Merging MOOC and mLearning for Increased Learner Interactions

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ABSTRACT

In this paper, the authors suggest the merger of the Massively Open Online Course (MOOC) format and mobile learning (mLearning) based on mutual affordances of both contemporary learning/teaching formats to investigate learner interactions and dialogues in an open online course. The paper presents a case study of how MobiMOOC, a course created using the MOOC format, demonstrates the synergistic characteristics between the MOOC format and mLearning, making a combination of both fields ideal for contemporary, digital, collaborative learning, and knowledge construction based on learner interactions and dialogue. MobiMOOC was a six-week online course focusing on mLearning that ran in April and May 2011. An end-of-course survey provides insight that supports the synergies between MOOCs and mLearning: collaboration, informal and lifelong learning, and dialogue.

Keywords: Collaborative Learning, Massively Open Online Course (MOOC), Mobile Learning (mLearning), Mobile Massively Open Online Course (MobiMOOC), Open Educational Resources (OER)

INTRODUCTION

Since 2005, the rise of mobile devices, social media, and learning that is facilitated by new mobile and social technologies has grown exponentially. This rise of new educational forms (both from a pedagogical and a technical point of view) has resulted in a quest for new learning methodologies and frameworks. This paper reconciles a new learning format, the Massive Open Online Course (MOOC), with the contextualized nature of mobile learning (mLearning).

The world is changing rapidly. Bell (2011) points out one effect of this rapid change: "since the scope of the change exceeds personal and interpersonal learning activities to include larger scale organizational and societal change, additional theories are needed to explain change, to plan interventions and to develop policies" (pp. 100-101). The synergies between the MOOC format and mobile learning provide insight into new theories that help address the rapid rate of change in today's world.

The design of learning with and using mobile and wireless technologies, mLearning, is still exploratory as mentioned by Kukulska-Hulme and Traxler (2007). They proceed saying that if mobile technologies are used to support 'informal, personalized, situated mobile learning' then the learning designs are much more likely to be exciting, innovative and challenging" (p. 190). mLearning has not yet been tested in relation to MOOCs; however, these two emerging phenomena have some interesting similarities. As Downes states, networks in which people are engaged in dialogue can be small or vast, but the main characteristics for networks to support knowledge development will be that they are "diverse, open, autonomous and connected" and this fits the informal, personalized characteristics relating to mLearning (Downes, 2007). So, if mLearning is time and location independent and contextualized, then is it possible that the pedagogical format of a MOOC fits these specifics? In this paper the authors address that question in the link of mLearning and the MOOC format.

The following sections provide the background, the purpose of the research, the research methodology, a literature review, an overview of MobiMOOC, the results of the MobiMOOC survey, and finally provide recommendations for future research.

DEFINITION AND TERMS

Massive Open Online Course or MOOC

The term Massive Open Online Course or MOOC was first mentioned by two separate individuals: Bryan Alexander and Dave Cormier. The concepts behind and the actual realization of MOOCs were first introduced by Stephen Downes and George Siemens as they were building a course format, the so called Connectivism and Connective Knowledge (CCK) course, which first ran in 2008 (Downes, 2012, p. 10). A MOOC uses social media extensively to build the ad hoc learner community and to allow discussions and resulting learning to take place. Using a lot of social media increases the content that is created, which in turn demands the participants in a MOOC to be more experienced in self-regulated learning or pacing their own learning.

Mobile Learning

It is only in the last few years that the full capacity of mLearning has started to take shape and ubiquity has become a reality. This evolution in learning with mobile devices has resulted in different definitions of mLearning which evolved over time taking into account its most recent developments and understandings. mLearning is defined here as "learning across multiple contexts, through social and content interactions, using personal electronic devices" (Crompton, in press).

Mobile Devices

This research will look at the difference in learner interactions depending on the devices used to access an open, online course. For the purpose of this research, mobile devices are defined as those devices that are personal, portable and are connected to the internet on the go. As such mobile devices are all devices except fixed location computers (e.g., desktops) and/or laptops. Any other portable devices (tablets, smartphones, wifi-enabled portable devices such as iPods, wap-enabled cell-phones etc.) are seen as mobile devices.

PURPOSE OF THIS RESEARCH

The purpose of this research was to explore the similarities between MOOCs and mLearning and to investigate if these emerging educational innovations have a potential to be merged into a learning environment that optimizes learner dialogue fitting informal, contextual and life-long learning.

THEORETICAL FOUNDATION

A literature review was undertaken to get an idea of contemporary challenges with regard to mobile learning in the context of social learning based on collaboration and communication. This resulted in a set of challenges put forward by a number of mLearning and MOOC researchers that are related to informal, social and lifelong learning.

Clough (2009) focused on informal learning and based on her research she concluded that "future research into mobile learning needs to take account of the role of mobile technology in supporting collaborative and constructivist learning over a wider geographical and social context" (p. 131). Her focus on a wider geographical and social context can relate to the MOOC format as these types of courses have

attracted and will attract a global audience with a diverse professional and personal background (Fini, 2009).

Kukulska Hulme *et al*. (2009) stated that "research attention should be directed at identifying those simple things that technology does extremely and uniquely well" (p. 9) and they cited Roschelle (2003) adding that it is equally important "to understand the social practices by which those new affordances become powerful educational interventions" (p. 268). In addition, Kukulska-Hulme *et al*. mentioned that "moving the focus away from the mobile technology and towards the social practice it enables allows for a different conceptualization of mobile learning" (p. 9) and they concluded saying that researchers in mobile and ubiquitous learning will be keen to tackle the new challenges arising from learner activity across multiple virtual and physical contexts, spanning formal and informal learning. Looi *et al.* (2010) brought learner curiosity and social spaces together when he mentioned that "the challenge is to enable learners to learn whenever they are curious and seamlessly switch between different contexts, such as between formal and informal contexts and between individual and social learning, and by extending the social spaces in which learners interact with each other" (p. 1). Hence, it is interesting to look at an informal learning environment that allows different social learner interactions to take place. Frohberg *et al*. (2009) screened 1,469 publications (570 papers from mobile learning conferences and 887 papers from journals) and categorized 102 mobile projects that were happening up to 2007. They came to the conclusion that "although a significant number of [mobile] projects have ventured to incorporate the physical context into the learning experience, few projects include a socializing context" (p. 1) and they went on stating that "despite the fact that mobile phones initially started as a communication device, communication and collaboration play a surprisingly small role in Mobile Learning projects" (p. 1).

LITERATURE REVIEW: MERGING MLEARNING AND MOOCS

How mLearning Relates to MOOCs

Though MobiMOOC started out to simply deepen the understanding of mLearning, as the course preceded similarities between mLearning and MOOC characteristics arose.

There are a variety of mLearning definitions, but during MobiMOOC an adapted mLearning definition as described by O'Malley *et al.* (2003) was used. Participants took mLearning to be "any sort of [technology enhanced] learning that happens when the learner is not at a fixed, predetermined location, or learning that happens when the learner takes advantage of the learning opportunities offered by mobile technologies.

Özdamar Keskin and Metcalf (2011) point out that: "mLearning has attracted a great deal of attention from researchers in different disciplines who have realized the potential to apply mobile technologies to enhance learning" (p. 1). This focus on learning within mobile technology driven learning is only just emerging. Traxler (2009) remarks "early definitions of mobile learning were too technocentric and imprecise … they merely put mobile learning somewhere on e-learning's spectrum of portability" (p. 3) essentially selling mLearning short. Laurillard (2007) makes a strong point mentioning "the point of turning to new technologies is to find the pedagogies that promote higher quality learning of a more durable kind than traditional methods" (p. 158). The authors of this paper feel that the pedagogical format of a MOOC is a worthwhile pedagogical approach to combine with mLearning precisely because it explores new pedagogies which promote a higher quality of learning than traditional formats, especially in light of the affordances of these new mobile technologies (e.g., across location and time).

MOOCs allow learning to happen across space and time due to its mainly asynchronous and online architecture. This is very similar to the characteristics of mLearning. Due to the pervasiveness of the use of mobile devices in society, connecting to a community across space and time is becoming a fact:

"Mobile phones have created 'simultaneity of place;' a physical space and a virtual space of conversational interaction, and an extension of physical space, through the creation and juxtaposition of a mobile 'social space'" (Traxler, 2010 p. 2).

But the same can be said of social media, which drive MOOCs, and the rise of ubiquitous learning. Due to the use of social media by MOOC participants, learners in particular, can surpass time and space. The MOOC participants also become part of a community with its own identity and dynamics. According to Siemens, learning is now happening "through communities of practice, personal networks, and through completion of work-related tasks …" in an environment in which "know-how and know-what is being supplemented with know-where (the understanding of where to find knowledge needed)" (Siemens, 2005, p. 4). mLearning facilitates this know-where understanding of knowledge by connecting learners, information, and tools at a point and time of the learner's choosing. When looking at these characteristics mLearning and MOOCs fit well together, but there is more. Traxler (2010) mentioned that the "learners' experiences of knowing and learning … are changing with the experience of greater mobility and connectedness" (p. 13).

When describing mLearning, Winters (2007) also lists three interesting aspects: mLearning enables knowledge building by learners in different contexts, it enables learners to construct understandings, and the context of mobile learning is about more than time and space. Indeed the same can be said about learning through a MOOC. A MOOC surpasses time and space as all the resources are centralized in the cloud accessible for those who are willing (and technologically able), it fits the learners' context(s), and it enables knowledge construction. As Bell (2011) points out, "knowledge can be viewed as residing in networks

of humans and non-human appliances, whilst leaving space for human agency." However, as both emerging learning methods are based on technology and accessibility, they do have a similar challenge as well. Technology, social media, and Internet access (whether via mobile devices or computers in general) is still not a global reality. There is still a digital divide that keeps knowledgeable people from a weaker socioeconomic background to take part in this learning shift. This is an important challenge to tackle in the future.

In short, when looking at mLearning and MOOCs one cannot help but see similarities in its time and space autonomy, the community that is built, and the contextualization that takes place by the fact that everyone brings their experience to the center of the learning community. Connecting is now possible across time, space and contexts. mLearning and the MOOC format fit these new contemporary facts.

mLearning and MOOC: Setting up Communicative Dialogues

While looking at mLearning and MOOCs, it is clear that even though knowledge can be seen as residing in both humans and non-human appliances, it is what we do with that knowledge, and how we construct new knowledge, that is important. This is where a Vygotskian perspective is quite useful. According to Vygotsky (Nassaji & Swain, 2000), knowledge is social in nature and is constructed through a process of collaboration, interaction and communication among learners in social settings; this we saw happen in MobiMOOC time and time again. Through a process of collective scaffolding (Lantolf & Appel, 1994) participants assisted other participants in MobiMOOC to expand their understanding of mLearning, and in some cases also helped them implement personal mLearning projects. In many cases participants received constructive feedback on mLearning projects that they were either implementing or designing. This collective scaffolding enabled

participants to work within the zone of proximal development (ZPD) (Vygotsky, 1978), to expand their capabilities with the help of more knowledgeable peers. In order for this to happen, dialogue must take place.

Kop and Hill (2008) point out that "the rapid development of technology and exponential growth in the use of the Internet, along with the Web 2.0 and mobile developments, make new and different educational structures, organizations, and settings a possibility" (p. 9). But due to all these societal changes, the dynamics between people are becoming more complex. As knowledge societies are becoming more of a reality, that complexity reaches the field of learning and education as well. Garrison (2000) points out "the need to make sense of complexity is compounded in the context of distance education" (p. 13). He continued to write that: "this adaptability in designing the educational transaction based upon sustained communication and collaborative experiences reflects the essence of the postindustrial era of distance education" (p. 13). Communication, or dialogue, and living through experiences in a collaborative way are central to the idea of a MOOC. And although many voices raise the fact that with the rise of technology, complexity is growing too, there is one human factor that is now more than ever possible across borders, beliefs and time, that is, dialogue.

"Mobile technologies are redefining models of learning that often rest on a Socratic or dialogic base" (Traxler, 2010 p. 13). This adds to the idea of Sharples (2005) who said that learning is a conversation in context. This emphasis on dialogue and conversations is also mentioned by Kop and Hill (2008) who wrote that learning and knowledge "rest in diversity of opinions." He also emphasizes the strength of interdisciplinary knowledge by stressing that "the ability to see connections between fields, ideas and concepts is a core skill."

As a MOOC is a gathering of people with generally no prior connection, it has a unique social advantage that relates to a more open

and connected way of thinking. As such the authors underline the idea expressed by Freire and Macedo (1999): "I engage in dialogue because I recognize the social and not merely the individualistic character of knowing" (p. 48). This also coincides with what Downes (2007) wrote on that the learning "activities we undertake when we conduct practices in order to learn are more like growing or developing ourselves and our society in certain (connected) ways."

Dialogue is also at the center of constructing or gaining knowledge, for "dialogue is the primary mechanism for maintaining connections and developing knowledge through them" (Ravenscroft, 2011). Where a MOOC is an ideal place for dialogue to take place and as such for knowledge to be constructed or appear, the same is said to be true for mLearning as written by de Waard and Kiyan "with mobile devices the learning environment is enhanced and ability to share knowledge through online discussion is strengthened through social media. The sharing of experiences in a network facilitates the transformation of learning outcomes into permanent and valuable knowledge assets" (2010). Due to the fact that one of the core content spaces was a Google Group, which promoted discussions, dialogue was at the core of MobiMOOC. In the final survey it also became clear that although there was a wide diversity of backgrounds within the participators of the MobiMOOC (health professionals, K-12 teachers, corporate training managers, language teachers, etc.) 92.5% of them indicated that they learned from mLearning ideas from participants in other fields of expertise.

Learning is not a linear process; it is a continued iteration which links to prior knowledge, but that knowledge can then be modified after evaluating new information and analyzing it in respect to that previous knowledge. As such learning and knowledge are in a constant state of flux. This fluctuating state of knowledge is even more emphasized in informal learning, for the learner is taking his or her own interpretation and testing it on the ideas of the other participants of learners.

The fact that dialogue is a core aspect of both communication and learning results in the idea that the MOOC format could also benefit other communities due to its open and human nature of constructing new knowledge as well as its very human characteristic of connecting to peers. This idea is strengthened by the fact that 90% of the participants indicated that they believe a MOOC format is appropriate for their respective learning communities.

How mLearning and MOOCs Strengthen Lifelong and Informal Learning

As global citizens, we learn all of the time, but we are not always aware of our learning. Informal learning happens depending on the context we are in and the learning needs we consciously or unconsciously perceive. As we move through life, we transfer our insights and beliefs from one experience to another abiding by the flux of life and knowledge itself. In contemporary society we only value learning when it can be categorized with reference to frameworks of academic disciplines that we recognize as 'knowledge' or when it can be 'certified' (Coffield, 2000; Sutherland *et al.,* 2001). "Web-enabled learning is undertaken by individuals as independent, informal learners, often within social settings" (Bell, 2011, p. 100).

MobiMOOC (as well as other MOOCs) crystalized informal learning and made it possible to see that learning was happening in an informal setting. At the end, the participants acknowledged that they were able to use what was learned during the MOOC in their own formal setting. Hence knowledge was built in an informal way and transposed into the formal or professional realm. This is an interesting shift when compared to the more traditional education or training where knowledge is mostly formed in a formal way and stays there.

MobiMOOC was an informal course as there were no educational institutions linked to the course. The certification was also informal, as the certificate of participation was

given to the memorably active participants. As such MobiMOOC is an interesting method for informal learning taking place ad hoc or over time. This ability to fit informal learning is also recognized in mLearning. Mobile and wireless technologies seem very well suited to learning that has been variously described as informal, opportunistic, 'bite-sized' and spontaneous (Colley and Stead, 2003; Bull *et al.,* 2004, as cited in Kukulska–Hulme & Traxler, 2007) and also 'disruptive' (Sharples, 2005). Naismith *et al.* (2004) have demonstrated that mobile technology can relate to six different types of learning: behaviorist, constructivist, situated, collaborative, informal and lifelong learning and support or coordination of learning and resources. From these types of learning two can immediately be linked to the MobiMOOC dynamics: collaborative learning and informal and lifelong learning as previously mentioned in this article.

mLearning and MOOC: Connecting to People

We have seen that dialogue is at the core of the MobiMOOC, and that informal learning occurs. But these two dynamics cannot happen unless real connections occurred between real people, the participants of the MOOC. Connecting to people, networking amongst each other, is essential for learning to appear. A network is comprised of at least two nodes linked in order to share resources (Downes, 2007). As such all the participants in this MobiMOOC are nodes that are connected. A MOOC (and in particular this MobiMOOC) can be thought of as a "short-term" community of practice. All the participants are brought together to share community, domain knowledge, and practice for a short period of time. The community of practice lasts longer than the course itself, as activities continue (e.g., writing a paper) beyond the scope of the initial course. As a community of practice, there are different levels of participation and everyone shares tools related to practice in a common network. Downes (2007) stresses the importance of networking

and especially the way in which we are each part of multiple networks. Downes stated that "knowledge is distributed across a network of connections, and therefore that learning consists of the ability to construct and traverse those networks." As such, a successful, connected/networked pedagogy would "seek to describe the practices that lead to such networks, both in the individual and in society."

MOBIMOOC DESIGN

From 2 April to 14 May 2011 MobiMOOC, a six-week MOOC format course on mobile learning, was organized by Ingatia de Waard, who also remained present throughout the course. The course was free to anyone interested in the topic of mLearning, fitting it within the idea of Open Educational Resources (OER). After completion of the course the content was available via open source content resources. Although most resources offered by the facilitators and participants were openly accessible online, some of the academic resources, such as peer reviewed papers in academic journals, were behind paywalls.

MobiMOOC was offered over a course of six weeks with each week organized thematically and facilitated by leading mobile learning researchers and practitioners. The content of MobiMOOC included an introductory session to the MOOC, mLearning planning, mLearning for development (M4D), leading edge innovations in mLearning, interaction between mLearning and a mobile connected society and mLearning in K-12 environments. All the facilitators were *guides on the side*, each putting forward as many learning actions and follow-ups as they wanted, as each of these facilitators was voluntary engaged in this course.

The format of a MOOC is by definition open and online. In order to allow as many participants as possible to join the course, de Waard chose to use resources that were accessible via the Web. In addition to their accessibility, these web-based spaces were screened for their accessibility via mobile devices. This option was

taken to allow participants to immediately use mobile devices to access the course materials, and thus adding to their mobile experience. However, the course was not intended to be delivered solely via mobile devices, because if only mobile devices were used (1) this might have limited the accessibility for people with a preference not to access learning material or discussions via mobile devices; and (2) we wanted to enable participants without mobile devices, but who would be interested in exploring mLearning, to actively participate in the course.

All participants (including the facilitators) were free to receive new information and construct new knowledge that fit their own personal mLearning needs. As such, participants were in charge of their own learning. The participants were able to get information that was relevant to them by asking the entire group for their insights.

The course organizer suggested three categories for learner participation, hoping to convey the importance of self-regulated learning to the participants. The three types were:

1. Lurking participants participated in a variety of ways: just follow the course, look at the recordings, and browse the available course resources. The benefit to the lurking participant was to get some idea of what is going on in the field of mLearning.
2. Moderately active participants took one or two topics and engaged in the conversation with everyone involved. The benefit for the moderately active participants was that they developed more in-depth knowledge in that area of mLearning and were able to exchange notes and expertise, getting answers to questions the participants may have had.
3. Memorably active participants participated in at least five of the six topics. They developed an mLearning proposal in their area and received peer and expert help. Although a template for the individual project was provided, it was clearly communicated that the writing of the proposal

would be done by each of the participants. Memorably active participants received a certificate of participation.

The use of social media is central to a MOOC and is also increasingly available with mobile devices. As such, the participants in the course used a variety of web-based tools. The initiator of the course choose to centralize the course around two major web-based spaces: a MobiMOOC Google Group (http://groups.google.com/group/mobimooc/) and a MobiMOOC wikispace (http://mobimooc.wikispaces.com). Both were also marked with a RSS link to allow people keep informed on the latest developments. The Google Group was set-up to centralize discussions, while the course wiki was set-up to function as an online syllabus. Other social media spaces, such as YouTube, Twitter, Facebook, and Delicious, were used throughout the course for sharing specific content. In addition to the official MobiMOOC web-spaces, some of the participants added other spaces during the course. Examples of these are the MobiMOOC Crowdmap, the MobiMOOC LinkedIn group, the MobiMOOC Posterous blog, and the Zotero MobiMOOC group. The end result was a course with a variety of participants and levels of participation.

RESEARCH METHODOLOGY

This is a case study based on the design and implementation of MobiMOOC, a six-week MOOC on the topic of mobile learning. Data collection included the design of the MobiMOOC course itself, statistics and content from the social media tools (Google Groups, Twitter, Delicious, Crowdmap) and results from an online survey provided at the end of the course (40 respondents). The online survey comprised a series of 12 questions designed to determine general demographic information, familiarity and use of mobile technology and social media, participant satisfaction with the course, preconceived notion of what type of

learner participants would be in the course, and actual level of participation. The online survey was offered voluntarily to all the MobiMOOC participants.

The online survey was set up with formsite. com software, which offers mobile friendly surveys. The survey results and the date collected across the different online web spaces was analyzed to validate the hypothesis that mLearning and the MOOC format share mutually beneficial characteristics that increase dialogue and learner interactions for lifelong and informal learning purposes. These characteristics work well in the new knowledge society where informal lifelong learning is a valuable asset for knowledge workers. The authors are both participants as well as researchers from the MobiMOOC.

In accordance with the vision of a MOOC in which you construct knowledge collaboratively, this paper was written jointly with the MobiMOOC participants that volunteered.

DATA RESULTS AND DISCUSSION

General Data

By 14 May 2011, the end of the course saw the following general statistics:

• 556 participants joined the Google Group, of which 13.3% (n=74) were active members, with active membership being defined as those who posted at least one message in addition to their introduction;
• 1827 discussion threads were started;
• 1123 tweets were sent with the #mobimooc hash tag;
• 335 mLearning related links were shared on the social bookmarking site Delicious.

Online Survey Data Analysis

There were 556 participants that registered for the MobiMOOC course, of which 74 performed an action other than posting a welcome message (13%). From all 74 slightly active to memorably active participants, 32 participants completed the course as memorably active participants. 40 of the participants completed the end of course survey. Although a MOOC is a fairly new educational format and mLearning is still mainly seen as a technology rich field, Mobi-MOOC participants showed diversity in both age (21-30=15%, 31-40=22.5%, 41-50=25%, 51-60=27.5%, 61-70=10%) and gender (male=57.5%, female=42.5%) which could indicate that the format attracts people from across the traditional dichotomies (Figure 1).

This is an important result as this underlines the option of a mobile MOOC to be a possible format for lifelong learning, as it fits learners from all (adult) ages. The fact that both sexes are represented above the critical threshold of

Figure 1. Participants per age and gender group
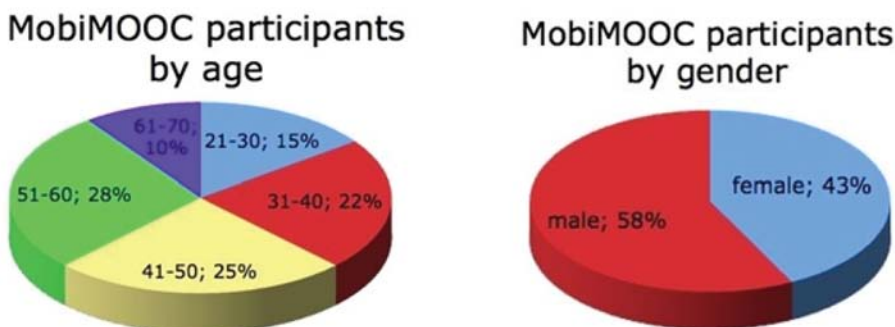
30%, also supports the lifelong learning capacity mobile supported MOOCs.

One remarkable result was that 65% of the active participants reported that they did indeed work on a personal project. Additionally, 82.5% of active participants indicated that they did indeed make use of what they learned in MobiMOOC in their own local settings, pointing to the fact that knowledge acquired during MobiMOOC was directly applicable and beneficial to the advancement of participant's learning in the mLearning field. This fits the literature that indicates that both MOOCs and mLearning are solid formats to support informal learning (Coffield, 2009; Sutherland *et al.,* 2001; Kukulska-Hulme & Traxler, 2007).

Although the participants were not required to access materials via mobile devices, 77.5% of them chose to. Participants indicated the reasons they preferred to use their mobile devices to access the course materials. The predominant factor was the location independence afforded by mobile devices (61.3%). Participants did not need to be tied to a desk in order to participate, rather they could participate wherever they we located. Closely tied to the location independence is the temporal independence (56.8%). Participants could access materials at a time and place that was convenient for them. In addition, participants used mobile technologies to access the course because they could (29.5%): it was an option and participants choice to use it. This ability and willingness to access an open, online course via mobile devices is only made possible because both mobile technology and MOOCs share the characteristic of being context, time and location independent (Downes, 2007; Traxler, 2010).

In MobiMOOC new ideas were shared with other MobiMOOC participants, but with course outsiders. The new information and ideas were taken out of the course and tested in other learning networks including with face-to-face colleagues (67.5%), with virtual (online) colleagues (77.5%), with friends (50%), with family (35%), and with classmates (25%). Networking did also occur and new connections were formed during the MobiMOOC course, as 42.5% of the participants taking the final survey indicated that they connected to other participants in order to collaborate on projects after MobiMOOC. This coincides with literature indicating the benefits of MOOCs and learning devices to grow or maintain a network (de Waard & Kiyan, 2010; Downes, 2007; Siemens, 2005).

There were, however, restrictions to using a mobile device, the chief reason centering on mobile device usability and user interface. The major reasons were the screen size of mobile devices (72.5%), the lack of a physical keyboard (65%), and the perceived device functionality (57.5%); a device, for example, may lend itself much more to read-only functionality than read-write functionality. Other factors that were important to participants when deciding when to use a mobile device were the cost of mobile data plans (25%), their speed when compared to traditional Internet connections (32.5%), and, as is usually the case, habit (30%). These restrictions put boundaries on the mobile use of the learners, especially on the aforementioned anytime/anywhere options. Because although mobile devices and MOOCs do allow anytime and anywhere access, the fact that mobile devices have limitations to content interpretation and content creation, the ubiquity of mobile learning and the immediacy of learner interactions is affected by the limitations of the current mobile technology.

EVALUATION AND FUTURE RESEARCH

This research was the first in its kind, and as such can be seen as a pilot project for more extensive, optimized future research. Issues emerged as the research unfolded and many lessons were learned to guide future research in this area. In hindsight there were many unforeseen circumstances that affected the data collection to be optimal for the intended research. The drop-out rate was very high: only 74 active participants of 556 people that registered for the course (Koutropoulos *et al.,* 2012). Although this is consistent with other MOOCs, it is a setback for

any organized research. As a result the conclusions of this research should be tested with a vaster learner population. Researching informal learning has many challenges as well, as one cannot for instance use formal assignments to indicate whether actual learning is taking place. However, if a multiplicator effect does take place (e.g., learners use what they have seen to set up their own mLearning projects), one can imagine informal learning took place. For this reason one might consider a follow-up research to investigate if any of the participants have been (re)using their newly found course knowledge to set up other projects or initiatives. The interactions taking place in a MOOC, specifically when looking for mobile device driven content additions or content access, provide challenging tasks. As learning analytics are a growing field of interest, so it learning analytics of open, online courses. It is difficult to keep track of mobile versus non-mobile learner interactions in an open, online course. New software tools (e.g., Google Analytics) might offer solutions to tackle this research dilemma. The gender and age diversity does indicate that the MOOC format appeals to people across the traditional (and possibly flawed) dichotomies of gender and age, or that the people participating in MOOCs are well into their professional careers, perhaps indicating a general level of "seriousness" about the goals at hand. Further research is needed to see whether MOOCs or informal learning are attracting a specific learner profile that is not linked to age, gender or cultural background, but rather to factors in intrinsic and extrinsic motivations. In addition, two important categories were not mentioned in the final survey: race and social-economic status. It would be very revealing to see the ethnic breakdown as well as the socio-economic breakdown of participants in a MOOC. MOOCs have a high enrollment of participants at the start, but they also have a high percentage of non-active participants, and a high dropout rate. Some of the non-active participants can be lurkers, who still find that following the course from the sidelines adds to their knowledge. The

reasons behind this dropout or non-participation need further research. The retention rate after a MobiMOOC is of interest, as after this course closed, the network between the participants remained active indicating that the efficacy the participants feel towards the MobiMOOC community has more strength than previously anticipated. As mLearning is more present then computer based learning in many developing regions, it would be worthwhile to explore the MOOC format in combination with mLearning in developing regions to overcome the lack of trainers in these regions. More representation from developing nations that are facilitating innovations in mLearning would add depth to the dialogue. Finally, MOOCs are still evolving, each with its own format and underlying design priorities. Investigation into which design principles encourage dialogue, encourage retention, and lead to MOOC success would be beneficial.

CONCLUSION

With this paper the authors wanted to move away from the focus on technology, the main focus of mLearning in the past, and research its specific learning potential especially when combined with the format of a MOOC. mLearning and the MOOC format have a great potential for informal and lifelong learning. Both learning forms allow for knowledge creation to happen over time without being tied to a particular space and contexts. The growing importance of collaborative learning is supported by mLearning and its practical implementation the MOOC by all of their ability and focus on communication, more specifically dialogue, to construct knowledge and create collaborative networks. This new knowledge age demands new formats and frameworks to be drawn up, like McLuhan stated, "it is the framework which changes with each new technology and not just the picture within the frame" (McLuhan & Zingrone, 1997, p. 273). When looking at the shift in learning which is happening as a result of the rise in social media, ubiquitous cloud computing and new technologies, a MOOC complements all

these changes and mLearning offers the devices and characteristics to realize such changes.

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