UNESCO Policy Guidelines for Mobile Learning

Version 2.1: Draft

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Purpose and Scope of the Guidelines

UNESCO believes that mobile technologies can expand and enrich educational opportunities for students in a diversity of contexts.

Today, a growing body of evidence suggests that ubiquitous mobile devices – and mobile phones in particular – are being used by students and teachers around the world to access information, streamline administration, and facilitate learning in new and innovative ways.

This set of guidelines, drawing on UNESCO's research, seeks to help policy makers better understand what mobile learning is and how its unique benefits can be leveraged to advance progress toward Education for All.

What is Mobile Learning?

Mobile learning involves the use of mobile technology, either alone or in combination with other information and communication technology (ICT), to enable learning anytime and anywhere. Learning can unfold in a variety of ways: people can use mobile devices to access educational resources, connect with others, and create content, both inside and outside classrooms. Mobile learning also encompasses efforts to support broad educational goals such as effective administration of school systems through the use of mobile devices.

Mobile technologies are constantly evolving: the diversity of devices on the market is huge and includes, in broad strokes, mobile phones, tablet computers, e-readers, portable audio players, and handheld gaming consoles. Tomorrow the list will be different. UNESCO chooses to embrace a purposefully broad definition of mobile devices, recognizing simply that they are digital, easily portable, usually connected to a network, and can facilitate any number of tasks including communication, data storage, video and audio recording, and more.

Another defining attribute of mobile technology is its ubiquity. There are over 6 billion mobile phone subscriptions worldwide and over 70% of these subscriptions come from the developing world (ITU, 2011). For example, Africa is currently the fastest growing and second largest market for mobile phones (GSMA and Kearney, 2011). The number of tablet computers has also soared: industry experts predict that their sales are likely to parallel or surpass purchases of PCs by 2016 (NPD, 2012). Already, several countries have announced ambitious plans to roll-out tablet computers in schools.

Finally, mobile learning is fundamentally different from earlier models of e-learning because it employs hardware that is far more affordable and thus more easily self-procured and managed than tethered computers. Where e-learning has historically been constrained by technology that is expensive, fragile, heavy, and kept in tightly controlled computer labs, mobile learning projects tend to assume that students have uninterrupted and largely unregulated access to technology. In this sense, mobile learning is not e-learning "gone for a walk," but something entirely new. It therefore demands that policy makers re-conceptualize the potentialities of ICT in education as well as practical strategies for technology implementation and use. These guidelines aim to assist this endeavour by detailing several of the unique benefits of mobile learning and then articulating high-level policy recommendations.

Unique Benefits of Mobile Learning

Far from being a theoretical possibility, mobile learning is an on-the-ground reality: students and teachers from Mozambique to Mongolia are using mobile devices to access rich educational content, converse and share information with other students, elicit support from peers and instructors, and facilitate productive communication.

While mobile technology is not (and never will be) an educational panacea, it is a powerful and often overlooked tool – in a repertoire of other tools – that can support education in ways not possible before.

These are some of the ways mobile technologies can help UNESCO Member States now and in the future:

Expand the reach and equity of education

Today mobile technologies are common even in areas where schools, books, and computers are scarce. As the price of mobile phone ownership continues to decline, more and more people, including those in extremely impoverished areas, are likely to own and know how to use a mobile device.

A growing number of projects have shown that mobile technologies provide an excellent medium for extending educational opportunities to students who may not have access to high quality schooling. For example, BridgeIT in Latin America and Asia brings up-to-date content that supports inquiry-based learning to geographically isolated schools via mobile networks, the only immediate communication channel possible with these remote institutions; and a large project funded by the government of Colombia is providing inexpensive mobile devices equipped with educational software to 250,000 people in an effort to eradicate illiteracy. These projects improve educational equity by introducing new pathways for learning and improving existing educational offerings. It is important to note that mobile learning does not replace but rather complements existing education, as well as ICT in education investments – such as textbooks, infrastructure, hardware, training and content – in ways that best utilize the attributes of mobile devices.

> **BBC Janala**, a component of a broad English language skills development programme in Bangladesh, enables learners to easily and affordably access English lessons and other educational content via their mobile phones and a website. In its first two years of operation more than 15 million calls were made to the BBC Janala mobile service, and more than 250,000 English audio lessons were downloaded from the mobile internet site. Only by utilising the mobile phones that most Bangladeshis already have access to has BBC Janala been able to significantly expand the reach of its education efforts.

Facilitate personalized learning

Because mobile devices are generally owned by their users, highly customizable, and carried throughout the day, they lend themselves to personalization in a way that shared and tethered technologies have not. Programs on mobile phones can, for example, select among harder or easier texts for a reading assignment depending on the skills and background knowledge of an individual user. This technology helps ensure that students are not held back or left behind by larger groups. While PCs have offered similar affordances for years, this technology came with serious limitations: students could not easily carry computers to and from school, and many students could not afford computers so the technology – even when it was available in school computer labs – was not truly

personal. Mobile technologies by virtue of being highly mobile and relatively inexpensive have enormously expanded the potentials and practicability of personalized learning.

Additionally, as the amount and type of information mobile technologies can collect about their users increases, they will be better able to individualize learning. For instance, if a student is a visual learner with a passion for maps, historical information might be presented on an interactive atlas that can be manipulated on a touchscreen device. A student with different aptitudes might be presented similar information in a very different way, such as on a timeline indicating important events with links to informational videos and primary source documents. Over time, personal technology will obviate one-size-fits-all models of education.

Cumulatively, intelligent mobile devices (of the types that are already in the pockets of millions of people) can give students greater flexibility to move at their own pace and follow their own interests.

Power anytime, anywhere learning

Because people carry mobile devices with them most of the time, learning can happen at times and in places that were not previously conducive to education. Mobile learning applications commonly allow people to select between lessons that require only a few minutes to complete and lessons that demand sustained concentration over a period of hours. This flexibility allows people to study during a long break or while taking a short bus ride.

The UNESCO Mobile Literacy Project used mobile phones to complement and support a traditional face-to-face literacy course offered to 250 adolescent girls living in a remote area of Pakistan. Because education research shows that newly-acquired literacy skill quickly atrophy without consistent practice, project planners wanted a way to support the girls remotely after they completed the course. The only way to communicate with participating students was via mobile phones since in the villages where the girls lived computers and reliable internet connections were non-existent. Program instructors sent text messages to their former students reminding them to practice handwriting skills or re-read passages in a workbook. Instructors also posed questions to their students which the girls answered via text messages. All the activities and communication sought to reinforce the literacy skills the girls had gained in the in-person course. Before the UNESCO project incorporated mobile devices only 28% of the girls who completed the literacy course earned an "A" grade on a follow-up examination. However, with the mobile support, over 60% of the girls earned an "A" grade. Based on its initial success the project is being scaled-up to reach more students.

Provide immediate feedback and assessment

A number of projects have demonstrated that mobile technologies can streamline assessments and provide students and teachers more immediate indicators of progress. While historically students have had to wait days or weeks to get guidance regarding their comprehension of curricular content, mobile technologies, thanks to their interactive features, can provide instant feedback, allowing students to pinpoint problems of understanding and review explanations of key concepts. A number of math applications available for smart as well as basic mobile phones "show" students, step-by-step, how to correctly solve questions they might have answered incorrectly. This functionality helps ensure that assessments are used to advance student learning rather than simply rank, reward, and punish performance.

Mobile technologies can also make teachers more efficient by automating the distribution, collection, evaluation, and documentation of assessments. For example, a number of mobile phone programs make it easy for teachers to give short quizzes to ensure that students completed a given reading assignment. These programs typical support multiple operating systems and handset models, allowing students to complete the quiz using a personal mobile device. The quizzes can be assessed instantaneously and, when desired, synched to a grade book – no paper, red pens, or laborious data entry necessary. By speeding up and eliminating tedious logistical tasks, teachers can spend more time working directly with students.

Ensure the productive use of time spent in classrooms

UNESCO's investigations have revealed that mobile devices can help instructors use class time more effectively. When students utilize mobile technology to complete rote tasks such as listening to a lecture or memorizing information at home, they have more time to discuss ideas, share alternate interpretations, work collaboratively, and participate in laboratory activities while at school. Far from heightening isolation, mobile learning allows people increased opportunities to cultivate the complex skills required to work productively with others.

A model gaining traction in North America "flips" classrooms by asking students to watch informational lectures outside of school – usually on mobile devices carried with students wherever they are – so that greater class time can be devoted to the application (as opposed to the mere transmission) of disciplinary concepts. Tasks that were once school-work become homework, and school-work places greater emphasis on the social aspects of learning.

Build new communities of students

Mobile devices are regularly used to create communities of students where they did not exist before. Yoza Cellphone Stories, a project in South Africa, allows students to read and comment on short stories using inexpensive mobile phones, effectively creating a community of readers in areas where physical books are scarce. The Pink Phone project in Cambodia trains women leaders to use mobile handsets to share ideas, information, and resources in a virtual space. Women draw on the expertise of females in their virtual network to assist people in their physical communities. Massive open online course (MOOC) systems such as Coursera, edX, and Udacity have experimented with a variety of methods to encourage productive communication between students taking the same class. Apart from making first-rate instruction available to far more people than a traditional brick-and-mortar university could support, these systems – which increasingly accommodate mobile devices – help students pose and answer questions, complete collaborative projects, and, more generally, lubricate the social interactions foundational to peer-to-peer education.

Support situated learning

While formal education has historically been confined to the four walls of classrooms, mobile devices can move learning to new settings that maximize understanding. For example, by accessing related information on mobile devices, architecture students can enhance field trips to building sites, and botany students can learn about plants while inspecting them in their natural habitats. Mobile devices can, in essence, give literal meaning to the maxim "The world is a classroom."

In Europe several projects have employed mobile devices to "augment" reality. Relying on location-aware technology, devices reveal processes and structures in the physical world that cannot be seen

visually. For example, software available on tablet computers helps engineers-in-training "see" the location of structural supports inside specific bridges when they are observed from different angles in the field.

> **The Ecosystems Mobile Outdoor Blended Immersion Learning Environment** (EcoMOBILE) programme, currently being implemented with middle-school students, allows students to use mobile devices to learn more about the ecosystem of a pond. On one or more field trips to a local pond, students use their mobile devices to explore the area. When they arrive at certain locations, they are asked questions, provided with resources and encouraged to collect data for further investigation. This interactive programme dramatically changes the relationship between students and the environment they are studying, and encourages high-level thinking skills, primary research and collaboration.

Enhance seamless learning

Cloud computing and cloud storage streamline education by providing students continuous and up-to-date learning experiences regardless of the device they use to access content. Because educational resources and information about a student's progress are stored on remote servers rather than on the hard drive of a single device, students can access similar material from a wide variety of devices (including desktop computers, laptops, tablets, and mobile phones), utilizing comparative advantages of each. Software remembers where students left off, so they can resume lessons easily. Also, because computing is increasingly moving to the cloud, devices do not necessarily need expensive processors to utilize sophisticated software; they simply need to provide a student a connection to the cloud.

Bridge formal and informal learning

Mobile devices facilitate learning by blurring boundaries between formal and informal education. Using a mobile device, students can easily access supplementary materials in order to clarify ideas introduced by a classroom instructor. As an illustration, numerous language learning applications "speak" to students and "listen" to them via the speakers and microphones embedded in mobile phones. Previously, this type of speaking and listening practice required the presence of a teacher. Additionally, students who strike up conversations with people fluent in a target language can use a mobile device to translate the meaning of unfamiliar words and phrases, thus supporting communication. The mobility and relative unobtrusiveness of the device makes this process fairly straightforward; it does not disrupt conversation in the same way that a paper-and-ink dictionary or laptop computer might. Many translation applications allow students to flag difficult words for later review, and confusing word combinations can be brought to the attention of a classroom instructor at a later date. Mobile technology helps ensure that learning which happens inside and outside classrooms is mutually supportive.

Improve communication and administration

Because messages sent by mobile devices are generally faster, more reliable, more efficient, and less expensive than alternative channels of communication, students and teachers are increasingly using them to facilitate the exchange of information.

Besides being more likely to reach intended recipients than paper-and-ink leaflets, messages sent by mobile technology can be used to elicit as well as disseminate information. Teachers can ask students to provide feedback on assignments, and parents can request up-to-the-minute information about the academic progress of a child.

Additionally, a number of projects active in Asia, Africa, and North America rely on mobile phones to streamline communication between classroom instructors who teach similar disciplines or groups of students. In South Africa instructors involved in the Teaching Biology Project used social media platforms to share lesson plans and pedagogical ideas via mobile phones. Teachers involved in this project reported that it helped instil a sense of professionalism and camaraderie, while opening up new channels of communication that made it easy to request assistance from peers who understood the day-to-day exigencies of their job.

> In many countries there is a dearth of information about school and student performance, and communication between schools and the district, state, or national educational bodies that administer them is often unreliable. To respond to these challenges, the **Argentine province of Mendoza recently launched an initiative** that provided smartphones to 350 school supervisors. On visits to school sites without working computers, the supervisors use the phones to enter relevant information about schools and student learning into an online education management information system. This simple initiative and others like it have improved decision making by making higher quality data immediately available to administrators.

Maximize cost efficiency

When weighed against the costs of comparable educational resources, mobile technology can offer exceptional value. For example, Thailand recently launched an initiative to provide students with tablet computers in place of text books. While this project is expensive in absolute terms, it must be balanced against the costs of purchasing, procuring, delivering, and updating physical textbooks. Similarly, the functionality and limitations of tablet devices versus paper books need to be compared and contrasted. Viewed in holistic contexts, mobile learning is often highly cost effective.

Many governments have successfully expanded educational opportunities by leveraging the technology people already own, rather than providing new devices. Initiatives that transform ubiquitous mobile devices into tools for learning (while ensuring equity of opportunity for students who cannot afford them) generally provide inexpensive solutions to educational challenges.

Policy Guidelines for Mobile Learning

In order to realize the unique benefits of mobile learning, UNESCO recommends that policy makers:

Create or update policies related to mobile learning

Because most ICT in education policies were articulated in a 'pre-mobile' era, they do not seek to maximize the learning potentials of mobile technology. The rare policies that do reference mobile devices tend to treat them tangentially or ban their use in schools. Newly developed policy directives related to mobile learning should be embedded within existing ICT in education policies, which many governments already have in place. In order to leverage opportunities afforded by mobile technology and other new ICTs, education officials may need to comprehensively review existing policies.

Policy recommendations:

- Examine the unique educational potentials and challenges offered by mobile technology and, when appropriate, incorporate these into broader ICT in education policies.
- Avoid blanket prohibitions of particular devices. Universal bans, unless implemented for well-considered reasons, are blunt instruments that usually obstruct educational opportunities and slow innovation in teaching and learning.
- Provide guidance on how new investments in technology can work in conjunction with existing educational investments and initiatives.

Train teachers to advance learning through mobile technologies

To realize the advantages of mobile technologies, teachers need to be trained how to successfully incorporate them into pedagogical practice. In many instances, a government's investment in teacher training is more important than its investment in technology itself. UNESCO's research has shown that without guidance and instruction teachers will often use technology to "do old things in new ways," rather than transforming approaches to teaching and learning.

Policy recommendations:

- Prioritise the professional development of teachers. The success of mobile learning hinges fundamentally on the ability of teachers to maximize the educational advantages of mobile devices, while minimizing their drawbacks.
- Encourage teacher training institutes to incorporate mobile learning into their programs and curriculum.
- Provide opportunities for teachers to share strategies for effectively integrating technology in schools with similar needs and student populations.

Provide support and training to teachers through mobile technologies

UNESCO has found that very few education systems use mobile technologies to support the work and development of teachers even though this is often a practical and cost effective method to help teachers, especially those working in remote and resource-poor areas.

Policy recommendations:

- Ensure that, where possible, curriculum, educational resources, and lesson plans are available to teachers via mobile devices. While many mobile learning projects make resources available to students, very few target teachers specifically.
- Support projects that explore the practicability of providing professional development via mobile technology.

Optimize educational content for use on mobile devices

Currently most educational content, including digital content, is not accessible from mobile devices. Also, even when content is available, it often lacks relevance to local student populations, either because of language or culturally-specific material. By tailoring appropriate resources for use on mobile devices, educators can vastly extend their reach since far more students and teachers worldwide own mobile devices than laptop or desktop computers.

Policy recommendations:

- Ensure that, where possible, content, including online repositories of educational resources, is as widely accessible as possible from mobile devices.
- Support the open licensing of mobile content to ensure its widest possible use and adaptation. For specific guidance on how to promote the open licensing of digital content, see UNESCO's publications on open educational resources or OER (UNESCO, 2012).
- Encourage the development of platforms or software that allow classroom teachers (and others with first-hand knowledge of students) to create or tailor mobile content.
- Promote the creation of local educational content in local languages for mobile access, as well as the ability to write in local languages on mobile devices.
- Advocate for standards that make mobile hardware, software, and content accessible to diverse student populations, including students with disabilities.

Ensure gender equality for mobile students

Inclusive education promotes the right of all women and men, girls and boys to a quality education that meets basic learning needs and enriches lives. While mobile phones have empowered women and girls in educational, social, and economic ways, approximately 300 million more men own mobile phones in low- to middle-income countries than women (GSMA, 2010). The mobile phone gender gap is a symptom of broader gender inequalities, apparent in education as well as in the general use and ownership of ICTs. Policy makers should work to promote gender equality for mobile learning.

Policy recommendations:

- Ameliorate existing gender gaps by encouraging women and girls to use mobile phones for learning. Specifically, government officials should identify obstacles preventing women and girls from using mobile devices and propose solutions to overcome these obstacles.
- Promote mobile technology as a tool that creates educational opportunities for women and girls as well as men and boys.
- Identify culturally relevant and acceptable ways of normalizing mobile phone ownership for women and girls.
- Be responsive to the particular needs of all people – women and men, girls and boys.

The mWomen Policy Recommendations provide further guidance on gender issues related to mobile phone use (GSMA mWomen, 2011).

Expand and improve connectivity options while ensuring equity

Most mobile learning opportunities depend on reliable connectivity to the internet and other communication and data networks. As access to information becomes increasingly tied to economic and social development, governments should work with relevant industries to build and augment the technological infrastructure that powers mobile learning. It is also crucial that governments seek to provide equal access to mobile connectivity. A student who cannot use a mobile network – whether because of economic or geographic reasons – is functionally denied access to an impressive and growing range of learning possibilities.

Policy recommendations:

- Support the provision of robust and affordable mobile networks within and across communities, especially in educational institutions such as schools, universities, and libraries.
- Consider providing full or partial subsidies for access to mobile data and broadband services. Many governments have offered "e-rate" subsidies to promote internet access for educational purposes via computers. In addition, governments should now advocate for "m-rate" subsidies.

Develop strategies to provide devices for students who cannot afford them

Mobile devices hold special promise for education, in large part, because a majority of people already have access to one. Collectively, they are the most common ICT on the planet. While governments should seek to enlarge learning opportunities for the huge number of people who have a personal mobile device, they also need to ensure mobile learning opportunities remain open to students who do not currently have one.

Currently there are three widely-practiced models for ensuring people have the hardware needed for mobile learning: 1) governments or other institutions provide devices directly; 2) students bring their own devices, commonly referred to as BYOD; or 3) governments and institutions share provisioning responsibilities with students.

As expected, the BYOD model is attractive because it is inexpensive – the costs of the devices, their maintenance, and their connectivity plans are usually shouldered by students – and, as a result, BYOD projects can be implemented quickly in areas where most students have mobile devices. However, BYOD has serious limitations if it fails to accommodate students who do not own mobile hardware or creates scenarios where students with superior devices and connectivity plans can outperform those with inferior devices and plans.

Policy recommendations:

- Ensure equal access for all students and teachers to mobile technology and participation in mobile learning. In the case of BYOD implementations, governments should adopt measures to provide mobile hardware and connectivity to students who do not own their own devices.
- When possible, allow students to "own" their mobile devices. A principle advantage of mobile learning is that it opens up educational opportunities inside and outside of schools.
- Encourage government departments and educational institutions to negotiate with vendors and leverage the purchasing power of large numbers of students.

Use mobile technology to improve communication and education management

Mobile technology has a track record of making education administration more efficient, as well as improving communication between schools, teachers, and parents. By streamlining tasks such as recording attendance and assessment results, educators have more time to focus on instruction. Mobile devices also facilitate data gathering and improve the education management, especially in education systems where fixed-line internet access is rare.

Policy recommendations:

- Promote the "system strengthening" uses of mobile technologies.
- Encourage schools and individual educators to communicate with students and parents via mobile devices.
- Extend the reach and effectiveness of education management and information systems by integrating support for mobile access/technologies.

Promote the safe, responsible, and healthy use of mobile technologies

Like any ICT, mobile technologies can be used to access inappropriate material. In the wrong hands mobile devices can also enable undesirable behaviour such as bullying, sending violent or sexually explicit messages, and interacting with dangerous individuals. However, because mobile technologies are often overlooked or prohibited in schools, educators have not had opportunities to teach students how to use them responsibly. Schools are well-placed to provide guidance on the appropriate and productive uses of mobile devices and, in many instances, students are unlikely to get this guidance from outside social institutions. Data reviewed by UNESCO overwhelmingly indicates that banning mobile technologies in formal systems of education does not prevent young people from using them. Rather, schools should increase student awareness about how to use mobile devices safely and avoid the hazards incumbent in open access to communication and information, including overuse and internet addiction.

Finally, there are concerns around potential health risks associated with the use of mobile technologies, including eye strain from working on small screens and exposure to electromagnetic radiation. While most research has concluded that mobile technologies are safe, the issue of alleged health risks, especially for long-term usage, is an important one and should continue to be actively researched (WHO, 2011).

Policy recommendations:

- Promote the responsible use of mobile devices by teaching digital citizenship.
- When possible, adopt "responsible use policies" (RUPs) instead of "acceptable use policies" (AUPs). RUPs help highlight and reinforce healthy habits, while simultaneously ensuring that teachers are not forced to police mobile phone use (a task that is largely futile for classroom instructors who may see hundreds of students over the course of a single day).
- When practical and within reason, take obvious steps to safeguard online behaviour by blocking access to inappropriate material and communication.
- In contexts where excessive "screen time" and overuse of ICT are serious concerns, articulate strategies to balance online interaction with offline interaction. Also, distinguish what constitutes productive and unproductive, healthy and unhealthy "screen time."
- Stay abreast of research surrounding potential health risks associated with mobile technology.

Raise awareness of mobile learning through advocacy, leadership, and dialogue

Negative social attitudes regarding the educational potentials of mobile technology constitute the most immediate barrier to the widespread embrace of mobile learning. Broadly speaking, people tend to view mobile devices (and mobile phones in particular) as portals to entertainment, not

education, and, as a result, this technology is regularly dismissed as distracting and disruptive in school settings. Historically, the small screen sizes and awkward input methods on mobile devices have also been seen as disadvantages to their use in education. While these views are changing – due largely to impressive technological advances – policy makers can also take steps to educate the public about the benefits of mobile learning.

Policy recommendations:

- Highlight and model how mobile technology can improve teaching, learning, and administration.
- Share research findings and evaluations of mobile learning programs.
- Encourage dialogue among key stakeholders – including principals, teachers, learners, parents and community-based organisations – about mobile learning.
- Provide a coherent vision of how technology, including mobile technologies, will further learning goals.

Conclusion

This year the number of connected mobile devices, the vast majority of which are mobile phones, will surpass the world's population for the first time in history. Yet despite their ubiquity and the unique types of learning they support, these technologies are often prohibited or ignored in formal systems of education.

This represents a missed opportunity. The learning potentials of mobile devices are impressive and, in many instances, well-established: they can help address a number of pressing educational needs in new and cost effective ways.

In a world that is increasingly reliant on connectivity and access to information, these devices are not a passing fad. As mobile technologies continue to grow in power and functionality, their utility as educational tools is likely to expand and, with it, their centrality to formal education. For these reasons, UNESCO believes that mobile learning deserves the careful consideration of policy makers.

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