Mobility in Education: can mobile devices support teaching and learning in South Africa?

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From smart phones to tablets, from Mxit to Facebook to Twitter to Pinterest– mobile technology is rapidly transforming the way we live, study, play and communicate.

Mobile education provides unparalleled access to information, raising the quality of education and enhancing learning outcomes worldwide.[1] Mobile Education or 'mEducation' is defined as any technology-enabled learning solution that allows learners to access educational content through internet connectivity. Any portable device – mobile phone, laptop or tablet – can be a tool for mEducation.[2]

Across the globe, digital learning is being embraced by schools and higher institutions of education. In 2012, the Massachussets Institute of Technology (MIT) appointed a Professor of Chemical Engineering as their first Director of Digital Learning.[3] In 2011, Andrew Ng and Daphne Koller of Stanford University launched 'Coursera', an online platform that partners with top universities across the world to offer free courses from leading lecturers.[4] In 2013, over 23,000 students registered online for just one of these courses.[5]

Is this digital revolution relevant in the context of the ongoing education crisis in Africa? Does mEducation have a role to play in resolving South Africa's education challenges?

Education Crisis in South Africa

South Africa's endemic education crisis is characterized by a shortage of motivated, qualified and experienced teachers. Africa has one of the lowest teacher-to-learner ratios of 2.2 teachers per every 100 learners.[6] According to the UNESCO Report on Mobile Learning, the Sub-Saharan Africa region will have to recruit 350,000 new teachers if we are to reach the Education for All (EFA) goals by 2015 – an insurmountable task without divine (or technological) intervention.

The 2012 textbook saga highlighted the inefficiency of textbook distribution, not to mention the high cost of printing and transporting materials continues, with schools still claiming that they do not have all the correct textbooks. Only 7% of public schools have stocked libraries, symptomatic of the general lack of resources and infrastructure.[7]

Not surprising then that South African learners score on the bottom end of two

international benchmarking literacy and numeracy tests: Progress in International Reading Literacy Study (PIRLS) and Trends in International Mathematics and Science Study (TIMMS).[8]

Inadequate transport adds to the inequity in education with rural teachers finding it particularly difficult to access resources and training. Typically rural schools perform worse than their urban counterparts.

Mobile Penetration in Africa

Although Africa still has the lowest global cell phone penetration at 67.55%, it is the fastest growing mobile market in the world.[9]

South Africa recorded 12,6 million internet users in 2012. The number of users who access the internet *via* mobiles is expected to rise to 23 million by 2016.[10]

The demographics of South African internet users are changing. The majority of new users are young, black, and live on less than R1500 a month. Almost three quarters of these users access the internet via their phones. Their top five reasons for going online: to get information; socialise; study; work and look for a job.[11]

Mobile Technology in Action

Research across Africa reveals the use of mobile technology in remote communities to address pressing challenges in agriculture, water and sanitation, health and education.

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In 2012, One Laptop per Child (OLPC) conducted an mEducation experiment with astounding results.[12] Led by MIT Professor Nicholas Negroponte, the research aimed to answer the question: Can we give the 100 million children around the world who don't go to school, a tool to read and learn without having to provide schools and teachers and textbooks?[13]

Tablets preloaded with monitoring software, alphabet training games, e-books, cartoons and other educational applications were "dumped" in closed boxes without instructions in two remote villages in Ethiopia.[14] The children who had no previous access to the printed word opened the boxes and found the on/off switches within minutes. Five days later children were using up to 47 applications per child per day; within two weeks they were singing ABC songs in the village. Most incredibly, within five months the children had hacked the operating system to enable the locked camera and to personalise their tablets. All this, without a teacher on hand.[15]

As versatile as tablets are proving to be, they are not yet easily affordable. In 2009, Jeffrey Sachs, Director of the Earth Institute at Columbia University, described the cell phone as "the single most transformative technology for development".[16]

mEducation in a Mobile South Africa.

Developed in Stellenbosch, 'Mxit' is an instant messaging servicing available on 3,000 different cell phones including relatively low cost feature phones. It is the cheapest, most accessible and consequently most popular social media tool in South Africa with over 10 million subscriptions[17]. Mxit has become a leading platform

for a variety of home grown mEducation tools. In November 2012, Mxit reported 5 million subscibers to its educational content and 600,000 to its eight exam preparation applications.[18]

One of the most innovative applications available on Mxit is 'Dr Maths'. Developed by the Meraka Institute at the Council for Scientific and Industrial Research (CSIR), Dr Maths is an online tutoring system that enables 32,000 learners across the country to chat to, ask questions and gain real-time support from qualified maths tutors.[19] All volunteers, the tutors are predominantly recruited through maths and science departments in universities. Mxit reported a significant spike in usage of the system during the 2011 teacher strike, indicating mEducation's potential to provide learner support with or without a teacher in the classroom. The Dr Maths application won the 2011 United Nations Technology in Government in Africa Award for its powerful impact on education.[20] Laurie Butgereit, the principal technologist and creative spark behind Dr Maths, explains: "It's about using a fun and exciting medium to connect instructors and students in a teaching process that is readily accessible, interactive and effective".

Launched in 2010 by the Learning to the Max Foundation, 'Quizmax' is a cell phone-based revision tool for Grade 10 – 12 Maths, Physical Science, and Life Sciences learners. The quiz tool enables its 129 601 active Mxit users to do revision at their own pace. Learners are given questions in sets of 5; if they are unable to complete the task successfully, they are presented with simpler problems. Questions are upgraded as the learner gains mastery. The system provides valuable feedback to schools and institutions through detailed online reporting.

The Nokia Mobile Mathematics project is possibly one of the most thoroughly researched mEducation tools in South Africa. Designed by Nokia in partnership with provincial officials from the Department of Education, the tool offers theory, tutoring, exercises and peer-to-peer support.

'Siyavula' poses a real solution to the South African textbook crisis while seriously challenging the current publishing model. The Siyavula team identified key education experts and facilitated writing sessions with these volunteers to produce textbooks and teacher guides for Maths and Science Grade 10 – 12. Developed under an Open Copyright licence the books are aligned to the South African curriculum and are downloadable on mobile and PDF formats. 150 000 subscribers were recorded within 48 hours of the content being placed on Mxit.[21] The freely downloadable textbooks include embedded videos, simulations and presentations, making them more interactive than an ordinary printed textbook and, delivery time is almost instantaneous.

The Nokia Mobile Mathematics project is possibly one of the most thoroughly researched mEducation tools in South Africa. Designed by Nokia in partnership with provincial officials from the Department of Education, the tool offers theory, tutoring, exercises and peer-to-peer support.[22] The Nokia project has a zero rating agreement with two of the major mobile network carriers ensuring free access to users. Grade 10 – 12 learners access maths content via mobile/computer and interact via social platforms. Teachers monitor, track and analyse learners' progress via computer. The project was designed to integrate with classroom learning, offering support to both teachers and learners. The pilot project was established in 2010 with 260 learners in 3 provinces. A 2010 evaluation showed a 14% improvement in maths competency with 82% of learners also accessing the tool outside of school hours.[23] Teachers at one of the participating schools highlighted the ease with which they

were able to personalise exercises for individual learners and the ability to track the progress of their learners as particularly advantageous in their classes of over 50 learners. In 2011 the project involved 25,000 learners and 500 teachers in 172 schools across four provinces. The project is due to be replicated in three additional African countries.[24]

mEducation as a tool for collaboration

SchoolNet SA has effectively created a supportive online community of educators who use a variety of social media platforms for sharing skills and resources.[25] In 2012 a Cape Town based principal started an online twitter conversation group: #EdchatSa and every Monday evening teachers from across the country meet virtually to network, discuss and debate selected topics.

> *It is critical that we create conversations that include all stakeholders: teachers; learners; parents; government; content providers and the mobile industry.*

In 2012 Ligbron Academy, a private school in Mpumalanga, won the Creative Problem Solving Institute Public Sector Innovation Award for their project.[26] Their project connects 5 rural schools to their maths, science and technology classrooms using a wireless network. Schools share lessons, material, and resources through an integrated system that makes use of video conferencing and interactive white boards. The project demonstrates how mEducation can be used to increase access to quality education.

Are we ready for a learning revolution?

It is evident that not only is South Africa using mobile education but that we are more than capable of producing our own contextually relevant, award winning tools. These projects show the innovative use of technology to increase learners' access to expert and remote tutoring, support informal learning outside the classroom, facilitate self-directed learning, improve education results, accelerate distribution of low cost resources, streamline tracking and reporting, enable collaboration and skill sharing, and promote equity through improved access to quality resources and teaching.

A truly mobile South Africa is still restricted by low speeds and high cost of data download, as well as inefficient connectivity infrastructure. In 2012 the CSIR developed a pioneering video streaming technology that may circumvent some of the connectivity limitations.[27]

The mobile technology industry currently contributes 4.4% to the GDP of Sub Saharan Africa and is in a growth phase. In addition to developing entry level phones with enhanced features, Cellphone companies and mobile network-operators have consistently shown a strong commitment, if only to ensure long term market share, to support and develop mobile solutions in the fields of education and health.

A more insidious obstacle is the tendency of educational organisations to operate in silos resulting in crucial decision makers being unaware of existing or potential mEducation projects. It is critical that we create conversations that include all stakeholders: teachers; learners; parents; government; content providers and the mobile industry. Currently South Africa has no policy with regard to mobile learning. Rigorous and relevant quantitative and qualitative research needs to be conducted and used to engage policy makers and influence national policy. Taking the lead, COZA Cares Foundation collaborated with the Bridge SA and the Department of

Basic Education in 2012 to host the ICTs in Basic Education Community meeting to share research and begin to link policy and practice.[28]

Mobile technology is transforming the way we educate and learn. Taking heed from Katie Lepi's '6 challenges to Education Technology': technology must not be used merely for the sake of technology.[29] What tools and how we use them must be aligned to our context, our needs and our desired outcomes. mEducation is just another, albeit extremely powerful tool to aid our quest to achieving quality education for all.

NOTES
1   McKinsey & Company, 2012
2   Ibid.
3   Bradt, 2012
4   Emson, 2013
5   Noor, 2012
6   UNESCO, 2011
7   Equal Education, 2011
8   Nkosi, 2012
9   Steve Vosloo, 2012
10 PricewaterhouseCoopers, 2012
11 De Lanerolle, 2012
12 Glen, 2012
13 Ibid.
14 Ibid.
15 Ibid.
16 Shiner, 2012
17 www.mxit.com
18 Gadget, 2012
19 eLearning Africa, 2012
20 Ibid.
21 Shillington, 2012
22 UNESC0, 2012
23 Ibid.
24 Ibid.
25 http://www.schoolnet.org.za/about-us/today/
26 Centre for Public Service Innovation Awards, The 10th Public Sector Innovation Awards, http://www.cpsi.co.za/awards.php
27 http://www.tuluntulu.com/?page_id=6
28 Wallace, 2012
29 Lepi, 2013

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