[Educational Technology's Successes and Challenges in Sub-Saharan Africa Secondary Systems](#)

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Educational innovations

As discussed in [the previous post](#), secondary education systems in Sub-Saharan Africa struggle with issues around access, quality and equity. To counter such challenges, numerous actors across Sub-Saharan Africa—humanitarian organizations, the private sector, and governments—have undertaken a number of technology-based initiatives to address issues of access and equity (though less so, quality). In this post, I highlight some of these promising initiatives. I also discuss the larger challenges that hamstring the potential of educational technology to fully address some of the most vexing issues facing secondary education in Sub-Saharan Africa.

Increasing access

Providing Internally Displaced People (IDPs) and refugees with access to education. Through access to online courses, WhatsApp study groups, "school in a box" programs, and most commonly, mobile devices, students fleeing conflict and crisis can increasingly access formal and informal educational opportunities. Two examples are noteworthy. First is War Child Holland's [Can't Wait to Learn](#) initiative—a tablet-based gaming application for refugees, IDPs and out-of-school youth and teachers in Sudan and Uganda. The second example is the [United Nations High Commission for Refugees](#) (UNHCR) and the [Vodafone Foundation's](#) "Instant Network Schools." Based in eight refugee camps in Kenya, Tanzania, South Sudan, and the Democratic Republic of Congo, this initiative connects refugee students and teachers to digital educational content.

Making content available to students and teachers. Given the lack of funds to purchase educational content and software, and rampant software piracy, [Open Educational Resources](#) (OER) and open content licenses are an absolute must for schools. In one of the first regional examples of open-licensed materials

at scale, [Siyavula](#) and [South Africa's Department of Basic Education](#) (DBE) developed open-source science and math textbooks for every grade 10-12 student in South Africa (DBE has also digitized its entire curriculum so all content and materials are available online). The UK Open University's [Teacher Education in Sub-Saharan Africa](#) (TESSA) Secondary Science program provides teachers in Uganda, Kenya, Ghana, Zambia and Tanzania with open education resources, teaching resources and other materials.

Addressing equity

Improving educational management and resource allocation. Many governments are increasingly using technology for systematic data collection, management and educational planning. The Tanzanian government has used Geographic Information Systems (GIS) to map schools and track educational achievements in order to reallocate resources to underserved regions. Ghana, similarly, has mapped all secondary schools, using these basic data to inform decisions on resource and teacher allocations. These mapping and monitoring efforts can potentially lead to more equitable resource allocation for schools and much needed educational cost savings from reduced leakage of funds.

Improving Quality

Supplementing formal educational offerings. The greatest example of this may be tutoring for university-entrance examinations - via after-school secondary school computer lab computer-aided instruction (CAI) preparation; [commercial online video tutoring companies](#); and government-sponsored initiatives, such as [Game Changers](#), for under-served students in South Africa's Western Cape.

Supplementing traditional school offerings also extends to furnishing technical skills that students do not receive in secondary school. [Andela](#) (in Lagos, Nairobi, and Kampala) and [Gebeya](#) (in Ethiopia) train secondary-school graduates and out-of-school youth to be full-stack software developers and then match them to paying clients.

Low-cost private schools across sub-Saharan Africa are using ICTs as a central part of their model. Across Sub-Saharan Africa, parents and students are making their dissatisfaction with low-quality education evident by moving their children into low-cost private schools. Many of these mixed primary and secondary school chains—[SPARK](#) in South Africa and [Nova Pioneer Schools](#) in Kenya and South Africa—use blended learning and computer-aided instruction to

provide more individualized instruction and remediation to students.

Missed Opportunities

The above initiatives are certainly positive. That said, there are still numerous missed opportunities that undermine technology's role in improving and expanding secondary education opportunities.

While improving, Internet access is still problematic. None of the above initiatives can happen at scale or happen systematically without reliable and affordable Internet access. While Internet access is expanding and is becoming more affordable across the continent, the Internet divide is multifaceted (geographic, economic and gender-based) and persistent. Sub-Saharan Africa still has the lowest, and some of the most expensive, Internet access rates in the world. In many countries, it is simply not financially feasible to roll out the Internet anywhere beyond a capital city.

Governments can employ a combination of policy and technical solutions to address this challenge. They can invest in resource virtualization, satellite-based Internet, lease unused dark fiber, build government-owned networks, incentivize telecommunications providers to provide subsidized access to rural areas, tax Universal Service Funds, and/or use "white spaces"—wireless technology that leverages unused television and radio frequencies to create wireless broadband connections. Malawi, South Africa, Namibia, Nigeria, Tanzania, and Zambia have expanded Internet access through some combination of the above efforts (Burns et al. 2019).

Failure to use widely available technologies for learning. In a continent where mobile phone subscriptions are more common than electrical grid connections, where many countries have almost ubiquitous Long Term Evolution access (South Africa and Rwanda), and where there are often more cell phones than people (as in Botswana), mobile phones are still most conspicuous in schools by their absence. Ministries of Education have not figured out how to leverage phone ownership to reduce the burden of providing equipment and Internet access to students and teachers.

Similarly, most Africans have access to radio. Interactive Radio/Audio Instruction (IRI/IAI) can provide low-cost, at-scale educational opportunities to hard-to-reach (and hard-to-teach youth). Research has shown that IRI is an easy-to-use and effective technology that can measurably improve student achievement (Burns, 2011). Yet, IRI/IAI (with some exceptions, like Somalia and Cape Verde) is largely

absent from the technology landscape.

Research is limited on educational technology's impact on student achievement. Rigorous research on ICTs is limited (at best) in Sub-Saharan Africa. One of the fundamental challenges of studying the effects of computer technology on educational outcomes in Sub-Saharan Africa is that many of these initiatives are donor- or corporately-funded and do not finance rigorous research studies. Thus, when it comes to technology, the most basic questions remain unanswered. Can educational technology improve student achievement? Is it worth the investment? Is technology displacing other more productive educational activities or consuming resources that might otherwise contribute to achievement? Within the Sub-Saharan African context, we simply do not know.

This absence of research notwithstanding, technology must be part of any secondary education reform. It is essential for scaling innovations, providing educational services that might otherwise be unavailable, automating administrative functions, and providing high-quality content to teachers and students. Successful technology integration into education systems demands at the very least technology plans that place learning at the center of the educational ecosystem; telecommunication policies that promote affordable broadband; copyright and licensing regulations that support the development of localized, high-quality content; and long-term investment in building the knowledge, skills and dispositions of students, teachers, school directors, and education officials. If we want to capitalize on technology's potential to make quality secondary education available to young people in Sub-Saharan Africa, all stakeholders—governments, international donors, technology companies, and NGOs— must undertake this work collaboratively and coherently.

References

Burns, M. et al (2019). [Information and Communications Technologies in Secondary Education in Sub-Saharan Africa: Policies, Practices, Trends and Recommendations](#).

Burns, M. (2011). [Distance education for teacher training: Modes, models and methods](#).

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