MOBILE LEARNING FOR HIGHER AND CONTINUING EDUCATION

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Abstract:

A fundamental revolution in higher education is being sparked by the ubiquity of mobile devices used by students, faculty, and administrators. The opportunity is ripe for institutions, instructors, and instructional designers to take advantage of mobile technology to enhance the learning experience. To do this, we need to understand the power on tap, examine fundamental principles, review illustrative examples, and ultimately think through ways to improve the learner experience (Quinn, 2011). In spring 2009, HBS executive education launched a pilot program using iPod Touch mobile devices and a custom application called the "Mobile Nexus" to be used on campus during a six-week executive education program at Harvard Business School. For the first time, participants had real-time access to relevant, time-sensitive information and content from any location within the HBS wireless network (Gorman and others, 2010). Therefore, this paper will focus on methods of mobile learning, the application of mobile learning in higher education and how adult learners will benefit from m learning.

Keywords: mobile learning, higher education, continuing education

1. Introduction

Mobile learning refers to the use of mobile or wireless devices for the purpose of learning while on the move (Park, 2011). Typical examples of the devices used for mobile learning include cell phones, smartphones, palmtops, and handheld computers;

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tablet PCs, laptops, and personal media players can also fall within this scope (Kukulska-Hulme & Traxler, 2005). The first generation of truly portable information has been integrated with many functions in small, portable electronic devices (Peters, 2007). Recent innovations in program applications and social software using Web 2.0 technologies (e.g., blogs, wikis, Twitter, YouTube) or social networking sites (such as Facebook and MySpace) have made mobile devices more dynamic and pervasive and also promise more educational potential (Park, 2011).

M learning is described in numerous ways, but these descriptions all consider the nexus between working with mobile devices and the occurrence of learning: the process of learning mediated by a mobile device. Numerous characteristics of m-learning have been identified in the literature. Koole's (2009) FRAME model sits well with socio-cultural views of learning, taking into consideration both technical characteristics of mobile devices as well as social and personal learning processes. She refers especially to enhanced collaboration, access to information and deeper contextualisation of learning (Kearney et al, 2012).

However, it has been widely recognized that mobile learning is not just about the use of portable devices but also about learning across contexts (Walker, 2006). Winter (2006) reconceptualized the nature of mobile learning and addressed "*mediated learning through mobile technology*" (p. 9). Pea and Maldonado (2006) used the term *wireless interactive learning devices* or WILD, an acronym created at SRI International's Center for Technology in Learning, to define technology that made it possible for learners to work at unique activities in ways that were previously impossible (Park, 2011).

Peters (2007) viewed mobile learning as a useful component of the flexible learning model. In 2003, Brown summarized several definitions and terms and identified mobile learning as "*an extension of e-learning*" (Brown, 2005, p. 299). Peters (2007) also stated that it was a subset of e-learning, a step toward making the educational process "*just in time, just enough and just for me*" (Peters, 2007, p. 15). Finally, Pea and Maldonado (2006) stated that mobile learning incorporates "*transformative innovations for learning futures*" (p. 437) (Park, 2011). Mobile learning occurs in authentic contexts. Problems, challenges, investigations, and explorations that mobile learners engage with are situated in real world contexts that have personal meaning and relevance, allowing deeper understandings to be achieved. The contexts may be commercial, educational or purely lifestyle, and will often involve characteristics of collaboration, reflection, and articulation (Herrington et al, 2009).

2. Related studies

Thomas D. Cochrane (2010)

This paper is a comparative account and analysis of three mobile Web 2.0 projects instigated within a tertiary learning environment during 2008. Following the successful instigation of a mobile Web 2.0 project in the third year of a Bachelor of Product Design course during semester one, similar projects were initiated in semester two within the first-year and second-year Bachelor of Product Design courses. A common methodology for supporting and facilitating mobile Web 2.0 projects was used for all three projects. The projects were designed to explore the potential of mobile Web 2.0 tools to enhance both the formal and informal teaching and learning environments with a focus upon mobile blogging (moblogging). A comparison of student and teaching staff feedback from each of the three projects provided a basis for identifying and illustrating critical success factors within similar m-learning scenarios. Critical success factors identified include: the importance of the pedagogical integration of the technology into the course assessment, lecturer modelling of the pedagogical use of the tools, the need for regular formative feedback from lecturers to students, and the appropriate choice of mobile devices and software to support the pedagogical model underlying the course.

Kosalka & Kuswani (2010)

Worldwide growth in use of mobile phones has fostered the emergence of mobile learning. Mobile technologies are used both in classrooms to support instruction safe and as tools that significantly change instructional activities, learner roles, and learning location (disruptive). Learners become less consumers of information and more collaborators, researchers, and publishers on the go. Scholarship in m-learning is scarce and lacks rigor, even with increasing numbers of investigative studies there are still significant gaps in the literature. Little is understood about when m-technology is most useful and what constitutes good m-learning. A review of a broad range of investigative cases is presented and critiqued with suggestions for further research. Although both classroom-based and distance education topics are discussed, the distance education scholar and practitioner may benefit from learning more about these emerging technologies being used in face to face instruction.

Abuasson et al (2010)

This paper reflects on the role of mobile learning in teachers' professional learning. It argues that effective professional learning requires reflection and collaboration and that mobile learning is ideally suited to allow reflection-in-action and to capture the spontaneity of learning moments. The paper also argues for the value of collaborations between teachers and students in professional learning. It suggests that authentic

artefacts and anecdotes, captured through mobile technologies, can enable the sharing, analysis and synthesis of classroom experiences by teachers and students. Such analysis and synthesis helps to encourage collaborative reflective practice and is likely to improve teacher and student learning as a result. Ethical issues that might arise through using mobile technologies in this way are also discussed. Teacher voice is presented to indicate the range of views about mobile learning and to indicate current practices. Practical, school systemic, attitudinal and ethical factors may inhibit mobile technology adoption; these factors need to be researched and addressed to realise the potential of teacher mobile professional learning.

Traxler (2016)

Learning with mobiles in UK universities is not new and is not novel. It is, in fact, at least 10 years old, well-documented and comparable to activity in universities elsewhere in Western Europe, America and Asia Pacific. Continued and dramatic changes in the ownership, access and expectations of mobiles amongst university students and equally across UK society have suddenly propelled learning with mobiles to centre-stage as a feasible proposition but, it is now argued, only if students can bring-your-own-device. This has already catalysed discussion about authority, agency and control within university settings but the equally significant and profound implications for the inclusion agenda have not been articulated. This paper begins that process. A theoretical framework for social inclusion in this context is considered, identified and discussed. The paper reviews the progress and problems of the substantial and unique programme of mobile learning across UK higher education since 2000 in relation to its stance on inclusion, where this is apparent. These are all well-documented in academic and official sources; the paper does however also draw on the author's involvement in many of the events and initiatives. The paper raises however significant questions about this programme's meaning and direction in a world where now there is more, better, cheaper, faster, newer but different digital technology in the hands of students, potential students and everyone else than there is routinely in the educational institutions themselves. This digital technology, mobile technology, now allows learners to create, own, transform, discuss, discard, share, store and broadcast ideas, opinions, images and information, and to create and transform identities and communities. The paper argues that this *epistemological revolution* may mean that universities and colleges are no longer credible and authoritative gatekeepers to knowledge and its technologies and so the meaning and relevance of *inclusion* are much less clear. The paper proposes a new stance on inclusion.

Ma Qing (2017)

Emerging mobile technologies can be considered a new form of social and cultural artefact that mediates people's language learning. This multi-case study investigates

how mobile technologies mediate a group of Hong Kong university students' L2 learning, which serves as a lens with which to capture the personalised, unique, contextual and ubiquitous nature of mobile language learning. The results suggest that Hong Kong university students make use of varied e-resources and tools for learning their L2; they also tend to combine L2 learning with subject learning, communication, entertainment and personal interests, and reveal distinctive features and attributes that form their personalised learning approaches. Based on these, a new socio-cultural framework is constructed to capture the key components involved in mobile technologies-mediated L2 learning and to describe the dynamism and interaction among the components, involving L2 agency, personalisation, tools, knowledge, communications and entertainment. In addition, L2 agency plays an important role in determining how learners employ mobile technologies in mediating and personalising their language learning. Factors that influence personalised mobile language learning are also unveiled. Finally, a number of implications are derived from the research findings to inform further research or practice with regard to mobile language learning.

Park, 2011 argued that mobile devices are becoming increasingly ubiquitous, many researchers and practitioners have incorporated the technology into their teaching and learning environments. As Keegan, 2002, anticipated, mobile learning is a harbinger of the future of learning`. The applications of mobile learning range widely, from K–12 to higher education and corporate learning settings, from formal and informal learning to classroom learning, distance learning, and field study. Despite the many forms of and increasing services offered by mobile learning, it is still immature in terms of its technological limitations and pedagogical considerations. And although some researchers offer a framework for theorizing about mobile learning with conversation theory and activity theory, instructional designers and teachers need a solid theoretical foundation for mobile learning in the context of distance education and more guidance about how to utilize emerging mobile technologies and integrate them into their teaching more effectively (Alsaadat, 2017).

According to Sharples et al, 2005, Mobile learning appears to be ideally suited to teachers as it provides a process of learning for professionals who differ from others in the contexts and ways in which they work and learn. Teachers do not spend large amounts of time at a desk, tending to be largely itinerant in their daily work. Collaborative learning has to take place on the move, in snatched moments, and requires the rapid exchange of anecdotes and stories with a wide, diverse community. The value of harnessing the power of mobile technologies lies in their capacity to generate collaborative professional learning involving reflection, production, synthesis and analysis. Mobile learning enables interactions with people both beyond and within

one's own school; provides access to expertise over a range of areas readily available in an online learning environment; and builds personal and professional support networks. It capitalises on the ubiquitous nature of mobile technologies and their ease of use in a variety of locations (in Aubusson et al, 2009).

In the coming decade the technology of mobiles will continue the trend of becoming more popular, personal, robust, cheap and social. The technology has already become democratic, or rather has become more demotic, in nature and society itself has become mobile and connected. It has become increasingly difficult to imagine everyday life before or without mobile technology as its functionality and capability have increased, as a generation of young people have matured and as network take up, competition and coverage have increased to near saturation. This is leading to a new world, with new communities, expectations and behavior (Traxler, 2016).

3. Mobile learning in higher and continuing education

The term "nomadic" has been used to describe the current college students' culture of wireless and mobile connectedness in the sense that they are not "rooted" but incredibility flexible and fluid when it comes to their social connections and their virtual life culture (Reyard, 20080). She said *this refers not only to their uses of social networking tools but also to the reality that they are connected wirelessly in any situation and for any reason. They are essentially nomads when it comes to their life "space""* (Reynard, 2008). Mobile technologies such as mobile phones, smart phones, personal digital assistants and mp3 players support learners on the move, whereas technologies such as laptops, digital cameras, desktop computers do not. Commuters engage in mobile learning as they travel to and from work accessing different information and engaging in different tasks, returning to these tasks at different times throughout the day (Herrington et al, 2009).Reynard discussed the issue of nomadic she said Bryan Alexander, in his article, Going Nomadic: Mobile Learning in Higher Education (2004) says, "*More broadly, mobile and wireless computing has altered the rhythms of social time and has changed uses of social space.*" (p.28) within higher education, instructors are beginning to realize the impact of this both positively and negatively in creating communities of learners within their courses. Students bring to the course an extensive network of information input, peer connections, and the potential of a wider scope of application than what has been the case until now. The negative side of things is the challenge of "managing" not only the multitasking of the students but their insistence upon continual connectivity even when participating in a physical learning space with an instructor and other physical peers around them. Some instructors have seen this as something to be controlled through disabling access for the duration of the class while

others are trying to integrate this reality into the learning environments (Alexander, 2004).

Whether you choose as a professor to exclude the connectivity from your classroom or to include it, there exits the potential of creating learning communities with broader impact than ever before possible and this can bring wonderful enhancement to any course of study or academic field (Reynard, 2008) Jamati argued that it is a fact that the success of distance education depends largely on student support services provided to its learners who encounter feeling of isolation, lack of peer-peer interaction, lack of proper intimation from study centre, lack of proper academic support and hurdle of distance from the study centre to list a few (Fozdar, Kumar and Kannan 2006). The mobile devices are understood to be helpful in providing a good support to the learners to the extent of removing the feeling of isolation and lowering the rate of attrition (Simpson 2003). The text messaging (SMS) has been found to have particular and peculiar effects for counselling which has implications for the educators (Haxell 2008). Research from the OU, the University of Pretoria and the Leonardo project indicates some of the ways in which text messaging can best be used for student support in the context of Open and Distance Learning. In their research, Gaskell and Mills (2004) indicate that telephones have a major role to play in student support and are indeed the best medium to choose for student contact on many occasions. The increasing ubiquity of the mobile phone begs for it to be used as a learning tool. Hendrikz (2006) has reported the use of mobile phones both for academic and administrative purposes. Some of the researchers from the third world countries consider mobile learning as the state of the art future educational solution for all despite a limitation of access to educational facilities and infrastructure (Abdullah and Siraj 2009) (Jamatia et al, 2011). Whether you choose as a professor to exclude the connectivity from your classroom or to include it there exits the potential of creating learning communities with broader impact than ever before possible and this can bring wonderful enhancement to any course of study or academic field (Reynard, 2008). Mobile learning can be spontaneous, unanticipated and opportunistic. Being in the right place at the right time to capture significant events provides invaluable knowledge for individuals as well as communities, witnessed by the current reliance of news services on opportunistic recordings made by mobile learners and their technologies. (Herrington et al, 2009). Jamatia et al said about using m learning in the medical field.

In the context of medical education and health services, the requirement for mobile devices to deal with medical information overload and knowledge navigation has been stressed by Ducut and Fontelo (2008). According to them, the particular requirement has arisen due to recent developments of elucidating the pathophysiology of diseases down to the molecular levels; earlier most diseases were treated on the basis

of symptoms and empirical data. Based on literature study Kho et al (2006) reported that around 60% to 70% of the medical students and residents use mobile devices (PDAs) for educational purposes and patient care. Rege and Keane (2009) have provided details as to how leading US medical schools have adopted mobile technology as an educational tool for enhancing the education of students. According to them, mobile devices support existing learning tools besides enhancing course management, could influence accreditation (by providing well- rounded learning experiences) and is a cost-effective solution for medical schools. Kenny et al (2009) have provided details regarding the increasing use of PDAs in the domain of Nursing Education (Jamatia et al, 2011).

Mobile learning can occur wherever people find a need. Traditionally learning is seen to occur in formal settings like classrooms and lecture theatres whereas informal and continuing learning occurs as we wait for a bus, converse with a colleague over lunch, or engage in work experience. In some circumstances, it is better to choose one technology over another. A digital camera for instance may provide higher resolution images than those taken with a mobile phone. However, being ubiquitous and portable, there is a greater chance that the mobile phone will enable the user to capture spontaneous events (Herrington et al, 2009).

In their study, Kamela and Gammon explained that Elon University runs two courses that incorporate science outreach components in the form of a mobile science center. One course visits with an elementary school next to campus and the other is a travel course to middle schools in Kerala, India. In both cases, interactive science demonstrations are built on campus, set up museum-style in gymnasia, and monitored by university students who interact with the children. Elon students predominantly from non-science disciplines take part in the two courses. They discuss as science pedagogy the mobile science center, which relies on the service-learning model of engaging students in socially meaningful contexts. They also discuss the usefulness to the schools of having university students interact with schoolchildren in the context of science. Our experience suggests that promoting science engagement can be expanded beyond the domain of professional scientists and educators. The cause of science education can bring together individuals of diverse interests and serve to bridge cultural divides (Kamela and Gammon).

4. Technology application

While it is apparent that many higher education students have a greater familiarity with technology than their predecessors it is also clear that some do not. Providing time for students to explore the technological features and educational affordances of devices

can be done in a variety of ways. Sharing knowledge, peer tutoring and engaging in introductory authentic tasks appear to be useful approaches to developing in students the important understandings of how and when to use the available tools on offer Mobile learning can be enabled by technological tools and infrastructure. Mobile technologies are portable, personalised, and increasingly convergent. People always have them on hand and populate them with personal profiles and playlists, performing a multiplicity of functions. Wireless and telephone networks provide the infrastructure for mobile learners to access and remain networked and connected. There are learning tasks that benefit from a blending of mobile and non-mobile devices. The capacity to sync information and download media adds to the versatility of these devices (Herrington et al, 2009).

Park argued that Mobile learning has unique technological attributes which provide positive pedagogical affordances. Pea and Maldonado (2006) summarized seven features of handheld device use within schools and beyond: "*portability, small screen size, computing power (immediate starting-up), diverse communication networks, a broad range of applications, data synchronization across computers, and stylus input device*" (p. 428). As Klopfer and Squire (2008) summarized, "*portability, social interactivity, context, and individuality*" (p. 95) are frequently cited affordances of mobile learning. Specifically, *portability* is the most distinctive feature which distinguishes handheld devices from other emerging technologies, and this factor makes other technological attributes such as individuality and interactivity possible.

Park continued that above all, this mobility enables ubiquitous learning in formal and informal settings by decreasing "*the dependence on fixed locations for work and study, and consequently change the way we work and learn*" (Peters, 2007). Gay, Rieger, and Bennington (2002) developed the "*mobility hierarchy*," including four levels of objectives that encourage the use of mobile computers in education settings. This hierarchy presents the contrasting attributes of mobile devices (see Figure 2). The focus of "*productivity*" (level 1) is content-intensive, whereas the focus of collaboration and communication (level 4) is communication-intensive. Level 1 aims at individual learning, and level 4 aims at collaborative learning by multiple users. Levels 2 and 3 fall into the "*middle-range applications, such as personal tour guides, computer-aided instruction, database activity, mobile libraries, and electronic mail*" (pp. 512–513).

He concluded that as this hierarchy indicates, mobile technology has two comparable attributes. Scheduling and calendar applications are useful to increase an individual's organizational skills and self-regulative (or self-directed) learning ability; whereas, real-time chat and data sharing applications support communication, collaboration, and knowledge construction. This shows that students can consume and create information both "*collectively and individually*" (Koole, 2009, p. 26). (Park, 2011).

5. Conclusion

Reynard believed that Most of us as higher education faculty were taught to think in a linear flow and were taught thoroughly how to progress logically from one stage of the flow to the next. In fact, much of our expertise was established when we had an exhaustive knowledge of what that flow entailed and how exactly it was organized. She said that many of us were educated before the personal computer or individual access to the Internet and truly thinks and organizes information accordingly even to this day. The Internet brought with it the concept of the "web" and developed a generation of thinkers who organize information within a webbed environment. She continued that In incorporating this flow, faculty have increased the use of problem solving approaches that provide opportunity for students to "web out" as they explore options towards solutions. Increasingly, however, and beyond webbing comes the concept of mobile, multi-connections with little possibility to find a start and most often to always leave the solution open-ended for other contributions. For the purposes of this discussion, Reynard referred to these as "*multipoint mobile connections--MMCs*". The first wave of this came with blogs and wikis to which various authors could contribute and now we have twitter and live-feed connections which are on-going and multi-purposed (Reynard,2008).

In educational activities, it is common for educators and learners to engage in processes such as recording, representation, sharing and reflection to support knowledge construction and co-construction. Mobile learning provides many opportunities where these processes can be mediated using mobile technologies. As well as being motivating for students the use of mobile technologies blended with web based technologies can provide resources that aid knowledge construction that are reusable, sustainable and scalable to a wide group of students (Herrington et al, 2009). The predominant use of mobile learning has involved people consuming knowledge by way of podcasts, e books and accessing web sites. However, the active construction and co-construction of content through media capture and subsequent content creation will increase as students, teachers adopt less transmissive, and more constructivist approaches to teaching and learning. The proliferation of educational web 2.0 applications such as wikis and blogs that rely on the construction of content to be shared with others is an expanding area that exemplifies this trend (Herrington et al, 2009).

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