

# Worldreader Case Study: Using E-Readers to Improve Child Literacy in Ghana

## Worldreader Case Study: Using E-Readers to Improve Child Literacy in Ghana

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### **Abstract**

This paper provides an in-depth case study of Worldreader, a nonprofit that seeks to address low early grade literacy rates in sub-Saharan Africa by providing relevant, much-needed reading materials to schools through low cost e-reader devices and implementation support. The case study will provide an overview of the literacy challenge and how Worldreader works to address it through a pilot program in Ghana. It will also assess how well Worldreader uses its program to help teachers incorporate 21st century skills into the classroom and provide recommendations to improve impact evaluations as the organization works to scale-up throughout the continent.

### **Setting the Scene: Early Grade Literacy and Donor Incentives in Sub-Saharan Africa**

Since the adoption of the 2000 Millennium Development Goals (MDGs), access to education has greatly expanded across sub-Saharan Africa. However, *quality* of education remains a pressing issue in most systems. In particular, many aid organizations have identified early-grade literacy as a major point of concern. UNICEF officer Uma Polepeddi goes as far as to label the issue a “learning crisis” in her current country, Mozambique, where more than 90 percent of third graders are unable to perform even the most basic reading competencies (U. Polepeddi, personal communication, September 26, 2014).

Developing strong readers in early primary school is an especially urgent need because research demonstrates that in order for children to transition from “learning to read” to being able to participate in activities that require “reading to learn,” it is vital that they establish a basic foundation in literacy before they begin grade four (Abadzi, 2011). If they are not able to do so, as is the case for the vast majority of children in many countries, it becomes much more difficult

for students to continue to improve in school. Further, basic reading skills are imperative in order for children to develop sought-after “21<sup>st</sup> century skills” like communicating globally and synthesizing and using written information across contexts.

The major donors who fund MDG-aligned education development projects are acknowledging the importance of supporting early grade literacy in the programs they support. UNICEF Mozambique—which manages a nine-country pooled fund that underwrites almost 20 percent of the country’s education budget—is working to increase sector donor coordination in this area. And when USAID updated its education strategy in 2011, the agency identified improving primary grade reading as its main, unifying goal, writing that “effective reading is a necessary pre-condition for skill development in all other areas and, as such, will be the primary target by which we hold ourselves accountable for results in basic education” (USAID, 2011).

Interestingly, many donors are seeking to address early literacy in sub-Saharan Africa by specifically distributing grants that use technology to improve reading skills. In Mozambique, this has been a challenge for UNICEF, as several major donors plan to pull out of the education sector pooled fund, cutting the budget by half, in order to pursue education technology programs instead (U. Polepeddi, personal communication, September 26, 2014). On a global scale, in 2011 three bilateral donors—USAID, WorldVision, and Australian Aid—launched All Children Reading, “a global competition that leverages science and technology to create and apply scalable solutions to improve literacy skills in developing countries” (All Children Reading). By specifically awarding grants to partners that use education technology to teach reading, such programs provide strong financial incentives for NGOs and local organizations to incorporate technology into their literacy initiatives in order to qualify for funding.

It thus appears that more donors are interested in exploring literacy projects that incorporate technology. In order to access this funding, should aid organizations like UNICEF Mozambique consider making technology a greater priority in their early literacy strategies? Are there technology-based interventions that *do* effectively increase primary school reading levels in sub-Saharan African contexts?

To explore this question, this paper offers a case study of one of the projects All Children Reading helps fund: Worldreader's iREAD 1 and 2 projects in Ghana. Worldreader is an American nonprofit that attributes the literacy crisis in many developing countries to a lack of textbooks and relevant reading materials for students. The organization operates under the theory of action that if students have greater access to a wide-range of literature, as well as well-trained teachers who encourage reading, then student reading scores will improve. In the long term, Worldreader hopes that its programming—which it intends to be self-sustaining and scalable—will help develop what we might consider 21st century skills among students and communities, including technical literacy, communication and collaboration skills, social responsibility, and an appreciation for diversity.

### **21<sup>st</sup> Century Skills**

With the increasingly complex social, political, and economic challenges that come with living in a globalized world, no longer is the mastery of academic content enough to guarantee individual success and common social good in the future (Pellegrino, 2012). To meet new demands, individuals must develop other key aspects of human competence, including universal values (e.g., democracy and nonviolence), soft skills, and resilient attitudes (Global Citizenship Education, 2014). This range of cognitive and non-cognitive skills falls under the heading “21<sup>st</sup>

century skills.” These skills are often grouped into three clusters—cognitive competencies, intrapersonal competencies, and interpersonal competencies—as shown below:

1. Cognitive competencies

- E.g., Critical thinking, analysis, reasoning, interpretation, decision-making, adaptive learning, information literacy, technology literacy, oral and written communication, creativity (Pellegrino, 2012).

2. Intrapersonal competencies

- E.g., Flexibility, cultural appreciation, personal and social responsibility, appreciation for diversity, continuous learning, intellectual curiosity, self-direction, perseverance, productivity, professionalism, citizenship, career orientation (Pellegrino, 2012).

3. Interpersonal competencies

- E.g., Communication, collaboration, coordination, empathy, trust, negotiation, leadership (Pellegrino, 2012).

While 21<sup>st</sup> century skills can be learned outside of the traditional classroom, experience suggests they are best learned in an academic environment from as early as preschool (Koenig, 2011). Educators can incorporate meaningful learning into their lessons through different representations of models such as diagrams and simulations; prompting students to analyze, develop, and explain concepts; tasking learners with challenging assignments while also supporting them with guidance; teaching using examples; motivating students by connecting lessons to real world situations; and using assessments to consistently monitor and respond to students’ learning progress (Pellegrino, 2012).

## **21st Century Skills and Technology**

A common misconception is that teaching 21<sup>st</sup> century skills is synonymous with teaching students to use technology and digital resources. However, using technology in the classroom does not automatically mean that deeper learning is taking place. Many large-scale technology interventions have struggled to demonstrate that they can improve test scores or help foster 21<sup>st</sup> century skills. For example, in 2012, Thailand implemented a program to distribute 400,000 tablets to public school students (*The Economist*, 2012). The goal was to revitalize the stagnant education sector, which, despite receiving 20 percent of the national budget (the government's largest investment in any sector) had experienced falling PISA and English-language score rankings. But the huge investment in tablets did little to improve educational excellence. According to Kelly Rolfes-Haase, a former Thailand Peace Corps Volunteer, "the problem wasn't the tablets. The problem was how they were implemented. Teachers didn't have the tools to effectively utilize the tablets. Our tablets ended up not being used, and were locked away in a cabinet because they were valuable. They didn't want the children to mess with them because then the school would have to pay for them." (K. Rolfes-Haase, personal communication, 3 December 2014). Similarly, a 2013 program to distribute 700,000 iPads to students in the Los Angeles Unified School District proved so ineffective that it was prematurely halted, and is now even the subject of an FBI investigation (*Wall Street Journal*, Dec. 2, 2014).

In evaluating educational technology programs, it is thus important to remember that technology is only a *means* of addressing education challenges like reading, not a solution in and of itself. So, how then can technology be incorporated into education in a way that is meaningful, relevant, and contextually appropriate, especially in the developing world? Worldreader provides a useful case study to explore this question.

## **Worldreader**

David Risher, a former executive at Amazon.com, and Colin McElwee, former Director of Marketing at ESADE Business School, founded Worldreader, an American non-profit organization in 2010 (Worldreader.org). Worldreader aims to improve low literacy rates in sub-Saharan Africa by providing students and schools with access to relevant literature in the form of e-books. Believing that “literacy is a foundational skill that sets up children for lifelong success,” Worldreader hypothesizes that if students have more access to books, they will read more, thus increasing literacy rates and, in the long run, enjoy a higher quality of life (Worldreader.org, 2012). To date, Worldreader has programs in ten sub-Saharan African countries: Ghana, Kenya, Malawi, Nigeria, Rwanda, South Africa, Tanzania, Uganda, Zambia, and Zimbabwe. The organization hopes to continue scaling its programs within existing participating countries as well as to other countries worldwide (Worldreader.org, 2014).

### **How Worldreader Works**

Worldreader provides select classrooms with “Worldreader kits” that contain e-readers, around 5,000 e-books, cables, protective shock-resistant “skins,” protective cases, book lights, printed training materials, pre-deployment support, shipping to a port in Africa, and post-deployment support. Worldreader deploys e-reader programs in three different models:

1. “E-readers are sent directly to schools and remain in schools overnight
2. E-readers are sent directly to schools but students are able to take them home overnight, thereby allowing other family members access to e-readers. On average, each e-reader reaches 2-3 people in this model.

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3. E-readers are intended to be shared in communal environments such as libraries.

Using this deployment strategy, Worldreader targets underserved schools that cannot afford enough textbooks” (Center for Education Innovations).

In addition, Worldreader builds capacity and ownership in host communities by providing technical and pedagogical trainings for local teachers and stakeholders, as well as teaching local businesses how to repair e-readers (Center for Education Innovations).

Compared to traditional, hard copy books, “e-readers make it easy to distribute works from African authors that can be hard to get in print” (Fowler and Bariyo, 2012). Costs for Worldreader’s devices are steadily dropping, with e-readers currently costing \$40 per device (Ani-Asamoah, 2014). E-readers have a long battery life (lasting about two to four weeks on a single charge) and use ubiquitous cellular phone technology. Additionally, because the e-books have no printing or shipping costs, patrons have access to hundreds of books at a very low price. In the classroom, researchers discovered that students learned how to use the e-readers quickly and, over the course of several months, began to read more frequently inside and outside class, and fluently in their native language (Worldreader.org, 2014). Teachers reported that students were very enthusiastic about being able to pick through thousands of digitized educational content options, and schools with e-readers experienced higher rates of enrollment, perhaps because parents wanted to send their children to schools with e-reader programs (Worldreader.org, 2014). Researchers also observed a narrowing gender gap in reading fluency, and important gains in foundational English reading skills (Worldreader.org, 2014). Today,

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50,000 children have access to Worldreader's e-readers through their schools and libraries, and one million children and families worldwide read using Worldreader Mobile<sup>1</sup> (Press Kit, 2014).

### **E-readers: What the Literature Says**

Much of the peer-reviewed research on how e-readers develop literacy in children has focused on how students learn from the devices versus traditional books. This research question is an important one: do electronic books produce inferior results in helping children develop reading competencies than printed books? The answer, in short, is no. A 2007 study (Grimshaw, et. al.) divided students into two groups: one read a story on a digital device, and the other read the same story in a printed book. Researchers found no significant differences in comprehension between the two groups. However, when a third group was given a device that contained additional features such as oral narration, results indicated that comprehension increased for those students. Overall, students who read with digital devices reported a higher level of enjoyment while reading (Grimshaw, 2007). Worldreader has observed this increase in enjoyment in its e-readers and associated programs as well.

Another study found that students are more likely to use literacy resources, such as a dictionary or thesaurus, when using a digital text, where such resources are built-in, than when reading a traditional text, which would require them to access and use separate books (Wright, et. al., 2013). A 2007 study concluded that “children receive similar literacy benefits when they read independently using an e-book reader and when an adult reads to them using a book in print” (Korat & Shamir). This finding is especially relevant to Worldreader, which seeks to help students to learn independently, an especially important skill in settings with a high student-

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<sup>1</sup> Worldreader Mobile is a mobile app which runs on feature phones and Android devices (worldreader.org). This serves a different purpose from the e-reader which is mainly used in classrooms to enable student learning.

teacher ratio. However, Korat and Shamir also noted the importance of removing distractions, such as games, from reading devices. Worldreader has avoided this challenge by using devices that only support reading and select educational games.

### **Challenges with the Worldreader Model**

Despite its successes, Worldreader has experienced some challenges in its initial years of deployment. For instance, setting up the e-readers—buying, unpacking, downloading books—was time-consuming and could present scaling issues. There still remains a shortage of digitized teaching materials in local languages or by African authors. Rugged terrain and unreliable infrastructure in remote villages presented usability obstacles; power sources for charging e-readers and wireless connection for downloading content were not always guaranteed; and dust, dirt, rain, and rigors of child handling led to faster wear and tear of the devices. Furthermore, while the cost of e-readers has declined, they still are too expensive for many communities. Most importantly, initial trials highlighted the importance and logistical complexity of providing wide-scale training and support to school administration and community members, as their buy-in is the backbone of sustainable success (Worldreader.org, 2012). Worldreader collaborates with one of its major corporate supporters, Amazon.com, to address some of these issues, such as developing e-readers that are more durable (Worldreader, 2012). In addition, Worldreader plans to test the impact of providing e-readers at ratios of one to every three students to five students in order to find the most cost-effective, efficient option (Worldreader, 2012).

### **Worldreader and 21st Century Skills**

21st century skills—specifically critical thinking, reasoning, interpretation, adaptive learning, information literacy, and technology literacy—are an emerging intertwined priority in

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Worldreader's goals to increase student literacy. Per a sample extracurricular lesson plan, referenced in Appendix B, students gain skills that allow them to simultaneously interact with and respect their peers, and critically reflect on the text they read via their e-readers. In addition, learning how to use e-readers in and of itself is an opportunity to develop technical literacy, communication skills, collaboration skills, leadership potential, and personal and social responsibility. For instance, evaluators observed that students helped each other troubleshoot the e-readers in seven out of eight classrooms studied in Ghana (Worldreader.org, 2012). Moreover, the students took pride and responsibility in taking care of their e-readers (Worldreader, 2012).

In addition to cognitive skills, Worldreader cultivates cultural appreciation and promotes respect for diversity through actively seeking out culturally relevant books written by underrepresented voices in order to maintain what Nigerian writer Chinua Achebe calls “a balance of stories” (Adichie). For its Ghana program, the organization “works with African and Ghanaian publishers to digitize the most locally-relevant content for students, including fun storybooks written by Ghanaian authors, primary grade textbooks, and local language curriculum” (Worldreader, 2014). Currently, about 70 percent of Worldreader's library comes from African and Indian publishers (Worldreader.org, 2014). Worldreader also deploys programs in co-educational schools, as opposed to single-sex schools, which builds a more diverse classroom experience for students (Worldreader.org, 2014). With a promising future built on a reiterative monitoring and evaluation process, Worldreader is in a strong position to begin more aggressively incorporating 21st century skills into their program goals through creating deeper lessons around stories and interaction with the e-reader, and training teachers how to implement these lessons in the classroom.

## **Worldreader in Ghana**

For Ghana, a small, West African country with a population of over 25 million and over 38 percent of its population in the 0-14 year age bracket, education is crucial to economic development (The World Factbook, 2014). The country currently spends 8.1 percent of its GDP on education and has implemented several policy interventions such as free, compulsory basic education; a school feeding program; the provision of free school uniforms and exercise books; and the construction and rehabilitation of school classrooms (Osei-Assibey & Grey, 2013). However, low literacy rates and access to resources remain a concern.

Worldreader implemented its pilot program and simultaneous study, the Impact on Reading of E-Readers And Digital content study (iREAD 1), in Ghana from October 2010 to July 2011. Funded by USAID, iREAD 1 aimed to give “Ghana public school students access to books through e-reader technology” (Worldreader, 2012). The program was set in six schools in the Eastern region of the country and targeted 481 students, split between Primary School 4 (the first level at which students are taught reading and writing in English), Junior High School 1 (JHS 1), and Senior High School 1 (SHS 1). Three main communities were chosen for the pilot: one that received no e-readers and served as the control group; one that received e-readers, but did not allow pupils to take the devices home; and one that used the devices in class and were also able to take them home after classes.

The treatment groups of iREAD 1 outperformed those that did not receive the intervention. For the treatment groups, iREAD 1 resulted in increased access to books, increased enthusiasm towards reading, increased resources for teachers, and increased technological skills (Worldreader, 2012). However, one of the main challenges faced by the iREAD 1 program was frequent e-reader device breakages, especially by students who took them home. Also, while

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studies showed “that primary school students who received and used e-readers in class increased their performance on standardized reading tests from about 13% to 16%” (Fowler and Bariyo, 2012), they also showed that “e-readers work best when combined with other curricular support and activities” (Jaffe and Lowe, 2014).

In August 2011, Worldreader introduced the iREAD Vacation School to address some of the challenges students had faced in the school year, such as the unexpectedly high e-reader breakage rates (40% breakage rate), disruptions caused by teacher strikes, e-readers that did not include reading materials for all school subjects, limited volunteers, and socio-economic factors such as English language limitations and some unsupportive home environments (Worldreader, 2012). Through the Vacation School, students were able to select their own readings and read for pleasure and at their leisure, whereas during the school year they were expected to read English, Social Studies, and Integrated Science texts on the e-reader specifically for class. Teachers also had the opportunity to observe their students and assist and interact with the students when they had difficulties (Worldreader, 2012).

With funding from the All Children Reading initiative (USAID, WorldVision and Australian Aid), Worldreader improved on their pilot program and implemented the iREAD 2 program and study. The iREAD 2 program assumes that “reading is a foundational skill for lifelong learning; if children have access to reading materials, they will read better; intervening early is key because of the ‘reading to learn’ transition; and e-readers are a cost-effective and context-appropriate solution to increase access to reading materials in sub-Saharan Africa” (Worldreader, 2014). From evaluating iREAD 1, the organization recognized that it was most effective to target primary students before they reached Primary 4 (Ani-Asamoah, 2014). For instance, there was a 15.7% increase in literacy test scores, as opposed to the 8.1% increase

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among the control group among Primary 4 students in the control group. However, in comparison, students in JHS and SHS saw much smaller increases in scores after the treatment. Also, because the growth in reading comprehension was incremental, it was important to start the e-reader program earlier. Thus, from January 2013 to July 2014, the Ghana iREAD 2 program served 574 students from Primary grades 1, 2, and 3 in four under-resourced schools in the Eastern Region of Ghana (Worldreader, 2014). A total of 720 students, including those in control groups, were evaluated. The main components of the program included:

1. “Providing a wide range of Ghanaian and English language reading materials through e-reader technology
2. Strengthening the use of phonics and other literacy instruction techniques in conjunction with the e-reader
3. Creating and deploying extracurricular reading activities that leverage the e-reader
4. Empowering schools, communities, and stakeholders to manage e-reader school programs” (Worldreader, 2014).

Per the 2012-2014 iREAD Final Evaluation, a "vital component of iREAD 2 was the implementation of extracurricular reading activities that created fun, engaging spaces that fostered children’s interest in reading" (Worldreader, 2014). These extracurricular activities were held every two weeks, included “fun, participatory lesson plans designed by the Olinga Foundation and a Worldreader education specialist” and were led by teachers, university students, and other volunteers (Worldreader, 2014). A sample lesson plan can be found in Appendix B.

In addition, to ensure a higher sense of ownership and accountability in the schools that took part in the iREAD 2 program, Worldreader implemented an application process that required schools interested in Worldreader’s intervention to apply for the program. With the help of the Ghana Education Service (GES), Worldreader shortlisted 12 schools that were interested in the intervention and selected four schools to that would receive the programming

(Worldreader, 2014).

The iREAD program in Ghana has proven to be successful by the measures Worldreader determined in its evaluation strategy. In Figure 1, it is apparent that students in Primary 2 who received the e-reader and concurrent programming outperformed their peers, who were not part of the treatment group of iREAD 2, on reading tests in both their native language and in English.

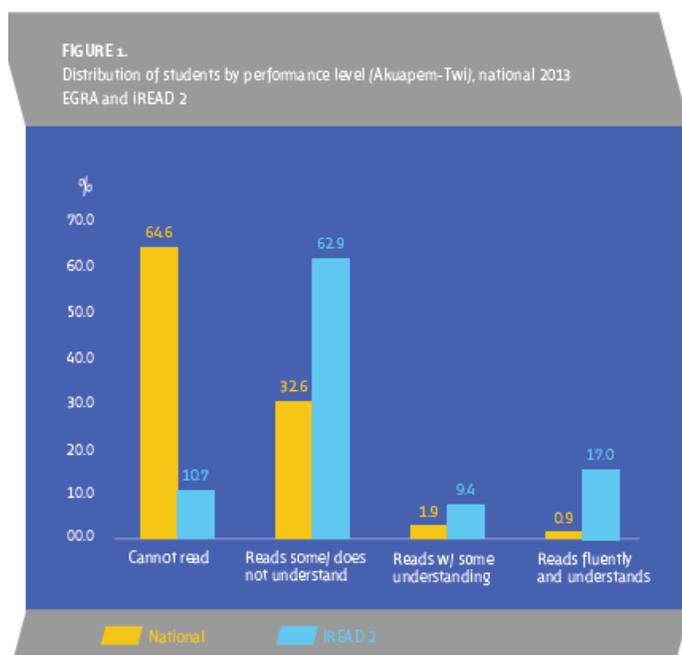


Figure 1. (Worldreader, 2014)

### Recommendations and Evaluations

In terms of its pilot program in Ghana, Worldreader has already established a strong evaluation program centered around a clear theory of change (see Appendix A for an example of one evaluation timeline). Therefore, rather than creating an entirely new evaluation model, in this section we provide recommendations for how Worldreader might improve and add to their current model, specifically in terms of 1) how the e-reader program impacts families’ quality of

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life, and 2) whether Worldreader's model for transitioning to self-sustaining, school-owned e-reader programs is based on sound assumptions.

In their final evaluation of the iREAD 2 program, Worldreader articulates its goals as such: "Worldreader is on a mission to bring digital books to every child and her family, so that they can improve their lives" (Worldreader, 2014). That is, if students have better access to digital books, and teachers are trained to effectively use them in the classroom, then early grade reading skills will improve, opening up more opportunities for students and their families.

Implicit in this theory of change are several underlying assumptions, which include:

1. Worldreader training and school support will successfully equip educators to teach using e-Readers.
2. Students will take advantage of increased access to reading materials, and this access will translate into improved reading scores on tests.
3. Participating in the program will improve the lives of students' families.
4. The program will continue to be cost-effective and sustainable for the four participating schools after Worldreader has phased-out direct financial and managerial support for the program.

Worldreader's own evaluation does address each of these assumptions, but evaluates the first two more thoroughly than the others. In terms of measuring whether school and teacher support resulted in improved instruction and use of e-readers, observers conducted frequent visits to schools and participated in quarterly School Management Committee meetings. The Olinga Foundation, a partner that helped implement teacher development, observed that teachers in all four participating schools used the e-reader curriculum they had been trained in alongside the national curriculum (Worldreader, 2014). They found that teachers increased positive behaviors

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such as “explaining the objectives of the lesson, discussing difficult words, engaging students by posing questions to them, group reading from the e-reader, and inviting students to the board to identify the sound of letters and to construct their simple words” (Worldreader, 2014).

As outlined in the previous section on the iREAD 2 program, there was a clear, statistically significant association between participation in the e-reader program and increased scores on national literacy assessments (Worldreader, 2014). By this measure of reading competency (improved test scores), Worldreader draws a strong connection between its implementation theory (using e-Readers in the curriculum) and its program theory (students improving reading skills).

However, the final two assumptions—that participating in the program improves the lives of students’ families and that schools will be able to sustain the program long-term—present the need for further evaluation. As Carol Weiss explains, evaluators must consider both short-term and long-term impact of programs (1997). Worldreader does acknowledge this need, noting that the Ghanaian government has expressed interest in exploring how an e-reader intervention might look nationwide, but is concerned “that a nationwide e-reader program would be too expensive” and that “the relatively small sample sizes of iREAD studies thus far do not yield sufficient evidence for scale-up” (Worldreader, 2014). Using Weiss’ framework as a guide, we outline a possible evaluation to assess some of Worldreader’s assumptions on the program’s broader impact.

### **Evaluating Impact on Students' Families**

Worldreader conducted surveys of students and parents to learn how students used e-readers outside of school. The results were promising: 75 percent of the 23 parents surveyed reported that children shared their device with siblings, indicating that the program's impact could potentially stretch beyond the students that formally participated (Worldreader, 2014). In addition, half the parents surveyed expressed interest in learning to use the e-reader themselves, prompting two of the participating schools to hold parent workshops.

However, to effectively evaluate whether Worldreader's mission to improve "the lives of students and their families" is being achieved, the organization must further explore potential positive externalities in future evaluations. As Worldreader scales up and launches new programs in new communities, staff could conduct additional surveys and interviews to better assess the assumed connection between program participation and "life improvement" for families.

In Carol Weiss' model for designing an effective program evaluation, she notes that in determining what kind of data to collect, it can be useful to focus on a specific category of information in order to avoid asking too many questions of participants (2007). One of the categories she recommends is "questions about anticipated and unanticipated features." This approach could be particularly useful to Worldreader, because a vague outcome like "life improvement" is difficult to define. In fact, these improvements are likely challenging to predict at the outset of the program. Therefore, we recommend that in future Worldreader programs, evaluators conduct additional qualitative interviews of students, teachers, parents, and community school leaders to explore and better define the types of impact student e-reader use may have on families' lives.

For example, a student and family survey could seek information using questions such as:

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- Has the student helped siblings or parents with their own reading abilities?
- Has the student been able to assist parents with reading-related tasks, such as understanding a legal document or product instructions?
- Have the student's academic and career goals changed as a result of increased reading scores?
- Has the family used the student's e-reader to access information, and how did they use it (e.g., to access health information, read a religious text, or to practice reading in English)?

Such questions could help evaluators better understand the community-wide impact of the program, or lack thereof. This could help Worldreader fine-tune and create a more specific theory of change as it continues to increase in scale. In terms of timing, this evaluation could take place at the same time as Worldreader's current, ongoing evaluations throughout the course of its two-year interventions (example in Appendix A).

One further benefit of evaluating family impact is that such studies could also help Worldreader gain useful information about the types of 21st century skills students are (or are not) developing. After all, social responsibility, leadership, citizenship, communication abilities, and empathy are some of the many competencies included in the 21st century skills framework. If students are helping their families and communities using the skills they have developed through the e-reader program, they are likely putting many of these competencies into action in the real world.

## **Evaluating Scalability and Sustainability**

As Worldreader's direct management of the iREAD 2 program comes to a close, it has worked closely with the School Management Committees of each of the four participating schools "in creating transition plans that define the way forward for managing and financing their e-reader programs without iREAD 2 support" (Worldreader, 2014). Each school chose a slightly different model to manage costs, such as restricting the e-readers only to early or late primary grades, and/or switching from a 1:1 student-to-device ratio to a 2:1 or 3:1 model.

Schools have expressed major concerns about funding the project on their own, due to the cost of repairing broken devices, providing adequate security for the e-readers, and hiring support staff to manage the program. Worldreader provided financial counseling and fundraising ideas, such as charging US\$0.30 per student per year to use e-readers and identifying local companies with corporate social responsibility programs for potential sponsorship. In the end, each school has produced a transition plan to become self-sustaining so that Worldreader can focus resources on scaling up in other locations.

However, this transition to school-led and school-financed e-reader programs involves an implicit set of assumptions that future evaluations must address. We recommend that Worldreader continue a long-term evaluation of up to five years to determine whether or not its phase-out model successfully contributes to continued success of the e-reader school programs, and if it does not, to pinpoint where and why this breakdown is occurring. For instance, if in five years student reading test scores have dropped at a particular participating school, it could be due to one of *many* factors. For example:

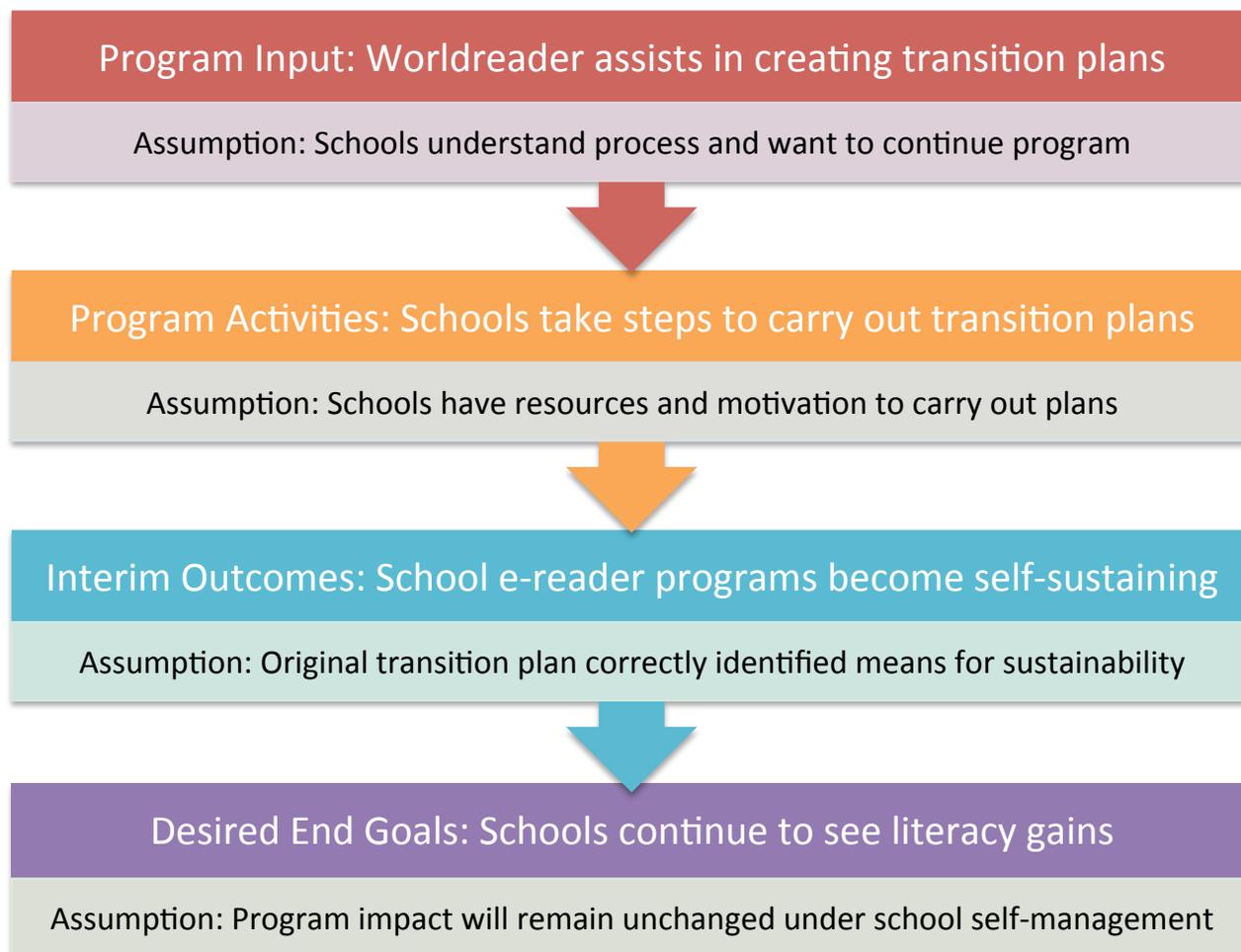
- The school may not have correctly understood, or been able to fully implement, the transition plan program created with Worldreader's support.

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- The school may have been unable to secure or sustain independent financing of the project.
- School staff may not have had adequate training or preparation to effectively conduct teacher professional development for the e-reader curriculum.
- Staff changes could have affected teachers' ability or interest in continuing the program.
- Transition away from a 1:1 student-to-device ratio could have decreased the efficacy of using the e-readers.
- Continued device breakage could make school officials less inclined to assign further resources to the program.

In Weiss's framework, she refers to this approach as an evaluation to assess "links between processes and outcomes" (2007). She writes that in a program theory for evaluation model, it is important to track program inputs, program activities, interim outcomes, and desired end goals—and the mechanisms and assumptions that connect each component to the next. If there is a breakdown identified between any two steps, the evaluator can thus identify a potential flaw in the theory of change. To evaluate the iREAD 2 schools' transition, and determine exactly where any breakdown in the theory of change may be occurring, we might use a system like the one below to determine the efficacy of Worldreader's school sustainability model, assessing each implicit assumption along the way:

Figure 2. Program Theory Evaluation for iREAD 2 Phase-Out Plan (Ghana)



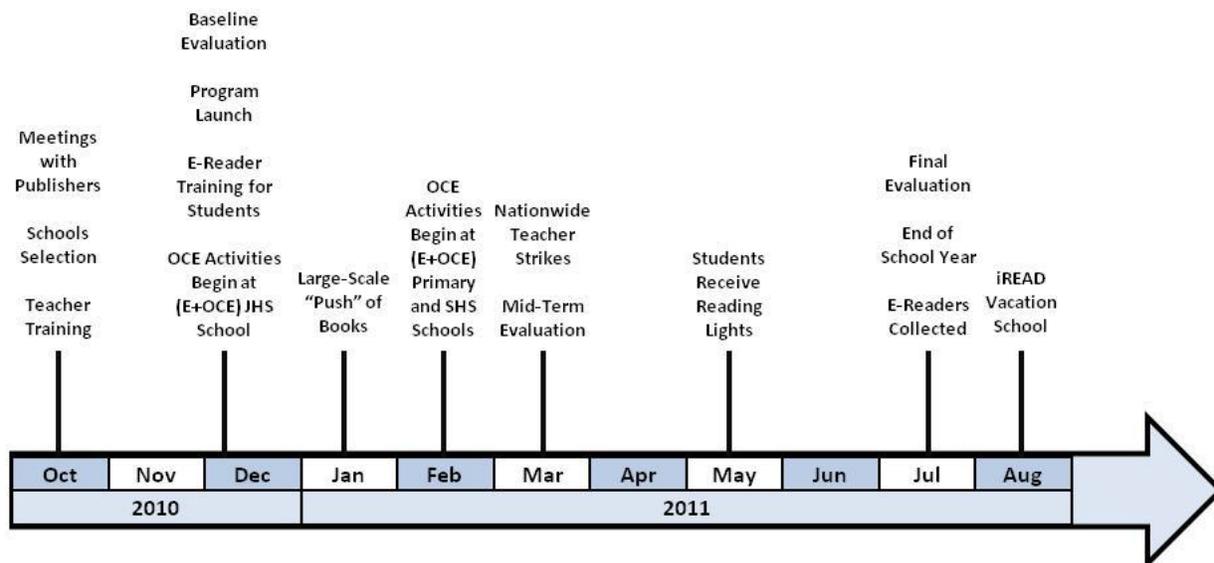
Worldreader has clearly experienced successful outcomes built on a reiterative program evaluation process. As they attempt to expand into other communities, it is imperative that they measure not only the impact of the program during Worldreader oversight, but the long-term feasibility of having School Management Committees continue to finance and manage the programs independently.

## **Conclusion**

As many education systems in sub-Saharan Africa struggle with poor reading performance among primary school students, we observe an emerging trend of major donors funding literacy projects that capitalize on technological interventions. Worldreader's programs in Ghana demonstrate that such a program can, in fact, lead to statistically significant increases in reading abilities. This provides evidence that Worldreader's theory of change (that increasing access to relevant reading material also increases literacy skills) is based on sound assumptions. Their process may provide a powerful model for other contexts, like Mozambique, that are searching for cost-effective ways to ensure that young learners develop reading competencies. However, in order to have a broad, long-term impact, Worldreader must demonstrate that schools can financially sustain e-reader programs after Worldreader phases out, and that the program continues to expand the inclusion of 21st century skills in its e-reader curriculum.

Reading is a powerful gateway to deeper learning and future opportunities for learners. In her TED Talk, Nigerian writer, Chimamanda Ngozi Adichie reinforces the learning potentials found in stories. "Stories matter," she explains. "Many stories matter. Stories have been used to dispossess and to malign, but stories can also be used to empower and to humanize. Stories can break the dignity of a people, but stories can also repair that broken dignity" (Adichie). Through providing low-resourced classrooms with access to over thousands of stories, Worldreader opens up opportunities for new generations to cultivate richer lives in the 21<sup>st</sup> century.

## Appendix A



*Timeline Summary of iREAD 1 Study Milestones (Worldreader, 2012)*

## Appendix B

### Extra-Curricular Reading Activity LESSON PLAN 1

Comparison can be good and bad. It can help us to aim higher in life in order to achieve feats we had not imagined. It can also make us feel so down that we resign to our fate. What is important is what one believes one is capable of because in whatever situation one finds oneself, one could be better or worse off.

#### Objective

To instill in children the idea of realizing their innate potentialities and build on them to be even better than those who are higher life's ladder.

Estimated Total Time: 1 hour 30 minutes

Resources: E-readers

As always, sort children into groups.

Activity 1: Comparison Period: 25 minutes

a. Let students compare the following animals. Starting with the first pair, Elephant & Mouse, ask them to describe the Elephant and have a student come up to draw it on the board. Again, have another student come up to draw a mouse on the board. Let them tell you the differences based on the drawings. Now, assign each group with a pair from the list and ask them to share their comparisons with the class.

- Elephant & mouse
- Snake & pig
- Bird and tortoise

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- Horse & cat.

b. Select any two children with striking differences for comparison eg

- One tall and one short.

- One boy and one girl

- One in bright coloured clothes and another in dark coloured clothes.

Again, let the children discuss (together) the differences between each pair.

Lesson: Differences among people do not make some superior over others.

### Activity 2: Silent Reading Period: 15 minutes

Let children open their e-readers to the story Suma went Walking. Assist those who struggle to do so. Ask them to read silently for this period. Even though not all students can read, it is very important that they develop the habit of at least trying to read.

### Activity 3: Think Questions Period: 20 minutes

After having students silently read, ask them the following questions about the stories. Even the students who couldn't read may be able to answer some of these questions using the pictures.

Write the questions on the board and explain in Twi.

1. Mention any of the five animals Suma saw when she went walking.
2. Where do you think Suma went for her walk?
3. Mention any five of the words used in the story to describe Suma.

### Activity 4: Model Reading & Oral Response Period: 25 minutes

Read the story to the children. Please model good reading by sounding all the words correctly and giving clues when you get to some of the adjectives used to describe Suma and the animals in the story. Read loudly, clearly and with expressions.

Now, let children give you answers to the questions raised earlier and discuss what their impressions are about the story.

### Summary and Conclusion: Period: 5 minutes

Discuss some of lessons learnt from the story. Explain the fact that all the words used to describe Suma in the story are called ADJECTIVES because they are describing somebody. Adjectives also describe things.

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