

Taking Tablet Learning Global

Can learning technology eradicate illiteracy in less-developed countries?

by MICHAEL B. HORN

MALAWI, IN SOUTHEASTERN AFRICA, is one of the world's least-developed nations. Many of its children are among the roughly 250 million worldwide who are not in school of any kind. Countless others are among those who attend school but do not learn to read or write. A look inside schools in the capital city of Lilongwe shows why: they enroll between 4,000 and 5,000 students who attend classes of up to 200 at a time, with students sitting on the floor as a teacher holds up a single book.

These are daunting circumstances. Yet two Lilongwe schools are part of the most audacious experiment occurring in education. Rather than participate in sprawling, traditional teacher-led classes each day, a group of young students filters into a learning center in each school where, for 45 minutes, they learn math or reading through instructional software on tablets that are charged by solar power.

The question this and other experiments like it are asking is: can students learn to read, write, and do basic math through technology with little to no adult instruction?

Organizations from the famed XPRIZE to the nonprofit Imagine Worldwide, where I'm a board member and which is facilitating the research in Malawi, are testing the proposition. The odds are long, but if the experiments work, the ramifications will ripple around the world.

Steep school barriers in less-developed countries

It's difficult to overstate how different children's exposure to modern-day conveniences is in less-developed countries compared to what is available in the United States. In the Malawi study, for example, the photographs that the children took to ensure the correct students were signed into their accounts on the tablets were, for many, the first time they had seen what they look like. Children's exposure to school is vastly different as well: in the United States, virtually every child has access to publicly funded schools. In Malawi and beyond, millions do not.

This state of affairs represents what Harvard Business School professor Clayton Christensen calls vast pockets of "non-consumption." These groups of individuals have no access to something simply because it is too inconvenient or expensive—but would be delighted by an offering that fits their life realities. In this case, the non-consumers are children who have no access to a formal education. For some girls, for

example, the distance to the closest school represents a safety hazard in the form of a treacherous two-kilometer walk that renders it a nonstarter.

Enter technology that attempts to help students become literate and numerate in the absence of traditional instruction. Taking teachers out of the equation sounds like a surprising strategy, but even a quick look at the numbers involved suggests it's worth considering.

Training the vast numbers of necessary teachers—69 million by 2030, according to the United Nations—to serve every student without access to schooling in the developing world would take decades and cost billions of dollars, and it's not clear that such efforts would ultimately succeed. But spending a relatively small amount of money to test whether autonomous learning could be a viable way to leapfrog how the developed world educates students seems a worthwhile bet.

As a classic disruptive innovation—meaning an innovation that transforms a market by offering something comparably simpler, more convenient, more affordable, and not as good as judged by traditional metrics—learning technology can't compete directly with the best teachers. But for students who have no access to teachers, or very limited access as in the Malawi schools, an innovation only needs to present an alternative better than the status quo.

The theory of disruptive innovation predicts that, once in place, software solutions to empower autonomous learning will improve over time to be able to serve more and more demanding contexts. And because the educational non-consumers are mainly outside the United States, the theory of disruptive innovation suggests that learning technology can first play a much more transformational role abroad—and especially in underdeveloped parts of the world.

Such disruption will be difficult, to put it mildly. The questions are many—from whether students can learn to read, write, and do math without human instruction to whether they will stay engaged, as well as the technical and monetary questions common to resource-strapped regions. There are plenty of reports documenting the failure of technology to make an impact in education worldwide, including some from the Organization for Economic Co-operation and Development. And although there is research in the United States showing positive effects from technology used in blended-learning settings, there is also no shortage of studies showing disap-

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pointing outcomes and stories of children disengaged and spending time on their cell phones instead of learning.

Field testing tech solutions for learning

Still, philanthropists and entrepreneurs are engaging with these challenges. The XPRIZE hopes to overcome those odds with its Global Learning prize, which offered \$10 million in a contest to develop “open-source, scalable software that will

United Kingdom called onebillion and the Kitkit School from South Korea and the United States.

Results from the field tests by onebillion and Kitkit have yet to be detailed publicly, but the overall results from all five finalist teams were released. They seem to show both just how hard this work will be—and its promise. At the outset, just 7 percent of all of the children in the field test could read a single word in Swahili. By the end, 30 percent were able to read full sentences. In numeracy, 23 percent were able to answer at least one single-digit addition or subtraction problem at the program’s outset. After 15 months, 66 percent could.

Imagine Worldwide is aiming to develop a deeper level of understanding of how autonomous tablet learning can work. It plans to conduct a series of tests with different methodologies—from randomized controlled trials to action research—in a variety of developing countries that speak different languages, as well as in both in-school and out-of-school settings like refugee camps. If evidence emerges that the approach can work, the organization will next embark on a series of replication studies with more than 100,000 students to understand how best to support governments looking to scale solutions to the millions of children who lack access to school.

The chief executive and cofounder of Imagine Worldwide, Susan Colby, said the students in Malawi are exhibiting deep focus and engagement as they work through the software on their tablets. It’s early in the work, but so far the students appear to be making steady progress through their lessons and showing signs of learning.

“The children have their heads down, they are working through exercises and totally absorbed in the work,” she said. “In my visits, I’ve seen focus more impressive than you’d find just about anywhere.”

As this work continues, it’s worth keeping an eye on what steps innovators like onebillion and Kitkit take next. And it’s critical to watch whether the broader movement can fulfill its transformational potential by both engaging children and helping them learn. No one has any idea for sure how this venture will evolve, but the thought that the world in one generation could be made literate is truly eye-popping.

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In Lilongwe, Malawi, a girl in Standard (Grade) 2 is completely focused as she learns to read.

enable children in developing countries to teach themselves basic reading, writing, and arithmetic within 15 months.” Some 200 teams from 40 countries signed up; in September 2017, the organization chose five finalists, each of which received \$1 million to design software to teach basic literacy and numeracy on a tablet, without direct adult support. Those designs were put in the hands of 2,700 children in 170 remote villages in eastern Tanzania, in partnership with the United Nations.

With much pomp and circumstance, Elon Musk, the famed founder of SpaceX and Tesla and funder of the prize, appeared on a stage with his arms folded on the evening of May 15, 2019. Taking two envelopes from Emily Church, the executive director of the Global Learning XPRIZE, he announced co-winners of the competition—a nonprofit in Kenya and the