

The global mobile learning story so far

By Helen Crompton

Mobile learning can now be used to take learning to individuals and communities, who for reasons of geography, finance, culture, disability, or infrastructure, were previously unable to access conventional educational opportunities. From its conception, mobile learning has changed the learning landscape over a relatively short period of time. To gain an understanding of those changes, this article provides impressions of mobile learning across the globe since about 2002. This review of recent history presents examples of the achievements and the challenges during those years. It also includes the work of global agencies, such as UNESCO, USAID, and the World Bank and their role in articulating, reviewing, and promoting mobile learning. With stories of success, there are also often many challenges and hurdles to overcome which is illustrated through examples. The article concludes with recommendations.

Mobile learning initiatives - 2002-2006

In 2002, a number of mobile learning initiatives were appearing in countries across the world. These initiatives typically used basic mobile phones as the device of choice, accessible to many at that time. In 2003, a *Text2Teaching*¹ program started in the Philippines. Supported by Nokia, basic mobile phones were used by teachers to access mathematics, science, and English videos. These were then played to the whole class on television sets or portable projectors. This initiative, MoMaths, has since expanded to Nigeria, Colombia, India, Chile, and Nigeria, as a way of providing education to poor families living in rural areas with a low population density. In early 2002-2003, SURF, a Netherlands based foundation, funded different types of projects that integrated practical field-work through mobile activities blended with classroom activities, for example the Manolo and Gypsy projects².

In 2000 the Dakar summit set the target of providing primary schooling (UPE, Universal Primary Education) for all children by 2015. This

was a difficult target for people living in countries of the world that have little to no access to education, such as the countries of Sub-Saharan Africa. UNESCO reported that in 2001, four out of every ten primary-aged children in Sub-Saharan Africa did not attend school. Despite advocacy efforts from Department for International Development (DFID) UK, UNESCO and the World Bank to use ICT for teacher training, resources were not always available to support training and encourage schooling. A study, aptly titled *Deep Impact: An investigation of the use of information and communication technologies* (Box 3.1)³ for teacher education, was implemented.

In Bangladesh, a study on the use of basic phones also focused on teacher professional development. The phones were used for weekly conference calls with a tutor to share photos and short videos of teaching practice, and communications with the tutor and other learners. The use of mobile phones in this study provided benefit to the teachers through the facilitation of contextualized, constructive, situated, and collaborative learning enabled by the use of the mobile devices.

Higher education students were the target in the Philippines for the *Viability of Mobile SMS Technologies for Non-Formal Distance Learning in Asia* initiative⁴. To support distance learning students and informal learning, the research team developed SMS learning packs made up of booklets, cassettes, and CD ROMS for various subjects to support students.

Mobile learning initiatives - 2007-2010

In developed countries, activists and researchers were interested in the potential for mobile learning to extend existing teaching practices. *Learning2Go* began in the United Kingdom (UK) in 2003. This project placed hundreds of Windows Mobile handheld devices into the hands of students in Wolverhampton until 2007 and claimed to be the largest collaborative mobile learning

Box 3.1: The Digital Education Enhancement Project (DEEP)

The *Digital Education Enhancement Project (DEEP)* was a research project to investigate ways ICT could be used to improve access and quality of teacher education in the global south. This study included 12 schools in South Africa and 12 schools in Egypt.

As part of the project, each school was provided with a laptop computer and the project teachers were given a powerful – at the time - pocket PC (206 MHz processor) and digital camera. DEEP professional development activities were loaded onto the pocket PC for the teacher to access. These resources included illustrated e-books, case studies and exemplar lessons.



Using handheld computers

Photo credits: Carmen Strigel

Using a handheld computer was a new experience for all the teachers and the respondents to a questionnaire reported that they used the device on a regular basis for use in the classroom and at home. This was confirmed by observations, as the teachers typically used the devices for

- a) lesson preparation including photographs to show the students,
- b) writing and recording appointments;
- c) note taking during lessons;
- d) making calculations;
- e) recording events to use during lessons;
- f) recording and photographing students' work; and
- g) recording student presentations and music for parents.

The findings of the study report that these activities supported teacher professional development and the development of basic computer skills was unproblematic. In Kenya at about the same time, DFID funded an initiative, the SEMA project, to provide in-service teacher training to 400 000 primary teachers nationally to meet the challenge of UPE, using messaging to support and coordinate their distance learning (and incidentally to gather and process school enrolment data nationally). This project exploited teachers' own mobile phones and, in terms of sustainability, contrasted with the DEEP project.

Source: Traxler, J. and Leach, J. (2006). Innovative and Sustainable Mobile Learning. In *Africa Proceedings of WMUTE (IEEE)*, Athens, Greece, November 2006.

project for students in the UK. The *Learning2Go*⁵ implementation that began in 2003 moved to the use of mobile Internet enabled smartphones in the Mobile Learning Network (MoLeNET) initiative of 2007. MoLeNET⁶, working in the UK TVET sector, is the largest mobile learning initiative to date. MoLeNET was a three-year project from 2007-2010. Approximately 10 000 learners were involved in the project in 2007-2008 and this number rose to 20 000 in 2008-2009. The findings of this implementation show that using mobile phones for learning facilitated students' retention and lower drop-out rates.

The English as a Second Language (ESL) project⁷ in 2010 was implemented at George Brown College Canada. Students practiced language skills outside the classroom walls using mobile devices. Web-based mobile tasks, accessible through student-owned mobiles, were developed. Students used their mobile devices to mediate their communication and access supports for the mobile-assisted language learning activities. The cross-platform mobile learning solution proved to be effective in supporting the development of ESL skills amongst immigrant and foreign students.

Around this same time, two universities in Moscow provided mobile devices to the university students. They gave students Android tablets as they enrolled at the university. These tablets were used to provide access to training materials, tests, and for connecting with peers and staff. This mobile learning initiative has been viewed as a step towards open education in Russia, offering learning opportunities that are flexible to the needs of the learner.

Following the positive results of the earlier *DEEP* project, other mobile learning initiatives have

been implemented in South Africa during 2007-2010. Two large projects include the Dr. Math and Nokia MoMaths⁸. Dr. Math is an online math tutoring service. Free live math tutors are available to students via feature phones with GPRS connectivity. The low connectivity costs are attractive to users and this service has been used by 32 000 middle and secondary school students. The Nokia MoMaths group used a proprietary mobile instant messaging service (MxIT) on feature phones to provide access to over 10 000 math exercises. This project began in 2008 with the focus on mathematics students in grade 10. This program was of voluntary use and 3 958 students visited the service with 2 136 active users. The findings show that from the grade 9 baseline, students who regularly used the service scored 7 per cent better on average than peers who did not use the service regularly. The Nokia MoMaths program grew to include in 2011 students in Finland.

A research team in the Ukraine began an initiative in late 2009 to educate students about modern means of communication. A mobile operator worked in collaboration with the Ministries of Education, Finance, and Youth and Sports for this initiative and the lessons have reached over 4 000 students. North America also recognized the need to focus on the effective use of technology. The International Society for Technology in Education (ISTE) developed a set of teacher technology standards (ISTE Standards; formally known as the NETS) to provide a set of standards of good practice⁹. North America has also extended the use of mobile devices in learning with external funding of the Federal Communications Commission *Learning On-the-go*¹⁰ programme in 2010. This initiative aims primarily to increase student access to educational content and to



Use of mobile devices in learning: Child's play

enable communications of teachers and students through the use of online tools for educational access 24 hours a day, seven days a week.

Mobile learning initiatives - 2011-2015

Since 2011 there has been a rise in mobile learning initiatives initiated by the primary stakeholders such as district leaders and educators. There has been a shift from mobile devices being banned in schools to the same devices being encouraged by many educational leaders. For example, the district leaders at Williamson School district in Tennessee saw the potential for mobile devices in the teaching and learning of their students and started a Bring Your Own Device (BYOD) initiative in 2011. This initiative was district wide by 2012 in grades 3-12 (8–18 years old) involving approximately 27 000 students. The district leaders report that 15 000 personal mobile devices connect to the guest network each day.

The mobile learning work of global agencies has increased greatly since 2011 and those efforts include:

- a. drawing together mobile learning researchers and scholars to better understand what is known about mobile learning and how it can be used to extend and enhance learning and providing opportunities to access appropriate learning around the globe; and
- b. produce publications to share what is known about mobile learning with policy makers, educational leaders, and other stakeholders.

These goals provided a focus for future mobile learning initiatives. As information was shared about mobile learning implementations, it became evident that a one-size-fits-all methodology was not effective. To be successful, the design of the initiative needs to connect with the culture, language, and needs of that society. Two examples of projects that were designed to better meet the needs of specific societies, and also align to EFA 1, were Project *Urban Planet Mobile*¹¹ and Project *Alphabetisation de Base par Cellulaire*¹². Urban Planet Mobile designed a mobile literacy program for Ugandan parents and children in their native language Rutooro. Funded by USAID, World Vision, and AusAID, the program uses affordable, accessible mobile phones and SMS with audio to deliver daily literacy activities and related parenting education to rural parents and their young children. The messages are in text and audio so the parent(s) can access the messages in Rutooto regardless of their literacy level.

Project Alphabetisation provided literacy and numeracy lessons over a two-year period to 6 700 adults in 134 villages in Niger. This initiative used the official and local languages of English, French, Hausa, Zarma, and Kanuri. Following the norms of the Ministry of Non-Formal Education, the literacy classes were split into separate classes for men and women. Preliminary results revealed positive outcomes with average math scores higher in villages that were involved in this initiative than in villages not involved. Another underserved population were served in Afghanistan, as women were targeted in a literacy initiative (Box 3.2).

Figure 3.1: Education for all (EFA) goals



Source: UNESCO. (2000). *The Dakar Framework for Action. Education for All: Meeting our Collective Commitments*. [pdf] Paris: UNESCO. Available at: <http://unesdoc.unesco.org/images/0012/001211/121147e.pdf> Accessed 7 Nov. 2016.

Box 3.2: Improving women's literacy in rural Afghanistan

The *Mobile Literacy Program* was a one-year program specifically targeted at improving the literacy skills of women living in villages in rural Afghanistan. Afghanistan has the lowest literacy rates in the world with an estimated 43.1 per cent of men and just 12.6 per cent of women. After mobile phone use rose from 1 per cent to over 18 million active mobile phone users in 2012, this telecommunication infrastructure was used to provide access to the under-served population in Afghanistan.

This initiative used a combination of classes and literacy tasks using mobile phones. The students received written assignments and additional work texted to their phones and involved topics that were relevant to the daily lives of the women in the group. This helped the learners understand why literacy was a practical skill for everyday life.



Mobile literacy programme

Photo credits: UNESCO. Available at: <http://www.unesco.org/ui/litbase/?menu=14&programme=146>

Students sent an average of 1 750 messages using the mobile phones. The mobile devices were used for the assigned tasks and were also used for communication with classmates. The mobile phones provided a method of communication for women who were typically confined to their homes. Four months into the program, 83 per cent of the students were able to meet the literacy level three test determined by the Afghan government curriculum, as they were able to use correct sentence structure and vocabulary.

Source: UNESCO (2013). *Mobile literacy programme in Afghanistan*. [online] Available at: <http://www.unesco.org/ui/litbase/?menu=4&programme=146> Accessed 7 Nov. 2016.

Global agencies are also looking at ways to use mobile learning to support women and girls who are marginalized in segments of today's society. Aligned to EFA 3, UNESCO started a project to answer questions on how mobile learning can be used to appropriately and effectively support

women and girls. This project aims to answer three driving questions:

1. How should effective mobile learning initiatives for women and girls be designed?
2. How can they be created in gender-sensitive and sustainable ways?

3. What barriers need to be addressed and what pre-conditions need to be in place for successful implementation?

One study that will provide a step towards answering these questions is the *Mobile Literacy Program in Afghanistan* (Box 3.2).

Since 2003, there has been a rise in the number of mobile learning initiatives taking place around the world. In the later years, these projects became more focused and more culturally appropriate than their predecessors, with attention to language and social norms of those communities and societies. As mobile opportunities become more attractive, the collective knowledge and experiences can be used to offer communities and cultures richer learning opportunities, and the challenges and hurdles faced in these implementations should also be considered as they provide a depth to our understanding toward the design of future successful mobile learning initiatives.

Challenges

The challenges and hurdles reported during mobile learning projects are arguably as important as the documentation of the achievements. Challenges are often location specific and culture specific, but as these reported challenges are aggregated,

common trends appear. This list provides examples of the challenges reported from mobile learning implementations since 2003. In reviewing the hurdles to a successful implementation, trends can be found among developing countries and similarly across developed countries, though contexts rather than countries might be a more accurate characterisation. Common issues faced by both groups can be found in Figure 3.2.

For the developing countries, or contexts, the issues are often a lack of resources. As many developing countries have more access to the hardware, software, and personnel resources needed for a successful mobile learning implementation, the challenges change to concern about the use of mobile devices for educational purposes. These concerns are due to insufficient information among government leaders, policy leaders, practitioners, and parents regarding the power and potential of mobile learning. This leads to a cyclical issue (Figure 3.3).

This is a very simplified view of the problems faced by those initiating mobile learning, taken from a highly complex network of issues defined by the identity, language, and practices of a culture.

This article provides an overview of some of the initiatives since 2003. Over that short period of time it is evident that knowledge and

Figure 3.2: Challenges for mobile learning projects

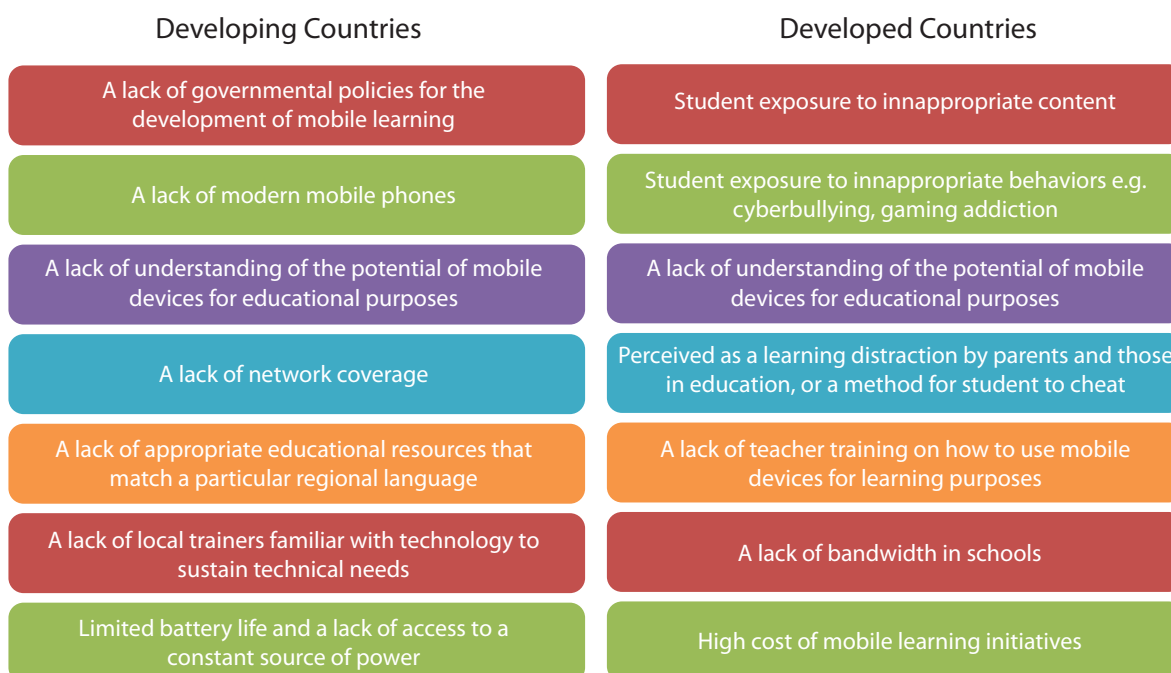
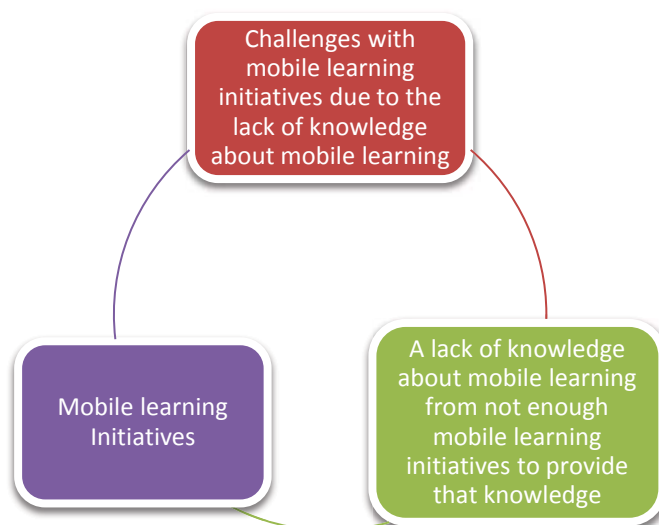


Figure 3.3: Problems faced by those initiating mobile learning



understanding are being built of how best to support a variety of learners with the use of mobile devices in both formal and informal environments.

Recommendations

These are a few recommendations for future mobile learning initiatives:

- Learn from failure as well as success: Gather all the available information to provide robust conclusions.
- Context matters: Local factors such as location and language, culture and individuals will have an impact on outcomes.

- Scale matters: Approaches that work in a small-scale implementation may not work in a large-scale implementation.
- Return on investment matters: Funders need to see that initiatives have far reaching benefits.
- Sustainability matters: Can the current and future infrastructure and wealth of a community sustain a project in the long term?

These recommendations are just a few lessons from studying past implementations. The successes and failures and the challenges of each implementation will provide further information on how mobile learning can be used to meet the needs of learners around the world.

Endnotes

- ¹ Text2teach: www.text2teach.org.ph/?page_id=2
- ² www.wageningenur.nl/en/Publication-details.htm?publicationId=publication-way-333339313833
- ³ Leach, J., Ahmed, A., Makalima, S., and Power, T. (2006). *DEEP IMPACT: An investigation of the use of information and communication technologies for teacher education in the global south: Researching the issues*. Department for International Development. London, UK. Available at: <http://oro.open.ac.uk/17802/> Accessed 20 Nov. 2016.
- ⁴ Baggaley, J. (2006). *Information and communication technology for social development*. [online ebook] Jakarta: ASEAN Foundation. Available at: www.aseanfoundation.org/documents/ICT4D_book_v2.pdf Accessed 4 Nov. 2016.
- ⁵ Learning2Go: <https://www.wolverhampton-engage.net/sites/anonymous/Learning2GoOld/default.aspx>
- ⁶ MoLeNet: www.molenet.org.uk/
- ⁷ Palalas, A. (2012). *Design guidelines for a Mobile-Enabled Language Learning system supporting the development of ESP listening skills*. Available at: www.academia.edu/2032959/Palalas_A._2012_.Design_guidelines_for_a_Mobile-Enabled_Language_Learning_system_supporting_the_development_of_ESP_listening_skills_Doctoral_dissertation_Athabasca_University Accessed 7 Nov. 2016.
- ⁸ Nokia MoMaths: www.meducationalliance.org/content/momaths
- ⁹ ISTE Standards: www.iste.org/STANDARDS
- ¹⁰ Learning on the go: www.fcc.gov/document/funding-schools-and-libraries-wireless-internet-projects
- ¹¹ Urban Planet. Mobiliteracy Uganda: Testing and providing the efficacy of SMS with audio in developing literacy-rich home environments in central Uganda. www.urbanplanetmobile.com/mobiliteracy-uganda
- ¹² Project ABC. (2010). Project ABC: Mobile 4 literacy: <http://sites.tufts.edu/projectabc/>