TAU Fellowship Project Report

M-learning for the future in the off-line mode for science

Sarah Jane Johnston

University of South Africa

johnssj@unisa.ac.za

1 The idea

Once upon a time, researchers believed that …

the only way to study was at a desk, using books. Since then, with the advent of the internet and fast communication and technology, online information and digital resources have become more prevalent in our students' lives and learning "on the go" is possible and necessary. Most universities and higher education institutions have a Learning Management System which is online and, in South Africa, is both optional and supplementary to students because, with the rising costs of broadband, a dedicated, ubiquitous, reasonably priced internet connection is not available to all students.

Additionally, students can often only study when at a desk or with a computer/laptop in front of them as required for e-learning. This results in a waste of time as students could study in the extra hours on the bus between work and home, between meetings, etc.

But then I thought that maybe …

an off-line mobile learning (m-learning) application that is platform independent that students could use any time, any place, that will have everything that a student needs but in an off-line mode would be supportive to students' learning.

So what I would like to ask is …

is such an off-line m-learning application viable for students studying in distance education institutions, in particular in the sciences.

And what I will have to do is …

investigate the pedagogic approach that best support effective use of mobile devices in the distance education context.   To this end, I have enrolled in the Master of Education degree at Unisa in Open Distance Learning.

2 Introduction

We take the definition of mobile learning or m-learning to be that learning which occurs when the student uses a mobile device to learn and is not in a fixed place each time the learning takes place. The mobile device can be any of the examples Park (2011) gives, for instance "cellphones, smartphones, palmtops, and handheld computers; tablet PCs, laptops, and personal media players" (p. 79). There are hundreds (if not thousands) of applications on various mobile platforms and operating systems that can be used in m-learning (McLester, 2011) and certainly, many universities, colleges and schools have a custom online app for various functions within their institution.

The purpose of this research is to investigate the viability of an offline m-learning innovation for students studying in distance education institutions. Certainly, this could have a huge impact for students enrolled at the University of South Africa (Unisa), the oldest open distance learning higher education institution in South Africa, especially for those students registered for study in the sciences as this is where the m-learning in an offline mode may have the greatest potential.

3 Discussion

Why must learning stop as soon as the student is not behind a desk or not in a classroom? In many cases in distance education where students are employed full-time, companies often restrict them from accessing student portals or external websites (related to their studies) at work. Add to this the time taken to travel to and from work, and it is easy to see why students struggle to complete their studies in the requisite amount of time. Our students are not learning as much as we want them to and are not putting the right amount of time into their studies due to work and family commitments.

In the Open Distance Learning (ODL) environment effected at Unisa, the Learning Management System and student portal is currently only available online. Server problems means that students are unable to access anything related to their studies electronically. Having an off-line application that will self-update on a connection to a fast network or a wireless connection would allow students to access all of their study material, learning units, assignment solutions, and tutorial material on the move without having to download it each time. This will save students time and money, and will become an invaluable supplementary resource for them in their studies. For the sciences in particular, the throughput rates are low and not as many graduates are emerging from STEM. An innovation that may change this is worth the time of investigation.

Offline m-learning can become a part of our students' lives seamlessly. As mobile usage becomes more widely available in South Afirca, m-learning can be used by more and more people. The usage of cell phones and other electronic devices in supporting students is certainly suitable in South Africa because of its affordability and ability to connect those in remote areas to information, in particular via cellphone. With broadband costs as high as they are and reliable internet connectivity in remote areas being scarce, this is a useful option for students with just a few minutes to spare to learn, for example, between meetings, in a doctor's waiting room, or on the bus without worrying about data costs to download large files.

Park (2011) hit the nail on the head when she said that m-learning is decreases "the dependence on fixed locations for work and study" (p. 81). It is unlikely that m-learning will be used as a single mode of learning, but as a supplement to ubiquitous learning. Thus m-learning can be used in conjunction with e-learning and/or face-to-face learning. Peter's (2007) reference to the "just enough, just in time, and just for me" demands is certainly evocative of this kind of learning.

Carrying a laptop around (if a student can afford one) is not always practical, especially in the confined working space of a bus or taxi. However, a vast majority of our students have smartphones. The first step would be to create a mobile student portal app that is self-updating as soon as the student is connected to WiFi or to a cellular data network (much like the apps that we have on our smart devices) depending on the students' selection. All students have WiFi access at all Unisa regional centres and the app could update seamlessly as the student walks in the door. This would allow students to access assignment solutions, tutorial material etc. on the move either online or offline. This student portal can be developed to provide students with additional useful links and resources relating to their studies.

Despite evidence that show that cell phones can be used successfully as a cognitive delivery tool, the pedagogical affordances of cell phones have not yet been fully explored in most developing

countries. To understand the pedagogy for mobile learning, it is important to look at distance education theories to determine the importance of interaction on the efficacy of distance learning. The idea is to map the role of interaction in the distance education transaction with the aim of facilitating and devising pedagogical strategies and techniques that can be used to assist students and lecturers to use cell phones. Therefore, the use of cell phones in teaching and learning should be grounded on sound theoretical and pedagogical principles.

There are several theoretical frameworks that should be consulted, such as guided didactic conversation (Holmberg, 1983), transactional distance (Moore, 1983 and 1993), and the theory of integration of the teaching and learning acts (Keegan, 1990). In particular, Moore's (1993) theory of transactional distance means that in mobile learning, the simple act of a lecturer sending an SMS can trigger discussion on a particular topic and then encourage students to engage on a discussion. Students can form peer support study groups through various social networks and can support each other synchronously or asynchronously. Additionally, students can interact or get clarity on a difficult concept by checking it on the internet using cell phones. Podcasts and vodcasts can be created to record, store and deliver content. To this end, students should acquire different technological skills and competencies they need to understand and know how to use different mobile features and applications for teaching and learning.

Another point to ponder is the role of the academic and lecturer in the employment of m-learning in the student's education. The use of mobile devices for teaching and learning cannot be sustained if academics are not trained on how to use the tool and how to integrate the technology into their own practice. Therefore, attention also needs to be given to the capacity building of distance education academics and practitioners. Open distance learning institutions have a critical role of providing the necessary knowledge and skills not only to students but also to the teachers who will be using mobile technologies in distance education (Makoe, 2012).

4 Conclusion

Weiser (1991) said, "the most profound technologies are those that disappear" (p. 94). So many of us cannot remember what life was like without the Internet and being able to find information as quickly and efficiently as we do. Communication is fast and one is expected to keep up with the information that travels so quickly.

We should take cognisance of the fact that mobile technologies will not transform education on their own; they require academics who can use them to improve student learning and students who can use them to effectively enrich their learning. Technology should not perceived as an add-on but as an integral part of the curriculum.

As much as we would like to, we can't change our students. However, we must accept that our students have been changed by technology. The environment for learning is different and as academics, we need to accept this and move forward. Not that long ago, a student needed an answer to a question, she had to consult books. Lots and lots of them until she found an answer. Nowadays, students can simply ask Google for help. While it may seem that this makes students lazier, it can be seen that students are simply using what technology is available to them. Academics should be doing the same, embracing technology and look to the future of learning.

References

Botzer, G., & Yerushalmy, M. (2007). Mobile application for mobile learning. Proceedings of the IADIS International Conference on Cognition & Exploratory Learning in Digital Age, 313-316.

Cady, J. A., Aydeniz, M., & Rearden, K. T. (2011). E-learning environments for math and science teachers. *Journal of Curriculum & Instruction*, 5(1), 17-33. doi:10.3776/joci.2011.v5n1p17-33

Educause, (2010). 7 things you should know about mobile apps for learning. Retrieved from https://net.educause.edu/ir/library/pdf/ELI7060.pdf

Franklin, T., & Peng, L.W. (2009). Mobile math: math educators and students engage in mobile learning. *Journal of Computing in Higher Education*, 20(2), 69-80. doi:10.1007/s12528-008-9005-0

Godwin-Jones, R (2011). Emerging technologies – Mobile apps for language learning. *Language Learning & Technology* 15 (2), 2–11. Retrieved from http://llt.msu.edu/ issues/june2011/emerging.pdf

Holmberg, B. (1983). Guided didactic conversation in distance education. In D. Sewart, D. Keegan, & B. Holmberg (Eds.), Distance Education: International Perspectives (p. 114-122). New York: St. Martin's Press

Keegan, D. (1990). *Foundations of distance education*. London: Routledge.

Laurillard, D. Pedagogical forms for mobile learning. In: Pachler, N. (ed) (2007) *Mobile learning: Towards a research agenda*. London: WLE Centre, IoE. Retrieved from http://eprints.ioe.ac.uk/627/1/Mobile_C6_Laurillard.pdf

Lawson, D., Carpenter, S., & Croft, A. (2008). Mathematics support: Real, virtual and mobile. *International Journal for Technology in Mathematics Education*, *15*(2), 73-78.

Makoe, M. (2012). The pedagogy of mobile learning in supporting distance learners, mLearn 2012: Mobile and contextual learning, proceeding from the 11th World Conference on Mobile and Contextual Learning, Helsinki, Finland, 15-18 October 2012, 117-125. Retrieved from http://ceur-ws.org/Vol-955/papers/paper_45.pdf

McLester, S. (2011). An app for that... and that...and that. *T H E Journal*, 38(2), 19-20.

Moore, M.G. (1993). Theory of transactional distance, in D. Keegan (ed), Theoretical Principles of Distance Education, Routledge, London, 22-38.

Moore, M.G. (1983). The individual adult learner. In . In *Adult Learning and Education*, ed. M. Tight, 153-168. London: Croom Helm

Norris, C., & Soloway, E. (2011). Mobile devices as essential tools. *District Administration*, 47(4), 70.

Park, Y. (2011). A pedagogical framework for mobile learning: Categorizing educational applications of mobile technologies into four types. The International Review of Research in Open and Distance Learning, 12(2), 78-102. Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/791

Peters, K. (2007). m-Learning: Positioning educators for a mobile, connected future. The International Review of Research in Open and Distance Learning, 8(2). Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/350/894

Sanga, C., Magesa, M. M., Chingonikaya, E., & Kayunze, K. A. (2013). Can e-learning promote participation of female students in STEM disciplines in higher learning institutions of Tanzania?. *International Journal of Education & Development Using Information & Communication Technology*, *9*(3), 86-102.

Weiser, M. (1991). The computer for the 21st century. *Scientific American*, 265(3), 94-104.