

Nurturing Collaborative Networks of Practice

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Abstract. In this paper we present the development of a framework for supporting and facilitating collaborative networks of practice using mobile social media. The framework was developed throughout a two-year collaborative mobile learning project #NPF14LMD. The #NPF14LMD project was a national project comprised of three universities and three polytechnics across New Zealand. One of the goals of the #NPF14LMD project was to create a collaborative network of practice across the six institutions participating in the project. The network provided a support and communication structure linking the six institutional communities of practice, enabling sharing of their experiences and a sense of belonging to a wider national and international community. This paper outlines the use of mobile social media to facilitate the #NPF14LMD network.

Keywords: *mobile learning, communities of practice, social media, collaboration*

1 Introduction

The project drew upon the authors' experiences of reimagining professional development as communities of practice (Cochrane et al., 2013b, Cochrane and Narayan, 2013, Cochrane and Narayan, 2012, Cochrane et al., 2012), and the wider literature surrounding establishing and nurturing collaborative networks and communities of practice (Jameson, 2011, Learning and Skills Network, 2009, Wenger et al., 2005, Wenger et al., 2002, Wenger et al., 2009). The development of supporting communities of practice (COP) was identified as a critical success factor for transforming pedagogy via mobile social media (Cochrane, 2014, Cochrane, 2012, Cochrane, 2010), and thus the project was initially framed around creating a network of COPs from six tertiary education institutions across the country.

The #NPF14LMD project was predicated upon the growing ubiquity of mobile device ownership, forecasted in International Telecommunications Union statistics (2014). In 2015 undergraduate student ownership of smartphones (92%) exceeded student ownership of laptops (91%) (Dahlstrom et al., 2015). These statistics were confirmed for the New Zealand context through the #NPF14LMD project student survey completed in 2015. Participation in the #NPF14LMD project involved lecturers integrating the use of mobile social media within the courses they were teaching over 3 semesters in 2014 through to the end of 2015. Participants were encouraged to ground their mobile learning project designs on relevant learning theory. Key learning theories and frameworks that informed the project design included, but were not limited to:

- Connectivism (Siemens, 2004): i.e. linking a national network within a global network of mobile learning researchers and practitioners.
- Social constructivism (Head and Dakers, 2005, Vygotsky, 1978): i.e. basing the wider project around collaborative curriculum design, and learner-generated team projects.
- Rhizomatic learning (Cormier, 2008): i.e. utilising a decentralized structure and designing the network activities around 'triggering events' to facilitate participant discussion and sharing.
- Conversational framework (Laurillard, 2001, Laurillard, 2007): i.e. encouraging discussion between learners and more expert peers.
- Authentic learning (Herrington et al., 2009): i.e. designing project shared activities around real world pragmatic scenarios.
- Constructive alignment (Biggs, 2003): i.e. aligning the design of the network activities with the goal of modeling the educational use of mobile social media.

- Heutagogy (Hase and Kenyon, 2007, Luckin et al., 2010): i.e. building learner capacity rather than merely competence through a focus upon supporting learner self-determination.
- Creativity (Kaufman and Sternberg, 2007, Sternberg et al., 2002): i.e. building upon the concept of three levels of creativity that move along a continuum from replication, incrementation, and reinitiation.

The project was grounded upon the wide body of research literature surrounding mobile learning. We drew upon the work of leading mobile learning researchers such as: Sharples et al., (2007) – connecting mobile learning practice to learning theories, Traxler (2010) – focusing upon BYOD approaches, Cook (2009) – exploring the mobility of the learner, Pachler et al. (2010) – exploring the socio-cultural impact of mobile learning, and Kukulska-Hulme (2010) – exploring mobile learning as a catalyst for new pedagogies.

Throughout the development of the project participants were encouraged to explore the unique affordances of mobile devices to enable innovative pedagogical strategies within their own discipline contexts. We agree with Bannan, Cook and Pachler (2015) that “The nature of learning is being augmented and accelerated by new digital tools and media, particularly by mobile devices and the networks and structures to which they connect people” (Bannan et al., 2015). Bannan, Cook and Pachler (2015) highlight eight mobile device affordances, to which we provide examples of the types of applications the project participants were encouraged to explore:

- Collaborative and communicative potential; for example Twitter, Skype
- Interactivity and nonlinearity; for example Google Now, Virtual Reality
- Distributed knowledge construction; for example Google Plus, Google Docs
- Multimodal knowledge representation; for example YouTube, Vine, Vyclone
- Authentic/contextualized/situated material, interaction, tasks and settings; for example Augmented Reality
- Multi-functionality and convergence; for example speech recognition such as Siri
- Portability, ubiquity, personal ownership: for example Smartphones
- User-generated content and contexts: for example ePortfolios (Behance)

As the project was a collaborative network of diverse communities of practice, mobile social media was used to facilitate collaboration and communication, and curate user-generated content. Thus similar to Cormier’s concept of rhizomatic learning the project coordinators focused upon designing triggering events throughout the life-span of the project to create discussion and sharing of practice between the project COPs.

2 Methodology

Our project aimed to create a collaborative partnership between tertiary researchers and practitioners in several Polytechnics and Universities throughout New Zealand, establishing a network of communities of practice (COP) sharing their experiences of exploring the potential of mobile learning within their own local discipline contexts. The project was co-funded by AKO Aotearoa and the participating institutions, with a combined budget of NZ\$300,000 over two years. The project was predominantly practice-based aiming to inform improved student learning outcomes.

Research Questions

Two overall project research questions formed the basis for the foundational concepts underlying the #NPF14LMD collaborative network.

RQ1. Will learners’ mobile devices deliver innovation, inclusion, and transformation—the main potential benefits for learners? If so, how?

RQ2. What is the ‘framework for enhanced learning and institutional change’ that will deliver these benefits?

Research Question1

The mobile learning research literature indicates that innovation (Parsons, 2013, Sharples, 2010, Kukulska-Hulme et al., 2009), inclusion (Attewell et al., 2009, Traxler, 2010, Unterfrauner and Marschalek, 2010), and transformation (Lindsay, 2015, Pachler et al., 2010, Puentedura, 2006) are key benefits of mobile learning. The network was designed to allow sharing of practice that explored these benefits from a variety of contexts and approaches. Sharples (2013) summarises the range of approaches taken by mobile learning initiatives as a scale from enhancing curriculum-led classrooms to informal highly mobile learning environments (Figure 1).

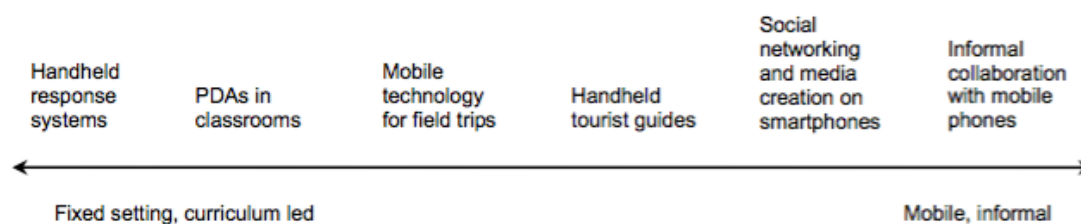


Figure 1. **Mobile Learning Dimensions from Classroom-led to Informal Highly Mobile (Sharples, 2013).**

Cook and Santos (2016) describe three aspects of state of the art mobile learning research: (1) the ability to use social media and apps to enable new patterns of connected, social, learning and work-based practices; (2) design research around the transformative possibilities of mobile learning; (3) a focus upon user/learner generated content and contexts. Basing the #NPF14LMD collaborative network around the use of mobile social media was one way to approach innovation (facilitate new pedagogies), inclusion (facilitate open access to all participants), and transformation (from the social use of mobile social media to the educational use).

Research Question2

The collaborative network was developed as part of a model framework for practice and institutional change that we envisioned that the project practitioners might apply within their own contexts. Facilitating lecturer professional development and providing a supporting technological infrastructure were core elements of the framework. We borrowed concepts from Puentedura's (2006) educational technology adoption framework (SAMR – Substitution, Augmentation, Modification, Redefinition), and all the participating researchers and practitioners were supplied with an iPad mini and an iPhone each to personalise and facilitate access to the use of mobile social media in their own contexts. We did not remotely manage or image participants' devices to simulate a BYOD (Bring Your Own Device) environment. Jameson (Jameson et al., 2006, Jameson, 2014) emphasises the critical nature of developing trust within networks and communities. Building trust within a new collaborative network of researchers and practitioners who did not know all of the other participants was a key goal of the use of social media within the #NPF14LMD network.

The research sub-question related to both of the two main project research questions that this paper explores is: How can we use mobile social media to facilitate and sustain the #NPF14LMD network?

Participants

The selection of project participants was a three-stage process. The first stage involved the invitation of project local coordinators from the six institutions by the project co-leader. Potential participants were identified by their previous experience of mobile learning research and practice within the New Zealand tertiary education sector. Participants who accepted the invitation to participate then gained institutional approval to sign the collaborative project fund application. Upon acceptance of the project proposal by the national funding body (AKO Aotearoa) the second stage involved the invitation of local practitioners (lecturers) from each institution to participate in the project by the local coordinators. All of the project coordinators and local practitioners were then supplied with an iPhone 5S and an iPad mini2. The final participant selection stage involved the local practitioners inviting their own students to participate in the project through implementing the integration of mobile learning in their courses. Students used their own devices (BYOD) when participat-

ing in the project. Ethics consent for the participating lecturers was approved through the lead institutions ethics committee consent process. Each institution was responsible for acquiring local ethics consent for the participating students. The project participants were drawn from a wide range of discipline contexts, including: Paramedicine, Game Development, Public Health, Communication Studies, Occupational Health, Performance for Screen, Computing, Pre-service Teacher Education, Carpentry, Business, Zoology, and Early Child Care Education. Two of the project COPs were based within a single discipline, while four COPs were interdisciplinary. This gave the project a wide base of participant experiences.

#NPF14LMD Network Formation

The #NPF14LMD project spanned two years from 2014 to 2015. The timeframe of the formation and development of the collaborative network was as follows:

- October 2013: Initial expression of interest with invited coordinators from the 6 institutions
- December 2013: Acceptance of project proposal for AKO Aotearoa funding
- February 2014: Initial meeting of project coordinators and administration team
- February 2014: Mobile social media Ecology of Resources introduced (Google Plus, Twitter...)
- May 2014: Local COPs established at each institution
- August 2014: First iteration of mobile social media projects in practitioners courses
- September 2014: Webinar series introduced
- November 2014: Sharing of project progress with the MINA2014 and Ascilite2014 conferences
- March 2015: Project coordinator roadshow – meeting with all local COPs
- March 2015: Launch of the Mosomelt cMOOC as an optional COP framework
- March 2015: Second iteration of integrating mobile social media in practitioner courses
- July 2015: Virtual Symposium
- July 2015: ISATT2015 Conference
- August 2015: Third iteration of integrating mobile social media in practitioner courses
- November2015: TERNZ2015 Conference
- November2015: MINA2015 Conference
- December2015: Ascilite2015 Conference
- February 2016: Wrap-up of #NPF14LMD project

A key strategy was to model the use of the mobile social media tools we were exploring throughout the project, and create an environment that could facilitate sharing of ideas and practice across the geographically disperse participants. We based the design of the #NPF14LMD social network around the concepts of social constructivism (Vygotsky, 1978), nurturing communities of practice (Wenger, 1998, Wenger et al., 2009, Wenger et al., 2002), connectivism (Siemens, 2004), and rhizomatic learning (Cormier, 2008). The #NPF14LMD network connected teams of researchers/practitioners across six institutions nationally. Cormier's concept of rhizomatic learning decentralises learning environments and refocuses the role of the teacher from deliverer of content to a designer of an ecology of resources and triggering events that enable learner discussion and creativity. Cook et al., (2013) argue that mobile social media can bridge the socio-cultural milieus of everyday life and education. We attempted to model these concepts in the #NPF14LMD collaborative network. There were five main elements of developing an ecology of resources to support the project: (1) a community-driven hub and discussion forum, (2) collaboration and communication channels, (3) opportunities for sharing practice, (4) a way of linking the local communities of practice into the wider network, and (5) a repository for project documentation. An ecology of resources was developed consisting of a core suite of mobile social media tools including:

- A Google Plus Community with 60 members <http://bit.ly/1zP2S0T>
- A social media hashtag #NPF14LMD

- Twitter – generating a network of 126 users and almost 700 conversations
- A collaborative participant Google Map
- A Google Drive folder of project documents
- Google Plus Hangouts
- A series of open access Webinars broadcast live and archived on YouTube (<http://bit.ly/1IAJRKWv>)

Other key collaboration strategies included face-to-face meetings, and participation in presenting at a variety of symposia and conferences across New Zealand and Australia (Frielick et al., 2015, Cochrane et al., 2015, Cochrane et al., 2014, Heap et al., 2015). Participation in these symposia and conferences also served to generate a broader network of interest in the project and conversations on social media that linked a global network of interested followers of the project. Figure 2 illustrates the #NPF14LMD project ecology of resources (EOR).

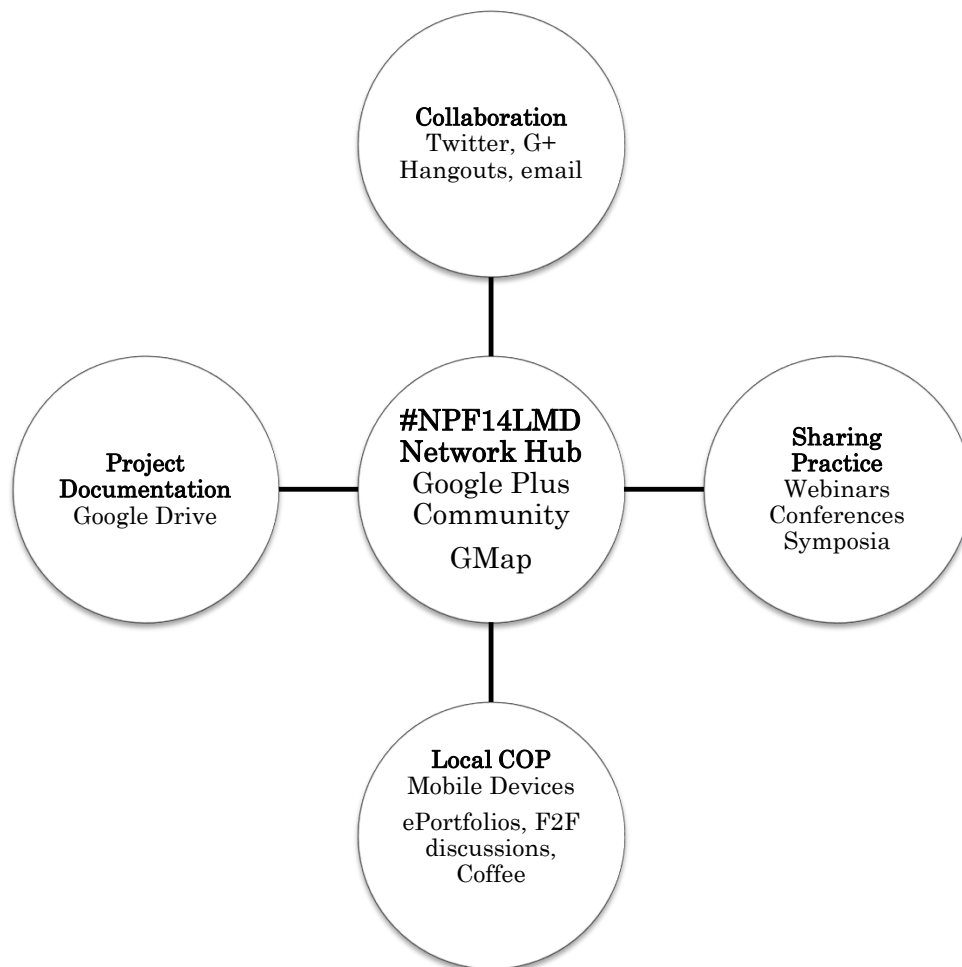


Figure 2. #NPF14LMD Project Ecology of Resources

3 Analysing the #NPF14LMD Collaborative Network

The #NPF14LMD project network EOR provided multiple channels for sharing and collaboration, including an email list serve. This ecology of resources provided participants with several options for collaboration to choose from, with the Google Plus Community serving as a central hub from which to find the various project resources and collaboration channels. The ability to create calendar events and schedule reminders

for upcoming events such as webinars with G+ Community was very useful for helping to coordinate interaction within the network of the project. Because we wanted to model open practice and allow for project interaction from a potentially global community of mobile learning experts we decided to make all of the project social media platforms public, but contribution was by invitation only. The email list serve and project documentation folder were kept closed to the participants only. Within the first three months of establishing the project there were over 80 posts on the Google Plus Community, with 35 comments on these posts, and 44 #NPF14LMD Twitter hashtag users active creating 182 tweets. Twitter interactions using the #NPF14LMD hashtag were graphically analysed via TAGSExplorer (Hawksey, 2011). TAGSExplorer utilizes a Twitter hashtag search to tabulate a Google Spreadsheet from which various data analysis functions are automated, with the live data available at <http://bit.ly/1OQkB2s> and a network diagram screenshot as at December 2015 shown in Figure 3. In Figure 3 individual Twitter users are represented as individual nodes, with conversations between the individuals represented by dashed lines for mentions, and retweets represented as solid lines.

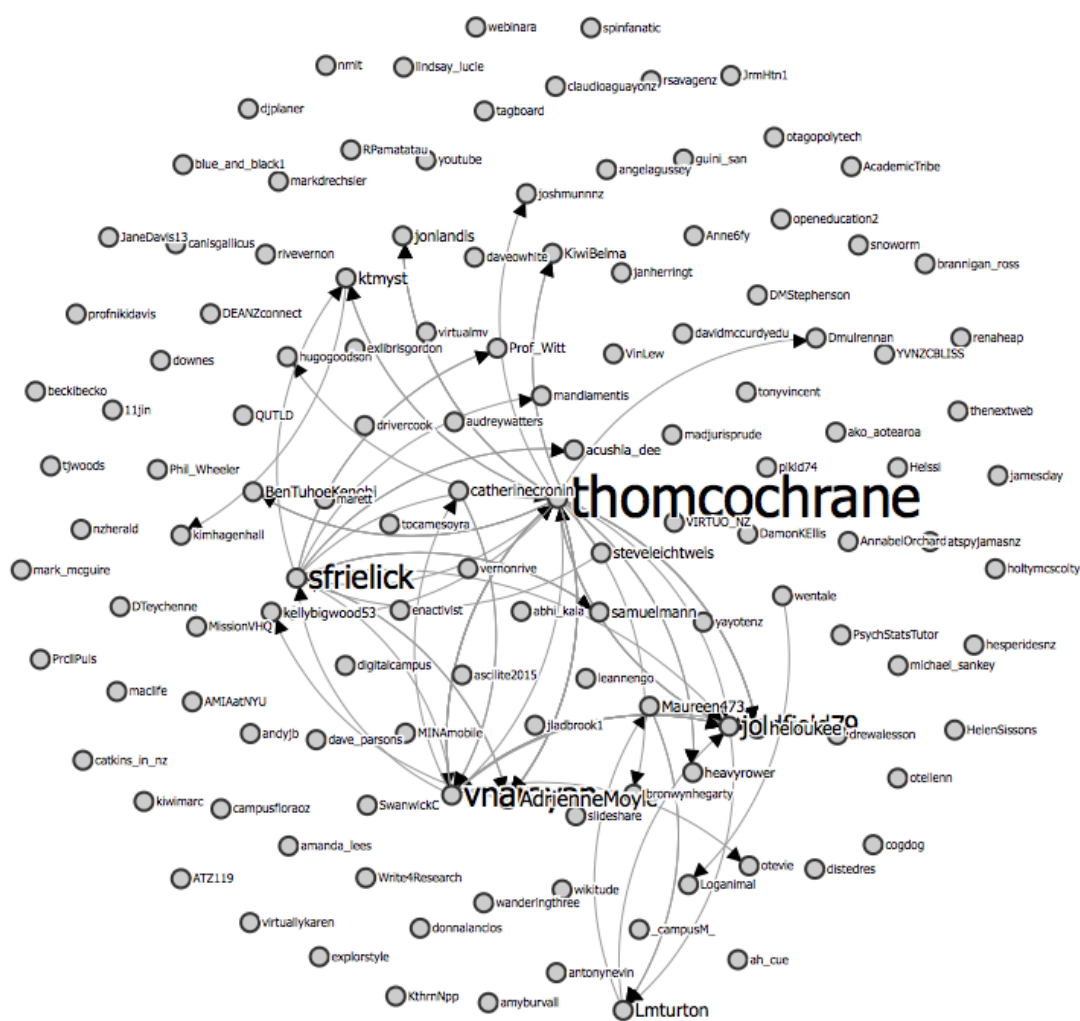


Figure 3. #NPF14LMD TAGSExplorer Analysis

The density of twitter conversational interaction is shown by the visualisation of Twitter replies, mentions and retweets that is illustrated as a growing network of conversations recorded in a time-lapse video <https://youtu.be/XFeKrAXbgIA>. The time-lapse video illustrates the growth of the Twitter network around

Figure 4. #NPF14LMD TAGSExplorer Replies Mentions and Retweets

Analysis of the key network nodes indicated by TAGSExplorer shows that the top Twitter conversationalists for the project include not only the project coordinators, but also several practitioners within the top 20, as shown in Figure 5. The project leaders feature prominently through modeling the use of Twitter throughout the project, encouraging and generating conversations around the project activities and sharing resources between the six project teams.

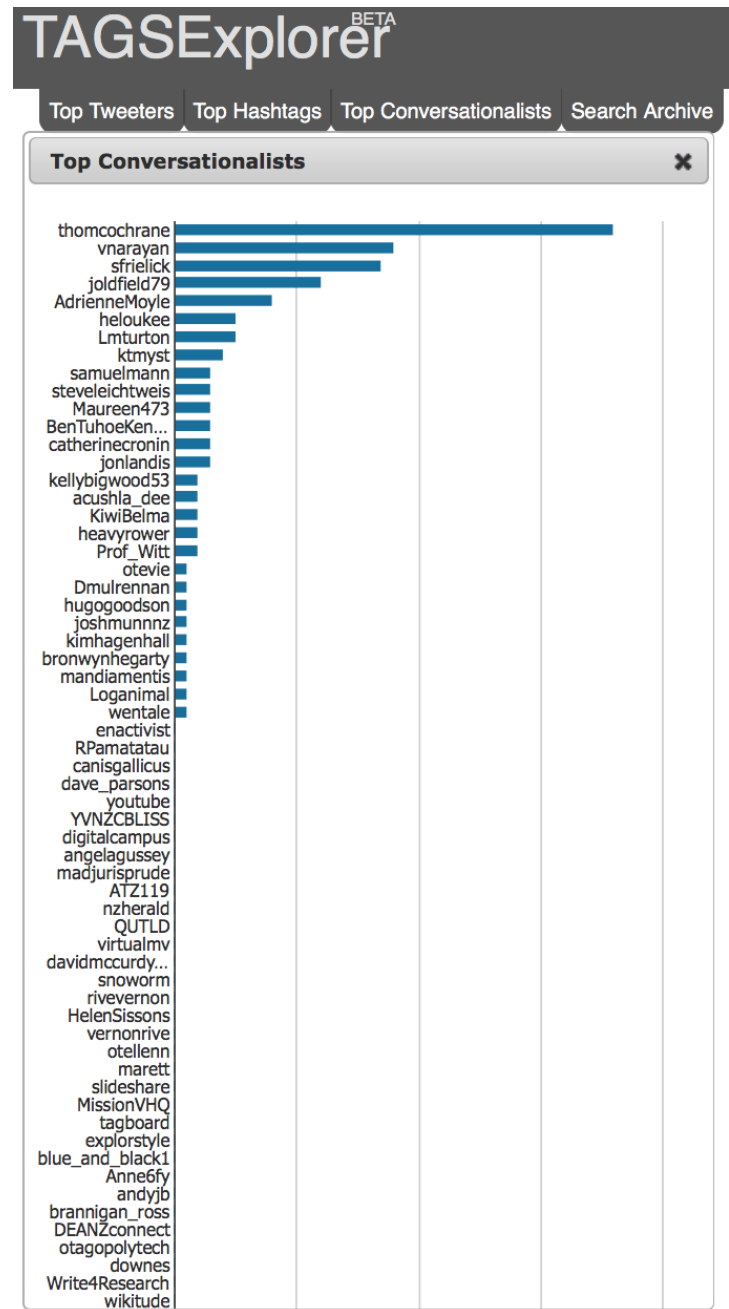


Figure 5. #NPF14LMD TAGSExplorer Top Conversationalists

The Google Plus Community formed a hub for linking the mobile social media EOR activity around the project. The use of the Google Plus Community was optional for the project participants although all participants were encouraged to contribute at some level. Significant activities included a weekly project coordinators video Hangout (for example: <http://bit.ly/20zcErm>), a series of webinars with invited guests, a series of

project report webinars, a virtual symposium, shared links to project resources and research, and sharing of conference presentations related to the project. A collaborative Google Doc was used to create the Webinar and project report schedules (<http://bit.ly/1K4eGsh>), these were live-streamed as Hangouts On Air, and archived on YouTube for asynchronous viewing. The webinar series topics included:

- Collaborative mobile film production
- The affordances of the open web
- Being an open educator
- Qualitative research approaches
- A journey from skeptic to digital ninja
- Maori learners and pedagogies
- Mobile pedagogies

The series of mid-2015 project report Hangouts were collated in a YouTube playlist. In July 2015 we convened a virtual symposium (<http://bit.ly/1SSxSup>), whereby project participants collaboratively created a map of their local project locations across New Zealand, and embedded project presentations and reflective VODcasts into this map (<http://goo.gl/maps/c09S0>), as shown in Figure 6.

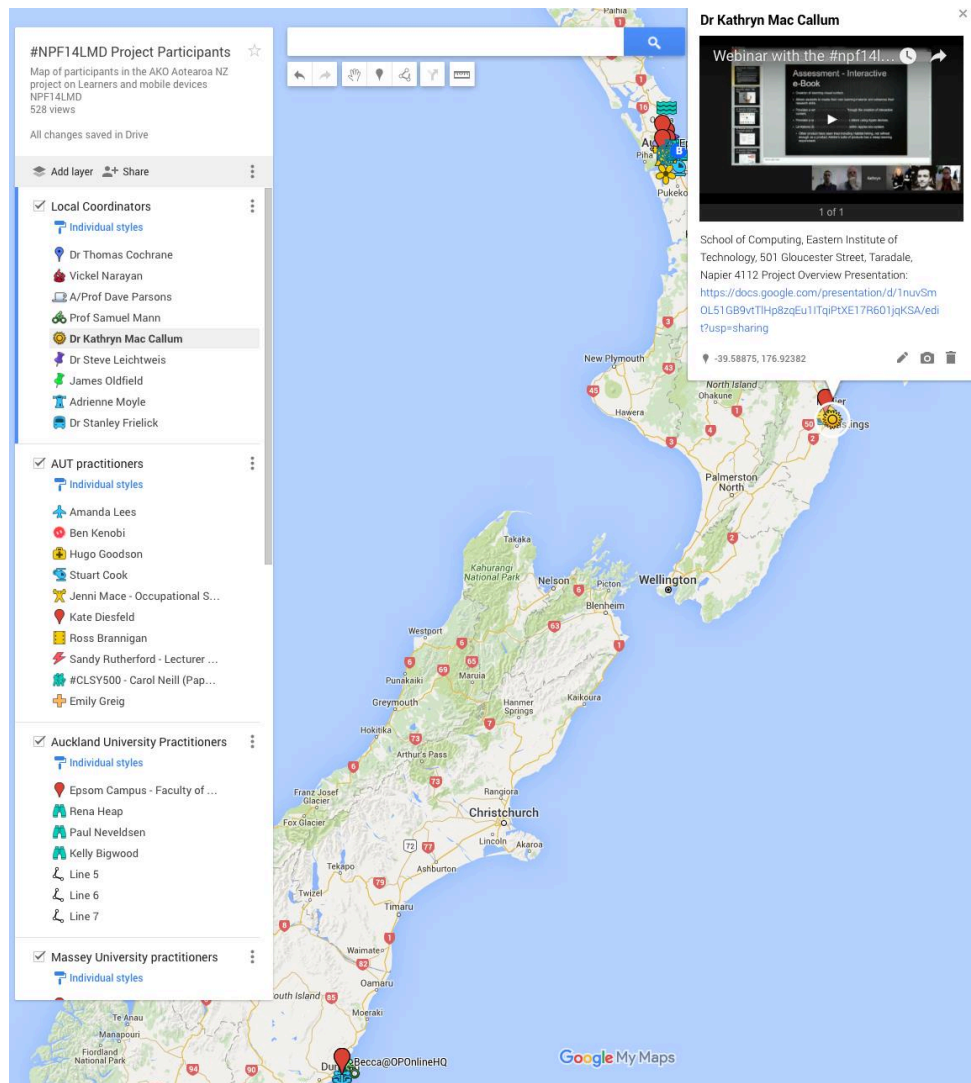


Figure 6. #NPF14LMD Participant Google Map

The map is arranged as several layers, including a layer for the project coordinators, and a layer for each participating institution. There are 39 contributors to the collaborative project map, with 32 videos embedded within it, creating a geolocated multimedia overview of the various educational contexts explored throughout the project. Created and shared in July 2015 the #NPF14LMD participant Map has had 534 views between July 2015 and December 2015.

Two examples of the discipline based case studies within the #NPF14LMD project network include the use of mobile technologies within a Performance for Screen course (Brannigan et al., 2015), and the integration of mobile social media within a Game Development course (Kenobi and Cochrane, 2015). The Performance for Screen case study explored the use of mobile screen mirroring displays within a live performance space to create new forms of interaction, and also to enable students to rapidly record and critique one another's performances using their mobile devices to capture the performance and then play back the performance for instant critique and evaluation via the large screen. These large mobile screens were developed to support the infrastructure of the projects by enabling the small personal screens of mobile devices to become collaborative group presentation tools via wireless screen mirroring. We nicknamed these custom designed screens MOAs: Mobile Airplay Screens (Cochrane et al., 2013a, Cochrane and Munn, 2016). This case study also explored the potential of mobile augmented reality to enhance live performances. The Performance for Screen students created individual Wordpress.com blogs as online journals of their learning and eportfolios, and their lecturers curated these blogs using the mobile application Flipboard on their iPads. In the Game Development case study MOAs were used for screen casting to model and demonstrate game designs from students' laptops and mobile devices. Third year students modeled their design and development processes to first year students using these screen-mirroring technologies. The game design project also evaluated and implemented the use of social media project management apps (for example: Trello, Slack, and Basecamp) and Google Plus Communities to stream-line Game Development project timelines, goals, student team management, resource sharing, discussion forums, and lecturer feedback. The instant notification of updates and announcements via the mobile apps on their own devices facilitated a faster and more effective team environment.

Table 1 summarizes the social media activity around the project.

Table 1. Summary of #NPF14LMD Project Social Media Activity

Mobile social media	Activity
#NPF14LMD Tweets http://bit.ly/1OQkB2s	662 conversations involving 129 users
Google Plus Community activity http://bit.ly/1zP2S0T	60 members 558 posts and 205 comments
TAGBoard https://tagboard.com/npf14lmd	Over 1200 posts from Twitter, Facebook, G+, Vine, Instagram & Flickr
Webinars http://bit.ly/1IAJRKW	13 Live streamed and archived videos
Collaborative Google Map participants http://goo.gl/maps/c09S0	39 participants, 32 embedded videos
Participant eportfolios	Google Plus Communities, Wordpress blogs, Mahara etc....
MINA2014 Conference Twitter activity	http://bit.ly/1mjDAIW
Asclite2014 Conference Twitter activity	http://bit.ly/1PGrTl8
2015 Roadshow G+ Photos	http://bit.ly/1KwFYHP
ISAAT2015 Conference Videostar	http://bit.ly/1VY1J45
TERNZ2015 Conference Twitter activity	http://bit.ly/1L59CPd
Asclite2015 Conference Twitter activity	http://bit.ly/1oeQb1E

The global reach of the project is illustrated by a map of Twitter geotagged tweets (<http://bit.ly/1Qbjn5b>), shown in Figure 7.

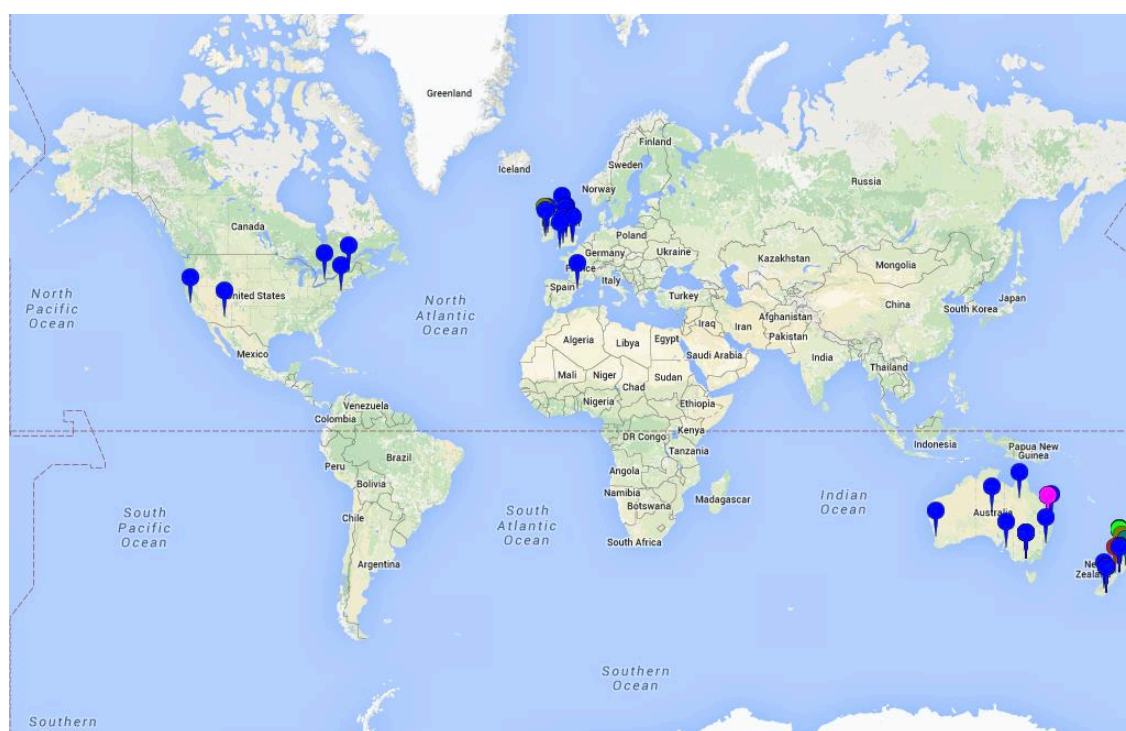


Figure 7. Map of Twitter Geotagged Tweets for #NPF14LMD

4 Discussion

The project participants were drawn from a wide variety of discipline contexts and represented a wide range of prior mobile learning experience. It took significant time for many project participants to gain confidence with using and interacting actively with the project social media EOR. One of the key initial barriers for many participants was the use of publically viewable social networks and protocols around the use of social media within educational contexts. A series of project roadshows in March 2015 at each participating institution was effective at mediating the concept of the mobile social media EOR supporting the network (<http://bit.ly/1KwFYHP>). The introduction of a project email listserve was aimed at providing a foundational communication and discussion forum for the project participants, however it was only ever used as an announcement channel for project administration purposes. A core group of project coordinators and practitioners made regular active use of the mobile social media channels, while others lurked passively on the periphery of this core group, with some preferring to keep their project activity private to themselves and their students via institutional systems such as Mahara and Moodle. However, as participant confidence with the educational use of mobile social media grew throughout the project we began to see several practitioners create their own social media ecology of resources to support their students and classes. Each of these ecologies was made up of a unique blend of social media and institutional tools that were suitable for each context. Based upon their experiences throughout the project, participants theoretically grounded their use of mobile social media from a variety of learning theories and frameworks, including: social constructivism, connectivism, rhizomatic learning, activity theory, e-tivities, situated learning, conversational learning, and socio-cultural theories. These theoretical perspectives provided a rich foundation from which to build the educational use of mobile social media within the various curriculum contexts, described within the case studies covered by the following chapters in this ebook.

There were different institutional and infrastructure barriers and enablers experienced within each institution, however working with the institutional IT support services to provide a robust wifi network for the project participants was a common theme. For example: there were many posts shared in the G+ Community with ideas and hints from the participants regarding ways of implementing wireless screen mirroring from mobile devices. While initially part of the project plan, the provision of MOAs: Mobile Airplay Screens (Cochrane et al., 2013a), for each institution exceeded the available project budget and practicalities of sup-

ply and transportation to each institution, hence each institution explored their own wireless screen-mirroring solution.

The use of a common social media hashtag (#npf14lmd) enabled a sense of connectivity and conversation between the six geographically disperse groups. Twitter and the Google Plus Community proved to be the key conversational connecting threads. Critical incidents in the use of social media to support the collaborative network included the development of the weekly webinar series, practitioner reports via Google Plus Hangouts, a virtual symposium with presentations linked via a collaborative Google Map, and collaborative presentations at several conferences throughout the project. Individual case studies and outcomes will be available at <http://mobilelearners.nz/>.

Future Directions

The #NPF14LMD project is now completed, but the impact of the collaborative network that has resulted is ongoing. In particular, many of the core #NPF14LMD participants have been invited to become members of the newly established Ascilite mobile learning Special Interest Group (Ascilite mobile learning SIG). The Ascilite mobile learning SIG aims to bring together interested researchers and practitioners across the Australasia region and globally, to deepen our understanding of the impact and potential of mobile augmented reality and mobile virtual reality in higher education (<https://ascilitemlsig.wordpress.com/about/>). Thus the Ascilite mobile learning SIG links a broader range of participants within a specific mobile learning research interest. The Ascilite mobile learning SIG applies and refines many of the elements of the support framework developed out of the #NPF14LMD project. The key difference with the Ascilite MLSIG is that there is no local face-to-face community of practice: as the participants are geographically dispersed the COP is sustained and nurtured virtually. Another key difference between the #NPF14LMD project and the Ascilite MLSIG is the specific focus upon research as an outcome of the Ascilite MLSIG. To this end Ascilite MLSIG participant eportfolios are based around creating and sharing an ORCID, the Open Researcher and Contributor Identity (<https://ascilitemlsig.wordpress.com/member-orcid-portfolios/>). The ecology of resources supporting the Ascilite mobile learning SIG include:

- A network community hub via a Google Plus Community linked to the official Ascilite website
- A social media hashtag #ascilitemlsig
- Twitter
- A portfolio of participant ORCIDs (<https://ascilitemlsig.wordpress.com/member-orcid-portfolios/>)
- A Wordpress site for SIG updates and archiving SIG outputs (<http://ascilitemlsig.wordpress.com>)
- Google Plus Hangouts for regular SIG member virtual meetings
- A series of open access invited guest Webinars broadcast live and archived on YouTube
- Google Docs for collaborative research articles

The collaborative network support framework is also being used to support the development of further mobile learning research projects based around exploring the impact of mobile AR and VR in the specific contexts of Paramedicine education, Journalism education, and New Media Design. This project aims to link the exploration of mobile VR within these three discipline contexts across two globally disperse universities (in New Zealand and in the United Kingdom), and thus the collaborative network supporting framework will also be applied to this context.

5 Conclusions

In this paper we have explored the impact of the use of mobile social media to facilitate and sustain the #NPF14LMD network over the two years of the collaborative project. The use of mobile social media to support the #NPF14LMD collaborative network enabled both active and passive participation as an opt-in form of facilitating sharing and collaboration throughout the two years of the project. Four of the six participating groups became regular contributors to the national collaborative network, while the other two groups lurked on the periphery of the network. A significant benefit of the use of social media to support the project network was the ability to create a global impact and awareness around the project and to link global experts

in mobile learning into the network. This allowed the core members of the project to broker the activities and outcomes of the project to a wider global network through conference publications and presentations and the option of following or participating in the project via the project social media hashtag. Another significant benefit was the development of participants' confidence in becoming mobile social media users and the development of professional and educational practices that they could then model to their own students, and explore integrating into the curriculum.

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