

Lessons from the Global

What can Mali, an impoverished, land-locked West African nation, teach educators about mobile technology? Little to nothing, one might think. Yet in Mali, as in much of sub-Saharan Africa, teachers and students are increasingly using mobile technologies for learning and teaching. While we in the United States have debated whether, why, and how to use mobile technologies in class, many schools in the poorest countries in the world—the so-called developing world or Global South—have taken up the use of mobile technologies with gusto despite formidable obstacles.

Smartphones in Mali

Malian schools don't have computers; indeed, the majority don't even have electricity. Most primary-school students have never seen a computer, much less used one in their classrooms. In such a context, where class sizes can exceed 200 children and where books and materials are lacking, any technology that is introduced has to be portable so it can be charged wherever power is available, simple to use so that teachers can adopt it with ease, and affordable enough to be taken to scale.

In light of such challenges, the Education Development Center (EDC), a global nonprofit organization that addresses some of the world's most urgent challenges in education, implemented a smartphone pilot program for teacher training in 19 Malian schools. Using smartphones equipped with a system that allows for Internet access via a cellular network, teachers accessed science



Radios and MP3 players have an important role in bringing support to teachers in some of the planet's most remote places.

What the World's Poorest Nations Can Teach Us about Mobile

and language arts lesson plans EDC created on a website called Pharekati (<http://sites.google.com/site/pharekati>). They used the text messaging features of their smartphones to receive synchronous and asynchronous academic and instructional support from EDC's main office in the capital, Bamako, and to report on their use.

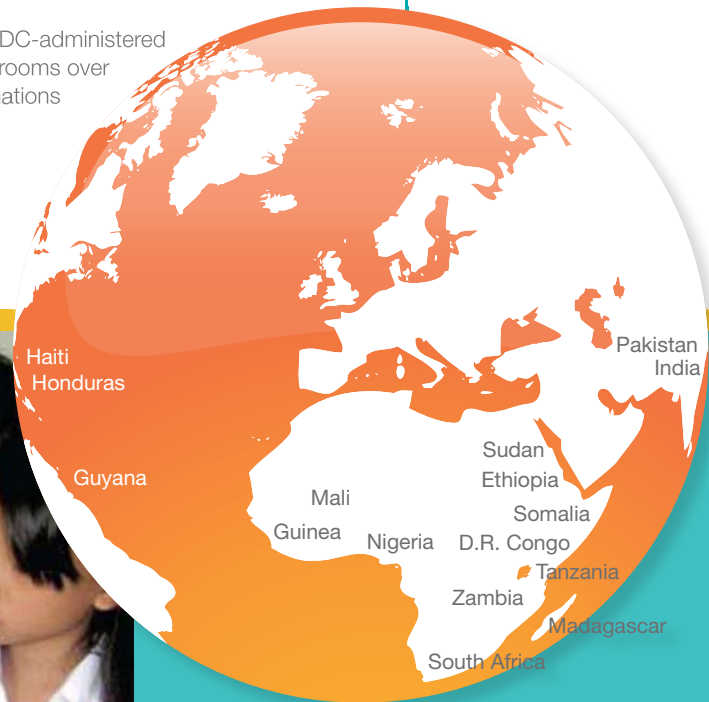
Smartphones became extremely popular with Malian teachers and students. Virtually every teacher in the program used their phones to access, implement, and report on the lessons. More than half of the students reported that smartphones made lessons easier to understand, more active, or more fun.

Though the smartphone pilot is a first for West Africa, one signal is very clear: Phones that enable teachers to connect with relevant content, with pedagogical guidance, and with their peers can change the face of teaching even in the most difficult classroom conditions.

IRI and IAI in Honduras

Interactive radio instruction (IRI) and its audio sibling, interactive audio instruction (IAI), were developed in California at Stanford University in the 1970s and have contributed to remarkable learning gains. Yet these technologies are virtually unknown in the United States.

This map shows countries with government-funded and EDC-administered uses of interactive radio instruction (IRI) broadcast in classrooms over airwaves. Many other Latin American, Asian, and African nations also use IRI or interactive audio instruction (IAI).



South



Indonesian primary-school students use a single laptop as part of a learner-centered activity. The badges they wear denote their roles and are a result of the instruction teachers receive in methods to promote collaboration with one computer.

In Zambia, where electricity is scarce and LCD projectors, TVs, and computers are nonexistent, students use iPods fitted with speakers and powered through a solar panel to allow for use in even the most remote areas.

Technologies

IRI and IAI involve the simplest of mobile technologies: a battery-powered or foot-cranked portable CD or audio player and a CD or cassette. Radio is the most widely used communications technology in many of the poorest countries of the world, and the cost of a radio or audio player is low enough to be affordable for most schools. Battery-operated and hand-cranked radios can operate without grid-based electrical power, and teachers need no additional training to use IRI and IAI. They simply tune in for IRI programs broadcast during the school day or push a button for IAI content via prerecorded CDs, and the learning begins.

IRI and IAI employ research-based instructional techniques to support active engagement of students and teachers. Radio programs that the EDC creates for countries such as India, Mali, Indonesia, and Zambia, among others, contain content and activities that are based on the country's national curriculum, and they use a series of structured learning episodes in which the radio "teacher" instructs the in-class teacher and students in a particular curricular topic through songs, games, group work, paired and individual tasks, and multisensory learning activities and projects. The approach is interactive because the



in-class teacher and students engage with the radio and collaborate with one another to create a product or solve a problem.

Though many may recoil at such scripted instruction, IAI and IRI have achieved results that other instructional technologies have not. The “orality” of audio instruction appeals to cultures where people exchange knowledge verbally more than visually. Both resources are extremely popular with teachers—many of whom, in numerous parts of South Asia and Africa, have little or no formal training—and students because they enliven instruction. And, because it is so highly scaffolded, after a couple of years, teachers often internalize the teaching method cultivated by IRI and IAI and no longer need the audio assistance.

Most important, IRI and IAI have demonstrated positive effects on students’ promotion, attendance, academic achievement, and test scores, particularly in math, language, and early-childhood education. Many have used these instructional techniques to improve the quality of education in the absence of qualified teachers due to disruptions such as war, natural disaster, teacher mortality, and morbidity as a result of HIV/AIDS or the lack of teachers in remote and isolated geographic regions.

Many nations use IRI. The EDC established 53 IRI early-childhood education centers in Honduras, where just 21% of children attend preschool. After one year of instruction using IRI, the number of students considered academically high risk dropped to nearly zero, whereas the percentage of students considered academically developed rose significantly.

iPods in Zambia

In addition to smartphones and radio, MP3 players have increasingly played an important role in bringing support to teachers in some of the hardest-to-reach places.

In Zambia, many community school teachers, who are often volunteers with little or no training or experience, serve in remote areas that lack radio reception and electricity. To support these educators, EDC distributed video-capable iPods with 150 lessons each for grades 1–7. Where there is no electricity, we provided solar panels and batteries to power speakers and charge the iPods.

In addition to lessons, the iPods hold an electronic resource library with enrichment materials and practice activities that support Zambia’s national curriculum for math, science, and English. Teachers receive training on how best to use these text, audio, and video resources in lesson preparation and classroom activities.

Teachers enjoy using iPods because of their portability, ease of use, and capacity to store an extensive supply of support materials. They report that the ability to pause and rewind allows them to stop at critical points in the lesson for discussion and reflection and to use the material for repetition or remedial assistance for students who need this help. Video examples of new teaching practices have prompted teacher discussions around instruction, which has encouraged collaboration and reflection. Even student attendance has increased, as this technological addition fascinates the children.

Portable Technology Kits in Indonesia

In Indonesia, mobile technology is truly mobile. On any given school day, an EDC technology assistant drives his moped from school to school. In his backpack is a technology kit that contains a digital camera, portable flash drive, and laptop to access the

Internet over Indonesia’s cellular network. The technology assistant hands off the technology kit to a teacher, who uses this lone laptop with her 40–50 students for one or two classes.

Limited to one laptop, teachers must teach innovatively. There’s no “stand and deliver” instruction allowed. Teachers organize students in groups to work on their project-based activity using one of several collaborative techniques, such as learning stations or carousel approaches, for managing the one-computer classroom. The technology assistant is on hand to provide technical assistance, but also to monitor and support the student use of the laptop.

Though a desktop computer lab would provide more computers, no school has the space or financial resources for a lab. The mobility of the laptop kit ensures that every teacher in a defined geographic region gets equal access to the one laptop over the course of the school year. The technology assistant cross-pollinates ideas from school to school as he or she travels with the laptop, enhancing the modest teacher professional development that occurs in Indonesia.

Lessons from the Global South

These examples hold three immediate lessons for U.S. educators. First, whether at a well-resourced American private school or a low-resource African one, the size, cost, portability, and multifunctionality of mobile technologies provide “just in time” and classroom-based support to teachers and students.

A technology kit contains a digital camera, portable flash drive, and laptop to access the Internet.



When it comes to technology adoption, attitude and resourcefulness often trump access and abundance.

Next, when it comes to technology adoption, attitude and resourcefulness often trump access and abundance. In Indonesia—where Internet penetration rates are low and Internet costs are high—many schools are not waiting for the government to furnish them with connectivity. They're pooling scarce resources to do so themselves. In Guinea, when radio batteries die, the village leverages its meager resources to buy batteries so IRI can continue. What people may lack in terms of access, skills, and knowledge, they more than make up for in enthusiasm and imagination.

Finally, these vignettes take us "back to the future," to the underlying promise of instructional technology. In the United States, our initial enthusiasm about technology has been strengthened by demands of adequate yearly progress or questions

about technology's impact. But for the Guinean student captivated by the radio teacher's stories or the Malian teacher connecting to the world via her smartphone, technology is indeed indistinguishable from magic. There's no debate in Mali and Zambia about whether technology improves student learning. Teachers and parents know that technology allows children to learn differently. Parents recognize that for their child to get a white-collar job in Jakarta or Bangalore, she must be able to use a computer. Teachers know that the Internet—not their local education agency—will provide them with innovative ideas to excite their students. And parents and children understand that on "radio day" or "computer day," something special occurs. Children who would otherwise work in the market or skip school because it is boring want to

go to class. These tools remind us of the commonality of humanity—that whether in Boston or Bamako, parents, teachers, and students value education that is engaging and meaningful in whatever form it takes.



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