European Journal of Open Education and E-learning Studies
ISSN: 2501-9120
ISSN-L: 2501-9120
Available on-line at: www.oapub.org/edu

doi: 10.5281/zenodo.582353 Volume 2 | Issue 1 | 2017

THE IMPORTANCE OF M LEARNING IN THE EDUCATIONAL ARENA

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Abstract:
There are one and a half billion cell phones in operation around the world, and a large percentage of them are in the hands of students. Yet these phones are barred in most classrooms because they interrupt lessons and can enable cheating. Marc Prensky encourages educators to reconsider their view of mobile technology - and to imagine a pedagogy that embraces its potential. Essentially small computers, cell phones can support language lessons, display animations of medical and chemical processes, be used for polling and testing, serve as the gateway to larger learning resources - and so much more. Prensky explores the possibilities and presents his vision of the new classroom, one in which mobile phones are a key learning tools (Prensky, 2003). Therefore, this paper examines the importance of m-learning and its effect and significance in today's educational settings at different levels. And that will discuss the following issues: defining m learning, m learning technology, m learning methods, m learning usefulness.

Keywords: m learning, technology, methods

1. Introduction

1.1 The concept of mobile learning

Richter, Brown and Delport discussed said that Landline telephones and wired computers are beginning to be replaced by wireless technologies. Desmond Keegan emphasized in his keynote address at the World Conference on Mobile Learning 2005 in

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Cape Town that "*The future is wireless. Never in the history of the use of technology in education has there been a technology that was as available to citizens as mobile telephony. The statistics are stunning: Ericsson and Nokia tell us there are 1.5 billion of them in the world today for a world population of just over 6 billion. Nokia forecasts further sales of 700 million in 2005. In China alone there are 358 million mobile subscriptions and these are reported to grow by 160.000 a day*" (p. 3). Seventy-seven percent of the world's population is within reach of a mobile phone network (Kukulska-Hulme & Traxler, 2005).

Richter, Brown and Delport argued that Educators started experimenting with wireless and mobile technologies from the turn of the millennium and the concept of mobile learning began to emerge. There is currently globally a rapid rate of development and application of wireless and mobile technologies in contemporary learning environments and learning paradigms. Apart from mobile phones, other wireless and mobile computational devices such as laptops, palmtops, PDAs (Personal Digital Assistants) and tablets also rapidly entered the market – some devices, of course, have exhibited more success than others for particular markets. Kukulska-Hulme & Traxler (2005) provide a dozen detailed case studies that report on the experiences of pioneer educators who have experimented with mobile technologies in universities and colleges and in commercial training. They explore user experience with mobile devices, accessibility, pedagogical and institutional change, and current technology. With regard to the potential of mobile learning in developing countries,

Brown (2004) argues that Africa is leapfrogging from an unwired, (almost) non-existent e-learning infrastructure, to a wireless e-learning infrastructure. There are already many mobile learning activities and projects in Africa – from the use of PDAs in assessment strategies (e.g. the clinical assessment of medical students) and PDAs in wireless learning environments (e.g. engineering students for collaboration and coursework) to the use of the most basic mobile texting functionality (SMS) for learning support (Brown, 2006). Given the lack of technical infrastructure for e-learning in developing countries, there is a huge demand for mobile learning. Brown reports on a pilot project in a teacher training programme that was launched already in 2002 with 1,725 students of the University of Pretoria in South Africa (Brown, 2004). The profile of these students was as follows:

- 100 % full-time employees (teaching),
- 83,8 % between the ages of 31 and 50,
- 66,4 % female,
- 97,3 % non-white,
- 0,4 % with access to e-mail, and
- 99,4 % with a mobile phone.

Richter et al. continued the majority of these students lived in deep rural areas with little or no landline telecom and internet infrastructure. This example shows that two-way academic and administrative support via mobile devices was the only way to reach this remote student population.

Over the past decade we have become familiar with the term 'e-learning' and now the concept of 'mobile learning' is emerging. What then, is the relation between the two notions? The all-inclusive umbrella term for media-based learning and teaching is distance education or distance learning, which is characterized by "*the quasi-permanent separation of teacher and learner throughout the length of the learning process*" (Keegan, 1986, p. 49). The central concern of distance teaching pedagogy is to bridge the distance: "*Because the distance to students was regarded as a deficit, and proximity as desirable and necessary, the first pedagogic approaches specific to distance education aimed immediately at finding ways by which the spatial distance could be bridged, reduced or even eliminated*" (Peters, 2001, p. 18).

E- and mobile learning provide enormous opportunities for closing the gap between learners and teachers or the teaching institution, to overcome the misconception of distance learning as an isolated form of learning.

Mobile learning can be viewed as a subset of e-learning. E-learning is the macro concept that includes online and mobile learning environments. In this regard the following simple definition by Quin (2000) is useful: "*M-learning is e-learning through mobile computational devices*" (p. 1). Mobile learning devices are defined as handheld devices and can take the form of personal digital assistants, mobile phones, smartphones, audio players (such as the Apple iPod), video and multimedia players, handheld computers and even wearable devices. They should be connected wirelessly, thus ensuring mobility and flexibility. They can be stand-alone and possibly synchronized periodically, intermittently connected to a network, or always connected (Richter, Brown and Delport).

As mobile connectedness continues to sweep across the landscape, the value of deploying mobile technologies in the service of learning and teaching seems to be both self-evident and unavoidable. And why shouldn't mobile learning accept its place in the spotlight as the "educational revolution *du jour*"? Using portable devices to support teaching and learning is not a new concept in educational circles. Robby Robson notes that graphic calculators were a revolutionary addition when they were first introduced to the classroom a few decades ago but are now often a requirement for statistics and business classes.[2] The use of PDA-based performance tools to support classroom instruction and on-the-job training alike has been well under way for a number of years, particularly in the fields of medicine and allied health, business, and journalism. Currently, laptop computers used in higher education settings outnumber desktop and

laboratory computers on campus, while notebook computers are ranked as the most important hardware issue on campus today, followed in second place by - you guessed it - cellular telephones (Wagner, 2005)

Bryan Alexander's descriptions of "m-learning" define new relationships and behaviors among learners, information, personal computing devices, and the world at large. The mobile learning landscape he envisioned as recently as August 2004 was described primarily in terms of mobile laptops and handheld computers.[4] Until the early months of 2005, there would have been no strong reason for looking beyond notebook and handheld computers - at least not in North America. However, with the expansion of 3G (third-generation) networks and the increasing availability of "smartphones" - integrated communications devices that combine telephony, computing, messaging, and multimedia - users in Asia and Europe are finding that their broadband connectivity *and* their computing needs can be met through a single device. And increasingly, that device is a mobile telephone. U.S. mobile users are starting to get some tastes of what mobile multimedia looks like with the growing adoption of GSM telephones with Multimedia Messaging System (MMS) functionality. Advancements in embedding rich media players, such as the Web-ubiquitous Macromedia Flash, in handsets and computers have gone a long way toward mitigating bandwidth limitations by enabling rich, engaging presentation layers on a wide variety of mobile devices, regardless of the form (Wagner, 2005).

Wagner also said The heightened interest in mobile possibilities for teaching, learning, and research can be attributed to a number of factors: the continuing expansion of broadband wireless networks; the explosion of power and capacity of the next generation of cellular telephones; and the fact that mobile telephones, a familiar tool for communications, are already fully ingrained in contemporary life as part of our social practice. In other words, unlike most other mobile devices used in education, devices such as PDAs or tablet computers, there is very little extra effort required to get people to adopt and use mobile phones. Rather, people can be offered more things to do with the mobile phones to which they are already attached and with which they are already reasonably competent (Wagner, 2005).

2. Usefulness of m learning

A question that is often posed in relation to the use of new technology in education is whether the technology enables new kinds of learning. Certainly, the development of e-learning is having an impact on teaching and learning practices, and it is reasonable to enquire what difference wireless and mobile technologies can make.

Naismith *et al.* (2004) have demonstrated that mobile technologies can relate to 6 different types of learning, or 'categories of activity', namely behaviourist, constructivist, situated, collaborative, informal/lifelong, and support/coordination. The mobile aspect comes to the fore in the following ways:

- For *behaviourist*-type activity, it is the quick feedback or reinforcement element, facilitated by mobile devices, that is most notable.
- For *constructivist* activity, mobile devices enable immersive experiences such as those provided by mobile investigations or games.
- For *situated* activity, learners can take a mobile device out into an authentic context, or use it while moving around a context-aware environment in a specially equipped location such as a museum.
- For *collaborative* learning, mobile devices provide a handy additional means of communication and a portable means of electronic information sharing.
- For *informal and lifelong* learning, mobile devices accompany users in their everyday experiences and become a convenient source of information or means of communication that assists with learning, or records it on the go for future consultation.
- *Support, or coordination* of learning and resources, can be improved by the availability of mobile technologies at all times for monitoring attendance or progress, checking schedules and dates, reviewing and managing - activities that teachers and learners engage in at numerous times during the day (Hulme, 2005).

Hulme suggests that the new technologies enhance and extend teaching, learning and support activities, and over time, we may see them multiply. Context-aware environments (where context-specific information is made available or used by learners as they move around) and immersive activities are opening up possibilities for new kinds of learning experiences. The ongoing nature of mobile collaboration and lifelong learning are creating the potential for the emergence of new attitudes and new outcomes that are only just beginning to be described or named.

Our review of literature and our investigations of wireless and mobile learning also suggest to us that the new technologies are particularly suited to certain kinds of activities or outcomes. As learning design and course design nowadays prioritize learning activities and outcomes, this alternative way of looking at things may be helpful. Wireless and mobile devices appear to be especially suited to:

- Motivating;
- Alerting;
- Rapid response;
- 'Drip, drip' learning - little and often;

- Skill building - little by little;
- Self-evaluation and reflection;
- Collaboration on task - spontaneous and ongoing;
- M-mentoring & m-moderating - as developments of e-mentoring and e-moderating;
- M-portfolios - electronic portfolios on mobile devices;
- Information gathering on the go;
- Learning in context - using contextual data;
- Connecting workplace learning with institutional learning;
- Recording experiences using multiple media - video, audio, text, graphics;
- Internet or resource access, almost anywhere and anytime;
- Widening participation;
- Improving accessibility;
- Personal learning management;
- Strengthening ownership of learning.

Three keywords that seem to sum up the main benefits are: *portability, connectivity, convenience*. Do these possibilities and benefits imply wider changes in pedagogical practices? We are still at a stage where any changes in pedagogical practice are quite localized. In the next section, some observed impacts on teaching, learning and assessment are reviewed.

3. Mobile learning technologies

Peters (2007) asked *"is the promise of mobile technologies as a trigger to generate learning cultures realistic?"* And is m-Learning any more likely to increase interest in learning than any other form of delivery? Articles about the link between mobile technologies and learning organizations appear to fall into three categories:

1. A database focus that captures organizational knowledge;
2. A human systems focus that allows synchronous communication and information sharing at the worksite;
3. A learning development focus that suggests that learning about new technologies generates a more general drive for learning.

The database focus has, to a large degree, become the accepted wisdom in organisations that use structured processes to collect, codify, and manage knowledge. Mobile technologies have the potential to collect a greater range and percentage of data, through recording of activity on the device (and subsequent analysis of the patterns of access to specific information or information sources) and through the reduction of paper-based records as electronic systems replace paper in the field.

Peters thinks that the capacity of mobile technology to deliver synchronous communication and knowledge-sharing can provide benefits to human (or soft) systems. Evidence of these benefits has been reported by Ragus (2004a), who found that m-Learning encouraged simultaneous personal development, such as networking and socialisation, outside of normal working groups – an unexpected, and positive result of the m-Learning trials (Peters, 2007).

The 'learning tools leads to learning culture' concept is more tenuous and has received limited attention in the m-Learning literature. However, the industry participants in Ragus' (2004b) New Practices Project found that m-Learning had generated new ideas for the incorporation of technology in the workplace, which indicates an enthusiasm for further learning introduced through the m-Learning experience.

Brodsky (2003) looks at drivers in learning organisations and concludes that the trend toward customer self-service (such as automated options for telephone enquiries, or online payment or registration of service needs) will result in changes to the nature of customer service training. Brodsky suggests that the automation of routine transactions means that the role of customer service or sales staff changes, there is greater need to manage complex transactions, with a higher level of knowledge and interaction skills and that, as a result, training technologies will become so intuitive that the technology will no longer be the focus, instead the focus will be on how the application serves the needs of the business (Peters, 2007).

5. M learning methods

The size, shape, weight and portability of mobile devices make them particularly effective for users with disabilities. The organiser functions usually included in mobile devices are extremely useful for learners with learning difficulties to help them organise their lives and achieve some independence. PDAs often also incorporate dictionaries and thesauruses, which provide handy reference tools for learners with dyslexia or other learning difficulties. Tablet PCs include text-to-speech and voice recognition as standard tools, which are valuable for users with disabilities or learning difficulties. The devices can also be attached to wheelchairs with the use of small brackets.

However, many of the other features are not so user friendly. For instance, the small buttons can be difficult for people with little manual dexterity to manipulate. The stylus pens are often narrow and small, and require accurate use to work correctly. You can purchase attachable keyboards for PDAs, but these are also quite small, and options for switch or mouse access are limited. They can be also be a little flimsy. The small screen sizes of PDAs and mobiles are not ideal, as the display tends to be cramped,

which is unhelpful for people with dyslexia and other learning difficulties. The restricted functionality of the operating systems used by PDAs also adds to the problems, as users with disabilities need to be able to customize colour, text size and font (Excellence gateway).

The reasons underpinning the use of mobile technology in education have been explored by Kukulska-Hulme (2005a), who identified the three main motivations as being: improving access, exploring the potential for changes in teaching and learning, and alignment with wider institutional or business aims. Where the emphasis is on changing teaching and learning, practitioners and researchers are interested in collaborative learning, students' appreciation of their own learning process, consolidation of learning, and ways of helping learners to see a subject differently than they would have done without the use of mobile devices. Just-in-time learning and support for managing learning are also key interests. There is awareness that the new technologies may have a role in reducing cultural and communication barriers, and that they are altering attitudes and patterns of study (Hulme, 2007).

Hulme noted that the diversity of reasons for use of mobile technologies in education makes it difficult to generalise about requirements. Nevertheless, there are attempts to characterise these requirements, including in relation to interface design and usability. Nielsen (2001) has remarked that although general usability standards apply equally to e-learning, there are additional considerations, for example the need to keep content fresh in learners' minds so that they do not forget things whilst trying to accommodate new concepts. User-centred system design and evaluation have traditionally been driven by the concept of a 'task.' To a certain extent, it is possible to list the kinds of tasks that learners engage in. For example, Rekkedal (2002) has suggested that mobile learners in distance education need to be able to perform tasks such as studying the course materials, making notes, writing assignments, accessing a forum, sending and receiving e-mail, and communicating with a tutor. The process of learning, however, is not always easily broken down into tasks, and something like 'studying course materials' is no more than a label that conceals great complexity in how the materials might be studied. Ryan and Finn (2005) have commented on the difficulty of task analysis in relation to mobile learning 'in the field,' in the course of their attempts to define the generic requirements of users who typically operate out in the field (e.g., geologists, archaeologists, journalists, technicians, police). It is also very challenging to design and evaluate tools that support learners' development and interactions with others over time (Hulme, 2007).

Conventional approaches to usability tend to be limited to metrics relating to time taken to complete a task, effort, throughput, flexibility and the user's attitude. Syvänen and Nokelainen (2005) have attempted to go beyond this by combining

technical usability criteria (such as accessibility, consistency, reliability) with pedagogical usability components such as learner control, learner activity, motivation and feedback. Kukulska-Hulme and Shield (2004; Shield and Kukulska-Hulme, 2006) have also argued that usability needs to be understood differently when it is being evaluated in the context of teaching and learning, and that the concept of pedagogical usability can be helpful as a means of focusing on the close relationship between usability and pedagogical design. Exploring this concept raises the question of whether there are aspects of pedagogical usability that are discipline-specific; this is examined by Kukulska-Hulme and Shield (2004) in relation to the discipline of language learning. In websites that support language learning, usability might depend on whether the site uses the first or target language, and on its ability to support multimodal and intercultural communication. The ways in which language experts conceptualise user interfaces may also be specific to the culture and sub-cultures of their discipline. These aspects can be hard to quantify and measure, but it does not mean that they are less important (Hulme, 2007).

Hulme (2007) argued that discipline-specific perspectives can be identified in a number of mobile learning projects. For example, in the accounting project reported by Roberts, Beke, Janzen, et al. (2003), screen size on the personal digital assistant (PDA) was found to be an important issue because of the particular needs of the discipline, namely data entry and spreadsheet requirements. Polishook's (2005) research into the possibilities for student music composition on PDAs showed that for some individuals, the small, poorly lit low-resolution screens, tiny dialogue boxes, and the need to connect extra wires, stood in the way of productive use for music composition (Hulme, 2007).

Educational activity can sometimes be better understood by system designers when it is seen as an example of a 'rich context' involving different people, the spaces they meet in and the physical artefacts they use (Dix et al., 2004). Collaboration and co-construction of knowledge are nowadays seen as being the defining characteristics of learning, in contrast to cognitive models that previously concentrated more on the individual learner without much consideration of their social and physical environment. In relation to mobile learning, Luckin, du Boulay, Smith et al. (2005) have defined a learning context as an 'ecology of resources' and have shown how technology can link different resource elements within and across learning contexts (Hlme, 2007).

6. Conclusion

To further explore opportunities that mobile learning affords, we have to build upon previous generations of technological innovations, in order to benefit from the lessons

learnt in distance education. The term 'paradigm shift' in education refers to the changes in teaching and learning as a consequence of the tremendous impact of technological advances (Peters, 2004): "*A paradigm shift in education might mean that in education certain models or patterns no longer exist, because new models and patterns which differ from the old ones in a marked way have substituted them. This means that, very often, we are not dealing with a transitory process in the field of education under investigation but with a sudden, if not with an abrupt change*" (p. 25) (Richhter, Brown and Delport).

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