

# Designing transformative learning environments

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One way of designing transformative learning environments is to frame teaching and learning around building learning communities. Cormier promotes the idea of creating ecologies where communities can interact, and seeding this interaction via triggering events. Building on these ideas in this paper we evaluate the use of the SAMR framework and the conception of three levels of creativity to trigger transformative curriculum design within two different learning communities in distinct course contexts including: Graphic Design, and Communications Studies. The two case studies provide practical examples of using social media to explore transformative curriculum design.

Keywords: SAMR, educational technology adoption, mlearning, heutagogy, creativity

## Introduction

In this paper we explore the relevance of the concepts of building learning communities, rhizomatic learning, triggering events, and the role of technology in redesigning learning environments for creativity. Laurillard (2012) describes teaching as a design science and argues that this should involve collaborative curriculum design enabled by digital technologies. Education is often seen as a transformative experience for learners, however the role of technology in mediating transformation in education has been hotly debated (JISC, 2011; Keane & Blicbau, 2012; Puentedura, 2006; Reeves, 2005). With the increasing ubiquity of mobile devices and access to social media much of the focus of current educational technology debate is upon the potential of mobile learning to transform education (Laurence Johnson, Adams Becker, Cummins, & Estrada, 2014; L Johnson, Becker, Estrada, & Freeman, 2014; Traxler, 2010).

## Communities of practice

The concept of communities of practice (COP) was introduced by Lave and Wenger (1991), and further developed by Wenger (1998). COP theory builds upon the basis of social learning theories such as social constructivism (Vygotsky, 1978). We have found that framing teaching and learning as participation within COPs can be an effective way of supporting transformative learning environments that involve the reconception of the roles of the teacher and the learner (Cochrane, 2014). We are interested in moving beyond a paradigm of teacher-directed content delivery to students becoming active participants of learning communities and negotiators of learning outcomes. Following a COP model allows the reconception of a group of learners as a unique community of practice with a shared interest (domain) learning to become active participants of a wider professional community, brokered by their lecturers as experts within these professional communities.

## Rhizomatic learning

Cormier (2008) explores the concept of rhizomatic learning within the context of large self-determining online communities (cMOOCs). Essentially rhizomatic education is a response to the speed at which new technologies change and the resultant reconception of what constitutes the canon of knowledge. In comparison to traditional education environments where the teaching and learning relationship is predominantly a vertical top-down teacher directed experience, Cormier uses the analogy of a rhizome to redefine teaching and learning environments as horizontal experiences with teachers and learners sharing the determination of the direction of learning represented by many branching roots from a central stem.

In the rhizomatic model of learning, curriculum is not driven by predefined inputs from experts; it is constructed and negotiated in real time by the contributions of those engaged in the learning process. This community acts as the curriculum, spontaneously shaping, constructing, and reconstructing itself and the subject of its learning in the same way that the rhizome responds to changing environmental conditions. (Cormier, 2008, p. no page)

To support rhizomatic learning environments the teacher's role is to establish an ecology of resources and trigger critical and creative thinking, and "to provide an introduction to an existing professional community in which students may participate" (Cormier, 2008, p. no page). The concept of creating an ecology of resources to support rhizomatic learning communities resonates with our approach of framing learning around building learning communities, brokered by expert lecturers, and mediated by mobile social media – a rapidly changing technology with an almost global ubiquity (International Telecommunication Union, 2014).

## **SAMR**

Puentedura (2006) defines a simple model of educational technology adoption that describes four levels of appropriation of technology: Substitution, Augmentation, Modification, and Redefinition (SAMR). SAMR represents the general progression of the application a new technology takes within educational settings: beginning with replicating current practice on new technologies (substitution), using technology to provide functional improvement (augmentation), utilizing technology for significant task redesign (modification), through to designing new experiences that were previously impossible or difficult with pre-existing technologies (redefinition). Educational technology literature is dominated by case studies comparing educational activities mediated by old and new technologies, leading to the no significant difference phenomena (Reeves, 2005) whereby no new outcomes are achieved because these comparative studies do not represent redesign of educational processes, activities, or goals, but focus upon substitution of current practice. In contrast, Hockly (2012) applies the SAMR model to the design of mobile learning activities to distinguish between the design of mobile learning activities that focus upon consumption of content (substitution) and those that create new learning experiences that leverage the potential of mobile learning to bridge contexts such as geolocation (transformation).

## **Creativity**

Creativity is one of the key attributes looked for in our graduates (Kaufman & Sternberg, 2007). Creativity, like learning, can be hard to quantify and measure, however Sternberg, Kaufman and Pretz (2002) make a strong case for defining three types of creativity: replication, incrementation, and reinterpretation. Sternberg et al., argue "that there are multiple kinds of creativity, and that everyone can develop at least some of these kinds of creativity" (Sternberg, et al., 2002). We agree with Danvers (2003) that designing transformative learning environments involves cultivating a sense of supporting and encouraging student creativity.

Creativity thrives in an atmosphere that is supportive, dynamic, and receptive to new ideas and activities. The learning environment has to encourage interactions between learners in which: action and reflection are carefully counter-balanced; open-ended periods of play and 'blue-sky' thinking alternate with goal-oriented problem-solving; stimulating inputs and staff interventions are interwoven with periods in which learners develop ideas and constructs at their own pace; critical thinking and robust debate co-exist with a supportive 'space' in which risk-taking, imaginative exploration and productive failure are accepted as positive processes of learning and, the development of meanings and interpretations is inseparable from material processes and production. (Danvers, 2003, p. 52)

By nurturing a culture that celebrates and supports creativity within learning communities we hope to develop creative graduates.

## **Case Studies**

In this section we explore two case studies that illustrate the creation of an ecology designed to support student creativity and the building of learning communities. These include a large first year compulsory course in communications studies, and a second year elective course (15 points credits) in communication design, formerly graphic design.

## Communication studies

During 2014 we formed a COP of lecturers within the communications studies department interested in exploring new pedagogical practices (Cochrane, Antonczak, Guinibert, & Mulrennan, 2014). These experiences informed the redesign of one of the core first year papers of the degree, Visual communications. Visual communication is a large course that is offered to approximately 200 students divided into 8 classes or streams. The lecturing team consists of 5 lecturers and a course leader. The course is compulsory for many majors within the university's Communication Studies program. The course attempts to teach students to both read or decode imagery through in class activities and lectures, and write or encode imagery through assessed projects. The course has traditionally been staffed with first time lecturers for whom this is their first introduction to teaching. This has in the past caused friction among the students in the separate streams, as new lecturers are often unable to provide the same quality of teaching as more experienced staff. The course has also suffered due to it being a very short course over one semester that attempts to teach a wide range of basic visual literacy skills to prepare students for a number of different majors. Previously the institution's Learning Management System (LMS) was used as a course hub and for document sharing, with limited student engagement. In 2014 the course was redesigned using social media to help overcome some of the problems faced.

The redesigned ecology of the learning community for the first year communications studies degree was based around Google Plus, Google Drive, and Wordpress. Google Plus was used to create a community hub and communications channel for the Visual Communications course. Google Drive was used for sharing course documents and shared lists of student Wordpress blog addresses. Wordpress was used as a personal eportfolio for each student to setup, customize and share. Wordpress was also used as part of the assessment criteria to help develop students' digital and visual literacies. Students were required to post research, weekly work in progress updates, comment on their peers blogs, and submit finished work to their own blogs. Table 1 provides a brief overview of the redesigned second year compulsory visual communications course.

**Table 1: Overview of redesigned visual communications course**

<b>Topic</b>	<b>Triggering event</b>	<b>Activity design</b>	<b>Conceptual shift</b>	<b>SAMR</b>
Google Plus Community participation	All students invited to become members of a G+ Community	A G+ community was established as the support and announcement channel for the class	Teacher modeled participation within a learning community	Modification of prior use of course LMS to active community participation
Establishing a personal ePortfolio	Students create a Wordpress.com blog	Comment on two other class members posts every week	Peer formative feedback	Modification of the value of collaboration in learning
Work in progress	Post a minimum of one work in progress update per week.	These posts must be made to your Wordpress blog, categorized as "Brief X WIP"	Teacher guided activity	Augmentation of design journal
Research	5 posts identifying sources of research and inspiration.	These posts must be made to your Wordpress blog, categorized as "Brief X Research"	Teacher guided activity	Augmentation of documentation and referencing process
Summary	Write a brief summary of your project in 300 - 400 words.	Submit these to your Wordpress blog categorized as "Brief X Submission", summarizing how you have used what was taught in class to achieve your communication objective.	Student reflection	Augmentation of the reflective process
Submission	Summative project submission	Submitted via personal Wordpress blog categorised as "Brief X Submission"	Use of student owned space rather than institutional LMS	Modification of LMS submission

The research posts were implemented to encourage students to develop critical visual analysis skills and by doing so build their visual literacy skills. Analyzing images is both a necessary skill and learning method within visual communications. As a skill it is necessary as it helps us critique images on various levels, such as on its aesthetics or as a piece of communication. Visual analysis is a powerful learning method that enhances memory retention. Also, by making this analysis publicly available to their peers, students can learn from each other to help build a more objective view of what effective visual communication is. This simple activity of analyzing images has been difficult to manage in the past as it had traditionally relied on the lecturer to drive the engagement. This was always problematic as lecturers often did not have enough time to dedicate to all the 200 students, and in traditional critique sessions "critique fatigue" would often set in on lecturers, as offering quick fire critiques on a large number of images is mentally taxing.

The work in progress posts were implemented for several reasons. The first was to build a feedback loop in conjunction with the requirement to post feedback on student peers' posts. This resulted in students receiving much more guidance on their work. This is important, as quite often novice learners need constant support as many have yet to develop the ability to critically reflect on their own work. Traditionally the lecturer would have to set aside a portion of time for class presentations to give guidance and critique, which taxed an already tight curricula time schedule. Secondly, it helped combat the problem of leaving assignments to the last minute. This is a common problem as communications students are used to predominantly verbal assignments and exams that require less time spent on them. This has seen many students in previous years fall into the trap of attempting last minute rush jobs, to the point where students have actually asked for their assignments to have milestones that are marked along the way. While summative assessment milestones would be ideal, this is impractical, as it would create a massive marking load. An alternative redesign for semester one 2014 required students to upload work in progress to their Wordpress blogs in weekly intervals creating a motivational triggering activity that has the added benefit of making each student's progress transparent, so those lagging can recognize this when they see their peers progress. Lastly the work in progress reports have minimized student attempts to cheat on practical assessments. Plagiarism of work becomes apparent, as the work in progress blog posts are not reflected in the final submission. Those who attempt to have others do their assignments for them are also discouraged by a requirement to post regular work updates, as this would entail employing another's effort for an entire semester.

The Google plus (G+) community proved beneficial by creating a hub for ensuring consistency of expectations, support, and information sharing among the eight streams of the course. In previous years classes had been kept segregated in different streams that did not interact. However, this did not stop the students from organising their own social media groups for all the streams to participate in. This led to information that was meant for a specific individual stream being posted by students creating conflict or friction with the other streams. For example, in 2013 two lecturers stated different attendance requirements. While the two lecturers thought they were talking to their class in isolation, students had posted the conflicting requirements on a private Facebook group causing a wave of complaints. One solution offered would be to discourage the students from using social media, however, this was impossible to enforce. Instead the redesigned 2014 course embraced mobile social media. This allowed lecturers from different streams to communicate via a common forum so both the students and lecturers in other streams could see the shared activity and information. This had the unexpected result of reducing course administration, as students tended to have the same questions across the multiple streams. Questions asked on the G+ community were visible to the whole course, reducing duplicate questions being answered in isolation. Lecturers were also able to have input into the classrooms back channels and identify critical issues before problems arose. Finally the response time was often much quicker to G+ as lecturers logged into Google services on multiple platforms including the mobile App and Chrome on desktops or laptops, providing real time updates of posts to the community. This produced a far more interactive and responsive learning community than in previous years of the visual communications course.

### **Communication Design (Graphic design)**

Over the past three years we have explored a variety of ways of transforming graphic design education from a predominantly paper-based or desktop computer publishing based curriculum into engagement with the rise of mobile computing and interactive multimedia digital book formats (Cochrane, et al., 2014). In particular, this has involved introducing graphic design students to the world of mobile film production. In semester one 2014 we invited a group of mobile film making experts from a mix of four universities and one polytechnic around the globe to form a community of practice in order to design a collaborative mobile social media and film making experience for their students. The course contexts included: graphic design, audio engineering, and filmmaking. Class sizes varied from 12 students to 120 students with a total of 280 students. We called this

project MoCo360, short for Mobile Collaboration around the world. Due to the transposition of the academic calendars between the northern and southern hemispheres the project was designed around six weeks of shared activities that each course group could choose to participate in. We used a hashtag (#moco360) to curate a social media stream around the project, and a selection of asynchronous and synchronous mobile social media platforms for communication and collaboration between the five different courses. This enabled us to create a sense of participation within a wider global community, with the goal being the facilitation of students collaborating globally to create a mobile film project of their own design. Another critical factor in designing the ecology to support the moco360 project was the variation in the size of the student numbers involved in each course, ranging from 12 to 120. By choosing an ecology of mobile social media tools that could be curated by a common hashtag we created an environment whereby all participants could choose to contribute as appropriate to their own course structures and assessment criteria. This ecology included: a Google Plus (G+) Community, Twitter, Vine, Vyclone, Behance (for the French students) a project Facebook page, YouTube and Vimeo. Table 2 briefly outlines the six main collaborative project activities.

**Table 2: Overview of the MoCo360 project**

<b>Topic</b>	<b>Triggering event</b>	<b>Activity design</b>	<b>Conceptual shift</b>	<b>SAMR</b>
Week 1: Introduction to the MoCo360 community	All students invited to become members of a G+ Community	A G+ community was established as the support and announcement channel for the class	Teacher modeled participation within a learning community	Modification of prior use of course LMS to active community participation
Week 2: Personal introduction	Students create and share a 6 second Vine video, and a Behance profile (France)	Students establish an online digital identity using a range of mobile social media	Teacher guided	Augmenting an online profile
Week 3: Global Hangout	Synchronous video conference of all project teams	Lecturers invite their students to participate in a global G+ Hangout	Teacher modeled community participation	Substitution of face to face presence
Week 4: Collaborative content creation	All participants record content for a shared Vyclone video	Collaboration in a global team-based project as content creators	Teacher as participant	Redefinition of collaborative production
Week 5: Negotiate student directed projects via a Facebook page	Students invite peer participation into an original mobile video production project, shared via Twitter	Establishment of international student team projects	Student negotiated	Redefinition of learning as project negotiation
Week 6: Collaborative video production	Student directed collaborative mobile video production project	Active participation within a global professional community	Student directed	Redefinition of learning community on a global scale

Student participation within the global #moco360 community was predominantly mediated by the public (contribution by invited members only) G+ Community, and Twitter conversations curated via the project hashtag #moco360. We used TAGSExplorer (Hawksey, 2011) to collate and provide a visual analysis of Twitter hashtag activity.

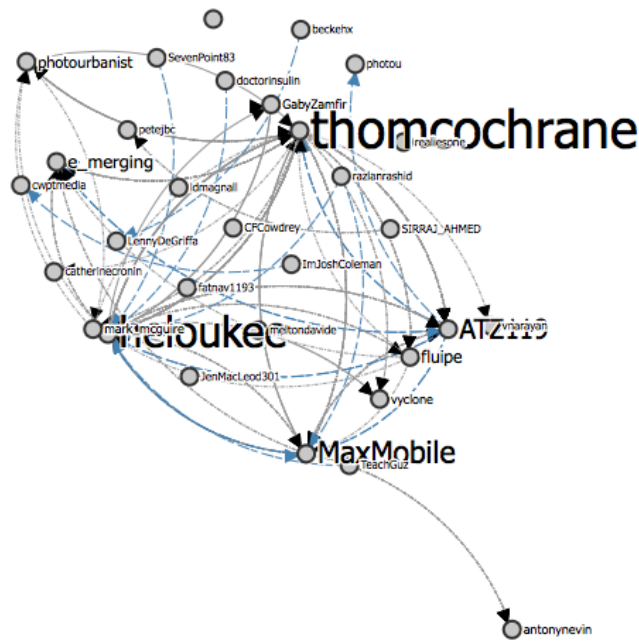


Figure 1: TAGSExplorer analysis of #moco360 February 2014

At the beginning of the project the most significant nodes of conversation were centred on the lecturers, with 29 users of the project hashtag (Figure 1). However as the project progressed several students became significant nodes of conversation, and the project reached a large number of peripheral participants. By the end of the project there were 362 #moco360 hashtag users on Twitter, with a total of 1741 tweets (Figure 2).

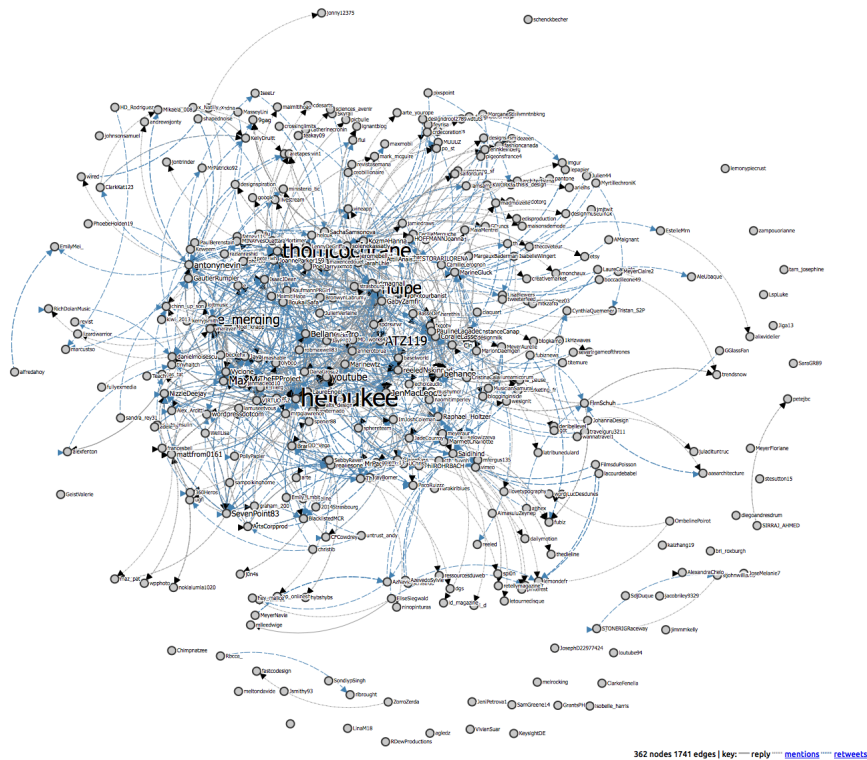


Figure 2: TAGSExplorer analysis of #moco360 April 2014

TAGSExplorer was also used to curate Tweets with both the project hashtag and geolocation data that were then mapped via Google Maps, creating a sense of context to the global activity surrounding the project. Figure 3 provides a snapshot of the geolocated Twitter conversations using the #moco360 hashtag in June 2014, illustrating the continued growth of interest and participation in the project over a month after the official end of the project.



**Figure 3: Google Map TAGSExplorer analysis of geotagged #moco360 tweets June 2014**

Following the success of the MoCo360 project in semester one of 2014, we designed a six-week elective course for semester two 2014 to provide another group of Communication Design students with a similar experience, a kind of MoCo360 project on a smaller scale. The description of the elective course gives an overview of its purpose:

By the end of 2014 there will be more active mobile phones on the planet than people (ITU, 2014). Daily smartphone screen time has now surpassed TV usage also. This elective will help you to design for this rapidly developing *Mobile Social Media* in an environment where there is an App for everything (1.2 billion Apps are now in the iTunes Store). In it you will create an ePortfolio utilizing the unique affordances of smartphones and/or tablets that will help you to launch your Design career. You will be introduced to some of the theory of *Mobile Social Media*, and how it can help you to establish effective ePortfolios, as well as to using Web2 tools through online collaborations and case studies. (Course descriptor, 2014)

The ecology of the learning community for the semester two 2014 Communication Design elective course is based around G+ and Behance. Google Plus provides a community hub for the course members (Students and lecturers), while Behance provides an online platform for student eportfolios with a specific focus on participation within a wider global visual design community.

The elective course is designed as a taste of the experience involved in a mobile social media minor that includes four courses over the length of a bachelor of design degree – comprised of one introductory course in first year, followed by two courses in second year and a final course in third year. The elective course follows a six-week format as shown in table 3, where each week introduces topics as triggering events for the learning community.

**Table 3: Overview of the communication design mobile social media elective course**

<b>Topic</b>	<b>Triggering event</b>	<b>Activity design</b>	<b>Conceptual shift</b>	<b>SAMR</b>
Week 1: Introduction to mobile social media	International guest (UK) via Hangout: “The power of social media and curation”	Students create the following mobile social media accounts: <i>G+</i> , <i>Google Hangouts</i> , <i>Google Drive</i> , <i>YouTube</i> , <i>Vimeo</i> , <i>Twitter</i> , <i>Storify</i> , <i>Bambuser</i> , <i>Behance</i> , and are invited to join a G+ community for the course	Teacher modeled educational use of mobile social media and G+ Community participation	Redefinition of course LMS as a collection of student owned mobile social media – building a learning community
Week 2: Brand yourself	Guest speaker from Journalism Department: “The power of an online profile”	Students showcase their creativity via a six second Vine video	Teacher guided exploration of digital identity	Redefinition of social media as an educational platform
Week 3: Contextual affordances of mobile social media	International guest (Colombia) via Hangout: “The power of mobile video”	Students explore geolocation by creating a collaborative interactive Google Map with embedded video	Teacher guided exploration of contextual affordances of mobile	Augmentation of mobile video
Week 4: Creating an mPortfolio	Guest speaker (NZ): “The power of an ePortfolio”	Students establish their own Behance portfolios as hubs for their mobile social media platforms of choice (e.g. Flickr, Instagram, Vimeo)	Student negotiated	Modification of student portfolios
Week 5: Collaborative video production	International industry guest from Vyclone (USA) via Hangout: “The power of collaborative production”	Students create and share a short form collaborative video using Vyclone	Student negotiated	Modification of collaborative video production
Week 6: Student presentations and reflections	International guest (Ireland) via Hangout: “The power of a shared journey”	Students record a reflective statement via <i>Vyclone</i> or <i>Bambuser</i> – 10 min max, shared via Twitter for peer feedback	Active student participation within a learning community	Augmentation of student reflections

Rather than substituting existing curriculum activities and assessment strategies using mobile social media we have attempted to modify and redefine the nature of activities and assessments that can be enabled by mobile social media within the context of the new elective course. The elective course design focuses upon drawing students into active participation within a global learning community that will hopefully become a model for participation in life-long professional communities after graduation.

## Discussion

The two case studies highlight two fundamental reconceptions that we have found are required for designing transformative learning environments: reconceptualising the role of the lecturer, and reconceptualising the role of technology.

### The role of the lecturer

The role of the lecturer becomes that of designing an ecology for community interaction, becoming an active participant in this learning community (modelling behaviour), and moderator of community posts and comments. The emphasis shifts from being a source of content delivery to contextualising knowledge and designing learning activities for student’s active participation in a learning community.



## The role of technology

### *BYOD*

Focusing upon student owned devices and mobile Apps adds flexibility and context to learning communities. Landis (Gogno, 2013) highlights the transformative potential of mobile devices by describing the overtaking of combined desktop and laptop internet connectivity by mobile internet connectivity in 2013 as a tipping point in human history, similar to the impact of the invention of the printing press. Access to knowledge and communication are now a global reality – how we redesign education to meet this potential is therefore critical. However every group of learners will represent a different specific demographic of mobile device ownership. In the case of the #moco360 project there was some differences amongst the different countries and students device ownership and connectivity access to connectivity (3G, 4G, free Wi-Fi or not). We are confident that these differences will be minimised over time.

### *Social media*

Blaschke (2013) highlights the alignment between the affordances of web 2.0 (social media) and the characteristics of self-determined learning (heutagogy): content creation (individual and group), content discovery and sharing (individual and group), knowledge and information aggregation, and connectivity and social rapport. There are also many similarities between the concepts of rhizomatic education and the affordances of mobile social media. Mobile social media can be incorporated within course designs as a mediator of student centred collaborative pedagogies, as well as a catalyst for professionalism and introducing ethical online practices.

### *SAMR*

The communications studies case study largely represents an augmentation and modification of previous learning environments, whereas the communication design case study explores the potential of redefining learning experiences using the unique affordances of mobile social media. This is a reflection of the difference in maturity of the two projects. The communications studies case study is a first iteration of course redesign, while the moco360 project and the communication design elective are the result of several previous project iterations by the participating lecturers. The SAMR framework can be seen as a continuum of educational technology adoption, and few lecturers would be willing to make an ontological leap from their current pedagogical practice directly to redefinition without first exploring substitution, augmentation and modification. Transformation can be equivalent to exploring different pedagogical practice rather than necessarily being defined as ‘better’ than previous practice.

### *Enabling creativity*

The SAMR framework maps onto Sternberg, Kaufman and Pretz’s (2002) three levels of creativity: where substitution and augmentation equate to replication, modification equates to incrementation, and redefinition equates to reinterpretation. Structuring curriculum design around iteratively moving from course activities and assessments that begin with replicating prior knowledge allows students to build cognitive bridges to the higher levels of creativity as the course progresses. While many pedagogical innovations are typically reserved for final year cohorts of students, a more sustainable approach to building higher levels of creative practices into the curriculum will focus upon staging innovation across the curriculum. Several studies have highlighted that while students are comfortable with social and personal use of mobile social media, they have very limited experience of using mobile social media creatively within the context of higher education (Beetham & White, 2014). This implies that lecturers need to support a culture change around students’ expectations of the use of technology in education, and design triggering events to catalyse these conceptual shifts. In the context of our cases studies this involves beginning the introduction of creative practice into the first year of the course (replication), building upon this in the second year (incrementation), and finally enabling the integration of highly creative student-determined projects in the final year of a course (reinterpretation). This staged and scaffolded approach to creativity across the curriculum minimises the cognitive load required for students to learn to use new technologies in education while at the same time meeting the assessment requirements of the course. We have attempted to demonstrate a practical approach to scaffolding innovation in pedagogy and creativity in the two included case studies.

## Future directions

The experiences of semester one 2014 have provided valuable directions for further iterations of course redesign within two different course contexts in semester two. The graphic design elective course will be run in semester two 2014 and evaluation of student and lecturer feedback will inform subsequent redesign iterations. The experiences from the redesign of the visual communications course are informing the redesign of other communications studies courses in semester two of 2014, and we hope to explore ideas for using mobile social media to move beyond augmentation and modification to redefine pedagogical practices and activities in several communications courses in the future.

## Conclusions

In our attempts to design transformative learning experiences we have found the concepts of communities of practice, rhizomatic learning, the SAMR educational adoption model, and three levels of creativity useful in providing us with guidelines and frameworks for course redesign. These are not intended as value judgments on the worth of particular pedagogies, but provide design principles that can guide course redesign around a social constructivist view of teaching and learning.

## References

- Beetham, H., & White, D. (2014). *Students' expectations and experiences of the digital environment*. Bristol, UK.
- Blaschke, L. M. (2013). E-Learning and self-determined learning skills. In S. Hase & C. Kenyon (Eds.), *Self-Determined learning: Heutagogy in action* (pp. 55-68). London: Bloomsbury Academic.
- Cochrane, T. (2014). Critical success factors for transforming pedagogy with mobile Web 2.0. *British Journal of Educational Technology*, 45(1), 65-82.
- Cochrane, T., Antonczak, L., Guinibert, M., & Mulrennan, D. (2014, 28 February to 2 March). Developing a mobile social media framework for creative pedagogies. *Paper presented at the 10th International Conference on Mobile Learning, Madrid, Spain*.
- Cormier, D. (2008). Rhizomatic education: Community as curriculum. *Innovate*, 4(5), np. available <http://davecormier.com/edblog/2008/2006/2003/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*, 22(1), 47-57.
- Gogno, N. (2013). *Educational technology reaches a point of redefinition*. Wordpress Blog posted to <http://wp.lasalle.edu/blog/educational-technology-reaches-a-point-of-redefinition/>
- Hawksey, M. (2011). *Twitter: How to archive event hashtags and create an interactive visualization of the conversation*. Blog posted to <http://mashe.hawksey.info/2011/11/twitter-how-to-archive-event-hashtags-and-visualize-conversation/>
- Hockly, N. (2012). Mobile learning. [Advance View]. *ELT Journal*, 67(1), 80-84.
- International Telecommunication Union. (2014). *The World in 2014: ICT facts and figures*. 2014(April). Retrieved from <http://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2014-e.pdf>
- JISC. (2011). *Transforming curriculum delivery through technology: Stories of challenge, benefit and change* (Internet). Bristol: Higher Education Funding Council for England.
- Johnson, L., Adams Becker, S., Cummins, M., & Estrada, V. (2014). 2014 NMC Technology Outlook for Australian Tertiary Education: A Horizon Project Regional Report, *The Horizon Report* (Vol. 2014, pp. 23). Available from <http://cdn.nmc.org/media/2014-technology-outlook-australian-tertiary-education-EN.pdf>
- Johnson, L., Becker, S. A., Estrada, V., & Freeman, A. (2014). *NMC Horizon Report: 2014 Higher Education Edition*. Austin, Texas: The New Media Consortium.
- Kaufman, J. C., & Sternberg, R. J. (2007). Creativity. *Change: The Magazine of Higher Learning*, 39(4), 55-60.
- Keane, T., & Blicbau, A. (2012). (Trans) Formation through educational technologies. *Paper presented at the ascilite 2012: Future challenges, sustainable futures, Wellington, New Zealand*.
- Laurillard, D. (2012). *Teaching as a design science: Building pedagogical patterns for learning and technology*. New York: Routledge.
- Lave, J., & Wenger, E. (1991). *Situated Learning: Legitimate peripheral participation*. Cambridge: Cambridge University Press.
- Puentedura, R. (2006). *Transformation, Technology, and Education*. Retrieved 18 February, 2013, from [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 G. Kearsley (Ed.), *Online learning: Personal reflections on the transformation of education* (pp. 299-308). Englewood Cliffs, NJ: Educational Technology Publications.

- Sternberg, R. J., Kaufman, J. C., & Pretz, J. E. (2002). *The creativity conundrum: A propulsion model of kinds of creative contributions*. Philadelphia: Psychology Press.
- Traxler, J. (2010). Will student devices deliver innovation, inclusion, and transformation? *Journal of the Research Center for Educational Technology (RCET)*, 6(1), 3-15.
- Vygotsky, L. (1978). *Mind in Society*. Cambridge, MA: Harvard University Press.
- Wenger, E. (1998). *Communities of Practice: Learning, Meaning, and Identity*. Cambridge: Cambridge University Press.

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