



WORLDREADER

CREATING A CULTURE OF
E-READING AROUND THE
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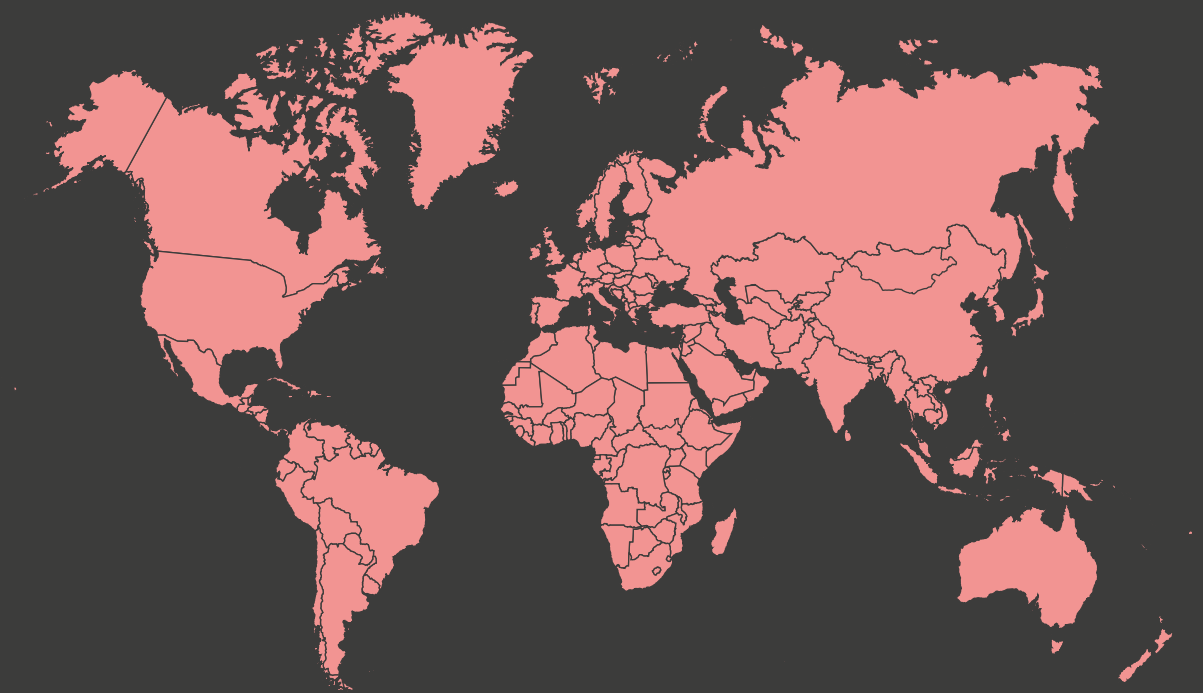
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Christina Kwauk and Jenny Perlman Robinson

Worldreader at a glance

EDUCATION LEVEL:

Primary, postprimary



LOCATION:

Ethiopia, Ghana, Kenya, Malawi, Nigeria, Rwanda, Sierra Leone, South Africa, Tanzania, Uganda, Zambia, and Zimbabwe; plus readers in a total of 53 countries

FOCUS OF INTERVENTION:

Literacy program delivered through digital books to students, teachers, and their families

INTERVENTION OVERVIEW:

Worldreader's digital reading program (2010–present), implemented by Worldreader (a nonprofit organization based in the U.S., Europe, and Africa) and through international and local partner nongovernmental organizations (NGOs), provides children and their families in 53 countries with immediate access to culturally and linguistically relevant digital books. By supplying schools (i.e., through its iREAD program) and libraries (i.e., through its LEAP program) with low-cost e-readers and tablets that are loaded with digital books and other digital teaching and learning materials, Worldreader aims to improve literacy skills by helping to create a culture of reading in places with very limited access to reading materials. Outside school contexts, the organization has also developed Worldreader Mobile, a suite of free mobile reading applications (or “apps”), with access to its digital library content. These apps are built for a variety of platforms (from Android to mobile web browsers) and can be downloaded anywhere around the world. Overall, Worldreader pursues an integrated approach that combines context-appropriate technology, digital access to 37,336 book titles in 43 languages, teacher and librarian support, and community engagement.

TYPE OF LEARNING MEASURED:

Reading (functional reading and interest in reading)

COST:

Worldreader's total operating budget was \$3.8 million in 2014. In 2015, the cost per person of its e-reader program reached \$32 (and is projected to fall to \$10 per person by 2018). Its mobile app's cost per person reached \$2.27 in 2015 (and is projected to fall to \$1.51 per person by 2018). The cost of delivering each e-book (via e-readers/tablets) is \$0.50 or less. In 2014, 73 percent of Worldreader's revenue was from bilateral, multilateral, foundation, corporate, and individual contributions and grants; 23 percent was from in-kind donations; and 4 percent was from sales of its products (i.e., its BLUE Box and Book Pack programs).

SIZE:

Direct reach—Worldreader's direct reach since 2010 has been 16 million people in 53 countries in Africa, Asia, and Latin America, 3 million of whom are readers (defined as people who opened an e-book and turned to the next page).

IMPACT:

Literacy outcomes—In the iREAD 2 program in Ghana, students could read 5.3 words per minute faster in their mother tongue, performed 50 percent better at letter sound knowledge and invented word decoding, and were 30 percent better at listening comprehension compared with students in control schools. Additionally, 89 percent of primary school students could read at least one word after two years of the intervention, compared with 35 percent of students not in the program. *Reading habits*—69 percent of students reported reading more after the intervention. *Access to textbooks*—iREAD students had access to 140 books (including textbooks and storybooks) per student, compared with 1.2 books per student in control schools.

Background

In 2010, a 27-nation study of both low-income and high-income countries under diverse political regimes over a period of 20 years pointed to the positive relationship between scholarly culture (defined by the number of books in the parents' home) and a child's educational advantage. Specifically, it illustrated the importance of exposing children to books, a circumstance that could give children as much of an advantage in their educational outcomes (i.e., total years of schooling) as having a university-educated rather than unschooled parent, and twice the advantage as having a professional rather than an unskilled father (Evans et al. 2010). Moreover, the study found that gains in educational advantages were the largest among children from the least-educated families. In the words of the study's authors, "It is at the bottom, where books are rare, that each additional book matters most, not among the literate elite; each additional book yields more 'bang for your book' among the book-poor than among the book-rich" (Evans et al. 2010). The study's authors attributed this relationship to the skills and competencies that a scholarly culture (i.e., the presence of books in the home) promotes—skills and competencies that are useful in school—or to a preference for books and reading that makes schooling more enjoyable, or both. Either way, these explanations suggest that exposing resource-poor children to books may translate into better educational outcomes, including higher levels of literacy.

However, one of the greatest challenges for improving literacy in Africa, and in many other parts of the world, is the lack

of access to texts—specifically, due to the shortage of books, especially inexpensive, accessible, and culturally, linguistically, and age-appropriate texts for children who are just learning to read. In a 2008 study of 19 African countries, for instance, only Botswana had close to a 1:1 ratio of textbooks to students for all subjects and all grades in secondary school. The other 18 countries faced serious supply shortages, especially in noncore subjects, for which ratios of textbooks to students in urban areas ranged from 1:8 in Uganda and Kenya, to 1:40 in Zambia, and up to 1:100 in Mozambique. Rural areas suffered even more, with less than 5 percent of students on average in any of the 19 countries having access to core subject textbooks (SEIA 2008). Efforts to expand access to books in these countries are often costly (i.e., transportation costs, storage costs, paper/ink costs, and the risk of overprinting) and logistically challenging (i.e., shipping cartons of books by sea, land, and air to remote rural areas).

Yet with the explosion of the Internet, mobile phone technology, and digital e-reading devices, along with the rise of digital publishing, vast inequalities in access to information are being reversed. Recent data suggest that 80 percent of people in the developing world now have access to a working mobile phone—this is more than the number of people who have access to a toilet (United Nations 2013; World Bank 2016). And in the last five years, the price of e-reading devices like the Amazon Kindle have plummeted, in some cases by as much as 70 to 90 percent (or, from approximately \$300-\$500 in 2010 to \$30-\$150 today). Along with the ubiquity

and increasing affordability of mobile phones and e-readers, the low cost of producing digital books and the simplified logistics for delivering them to readers in remote settings makes information and communication technology (ICT) a sustainable and cost-effective strategy for expanding access to text to millions throughout the developing world.¹

Recognizing what leveraging technology could do for literacy globally, Colin McElwee, the former director of marketing at ESADE Business School in Barcelona, and David Risher, a former general manager at Microsoft and senior vice

president at Amazon.com, tapped into this emerging market opportunity. In 2010, they founded Worldreader, a nonprofit organization dedicated to addressing the lack of appropriate books and other reading materials in developing countries by digitizing a variety of textbooks, storybooks, and reference materials that can then be accessed through e-readers and mobile phones. Worldreader's rapid success in providing more than 3 million readers throughout Africa, Asia, and Latin America with access to more than 30,000 e-books within just five years provides the context for this case study.

Harnessing digital technology for literacy

Today, Worldreader implements two e-reading platforms through three models: (1) direct intervention and research projects, whereby Worldreader fund-raises and then tests, adapts, and scales up its digital reading program, in collaboration with national governments, bilateral and multilateral donors and other international NGOs; (2) a social enterprise model, whereby Worldreader sells its technology, digital library, and technical support directly to NGOs, schools, and libraries; and (3) joint partnerships with organizations like Camfed, Bridge International Academies, and the Office of the UN High Commissioner for Refugees (UNHCR), whereby Worldreader helps to co-design a digital reading program using its technology, content, delivery methods, and by providing technical assistance to enhance the partner organization's reading interventions among its target communities and populations.

Worldreader's first digital reading initiative, its e-reader program, targets primary and secondary school students and can be tailored for individual use (i.e., in classrooms), shared use, or community-wide usage (i.e., in libraries). Its second digital reading initiative, its suite of mobile apps ("Worldreader Mobile"), is geared toward young adult readers, their families, students and the wider community—allowing Worldreader to scale up rapidly and to increase global access to e-books throughout Africa, Asia, and Latin America. For both these platforms, Worldreader works with local and international authors and publishers to distribute linguistically and age-appropriate e-reading content from its library of more than 37,336 titles in 43 languages. Although there is some overlap between the two platforms, Worldreader's e-readers are generally loaded with digital textbooks, local storybooks, and international classics suitable for early grade readers and their

teachers; Worldreader Mobile has access to most of these titles, plus health information, business and entrepreneurship books, English-language learning materials, and a wide range of books covering other topics.

Worldreader's story of rapid growth is anchored by the organization's work in harnessing ICT in digital reading for literacy. Following an approach developed by-profit firms called the "lean" method, Worldreader developed the smallest-scale version of what it wanted to do, tested it in the field, and then continued to develop iterations of this idea on the basis of feedback (Murray and Ma 2015). This approach allowed Worldreader to run small, focused experiments of its e-reader program, to troubleshoot problems, and to weed out ineffective ideas before investing more time and resources in the program and scaling it up (Murray and Ma 2015).

Specifically, beginning in 2010 with a two-week trial of e-readers among 16 grade 6 students in Ghana, Worldreader conducted its first pilot study with the aim of understanding its most basic idea: the impact of a digital reading program on childhood literacy. This study demonstrated to the organization, its key stakeholders, and its emerging network of partners (1) that students could learn to use the e-readers after several hours of training and several days of practice; (2) that the e-readers supported the process of learning to read for new language learners, especially the built-in dictionary function, which helped readers decipher the meaning of new words, and text-to-speech capability, which helped readers with pronunciation; and (3) that the infrastructure already in place for mobile phones could also support e-readers (i.e., charging e-readers with solar-powered car batteries, using

satellite internet via cell phone networks to download e-books) (Worldreader 2010a). In short, the pilot test demonstrated that digital reading mediated by e-readers was a promising solution for students in the developing world.

In 2011, with the support of the U.S. Agency for International Development (USAID), and under the aegis of the Global Development Alliance, Worldreader continued to build on these promising findings with its next experiment: the iREAD (Impact on Reading of E-readers And Digital content) demonstration project in Ghana. Having secured agreements with both local and international publishers, including 10 Ghanaian publishers, Worldreader was also able to digitize and add a large number of new books, including eight textbooks, into its library. These initial agreements helped to lay a foundation of credibility for Worldreader's eventual network of more than 150 partner publishers, and demonstrated to its potential future partners that digital publishing could be a viable business model. After the seven-month iREAD intervention, Worldreader found that students exposed to both e-readers and to mentoring and extracurricular support had the greatest improvements on standardized reading scores; that there was a ripple effect, as students shared the benefits of the e-readers with their families and friends; and that e-readers helped to increase the exposure of Ghanaian authors (Worldreader 2012).

In 2013, with the support of an All Children Reading grant from USAID, the Australian Agency for International Development, and World Vision, Worldreader expanded upon the lessons it had learned from implementing iREAD to start iREAD 2

in eastern Ghana. iREAD 2 focused its package of interventions on early grade reading, delivering relevant content through e-readers to students in grades 1 through 3, providing teachers with phonics-based literacy instruction training, creating extracurricular reading activities, and developing school and community e-reader management systems. This intervention, which lasted one and a half years, showed that positive outcomes in reading skills development through access to digital learning materials could be extended to children younger than those reached in the previous, first iREAD project. It also showed that improved and more durable e-reader devices than used by Worldreader previously, along with ample student, teacher and community training could help reduce the number of device failures (Worldreader 2014b). Upon completion of iREAD 2, the program transitioned into community-owned projects run by individual school management committees along with district education officers. Worldreader is building upon this work, including engaging with the Ghanaian government about scaling up its interventions in the Eastern region and elsewhere in Ghana.

Throughout the "lean" experimentation with and expansion of iREAD—and as Worldreader began to form partnerships with other country governments to add e-reading devices to their existing reading programs, such as Kenya's Primary Math and Reading (PRIMR) Initiative—it became evident to Worldreader that the cost-effectiveness of providing one e-reader per student was posing a challenge for the process of scaling up its e-reader program (see below for more on costs). This led its leadership to explore the effectiveness of adding a shared model, whereby students

would have access to a set of e-readers provided for each classroom or via their school library. It also led the organization to look toward other distribution networks for scaling up digital reading.

For instance, in 2014, after securing funding from the Bill & Melinda Gates Foundation, Worldreader launched Project LEAP (Libraries, E-reading, Activities, and Partnership) to test the use, function, and adoption of 200 e-readers in eight public and community libraries in Western Kenya. Although the underlying purpose of this pilot was to determine whether and how e-readers might affect library patronage and community reading habits, it was also intended to extend the organization's scope beyond reading programs in schools. Worldreader saw expansion to libraries as a way to leverage other distribution networks and to further harness ICT for increasing access to books on a wider scale. Indeed, this model demonstrated to the organization, its stakeholders, and their partners that Worldreader's interventions could be scaled up at a much lower cost than its classroom model.² It also stimulated discussions with Kenya's national library association to scale up the program via the country's libraries (personal communication, Sarah Jaffe and Jenny Perlman Robinson, September 30, 2015).

Worldreader also responded to the cost of scaling up by approaching its interventions from a business franchise perspective. Specifically, Worldreader's BLUE (Building Literacy Using E-Books) Box and Book Pack programs enable other qualifying NGOs (i.e., those that already support or are interested in supporting schools and/or libraries in Africa), individuals, schools, and

libraries to purchase, for \$7,000 (BLUE Box) or \$4,500 (Book Pack), a kit with the necessary equipment, content and support needed to start a small-scale e-reading program. For example, a standard BLUE Box contains 50 e-readers, each loaded with a minimum of 100 digital books, accessories, project management tools, technical assistance, professional development opportunities, and access to Worldreader's book catalog to purchase additional e-books at affordable prices. A Book Pack contains everything a BLUE Box contains, with the exception of the e-readers, which must be supplied by the implementing organization. This allows schools which may already have tablets from other ICT interventions, to acquire more relevant content from the Worldreader library. To assist communities that have limited or unreliable access to electricity, Worldreader also sells a solar charging solution from the company BBOX, which was tested and vetted during its Renewable Energy for Education pilot project in 2014, as an add-on product for \$500 (Worldreader 2015c).

Finally, with mass market 2G mobile phones accounting for 75 percent of mobile phone subscriptions (or approximately 684 million subscriptions) in Africa today, Worldreader saw another opportunity to expand access to books worldwide and to amplify its impact on a global scale (TeleGeography 2015). In 2011 Worldreader began a strategic partnership with biNu, an Australian-based mobile app developer responsible for enabling millions of people in low-income countries to access popular apps like Facebook, Twitter, and Google from their phones.

Worldreader's partnership with biNu specifically centered on developing a feature phone reading app, which would help significantly expand Worldreader's reach to a broader population beyond students and teachers. In keeping with its "lean" approach, Worldreader started with a basic book reader that biNu had already built, which contained only books that were in the public domain, such as "A Tale of Two Cities" by Charles Dickens. Worldreader populated this application with local and relevant books—the combination of app and the right books was sufficient to test the platform. After the beta version revealed high user demand (thousands of biNu users came into the Worldreader app), Worldreader and biNu formalized their partnership and began to make improvements in the mobile reading app for an official launch in 2012 (personal communication, Christina Kwauk and Zev Lowe, June 7, 2016).

Worldreader has continued to build off its work with biNU on feature phones, and currently has reading apps available on Android, Windows Phones and mobile web browsers. In 2015 a strategic partnership with Opera, a Scandinavian Web browser developer and creator of the Opera mini-browser for mobile phones, allowed the organization to develop its mobile web browser app and promote it on Opera's "speed dial" in certain countries. This made Worldreader's library more accessible in an increasingly crowded app market and catalyzed even further Worldreader's impact on digital reading. In fact, Worldreader Mobile plays a crucial role in Worldreader's scale-up strategy; the organization's goal to reach 15 million people by 2018 includes reaching 14 million people via its mobile reading platform.

Impact and evidence of success

One advantage to using mobile phone apps is that Worldreader has been able to track the reading behaviors of its users through the apps' back ends. Based on these data, Worldreader has consistently increased the number of people reading on its e-reader and mobile platforms. In 2014 alone, 531,099 more people were reached than in 2013 (Worldreader 2014a). By June 2015, Worldreader had reached 5.6 million users (since 2010) in 53 countries across Africa, Asia, and Latin America; by the end of 2015 this number went up to 16 million, largely due to the Worldreader Mobile app being featured on Opera's speed dial (personal communication, Christina Kwauk and Zev Lowe, April 8, 2016).

In the classroom, Worldreader's e-reading solutions have helped to improve teachers' capacity by providing them with access to books and supplemental teaching materials that they did not have previously. According to teachers participating in the iREAD Ghana Study (2011-12), this access has given them a greater range of resources to draw upon while planning their lessons, improving the overall quality of the content covered in class. E-readers have also saved them time from having to search through the limited books in their schools' libraries or from having to pay to use internet cafes to conduct background research. They have also been able to "push" textbook materials and supplemental learning materials to students' e-readers without having to worry about access to the material for all students or burdening students with extra costs (Worldreader 2013).

Worldreader's e-reader programs have also appeared to help improve the quality of classroom instruction time and to increase reading opportunities for students. Because e-readers gave all students access to the text, teachers have been able to more effectively engage students in lessons—which, according to teachers, has helped increase students' retention of concepts, in turn increasing their confidence and improving their overall educational experience (Worldreader 2012). For instance, teachers reported being able to teach students the importance of supporting their ideas with specific facts and evidence by citing the sources of their responses to reading comprehension questions from content on their e-readers. Teachers have also been able to extend reading opportunities for students beyond class time by assigning reading homework. In the past, the task of assigning homework was mired in logistical difficulties—either there were not enough textbooks for students to take home to complete assignments, or schools did not allow students to take textbooks home, period. But because each student was assigned their own e-reader—in the iREAD Ghana Study—for the first time, students had reliable access to books for both academic and personal use. According to teachers, this had the added effect of improving students' preparation for class, allowing teachers to cover content from the syllabus at a faster pace (Worldreader 2012).

Students in the iREAD 2 program, in turn, responded that the e-reader made their classes more interesting and educational—no doubt due to the 140 books and

textbooks to which they each had access on their e-readers, compared with the 1.2 textbooks students each have access to in control schools (Republic of Ghana Ministry of Education 2013; Worldreader 2013). It also appears that the e-reader improved students' interest in reading, or what Worldreader calls inspirational reading—"reading that engages the imagination, builds knowledge about the world, and ignites a passion for learning" (Worldreader 2010a, 4).

In terms of more traditional measures of reading outcomes, the results of an independent evaluation of iREAD 1 found that primary students (grade 4) who received e-readers plus a full package of support interventions (including activity-based learning, extracurricular reading activities and support, and teacher training and support) improved their literacy scores by 15.7 percent after seven months, compared with control students, who improved by 8.1 percent. A randomized evaluation of iREAD 2 found that these reading gains could even be observed among younger children (grades 1-3). Specifically, these results indicate that by the end of the intervention, 41 percent of grade 3 iREAD 2 students could read above the minimum proficiency level of 45 correct words per minute in English, compared with 13.4 percent of students in the control group. Students in the iREAD 2 program also improved their reading comprehension scores in both their mother tongue and English by more than 50 percent. Low-performing students in iREAD schools were also significantly affected; the proportion of iREAD 2 students who could not read a single word in their mother tongue fell from 64.6 percent to 8.9 percent (Worldreader 2014b).

Furthermore, the results illustrated that though boys in control schools performed twice as well as their female counterparts, there was equal improvement by iREAD 2 boys and girls, narrowing the gender gap in reading fluency (Worldreader 2014c). Indeed, these results were a welcome relief, as one potential risk of leveraging technology for development is that these interventions often further perpetuate gender inequalities by benefiting those who already have access to the technology, in this case males. But in the case of found that, on average, females read six times more per month on mobile phones than do males (UNESCO 2014). The organization is further examining the reasons for this finding, but theories include the fact that the mobility and privacy of digital reading—and perhaps technology in general—drive girls and adolescent women to read more. (Sarah Jaffe and Zev Lowe, interview by Jenny Alexander and Jenny Perlman Robinson, March 12, 2015).

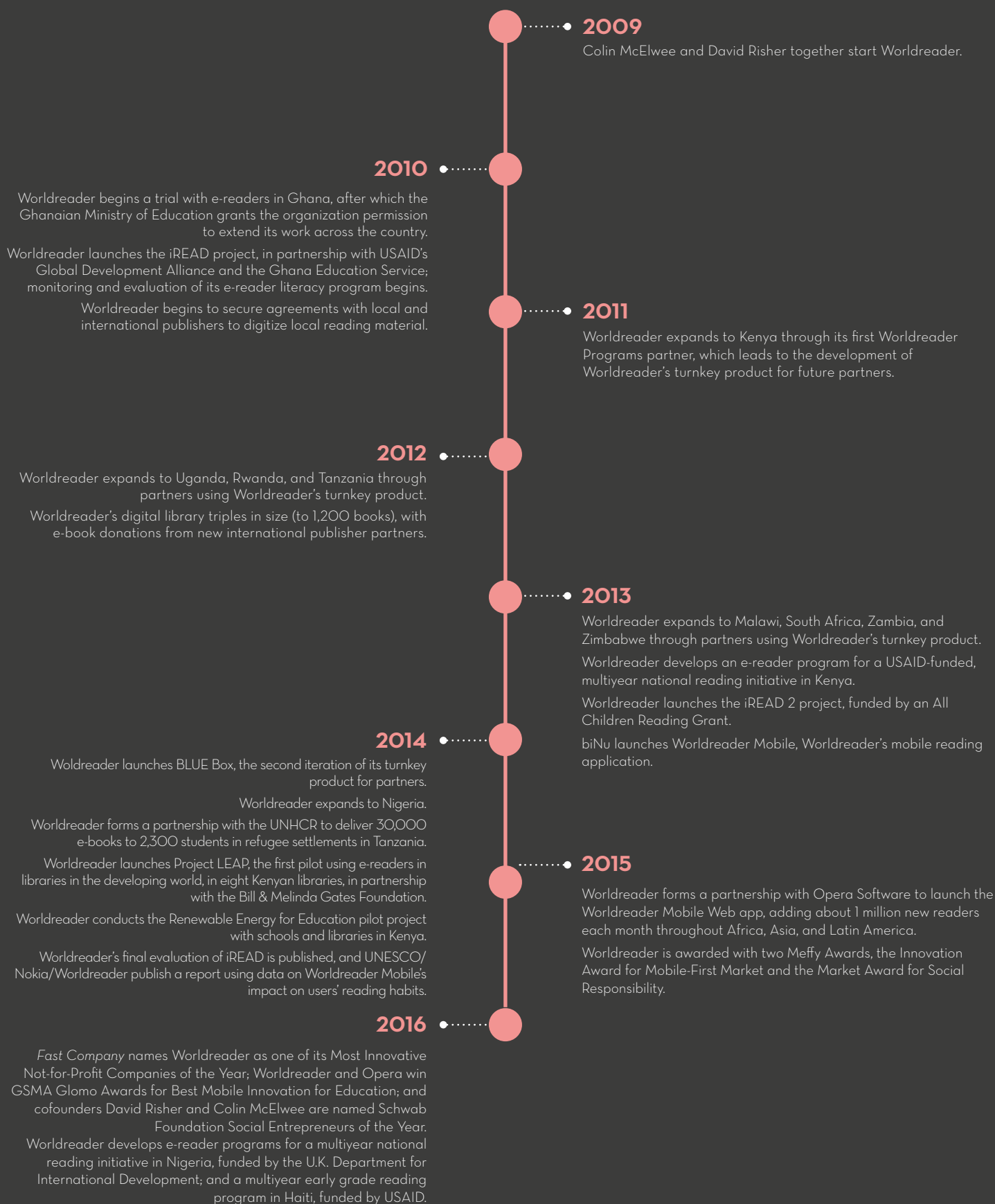
The positive impact of e-readers on teachers, students, and the classroom environment was also observed in public and community librariesWorldreader, another study conducted jointly by UNESCO, Nokia, and Worldreader. The results from an internal evaluation of Project LEAP in Kenya demonstrated a threefold increase in library visits over the course of 8 months. In addition, due in part to the rapid expansion of the libraries' collections, 84 percent of library patrons surveyed reported reading more after the e-reader program began (Worldreader 2015b). Although its direct impact on literacy has yet to be evaluated, this pilot demonstrated, along with the cost estimates noted above, that the e-reader could become an efficient and cost-

effective solution to the shortage of books and local-language reading material on a much larger scale.

Finally, Worldreader Mobile has also demonstrated positive outcomes in creating a culture of reading throughout the developing world. Like Project LEAP, however, whether Worldreader Mobile is having a direct impact on improving literacy remains to be studied. Nonetheless, the sheer number of people reached through

the app (3 million) is an indication that mobile reading is a promising solution to increasing people's access to reading material, especially for girls and women, as mentioned above. And the fact that more than 70 percent of Worldreader's the publishers Worldreader works with are located in Africa and India means that the content people are reading is more likely to be locally relevant, and that the platform is opening a market for local authors and local publishers.

Timeline of key events



Key drivers behind scaling impact

The story of how Worldreader has harnessed ICT for literacy and created a culture of reading through e-readers and mobile phones is one from which many educational organizations can learn, particularly those interested in the intersections of technology, education, and development. But for the purposes of this case study, the question of interest is: How did Worldreader reach more than 3 million readers across 53 countries so quickly?

Following a “lean” approach to experimentation, Worldreader started with a single program outside Accra, Ghana and moved to Kenya and beyond within two years. According to David Risher, Worldreader’s president, he and his cofounder, Colin McElwee, realized that they had a choice to continue searching for literacy solutions within the print industry, cutting down trees and enduring high shipping costs, or they could improve access to texts through digital means, allowing people to download books in 60 seconds (Keynote presentation by David Risher at the Kenya Publishers Association Digital Reading Summit, April 21-22, 2015). On top of this, digital reading presented an opportunity to move toward a global reading culture at breakneck speed, with “the wind at their backs” (Sarah Jaffe and David Risher, interview by Jenny Perlman

Robinson, December 1, 2014). Not only was technology getting less and less expensive everyday, but technological advances were also presenting a unique opportunity to propel literacy in areas that were book-poor by taking advantage of inexpensive e-readers and mobile phones to make thousands of e-books accessible to students, their families, and their communities around the developing world.

To accomplish this, Worldreader followed several key strategies, including identifying and bringing together a range of growth-oriented partners in governments, schools, libraries, and the commercial sector; using evidence of impact and reach to further propel the organization; and developing teacher support and community management systems to ensure maximum integration and utilization of the intervention. Worldreader’s leaders often compare its approach to scaling up digital reading with the way market forces made mobile phones ubiquitous across the developing world (Worldreader 2015a)—that is, by catalyzing a healthy ecosystem of actors and organizations, in which each entity affects and is affected by the other, and evolves and adapts in relation to each other. In this way, through cooperation as well as competition, a culture of e-reading rapidly takes hold.

Building an ecosystem of e-reading

Worldreader’s model for e-book distribution has tremendous potential to improve upon traditional paper book distribution mechanisms. For instance, by cultivating relationships with local and global publishers, Worldreader has been able to

procure e-books for its school and library programs at an average cost of \$0.50 per e-copy, rather than the average cost of \$2.25 per paper book. This has helped to create tremendous cost savings: compared with outfitting students with the same

number of paper books as are deployed for iREAD 2 (140 titles), Worldreader's e-reader delivery system amounts to over \$190 saved per student, even when taking into account the additional hardware cost of providing one e-reader per student.³

According to Sarah Jaffe, the director of education and program design at Worldreader, "one of the most innovative parts of our work isn't the technology, but our relationships with local publishers" (Sarah Jaffe and Zev Lowe, interview by Jenny Alexander and Jenny Perlman Robinson, March 12, 2015). Fostering strong relationships with 150+ local and international publishers enabled the organization to build its digital library while simultaneously laying the foundation for a robust local and international digital publishing market. For many of Worldreader's local publishing partners, their collaboration with Worldreader was their first foray into the world of digital publishing and sales. Though Worldreader's larger international publishing partners were able to donate portions of their catalogs—some already digitized, some not—Worldreader's business model with local publishers was to pay them for the rights to their books or to help them sell their books directly to users. In many arrangements, \$0.70 went directly to the publisher and \$0.30 went to Worldreader to cover the costs of digitizing and distributing the content (Worldreader 2015a).

Demonstrating impact with numbers

As illustrated earlier in this case study, Worldreader has benefited tremendously from a research-and-development approach to improving

Worldreader's relationships with its publishing partners can also be seen as part of a larger approach to identifying and coordinating growth-oriented partners where their interests align. This has meant not only developing partnerships with publishers interested in expanding their market share with digital content, but also with an entire ecosystem of stakeholders critical to supporting a culture of e-reading. This has included mobile phone carriers interested in increasing customers' usage; e-reader manufacturers interested in improving the durability of their devices; solar battery manufacturers interested in providing renewable energy to areas where access to electricity is limited; donors interested in supporting ICT for development; and information technology, telecommunications, and software companies interested in developing a global architecture of digital reading solutions. One partner that Worldreader has increasingly worked to include in this ecosystem is governments interested in delivering on their obligation to provide quality literacy instruction and reading materials. Branching outside its typical NGO-to-NGO pathways, Worldreader has begun working with ministries of education through multiyear, donor-funded initiatives. The organization has also customized or is beginning to customize its programs to better tailor them to meet the needs of national reading programs in, for example, Haiti, Kenya, and Nigeria.

its implementation models and delivery mechanisms. Specifically, Worldreader's iREAD 1 project was evaluated by an external organization; internal

evaluations used Early Grade Reading Assessments to demonstrate its impact on childhood literacy and reading habits. However, to date, evaluations like the iREAD Ghana Study and the others cited in this case study have been based on relatively small sample sizes and thus have not yet yielded sufficient evidence of impact at scale. Nonetheless, after several years of experimenting with different delivery mechanisms and implementation models, Worldreader's e-reading solutions now provide options for establishing digital e-reader programs tailored for individual use, shared use, and community-wide usage. Its mobile apps also provides convenient user data that feeds immediate information about programs' impact to Worldreader's leadership.

Designing based on users' needs

According to Joan Mwachi of Worldreader, Worldreader's programs are "about reading, not the device" (personal communication, Joan Mwachi and Jenny Perlman Robinson, April 21, 2015). That is, Worldreader focuses on the content over the technology, and the organization uses what it knows to enable technology to work for the needs of users. Rather than focusing on the latest technology, Worldreader leverages the idea of digital reading, especially in local languages, to make e-reading easier, cheaper, better, and faster to scale up.

Worldreader's technologies and program models are demand-driven, customer-designed, and market-based, which also helps to make them cheaper and easier to use. For instance, Worldreader began to

But beyond actionable data informing better programming, Worldreader's use of data and analytics has also been critical for enlisting key partners. For instance, its use of e-book sales data was a key factor in demonstrating the viability of digital publishing to African publishers, proving to them that there are both a robust local market and a nascent international one. And data indicating the sheer reach of Worldreader Mobile have caught the attention of corporate partners like Microsoft Mobile, which have helped significantly improve various aspects of Worldreader's data analytics and research capacity, and telecommunications companies like Cellcom Liberia, which has helped to link even more users to Worldreader through zero-fee access (Sarah Jaffe and David Risher, interview by Jenny Perlman Robinson, December 1, 2014).

distribute reading lights to students upon receiving feedback that students could not read in the evenings on their e-readers; it piloted a solar charger that would allow schools and teachers to recharge their devices without access to the grid; and it set up an iREAD Vacation Reading School to enable students to come to their schools during vacations to borrow an e-reader from a supervising teacher, or to participate in a book discussion or spelling bee (Worldreader 2012). Committing to meeting users' needs rather than to a focus primarily on the technology has also made Worldreader sensitive to the interests of libraries, a critical distribution channel for the organization (personal communication, Sarah Jaffe and Jenny Perlman Robinson, September 21, 2015). For instance, Worldreader has developed

a library program handbook to assist librarians manage their e-reader programs; it is helping libraries identify appropriate digital content for their target patron populations; and it is

developing better community outreach to help raise libraries' profiles and to attract new patrons who may not have known about the library before (Worldreader 2015b).

Encouraging buy-in from teachers and communities

According to Worldreader, "Over time, [Worldreader has] learned that we need to be more teacher-centric and less tech-centric" (personal communication, Sarah Jaffe and Jenny Perlman Robinson, December 7, 2015). That is, Worldreader has recognized that buy-in from teachers and school administrators and the support of local champions is critical to its success. During its trial run in Ghana, for example, the enthusiastic support from the headmaster and the grade 6 teacher at the implementing school greatly contributed to the trial's success (Worldreader 2010b). But beyond local champions who see the potential in the intervention early on, Worldreader has also conducted regular teacher training and professional development opportunities (i.e., ongoing knowledge sharing and professional workshops) to help build teachers' capacity, specifically for the functional use of the e-reader (i.e., navigating the device) and to help teachers incorporate the e-reader into their classrooms (i.e., lesson planning, integration with aspects of the syllabus, and developing specific activities and teaching methods using the e-readers) (Worldreader 2012). These strategies have not only helped to ensure that teachers feel comfortable using the device before it is introduced to students but have also garnered teachers' support for the program in general, increasing the likelihood that e-readers

will be used to their maximum utility in classrooms to enhance learning.

Worldreader has also spent significant time engaging students and their families, as well as community leaders, before deploying e-readers. These launch events have provided Worldreader with a logistical opportunity to get students and their parents to sign pledges promising to keep the e-readers safe and to use them effectively.⁴ But more crucially, these events have allowed Worldreader to introduce itself, its intervention, and the importance and significance of reading rather than just the novelty of the device. Indeed, as mentioned above, Worldreader has been focused not on the technology per se but on the role of technology in enabling society to do something better—in this case, read. Although the device itself makes it easier and faster to scale up the intervention and to attract widespread interest in the program, Worldreader has been committed to not letting the technology overshadow the task of improving literacy and increasing access to reading materials (personal communication, Sarah Jaffe and Jenny Perlman Robinson, September 30, 2015).

In addition, Worldreader has also worked with school management committees—which include teachers, parents, and project coordinators as

members—to create transition plans to enable schools to manage and finance the e-reader programs on their own. These committees also extend Worldreader's work to engage parents and communities, by raising parents'

awareness about the importance of allowing their children time to use e-readers at home to practice reading, and, in some cases, by even providing e-reader training for parents themselves (Worldreader 2014b).

Experimenting with different delivery models

As mentioned earlier in this case study, Worldreader followed a "lean" method to experiment with its e-reading platforms, which helped it reduce wasted effort by identifying inefficiencies and troubleshooting problems before it invested resources in scaling up the initiative (Murray and Ma 2015). This approach also enabled the organization to experiment with different delivery models, adapting its approach to control costs—its greatest challenge, and the biggest target among its critics—whenever possible.

For instance, Worldreader estimates that the cost of delivering a full set of textbooks per grade for each primary-level student via e-readers (including the cost of purchasing e-readers and accessories, and hiring on-the-ground technical support persons at each school) would be \$99 less per student over a five-year period than the cost of delivering traditional paper textbooks. And because digital books cost less than paper books, each additional book that students might purchase for academic use would cost on average \$0.80, compared with \$4.00 for paper books. However, even with the cost of e-reader devices falling drastically over the last five years (from \$300 per device to approximately \$50 today), providing one fully loaded e-reader per

primary student costs approximately \$16.20 per student per year—a price point that is still too high for most governments to absorb (Worldreader 2014b).

To position itself at the forefront of maintaining the cost-effectiveness of its intervention, Worldreader explored four additional e-reader deployment methods, which through iterative experimentation eventually evolved into its current early grade reading programming areas. To recap briefly, these models include (1) a shared model, whereby students have access to a set of e-readers in their classroom and/or school libraries; (2) a community model, whereby Worldreader leverages other distribution networks outside the classroom, such as libraries—which has demonstrated itself to be a surprisingly important vector for sharing e-readers; (3) a partnership model, whereby qualifying organizations can launch their own Worldreader programs using the Worldreader BLUE Box, whereby Worldreader provides devices, or the Worldreader Book Pack, whereby students can access Worldreader's digital library using e-reader devices or tablets that they or their schools already own (personal communication, Christina Kwauk and Zev Lowe, April 8, 2016).

Planning for long-term financial sustainability

Worldreader aims to reach 15 million readers by 2018 (1 million people via its e-reader programs, and 14 million people via its mobile reading apps). The organization's diligent collection of costing data has given it a good sense of what it will need to achieve this goal, while ensuring its long-term financial sustainability. Based on these costing data, Worldreader plans on raising \$15 million between 2015 and 2018 and on maximizing its economies of scale. As Worldreader's reach grew between 2011 and 2015, its cost per person reached (as calculated by total organizational costs divided by the number of people reached) fell dramatically. For its e-reader programs in schools and libraries, for instance, it cost \$727 per person in 2011; but in 2015 the cost per person was merely \$32, and it is projected to fall as low as \$10 per person by 2018. For its mobile app, the cost per person in 2012 was \$4.31; in 2015 it was \$2.27, and it is projected to fall even further, to \$1.51 per person, by 2018 (Worldreader 2014a). One cost that the organization is continuing to work on lowering is the cost of purchasing each e-book for its schools and libraries programs. At present, the cost of each book is \$0.50 on average to the end user. Conversations with Worldreader's publishing partners indicate a willingness to reduce these costs based on larger economies of scale (Sarah Jaffe and Zev Lowe, interview by Jenny Alexander and Jenny Perlman Robinson, March 12, 2015; personal communication, Christina Kwauk and Zev Lowe, April 8, 2016).

Worldreader also aims to raise an additional \$6 million over three years to cover its ongoing day-to-day operations.

Aside from fund-raising, the organization has also created a diversity of financing streams, which in some cases has meant leveraging its ecosystem of actors into specific types of institutional partnerships. These financing streams are closely aligned with the organization's three implementation models, which were discussed above: its direct implementation and pilot projects, funded by donors like USAID and the Bill & Melinda Gates Foundation; its social enterprise model, which is self-financing and currently makes up 4 percent of its revenue; and its joint partnership model, whereby Worldreader and its partner organizations fund-raise jointly or whereby the partner organization pays Worldreader directly to test an idea or to achieve a specific outcome (i.e., digitalizing local curriculum in refugee camps, testing solar power solutions to charge e-reader devices more cheaply, and improving girls' transitions to secondary school by improving their English-language literacy). Worldreader is also seeking to add government partnerships to ensure sustainability as its programs and/or digital content are integrated into the national education system.

Currently, Worldreader's largest source of revenue is individual donations, at 54 percent in 2014; its second-largest source, at 23 percent, is in-kind donations (i.e., digital content, e-readers, and mobile app development work); and its smallest source is government, at 2 percent (Worldreader 2014a). In-kind donations have been a particularly tricky terrain to navigate, because they have been a significant source of support for Worldreader, especially in its early stages

of development. To illustrate, in its early days Worldreader's e-readers were largely donated by e-reader manufacturers. But this model of acquisition meant that organizational growth would be less predictable and limited (i.e., dependent on periods of excess stock among e-reader manufacturers), and it did not afford the opportunity for Worldreader branding (personal communication, Christina Kwauk and Zev Lowe, April 8, 2016). In terms of its digital content, Worldreader initially asked many of its publishing partners for free use of their books in exchange for digitizing the books for free. This may have worked in the long term for its larger publishing partners, especially those located in the Global North and those interested in engaging with Worldreader exclusively through a one-time or continuing book-donation relationship. But for many of its local publishing partners, especially those that rely on book sales from countries where Worldreader has programs for their own revenue, Worldreader had to strategize how best to move away from donations of its digital library content to a business model in which it could pay publishers for their materials.

In short, Worldreader had to consider the long-term financial sustainability of its partners in order to achieve its own long-term sustainability and to maintain the health of the larger ecosystem of e-reading, to which a growing e-reader market and a thriving digital publishing industry

are integral. Although Worldreader continues to accept charitable donations, it has worked to build a supply chain for e-reader manufacturers and a pricing model for e-book publishers so that its prospective partners can provide goods at a lower cost, rather than at no cost, and can gain a business profit from their partnership with Worldreader (personal communication, Sarah Jaffe and Jenny Perlman Robinson, December 7, 2015; personal communication, Christina Kwauk and Zev Lowe, April 8, 2016). Moreover, publishers could especially make a greater profit in the long term and at scale by eliminating paper costs, by reducing logistical costs from distribution challenges, and by gaining wider access to customers through the e-reader or mobile app (Worldreader 2012).

Looking forward to its goal of reaching 15 million people by 2018, Worldreader plans to continue the strategies described above in those countries that have the greatest growth potential. These include the countries where Worldreader has existing relationships with publishers, implementation partners, and mobile carriers; where opportunities to scale up its reading interventions can reach a critical number of schools; where mobile phone penetration rates are high and mobile infrastructure is strong; and where there is a strong political will to support innovative education reform programs and to commit to the use of technology in education settings.

Lessons learned

- To improve literacy, Worldreader focused on creating a culture of reading by *leveraging technology* to provide access to more than 30,000 books via low-cost e-readers and mobile reading applications that could be used by students, teachers, and families. It is particularly important, however, that Worldreader has not been distracted by the technology, but rather has remained committed to using technology as a vehicle to achieve something bigger.
- But more than just leverage technology, Worldreader also *took strategic advantage of key market forces*, using opportunities like the decreasing cost of technology and the increasing use of mobile phones to catalyze scaling up and to amplify their impact.
- Worldreader sought out *partnerships with growth-oriented actors* where their interests aligned, such as local publishers and mobile phone carriers. This not only facilitated the expansion of Worldreader's digital library and the scope for scaling up its impact; it also allowed the organization to focus on building an ecosystem in which partners mutually helped the system grow and become self-sustaining.
- Worldreader benefited from *extensive user data and impact tracking*. Not only did the organization use actionable data to improve program design, delivery, and implementation; it also used data and analytics to win over potentially key partners, like publishers.
- Investing in *teacher training* not only helped garner crucial teachers' support for Worldreader; it also helped to ensure that e-readers were integrated to their maximum potential into classroom teaching and learning.
- Borrowing from the for-profit business world, Worldreader used a *"lean" approach to developing* the smallest-scale version of its e-reader platform, testing it in the field, and then improving upon its design and delivery based on user feedback. In some cases, this meant experimenting with other delivery models (i.e., providing e-readers per class rather than per student) and other delivery channels, including libraries to share e-readers and, later, relying more on mobile phones than e-readers outside school environments.
- Worldreader learned how to *keep costs low* by revising its delivery model and maximizing economies of scale. By maintaining diligent costing data, Worldreader has been able to stay at the forefront of maintaining the cost-effectiveness of its interventions, while planning for long-term financial sustainability.
- Additionally, in planning for long-term sustainability, Worldreader has benefited from *its ecosystem approach* to creating a thriving, self-sustaining culture of e-reading. That is, by assuring the health of each individual component and that the relationships within the system are mutually beneficial, the system can sustain itself.

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Endnotes

1. Although the decreasing cost of basic e-reader technology promises to make the Worldreader model cheaper as it grows and develops, some researchers like Tony Read (2015) caution that the demand for e-readers with larger screen sizes, color capacity (as opposed to black and white only text display), and other features will continue to drive costs up.
2. Conservative estimates placed the cost per person over a 3-year period to between \$8-\$15 (Worldreader 2015b).
3. This excludes operational costs and additional program components, such as teacher training (Worldreader 2014d).
4. Worldreader staff attribute the low loss and theft rate of e-readers to the degree of community buy-in.

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