\_Final\\_0.pdf](http://oerknowledgecloud.org/sites/oerknowledgecloud.org/files/MOOC_Final_0.pdf)
- Puentedura, R. (2006) 'Transformation, technology, and education', [online] Available at: [http://hippasus.com/resources/tte/puentedura\\_tte.pdf](http://hippasus.com/resources/tte/puentedura_tte.pdf)
- Reeves, T. (2005) 'No significant differences revisited: a historical perspective on the research informing contemporary online learning', in *Online Learning: Personal Reflections on the Transformation of Education*, ed. G. Kearsley, Educational Technology, Englewood Cliffs, NJ, pp. 299–308.
- Rushby, N. (2012) 'Editorial: an agenda for mobile learning', *British Journal of Educational Technology*, vol. 43, no. 3, pp. 355–356.
- Siemens, G. (2004) 'Connectivism: a learning theory for the digital age', *eLearnSpace*, (12 December), [online] Available at: <http://www.elearnspace.org/Articles/connectivism.htm>
- Sternberg, R. J., Kaufman, J. C. & Pretz, J. E. (2002) *The Creativity Conundrum: A Propulsion Model of Kinds of Creative Contributions*, Psychology Press, Philadelphia.
- Vygotsky, L. (1978) *Mind in Society*, Harvard University Press, Cambridge, MA.