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TURNING ON MOBILE LEARNING

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Published in 2012
by the United Nations Educational, Scientific and Cultural Organization
7, place de Fontenoy, 75352 Paris 07 SP, France

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ISSN 2227-5029

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ABOUT THE SERIES

This paper is part of the UNESCO Working Paper Series on Mobile Learning. The Series seeks to better understand how mobile technologies can be used to improve educational access, equity and quality around the world. It comprises fourteen individual papers that will be published throughout 2012.

The Series is divided into two broad subsets: six papers examine mobile learning initiatives and their policy implications, and six papers examine how mobile technologies can support teachers and improve their practice.

Within the two subsets there are five geographical divisions: Africa and the Middle East, Asia, Europe, Latin America, and North America. Each subset also contains a 'Global Themes' paper that synthesizes central findings from the five regional papers.

Two additional 'Issues' papers round out the Series. One paper highlights characteristics shared by successful mobile learning initiatives and identifies supportive policies. A separate paper discusses how mobile technologies are likely to impact education in the future.

As a whole, the Series provides a current snapshot of mobile learning efforts around the world. Collectively and individually, the papers consolidate lessons learned in different regions to provide policy-makers, educators and other stakeholders with a valuable tool for leveraging mobile technology to enhance learning, both now and in the future.

UNESCO has plans to add additional titles to the Series after 2012. The Organization hopes that these resources will help diverse audiences better understand the educational potential of mobile technologies.

To access existing and forthcoming titles in the Series, please see:
<http://www.unesco.org/new/en/unesco/themes/icts/m4ed/>

ACKNOWLEDGEMENTS

This paper is the culmination of the work of numerous individuals.

Mark West, a United States Fulbright Fellow working at UNESCO, researched and authored the paper. His work was informed by Steven Vosloo, Rebecca Kraut, and contributions from many experts including participants at the First UNESCO Mobile Learning Week hosted in Paris in December 2011.

This paper is part of the larger UNESCO Working Paper Series on Mobile Learning. Francesc Pedró conceived of the Series, and Steven Vosloo and Mark West coordinated and completed day-to-day work on the project. Additional input was provided by a number of UNESCO education specialists, particularly David Atchoarena, Fengchun Miao and Jongwon Seo, as well as UNESCO's partners at Nokia, notably Riitta Vänskä and Gregory Elphinston. At UNESCO, Marie-Lise Bourcier deserves special mention for her valuable assistance. Finally, Rebecca Kraut made outstanding editorial contributions to the Series.

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INTRODUCTION TO THE SERIES

The UNESCO Working Paper Series on Mobile Learning, of which this paper is a part, grew out of a simple, if profound, observation: today there are a staggering 5.9 billion mobile phone subscriptions on a planet with 7 billion people. For UNESCO, these numbers are alluring. If mobile phones – by far the most ubiquitous interactive information and communications technology (ICT) on Earth – can be used to help deliver and improve education, then they carry a tremendous potential to assist the learning of people everywhere.

Mobile technologies look especially promising as a vehicle to extend educational opportunities to people who have the fewest. The vast majority of mobile phone owners are not found in New York and Paris but rather in Cairo and Calcutta. Currently, over 70% of mobile subscriptions worldwide come from the developing world, and thanks to rapidly declining prices, powerful mobile handsets previously available only to wealthy individuals are increasingly within reach of the poor. Experts estimate that in Africa, the continent with the lowest mobile penetration, a majority of people already own mobile devices, and the ones who do not are purchasing them at a record pace. Access to robust mobile networks is nearly universal: 90% of the world's population and an impressive 80% of the population living in rural areas are blanketed by a mobile network. This means that learners who might not have access to high-quality education or even schools often do have working mobile phones.

Yet just because a particular technology is widespread does not necessarily mean it is suitable for education. To be sure, many parents and even experienced teachers cringe when they hear the words 'mobile phone' and 'education' used in the same sentence. Over the past decade, however, a number of diverse projects have demonstrated the educational value and possibilities of mobile technologies. The different regional papers that make up the Series describe a wide variety of mobile learning projects that leverage the unique affordances of mobile devices to facilitate learning. The papers detail, to borrow just two examples, how mobile phones help women in Pakistan practice and retain newly acquired literacy skills, and how students in North America use smartphones on field trips to better grasp the subtle complexities of ecological systems. These projects often enrich and extend education by making it more accessible, more personal, more equitable, more engaging and less expensive. Far from replacing teachers and classrooms with technology, the initiatives detailed here use mobile devices to improve the effectiveness and efficiency of both. Viewed holistically, the Series previews the still mostly unrealized potential of readily available mobile devices and offers a powerful rebuttal to those who would prefer to exclude them from education rather than explore – carefully and critically – how they can help students and teachers.

Of course, moving mobile learning from the starry realms of 'potential' and 'promise' to the solid ground of 'practice' requires planning, persistence, and a healthy dose of trial and error. Fortunately, even though mobile learning is still in its infancy, it is hardly uncharted territory. A number of teachers, schools and even countries have attempted to infuse mobile technology into education and learned important lessons along the way. By describing and analysing the successes as well as the failures of these efforts, this Series highlights characteristics shared by effective initiatives and helps policy-makers develop strategies to better leverage mobile devices to improve education.

TURNING ON MOBILE LEARNING: KEY FINDINGS

While this Series describes a dizzying range of mobile learning projects – each with their own complexities and nuances – it is possible to identify a number of important trends that cut across geographic boundaries. First, many parents, teachers and even students tend to view mobile technology as out of place in education and potentially harmful to students, despite the fact that mobile devices are well-situated to improve and extend learning opportunities. Second, there is currently a dearth of national, regional and local education policies that acknowledge mobile learning, let alone embrace its potential to help students and teachers work more effectively. Third, mobile technology can provide rich educational opportunities to students who have traditionally lacked access to high-quality schooling. Fourth, as mobile technology continues to make inroads in education it will be necessary for policy-makers to ensure that programmes help rectify educational inequities and bridge, rather than widen, the digital divide. Finally, for mobile learning to positively impact education in a substantive way, educators and policy-makers will need to forge new partnerships with industries and stakeholders that have not historically been involved in teaching and learning. These five central findings which emerge from the global mosaic of initiatives described in the regional ‘Turning on Mobile Learning’ papers are discussed in the sections below.

MOBILE LEARNING CARRIES A STIGMA THAT CAN AND SHOULD BE OVERCOME

Mobile phones have, for many people, come to represent the antithesis of learning. Their small screens and often intellectually shallow content have led people to associate mobile phones more with entertainment than education. They are commonly viewed as isolating, distracting and even dangerous to young people, providing access to inappropriate content and enabling destructive behaviours such as cyber-bullying. Many of these concerns are valid, and educators will need to propose workable solutions in order to move mobile learning from the margins of education to the mainstream. This Series rises to that task by describing some of the efforts underway around the world to ensure that mobile devices are used safely and effectively to enhance students’ educational experiences rather than detract from them.

Many people oppose mobile learning because they assume that strong educational content is not available on mobile phones. While this has traditionally been the case, several countries and companies have recently made a push to develop high-quality digital resources and educational materials optimized for mobile devices. Ambitious projects in Asia, particularly in South Korea and Singapore, seek to use mobile technology to make education more personalized and collaborative. For example, South Korea has launched a nationwide initiative to shift from paper to digital textbooks by 2015. The government wants textbook content to display on a variety of mobile devices including larger-screen tablet computers.

Leaders of this initiative have been piloting digital textbooks that can be tailored to a student's individual abilities, interests and pace of learning. In Latin America, the government of Chile supports a widely used education portal that helps students prepare for the national university admissions test, and it has recently made this content available via mobile devices. Also, as a result of growing interest from governments and schools, educational publishers, including multinational corporations like Pearson, have begun creating content specifically for mobile devices. Not only does this make educational resources more accessible, but there is evidence that mobile technologies, with their wide range of multimedia and interactive capabilities, may in some instances and contexts be superior to paper-and-ink resources. As this Series demonstrates, the quality and quantity of educational content available for mobile devices, although still in the early stages of development, is likely to improve dramatically in the coming years.

Critics of mobile learning also claim that digital devices can be socially isolating and are a poor substitute for face-to-face interaction with teachers and peers. While this criticism may be true in some instances, mobile phones can also be used to increase collaboration and teamwork among students. Important projects in Latin America rely on mobile phones to help students work together to solve authentic problems. Similar projects in Africa have moved away from 1:1 (one device per student) models of education and instead ask multiple students to cooperate while sharing a single device. Not only have these projects proven effective in enhancing collaborative learning, they are also less expensive than projects that require all learners to have a mobile device.

Finally, student safety is a key component of any discussion about mobile learning. In reaction to harmful behaviours such as 'sexting' – sending sexually explicit text messages – and cyber-bullying, as well as the plethora of inappropriate and inaccurate content available on the internet via mobile devices, many schools and governments have banned or seriously restricted the use of mobile phones in educational settings. This approach, however, is counter-intuitive. Students around the world currently use mobile phones and will continue to do so regardless of whether the devices are prohibited in schools. If schools outlaw mobile technologies they will not vanish nor will the risks associated with them. A more appropriate stance is to position schools as institutions that can teach students to use mobile technologies responsibly. In North America educators are training students to take ownership over how they use digital technologies instead of simply banning them, and as a result schools are beginning to loosen constricting rules and statutes. A scattering of educational institutions around the world have taken steps to change the wording of relevant guidance documents to hold students more accountable for their actions while using mobile devices. This is an important shift in approach and mindset: 'responsible use policies' (as opposed to 'acceptable use policies') move the onus of policing students' behaviour away from educators and, in doing so, offer them opportunities to teach young people how to safely use devices that saturate society at large. As this Series demonstrates, schools are ideally situated to help students understand how to navigate digital technologies productively and ethically. Banning mobile phones in education has not stopped children from using them; instead sweeping prohibitions drive a wedge between formal education and the realities of life outside of school.

If mobile technologies are to assist education to the same degree that they have benefited other fields, researchers, practitioners, innovative teachers and others must continue to demonstrate their utility to sceptical audiences. UNESCO believes that this Series, by

describing a constellation of exciting possibilities, offers a cogent argument for reversing some of the outdated, if still firmly entrenched, stigmas attached to mobile devices.

EXISTING EDUCATION POLICIES HAVE YET TO EMBRACE THE POTENTIAL OF MOBILE LEARNING

Over the past twenty years, many governments have adopted policies to guide the integration of ICT in education. However, because interest in mobile learning has only recently become widespread, most of these policies were developed in a 'pre-mobile' era and do not account for the new technological environment in which educators and students work. As this Series makes abundantly clear, there is a global policy vacuum when it comes to mobile learning.

Frustratingly, the few policies that do refer to mobile devices tend to ban them outright. A huge number of schools prohibit students and often even teachers from using mobile devices in classrooms. Because these bans are commonly aimed at younger students, mobile learning, when it exists at all, is more established at the higher grade levels. All five regional papers describe more activity at secondary and postsecondary institutions than in primary schools.

Most prohibitions can be traced directly to the educational stigmas attached to mobile devices, particularly concerns related to safety. Almost every country on earth has some sort of policy that speaks to internet safety, and, for the most part, older models of ICT integration in schools ensured compliance with these policies. For example, in school-run computer labs educators could install various firewalls and filters and physically monitor student behaviour online. However, because mobile devices can be used anywhere at any time, and are more affordable and thus easily procured by students, they are significantly more challenging to regulate. Many educators, particularly those working in countries where schools can be held legally liable when students break safety rules, ban the use of mobile devices to avoid the possibility of violating strict and often nebulous regulations surrounding internet safety for children.

In this way, existing policies tend to shine a spotlight on what is arguably a weakness of mobile learning – the difficulty of regulating use (and online behaviour in particular) – while ignoring its numerous assets. For example, due to their portability, mobile devices open tremendous opportunities for situated learning. Students can, for instance, listen to information about the significance of a particular piece of art while examining the piece itself, or learn more about how a bridge was constructed and designed while looking at it from different angles. Also, scholars have long recognized that mobile devices provide a safe, private and non-judgmental environment for learners to test ideas and make mistakes. People from Japan to Brazil use mobile devices to learn new languages without the fear of botching a sentence or mispronouncing a word in a high-stakes social situation, and unlike in a class environment, they can study during short, irregular intervals of time, according to their schedules and preferences.

As this Series explains, the potential of mobile devices to transform everyday situations into spaces for learning is only just beginning to be explored, yet education policies rarely speak to this promise. Existing policies also routinely fail to acknowledge that because most people

already own and know how to use mobile devices, they are often better-suited to help learners than computers. This is especially true now that many of the technological hurdles that previously handicapped mobile devices have been overcome: processors are more powerful, screens are larger, operating systems are more stable and intuitive, and the devices themselves are more robust.

While education policies generally restrict the use of mobile phones in schools, it is meaningful that the few governments that have lent support to mobile learning saw explosions in innovation and levels of use. In the United Kingdom an initiative called the Mobile Learning Network (MoLeNET) spanned three years, involved 7,000 staff and 40,000 learners, and had a budget of 12 million British pounds. This programme spawned a wide range of mobile learning projects and experiments, many of which were shown to improve student retention and lower drop-out rates, two goals of the overarching initiative. Other projects investigated how mobile technologies could complement fixed technologies, and in general researchers tended to regard mobile devices and computers as presenting ‘both–and’ possibilities rather than forcing ‘either–or’ decisions. Although MoLeNET was shelved in 2010, its influence continues to reverberate not only in the UK but across Europe. More recently, Denmark, Holland, Paraguay, Singapore and South Korea have all launched similar, if decidedly smaller, initiatives which have also spurred progress. In addition, a handful of countries with policy environments that were either indifferent or hostile to mobile learning have re-evaluated and are beginning to slowly advance more welcoming guidelines and legislation. Broadly speaking though, most current policies seem to inhibit rather than promote the expansion of mobile learning.

A related policy observation cutting across the five regional papers is that countries sometimes confuse access with learning. For example, in the United States there has been an impressive legislative push to expand broadband internet connectivity, especially in disadvantaged communities. A variety of connectivity projects claim to promote education, yet few specify how students, schools and community members will or should use newly available digital access. A great deal of research suggests that mobile access alone will not guarantee or even encourage learning. Lessons from the projects described in this Series indicate that people need to be taught how to turn a mobile device into a tool for learning; this ‘jump’ is not as self-evident as many policies assume it to be.

In UNESCO’s view, education policy can function as either a bridge or a moat: it can invite innovation and connect millions of people to the benefits of mobile learning, or it can isolate them from what is arguably the most exciting educational technology of the past fifty years. It is essential that policy-makers begin to address and engage with mobile learning directly, in order to ensure that its potential to improve education is realized.

MOBILE LEARNING CAN HELP REACH MARGINALIZED POPULATIONS AND IMPROVE EDUCATION SYSTEMS

If there is a common thread that unites all the regional papers, it is that mobile learning holds the potential to assist individuals who have historically lacked educational opportunities. The Series describes initiatives like Project ABC in Niger, which uses mobile devices to help adults

achieve literacy in local dialects, and the recently concluded M4Girls project in South Africa, which encouraged female students to practice mathematics using interactive games designed specifically for mobile phones. Open universities, whether in the Philippines, the UK or Chile, are making higher education more flexible and affordable by allowing students to access educational content from mobile devices twenty-four hours a day, seven days a week. In India, Mongolia and Bangladesh, a variety of mobile learning projects have helped students living in isolated regions study English. Still other projects provide channels for students to reinforce cognitive skills introduced by teachers in classrooms. Many of these projects have built bridges between in-school and out-of-school learning for students at risk of falling behind their peers or dropping out of formal education systems altogether. Researchers have found that when curricular materials are available on mobile devices, students from lower socio-economic backgrounds are more likely to take advantage of them. Mobile devices allow students who might need to work or care for younger siblings opportunities to study during brief and often irregular periods of free time.

Viewed holistically, the regional papers show that many countries, especially in the developing world, appear to be 'leapfrogging' the earlier computer revolution in education and embracing, however tentatively, the more recent mobile revolution. Without question, such a move makes sense in places like Africa where twenty times more people connect to the internet through mobile phones than fixed-line computers. Colombia is one country that has recently decided to use mobile devices instead of traditional desktop or laptop computers to address a crisis of illiteracy in rural areas. The government will purchase 250,000 mobile devices equipped with interactive educational software and deliver them to illiterate young people and adults before the end of 2012. Other countries have similar, if still unrealized, plans to launch mobile learning projects in an effort to increase educational opportunities for people in underprivileged communities.

Beyond directly facilitating the learning of individuals, mobile devices also help students by improving the efficiency of education systems. Here again, mobile technologies appear particularly well-placed to benefit poorer schools and school systems, where computers equipped with reliable internet connections are rare. In many developing countries there is a paucity of information about school and student performance, and poor communication between schools and the district, state and national educational bodies that administer them. To respond to these challenges, the Argentine province of Mendoza, to cite just one example from the Series, launched an initiative that provided smartphones to 350 school supervisors. On visits to school sites without working computers, the supervisors used the phones to enter relevant information about individual schools into an online system. This simple programme has improved decision-making in the Mendoza province by providing higher-quality data to central administrators. Separate programmes, from Uganda to the United States, have relied on text messages to send parents updates about their children's academic performance. More recently, Paraguay has begun asking students to take standardized multiple-choice examinations on mobile devices. Early results suggest that the programme is less expensive than paper-and-ink alternatives and speeds up the dissemination of results. In regions around the world, mobile technologies seem poised to transform educational assessment. By streamlining scoring and data entry, educators can get more timely feedback about the needs of their students and tailor their instruction accordingly.

QUESTIONS OF ACCESS AND EQUITY LOOM LARGE

While this Series rightly highlights the potential of mobile learning to improve educational equity and extend opportunities to students who have had too few, it also acknowledges that there are significant barriers to mobile learning. The total cost of mobile phone ownership, which includes the cost of a handset as well as a connectivity plan, is still too expensive in many parts of the world. On average, Africans spend 17% of their monthly salary on mobile subscriptions, whereas people in wealthier countries spend closer to 1.5%. Also, data-rich 3G (third generation) mobile networks have yet to make serious inroads in most developing countries, especially in rural areas. In Latin America, for example, less than 5% of the population accessed the internet from a mobile device in 2009, compared to 47% of people in OECD (Organisation for Economic Co-operation and Development) member countries, which include developed countries mainly in Europe, North America and Asia. There is also a significant gap in functionality between standard mobile phones and smartphones, and, at least for now, the cutting-edge, large-screen smartphones that greatly enhance possibilities for learning tend to be found predominantly in the pockets of rich people.

Apart from costs, there are technical hurdles as well. Developing applications for mobile devices is far from straightforward and typically requires expensive and complex software. Because mobile phones have an array of different processors, operating systems, screen sizes and keyboard arrangements, building platforms that can optimize content for a handful of devices, let alone a majority, requires skill, persistence and, more often than not, large sums of money.

Although mobile learning can look like a great leveller of educational opportunity from afar, closer inspection reveals that there is nothing fair about one student owning a large-screen smartphone that connects seamlessly to a high-speed 4G mobile network, while another student has a bulky handset with a small black-and-white display and unreliable access to a network that regularly drops voice calls. Now in addition to race and language divides, educators regularly speak of digital divides, and in a society and economy increasingly dependent on information, this divide may arguably eclipse others in terms of urgency.

This Series is valuable because it describes how educators working in different contexts are navigating questions of equity in relation to mobile learning. Individual papers discuss, for example, how initiatives that employ a bring-your-own-technology approach to mobile learning must balance the obvious cost and convenience benefits of this model with sober considerations of how to provide equivalent access for students without mobile devices or with inferior devices, so as not to widen opportunity gulfs between rich and poor students. The regional reviews offer policy-makers and other stakeholders guidance on how to ensure that future mobile learning projects ameliorate rather than exacerbate inequalities.

DIVERSE PARTNERSHIPS ARE REQUIRED TO SUSTAIN AND EXPAND MOBILE LEARNING INITIATIVES

A final lesson to be drawn from this Series is that for mobile learning to impact millions of learners, educators will need to cooperate with new partners. To be sure, mobile learning requires broader and more diverse ecosystems than those typically found in education; they must encompass not only the usual stakeholders such as content creators and publishers, but also companies that install telecommunications systems, mobile network operators and device manufacturers. Additionally, regulating agencies, which previously held little sway in education in the past, become crucial players when a government or organization launches a large mobile learning initiative.

Given the coordination required, it comes as no surprise that the largest projects described in the five regional papers involve a robust network of stakeholders. The Mobile Mathematics (MoMath) project in South Africa is a good example. This project currently reaches over 25,000 learners, 500 teachers and 172 schools, and its partners include officials from national, state and local education agencies; school leaders; local NGOs; three major cellular network providers; a widely used social networking platform; a textbook publisher; and a multinational telecommunications corporation. The larger but now defunct MoLeNET programme in the UK involved an even wider range of partners.

Ensuring that diverse stakeholders, each with unique interests and needs, work together toward common goals is an ongoing challenge and probably helps explain why so many projects never move out of the pilot stage. Many of the projects described in the Series are no longer operating, having withered away after their initial funding dried up. For this reason, each regional review dedicates substantial space to deciphering what ingredients are necessary to scale up and sustain projects. While it is difficult to generalize, strong and visionary leadership, ideally in the form of a government, seems to be a central pillar of all projects that impact thousands of learners. Yet even governments that invest in mobile learning often stumble because of a lack of communication and cooperation between essential agencies. Notably, the mobile learning initiative to promote literacy in Colombia – perhaps the most significant mobile learning project outlined in the Series – was launched by a government ministry founded in 2009 to manage information and communications technologies. This Ministry of ICT has taken a leadership role in designing and implementing policies that integrate ICT into education, a task that is often uncomfortably shared by typically insular education and communications departments. From the various initiatives described in the Series, it seems clear that in order to realize the ambitious potential of mobile learning, education leaders will need to clarify how projects can grow from their outset and establish the productive partnerships necessary to sustain them.

CONCLUSION

It seems fitting that the current decade, which many say will be shaped by advances in mobile technologies and the social and cultural changes those advances bring, began with a mobile revolution, not in a figurative sense but literally. If there was any doubt that mobile phones will change the world, those doubts were laid to rest with the Arab Spring in 2011. While many people are familiar with the role mobile phones played in the protests and fighting that eventually brought down decades-old governments in Egypt, Tunisia and Libya, it is less widely known that information about government corruption and abuse of constitutional rights were disseminated via mobile devices years before 2011. This activity – the learning that happened on mobile phones outside government censure – created an intellectual and social environment that allowed dissatisfaction with the status quo to compound and, over time, transform relatively small protests into bona fide revolutions.

Already mobile technologies have irreversibly changed politics, business, medicine and many other fields, often for the better. They have not yet had a massive impact on education, but as this Series signals, it is not likely to stay this way. Mobile devices – because of their ubiquity and portability – are positioned to influence teaching and learning in a way personal computers never did. The papers that constitute this Series, by describing and analysing a number of diverse mobile learning projects, offer a taste of some of the changes that are right around the corner. More importantly though, they provide a tool for policy-makers, educators and others who hope to leverage a near-universal technology to help make education more accessible, more equitable and more effective for students everywhere.

Today there are over 5.9 billion mobile phone subscriptions worldwide, and for every one person who accesses the internet from a computer two do so from a mobile device. Given the ubiquity and rapidly expanding functionality of mobile technologies, UNESCO would like to better understand their potential to improve and facilitate learning, particularly in communities where educational opportunities are scarce.

This paper synthesizes findings running across the five regional 'Turning on Mobile Learning' papers. By identifying global trends and analysing their implications, it reveals important lessons for policy-makers and other stakeholders seeking to better leverage mobile devices for education.

Complementing the six papers about initiatives and policies is a separate set of six papers which explore how mobile technologies can assist teachers. These papers are also organized geographically.

Two 'Issues' papers will be added to the Series later in 2012. One will anticipate the future of mobile learning, and another will articulate considerations for creating policy environments in which mobile learning can thrive.

Collectively and individually, the papers in the UNESCO Working Paper Series on Mobile Learning scan the globe to illuminate the ways in which mobile technologies can be used to support Education for All Goals; respond to the challenges of particular educational contexts; supplement and enrich formal schooling; and, in general, make learning more accessible, equitable and flexible for students everywhere.

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