Worldreader.org

E-reader Trial Report
OrphanAid Africa School, Ayenyah, Ghana
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ABSTRACT

Worldreader conducted the first-ever trial using e-readers in a Sub-Saharan Africa classroom, at the OrphanAid Africa School in Ayenyah, Ghana. This report outlines the preparation, methodology, and results from Phase 1 of the trial, which was completed in March 2010.

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Worldreader.org E-Reader Trial Report for Ghana

I.   Introduction

Worldreader.org is a not-for-profit organization based in Barcelona, Spain and the U.S., whose aim is to make digital books accessible to all in the developing world, from students to families to communities.

As a way to gauge interest and to observe how the current technology performs in situ, as well as to understand logistical challenges, we initiated the world's first trial of e-readers and e-books in developing-world classrooms. This document provides an overview of our e-reader trial involving the use of 16 Kindles by sixth-grade students at the Orphan Aid Africa School in Ayenyah, Ghana, which ran from March 16 through March 26, 2010.

These trials form the very initial phase of the long term and continuing study of the application of e-reader technology in education, and their consequent effects on literacy in developing countries.

II.   Summary of Findings

This report details the findings from the first phase of our trial. A summary of the main findings is included below.

Here are our key observations in the Ayenyah school that lead us to believe that e-readers have the potential to be deployed successfully in similar communities and schools in developing countries:

- These 6th-grade students in a village in Ghana, who had used cell phones but had no experience with computers, were all able to learn to use the Kindle successfully after several hours of training and several days of practice.

- Reading digital books was an acceptable alternative to reading paper books, and the kids quickly forgot they were using a device and became absorbed in the stories they were reading.

- Kids were excited to read using the device, in part because it was novel and fun to use, and also because it was less intimidating due to the built-in dictionary which helped readers decipher the meaning of new words.

- Kids also read more using the Kindle because of the variety of books on the device and the instant availability of thousands more, as well as local and timely material like Ghana football scores.

- The Kindles supported the process of learning to read, especially for new language learners, due to the built-in dictionary to look up words, and the text-to-speech capability for pronunciation (although mechanical-sounding).

- The infrastructure already in place for mobile phones supports e-readers: Low-power Kindles successfully charged from solar-powered car batteries in an hour, we were able to download books via the satellite internet link in 45 seconds, and there was cell phone coverage in the village.

Here are the main challenges we observed that could affect adoption in developing countries:

- The preparation and setup of the e-readers – buying, unpacking, charging, loading with books, etc. – was time-consuming and will be challenging to scale without developing new methods, in cooperation with the manufacturers. There was also a lack of tools for managing many devices; for example, there was no central way to see which devices had which books loaded.

- There were a number of usability issues with the Kindles that, while not barriers, increased the learning curve, such as several ways to accidently hide books, and a setting that drains the battery quickly. A light was also commonly requested, so the students could read at night.

- The current cost of e-readers and books, along with DRM (digital rights management) policies, would need to be adapted to the market and to educational use.

- Content for this trial was purchased using personal credit cards, but new payment methods will need to be supported for widescale deployment, such as educational invoicing, and the scratch-off cards used for mobile phones.

- There is currently a lack of local content available on e-readers, so local publishers would need to be encouraged to digitize their content.

- While ruggedness of the devices was not a problem in our study, the conditions we observed - dust, dirt, rain, and the rigors of child handling - will need to be considered by e-reader manufacturers.

And finally, we discovered that the importance of buy-in by the school administration, and the support of a local champion, cannot be understated. In our trial, the headmaster, Earnest, and the 6th-grade teacher, Philip, were extremely enthusiastic and supportive, and this contributed to the success of the trial.

III. Trial Overview

Most studies of literacy focus on measuring and improving "functional literacy" – often defined as "the reading and writing skills adequate to cope with the demands of everyday life." Worldreader.org is interested in not only improving

functional literacy in the developing world, but also encouraging reading that engages the imagination, builds knowledge about the world, and ignites a passion for learning. Our studies are designed to investigate whether "connected" e-readers, coupled with an effective digital content localization and distribution system, will help both functional as well as inspirational reading.

These short-term studies are intended as a way to take a rapid inventory of the existing state of reading education in certain schools, to observe how the introduction of e-readers into the classroom is likely to impact reading, to uncover logistical challenges and barriers to the successful adoption of the technology, and to highlight important areas for further study. While no device or content can be a substitute for a good curriculum, well-trained teachers, and an effective support system at school and at home, we believe that access to inspiring, student-driven reading material, along with some of the advanced capabilities of e-readers, can support language acquisition, improve critical thinking, expand literacy and, ultimately, increase opportunity.

A. Hypotheses

Our working hypotheses for introducing e-readers into schools and communities in Ghana and other developing countries is that they will result in:

Better distribution

1. Less expensive to produce and distribute than physical books
2. Much faster to get new books, updates, and time-sensitive media
3. Easier translation of written material to multiple languages

Increased reading

4. The reading experience they provide is an acceptable alternative to reading paper-based textbooks, novels, magazines, and newspapers
5. Increases the amount and variety of materials read both within and outside the classroom, through access to a wide variety of supplementary reading material at an appropriate reading level
6. Results in a measurable increase in functional literacy, but also engages the imagination and opens opportunities by giving access to a previously unavailable world of knowledge and ideas

B. Trial Selection Criteria

Original selection criteria were based on the following.

- Challenging terrain (Sub-Saharan Africa preferred over Latin America) so that trial could act as a meaningful example for other markets
- English speaking (most digital content is still in English)
- High and fast-growing Internet and mobile phone penetration
- Potential scalability of project

In addition, during and after the trial, it became clear that any future trials would require the following:

- Supportive and communicative school leadership
- Highly motivated and implicated teachers.
- Local and national institutions eager to become partners
- Day-to-day support on the ground from person(s) who can drive the project forward and serve as the lynchpin for all the abovementioned parties

The trial described in this report was conducted in a sixth grade classroom at the Orphan Aid Africa School in the village of Ayenyah several hours outside of Accra, Ghana. 16 Kindle e-readers were distributed to the students in the class, who kept them for the full 2-week trial.

C.   Objectives of the Ghana trial

- o Learn and document existing curriculum and practices around reading «supplemental material» in the classroom and community, through observation and interviews.
- o Learn and document the logistics of setting up and conducting a trial in a primary school classroom in a developing country where English is the language of instruction.
- o Identify challenges and barriers to adoption, including physical, technical, behavioral, and social issues.
- o Gather *objective* information, such as:
  - Did students read more or less using e-readers over paper books?
  - What features did they use the most or least?
  - How did e-readers fit into the classroom setting? Help/hamper discussions? Cause distractions?
  - How were e-readers used outside the class?
  - Was ruggedness or security an issue?
  - What needs more investigation and testing?
- o Gather *subjective* information, such as:
  - What did students like and dislike about the experience of reading using an e-reader?
  - Did access to more reading material increase their interest in reading?
  - Were there any qualities of the e-reader that made them want to read more or less?

D.   Methodology

The trials were prepared and conducted by experienced ethnographers, who developed the following methodology and approach before our arrival in Ghana.

1. **Outputs**

At a broad level, the intention was to understand the existing system in the school, community, and government, as it relates to acquiring and distributing written materials, and teaching reading. We also captured the impact of e-readers on the various constituents, the potential barriers to adoption, and gaps between the existing technology and process and the apparent needs. The following map gives an overview of the desired outputs of the trial.
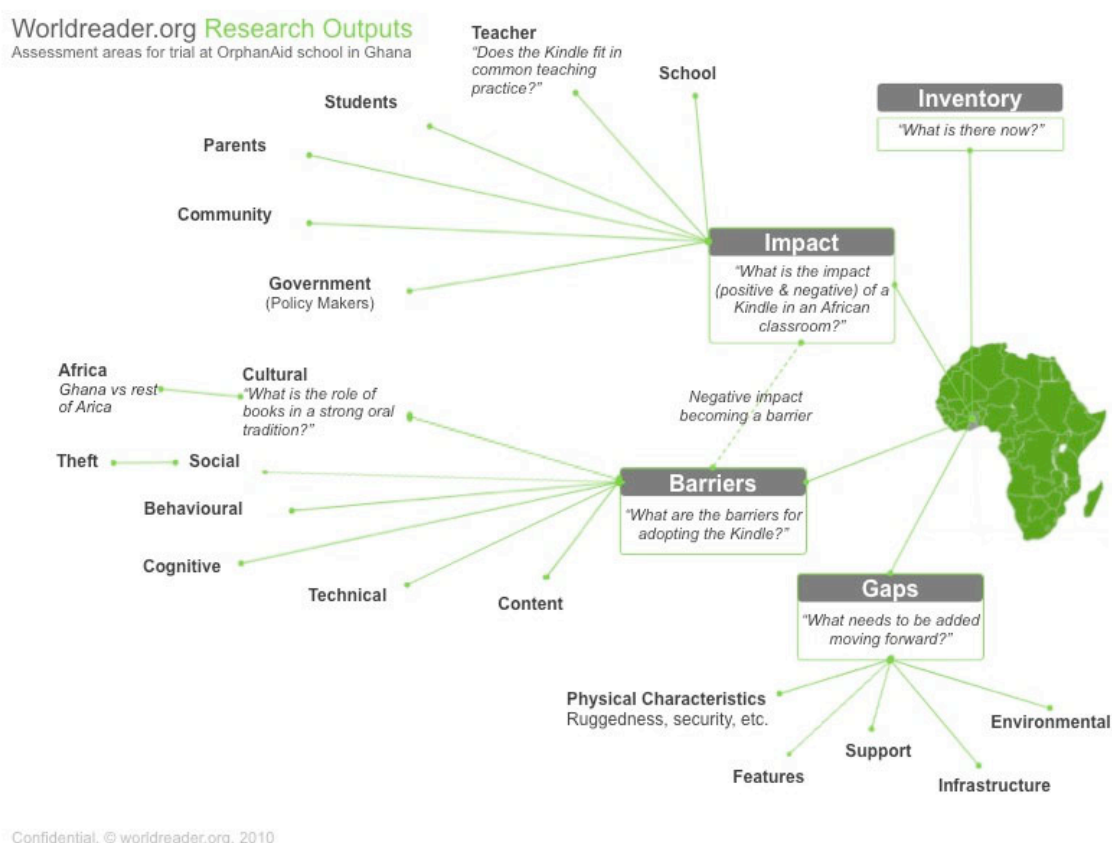
Figure 1: Methodology - Research Outputs

2. **Data Gathering**

The methods used to gather data were more qualitative than quantitative, in part because of the short-term nature of the study, and in part because at this early stage in the research process, much of what we were interested in discovering was qualitative in nature. In the sixth grade class where we conducted the study, many students had only had several years of formal schooling, and English was a second or third language, so they were reading at more of a 2nd grade level. Because of this, written diaries and questionnaires were more difficult to capture, and we had to rely more on classroom discussion and observation.

Figure 2: Methodology - Data Gathering Methods

E. Device Selection and Setup

For its initial trials, Worldreader.org chose to work with Amazon.com's second-generation International Kindle e-reader because of its extensive selection of books and low power consumption.

Although this device includes the capability to connect to a wireless mobile (GSM) network outside the United States, this function was not available in Ghana. Because of the lack of wireless access within Ghana, unknown access to power and possibly unreliable internet connectivity, we conducted the majority of the e-reader set-up in Barcelona, Spain before arriving in Ghana.

1. Equipment
- 20 Kindles, donated by Amazon.com
- Associated power-plug adapters, including US-to-EU-style (for Barcelona setup) & US-to-UK style (used in Ghana)
- 20 Neoprene covers, donated by tuff-luv.com
- Various power strips ans USB hubs for easier charging
- Duct tape and permanent markers for labeling

Figure 3: Unpacking Kindles

2. **Book Selection**

Ghana has a well-established series of textbooks, but provides less guidance to schools for supplementary reading material. Many of the students in the 6th grade class were fairly new readers in English, and the books requested by the school before our arrival were mostly western fairy tales. We were asked to choose some additional books to bring.

Consequently, we looked for books that were appropriate for new readers, experimented with books for slightly more advanced readers, and provided some content that might be of particular local interest. We used sources like bookwizard.scholastic.com and commonsensemedia.org for inspiration, as well as our own experience, looking for books aimed at fourth graders. (Using age as a guideline was less helpful, as the students' age levels do not easily correspond to grade levels.)

In the end we chose the following six books for a range of young readers, which we assembled onto an Amazon Wish List to facilitate management. We could not find any material that was locally published, so we also created a text based on Web sources about Ghana's Football league.

- *Folks Tales from Ghana*, by Raja Sharma
- *The Magic Flyswatter: A Superhero Tale of Africa, Retold from the Mwindo Epic*, by Aaron Shepard

- *Fairy Tales Every Child Should Know (*public domain book)
- *Magic Tree House #39: Dark Day in the Deep Sea,* by Mary Pope Osborne
- *Curious George Visits the Library*, by Margaret and H.A. Rey
- *Curious George Goes Camping,* by Margaret and H.A. Rey
- Ghana Football league document (processed through Amazon's doc-to-Kindle service)

3. **Technical Setup**

   The Kindle is primarily designed for single-person use, with each Kindle associated with an existing Amazon.com account. However, in the Ghana trial none of the students had an existing e-mail account. (This was different from our prior trial at an international school in Barcelona, Spain, in which all students had e-mail accounts, but the fundamental issue was the same: we wanted to create trial-specific e-mail accounts for maximum visibility into usage patterns.)

   Consequently, the first technical step was to establish e-mail accounts and associate each Kindle with an account. Ideally, we would be able to create a single account, so as to be able to manage all the Kindles centrally, and minimize duplicate work. However, while there was no limit on the number of Kindles that could be associated with a single account, the digital rights management (DRM) system employed by Amazon did not allow for more than six copies of a book to be downloaded across a single account. Additionally, once that limit of six copies had been achieved, the system did not permit the purchase of additional copies of the same e-books on that single account (presumably so as to prevent accidental re-purchases).

   As a result, we settled on a compromise: we loaded books onto three groups of six Kindles each, and kept two in reserve. This also allowed us to experiment with downloading books using an Internet-connected laptop. then transferring («side loading») them via USB cable to the Kindles (generally less expensive). The alternative was to download the e-books directly onto the Kindle using the wireless connection over the GSM network (fewer steps, but slightly more expensive.) In addition, we experimented with credit cards that had US- and Spain-based billing addresses; using a Spain-based billing address to buy books wirelessly resulted in a smaller content selection due to international licensing issues, as well as slightly higher prices. However, when taking into account that the prices for Spain included free wireless downloading, the e-book prices ended up being around the same – a US credit card used in an international location would result in the customer incurring a $1.99 wireless fee for downloading content directly to the Kindle off the mobile network.

   Optimizing for fastest setup at the least cost, we followed these steps:

1. Create one e-mail address and an Amazon.com account for each group of six Kindles.
2. Associate the Kindles' serial numbers with the proper accounts
3. Using a US credit card, buy and load books on first of each group of six Kindles using USB transfer
4. Using a Spanish credit card, load the books wirelessly on the other Kindles ($1.99 charge for each group of six.)

Figure 4: Loading Books onto Kindles

Additional notes and technical considerations:

- Before beginning, ensure that the Kindles' radios have been properly registered with Amazon. In our Barcelona trials, this was not the case, causing additional delays and Customer Service headaches.
- Synchronization must be turned off for each Kindle account
- Ideal set-up: one computer for each set of six Kindles.
- We used tape and sharpies to label each Kindle and case. We left space for the students to add their names on-site.
- Wireless should be turned off for each Kindle to reduce power (this is very important in a market without connectivity)
- For next time: once each Kindle is loaded, create a back-up onto a USB drive of each Kindles' contents in a separate, labeled folder. This will make it easier to recover books outside of wireless coverage areas.
- The total time to load 20 Kindles with six books was about four hours, not including additional charging time. While our speed improved as we learned how to work more efficiently, the fact remains that set-up is a fairly manual and time-consuming operation.
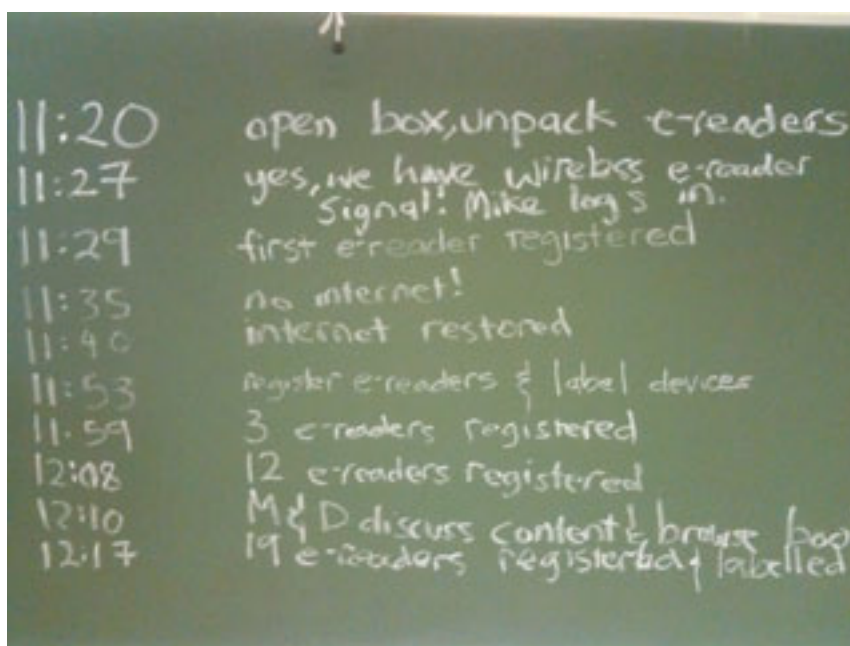
Figure 5: Tracking time spent preparing e-readers

Optimizations for the future:

- Under the current system, splitting the Kindles into groups of six early (both physically and virtually) speeds things up.
- Work with e-reader vendors to create a single log-in plus «bulk buying» capabilities for large numbers of e-books
- Other options include using SD cards for book distribution (not possible with Kindle 2) and focusing on free/public-domain books which have no DRM restrictions (but often the formatting is poor)

4. **Transportation and Logistics**

The in-bound logistics to Spain were simple. Amazon and tuff-luv both sent material through the national mail system. Perhaps because of our non-profit status, no customs duties were levied.

After setting up the Kindles in Barcelona, we elected to travel with the Kindles with us in our hand luggage, so as to avoid complications with customs in Ghana.

5. **On-site Setup**

Because of the prep work completed in Barcelona, there was little on-site setup required. However, on many occasions throughout the week it became clear how important it is to have a set-up and staging area with the following characteristics, in declining order of importance.

1. Physically separated from the school's main teaching area. Set-up and maintenence requires concentration and isolation—hard to do with curious kids around!
2. Electricity. The Kindles will at some point need to be re-charged.
3. Internet + a computer, for adminstration.
4. A secure area, to be able to leave equipment unattended

F.   Context / Inventory

In order to understand the impact e-readers can have in Ghana, we need to first examine the current situation in the community and school where we conducted the trial. This section presents a brief «inventory» of the existing system as we observed and learned from interviews and government documents. This section is only intended as a brief summary, but much more can be learned by reading some of the documents referred to in the bibliography.

1. Economic and Educational System in Ghana

A comprehensive summary of basic economic statistics for Ghana can be found at:

http://stats.uis.unesco.org/unesco/TableViewer/document.aspx?ReportId=124&IF_Language=eng&BR_Country=2880&BR_Region=40540

An overview of the size and dimensions of the educational system in Ghana is represented by the following table, which shows data from 2007/2008 and is sourced from the «Ghana Education Strategic Plan 2010-2020».

	No. of Institutions	No. of students	% female	GER %	No. of teaching staff	PTR	% of total education spending
Kindergarten/Pre	**15 075**	**1 229 473**	**49.8**	**89.9**	**34 859**	**35**	
Public	10 988	1 001 949	49.9		26 993	37	3.4
Private	4 087	228 832	49.5		7 866	29	
Primary	**16 785**	**3 501 543**	**48.6**	**95.2**	**108 858**	**32**	
Public	12 909	2 907 724	48.4		85 299	34	35.0
Private	3 876	593 819	49.5		23 559	25	
Junior High School	**9 507**	**1 192 442**	**46.7**	**78.8**	**71 703**	**17**	
Public	7 267	991 199	46.2		56 952	17	16.3
Private	2 240	201 243	46.7		14 751	14	

Senior High School	**700**	**437 771**	**44.0**	**32.2**	**21 790**	**20**	
Public	493	393 995	42.5		19 252	21	12.6
Private	207	43 776	54.4		2 538	17	
TVET							
Public and private	130	16 930	17.1	N/A	1 363	12	0.6
Teacher Training (CoE)	**39**	**27 000**	**43.5**	N/A	n/a	**10**	
Public	38	26 918	43.5		2 800	10	2.6
Private	1	<100	n/a		n/a	n/a	
Tertiary							
Public (f.t)	19	132 604	33.0	N/A	n/a	N/A	23.0
Universities	6	93 973	33.7		2 606	36	
Polytechnics	10	34 448	29.6		1 098	31	
Prof. Institutes	3	4 183	44.3		n/a	n/a	
Dist Learning	N/A	22 819	n/a		N/A	N/A	
Private (f.t.)	138	18 278	39.0		n/a	n/a	
Non-Formal	N/A	2 740 566	61.7	N/A	109 623	25	0.4
Special Education	27	5 654	41.4	N/A	n/a	n/a	0.3
	N/A	N/A	N/A	N/A	N/A	N/A	5.5

Figure 6: Ghana Education Institutions

A comprehensive summary of the education system in Ghana can be found at:

http://stats.uis.unesco.org/unesco/TableViewer/document.aspx?ReportId=121&IF_Language=eng&BR_Country=2880&BR_Region=40540

2. School / Community

1. The OrphanAid Africa District Assembly School Ayenyah was built originally as a private school in 2005 by OrphanAid Africa and was later integrated into the Ghana Education system in 2007.

Figure 7: OrphanAid Africa School where trial was conducted

2. The school is located 50 km (approximately 90 minutes drive) north east of Accra, near the small market town of Dodowa at:

   Ayenyah Village
   Dodowa-Somanya Road Klm 10
   Dangme West, Greater Accra Region
   Ghana

   http://maps.google.com/maps?client=safari&rls=en&q=ghana&oe=UTF-8&um=1&ie=UTF-8&sa=N&hl=en&tab=wl

   The Ghana Education Service District Director of Education for the school is located at the local town of Dodowa.

3. The school (at end March 2010) had a total of 124 students.

4. The school employs 7 teachers full time, 4 of whom are paid by the government, and 3 of whom are paid by OrphanAid Africa. Through financing from the Laureus Foundation, OrphanAid Africa also has 6 paid sports coaches and one full time volunteer from JICA who focus on sports with the students.
   http://www.laureus.com/foundation/projects/item?id=1395.

5. Education level covers the grades Kindergarten through Grade 6. Each grade is formed according to ability rather than age, so the ages of the

students vary, especially in the higher grades.

6. School hours are from 8 am until 2 pm Monday to Thursday and from 8 am until 12.30 pm Friday.

7. The Village of Ayenyah is co-located with the school, and is occupied primarily by members of the Ewe tribe, who are immigrants to the area, and it is run by a village chief, a fetish priest, and a group of elders. There is no electricity in the village, but there is water pumped in and stored in a tank from taps provided by OrphanAid Africa.

8. The school has limited access to electricity through solar and wind power. Existing classrooms have no power, but a new community health clinic and community centre run by OA and located next to the school is being outfitted with solar panels. In addition, the community clinic has solar power, which proved to be sufficient to re-charge multiple Kindles in about 90 minutes.

9. The school has wireless access to the Internet through a wind-powered, uninterruptable power supply satellite set-up, designed to work in conjunction with the new community center. Using that set-up, the school can have Internet access for approximately four hours at a time.

10. Languages: There are approximately 79 languages spoken in Ghana of which 9 are officially government sponsored. The villagers spoke a number of languages (given that some have come from differing regions) but the main language spoken was Ewe*. The ancestral tribe (which arrived approximately 100 years ago) of many in the village was originally from Togo where Ewe is widely spoken. (*Ewe is a Gbe language, part of the Kwa branch of the Niger-Congo language family. It is spoken by approximately 2 million people in the Volta Region of south-east Ghana. It is also spoken in Togo.)

The introduction on the Orphan Aid Africa site is worth reading to understand the context for the origins of the school:

"OrphanAid Africa was founded by Lisa Lovatt-Smith in October 2002. Lisa is an established author was an editor at Vogue magazine for many years while living in both Spain and France. In 2002 Lisa decided to volunteer with her daughter at a children's home in Ghana. There were more than 100 destitute and abandoned children living at the home, some brought to the home by police or social welfare workers because the children's parents had died of endemic sicknesses such as malaria, AIDS, or tuberculosis. Very often, however, the children were abandoned because the parents simply couldn't afford to take care of them. This experience proved to be so life changing for Lisa that she left behind her lifestyle in Europe and moved to Ghana full-time. Her desire to help orphans was a long-lasting and substantial one, driving her to launch

OrphanAid Africa with the aim of helping make sure no child should need to grow up in an institution, unloved and with few prospects for the future".

3. **Classroom Environment**

The school consisted of a number of classrooms in four (later five) separate buildings positioned in a rough circle around a central covered patio area. This patio was normally used for teacher meetings whilst the students were encouraged at breaktimes to disperse to the sports yard adjacent to the school.

Each (2nd to 6th grade) classroom consisted of three vertical rows of six double desks, with students positioned in pairs. There was a large blackboard with chalk at the front of the classroom with table and chair adjacent for the teacher. In some classrooms there were bookcases full of (donated, but seemingly little used) books at the rear of the class.

The classroom door was always left open to facilitate ventilation between door and wire mesh covered open windows. Temperatures were often around 26 – 26 C after Assembly at 8.15am in the morning, rising to circa 35 C (in March) throughout the school day.

An indirect consequence of the «open door» policy was the habitual arrival and departure of school or District personnel. This did not seem to distract the concentration of the students. Similarly the entrance of outside noise from the sports yard or central patio was at times invasive but inevitable given the openness of the environment.

4. **Students**

The students were mostly from the local village Ayenyah or from Orphan Aid Africa. Students wore bright orange school uniforms, and their ages were from 2-3 years old (pre K) until early teens in grade 6. These older students had been «held back» if they had missed schooling in previous years (for example several male students had been child soldiers in the war in Sierra Leone). This explains the mixture of ages in the grade 6 class where we conducted the trial.

5. **Key People and Protocol**

Beginning several weeks before the trial, we identified key individuals with whom to speak to undersand both protocol and process issues.

Name	Title/Role	Importance / Notes
Lisa Lovatt-Smith	Founder, OA Africa Community sponsor; School founder	Single most important player – introduced us to village chief, school officials; sensitized us to protocol issues; solved problems; opened doors

Village Chief	Responsible for all village activities	Critical for community acceptance. Received welcome gift; welcomed us to the community
Ibrahim Baba	Director, OA Africa Ayenyah	Served as intermediary during introduction to Chief
Earnest	Headmaster, OA Africa School	Critical for school buy-in. Received / used Kindle for duration of trial—important for protocol + allowed him to present to District Assembly
Phillip Osabutey	Teacher—6th grade	Most important advocate. Dedicated class time, helped with e-reader instruction, motivated students with / without our presence. Received Kindle during duration of trial.
Richard Adabrah-Klu	Director, Community Center; technical assistance	Critical support. Helped with instruction, solved technical problems; provided elect. + internet access. Received Kindle for duration of trial. Will be responsible for on-going Phase II of trial, including book download, charging, etc.
District Assembly	Oversight of school district	Important for protocol reasons that they be included early on. Headmaster Earnest worked with them informally; in the future, this needs to be formalized.
Deputy Minster of Education Annan	Joint oversight of Ghana schools	See below meeting notes. Met about larger proposal.
Students	Sixth-grade students, ages 10-15	Participated actively—learned, took notes, filled out diaries. Parents signed release documentation.

Figure 8: Key People

G. Training

Training of the class, and communication with the school and the community was conducted over the first week by Mike, David, and Colin. Here is the basic schedule and process that we followed.

1. Community introduction

Prior to working with the school, we had to get permission from the village chief and tribal elders. On Saturday, March 13th, we arrived at the OrphanAid school and received a tour and met Baba, the director of OA

Africa in Ayenyah. Baba accompanied us in the formal meeting with the village chief and local priest, where a ritual presentation and welcome ensued. Baba and Lisa spoke on our behalf, and we presented a small gift of several bottles of schnapps. We were then officially granted permission to work in the school and the village.

The ritual ceremony (which was more serious than solemn) was briefly interrupted by the ringing of a mobile phone belonging to the chief. The significance of this will be discussed later in relation to the high level of penetration and growth of mobile phones in Ghana, and many African states.

On Sunday, we met with the headmaster of the OA school, and the 6th grade teacher Philip, and talked about what we were planning to do, and what we needed of them. We also presented them with Kindles, and taught them how to use them. In addition, we took a look at the classroom, and tested the internet access to make sure we could download books. The village children also held a dance in our honor.

2. Pre-trial observation

Prior to working in the classroom, we spent Monday morning observing the class in action, so that we could get a better sense of the educational level of the kids, the type of teaching environment, and how best to approach our involvement. Our observations can be found in the Classroom Environment section.


Figure 9: Classroom with teacher Philip

3. Training

On Monday afternoon, we began the training. We signed out Kindles to each of the 16 students, and taught them basic reading and navigation, which took about an hour and a half, and then had them read out loud. The

initial training script developed before the trip, can be found in the Appendix.

We discovered however that the training script developed before the trip was marginally too advanced for this class, so we ended up dividing the training into two parts. The first part concentrated on basic navigation of the device: scrolling through the list of books, opening a book, paging through a book, understanding locations, going to the beginning of a book, and use of the dictionary. We returned on Tuesday morning to read with the children, answer questions, and re-enforce what we had taught them the day before. We had intended to do the second half of the training, but a snafu with the Kindle battery charging (see Potential Challenges section) meant some of the Kindles were not charged and so we had to postpone.
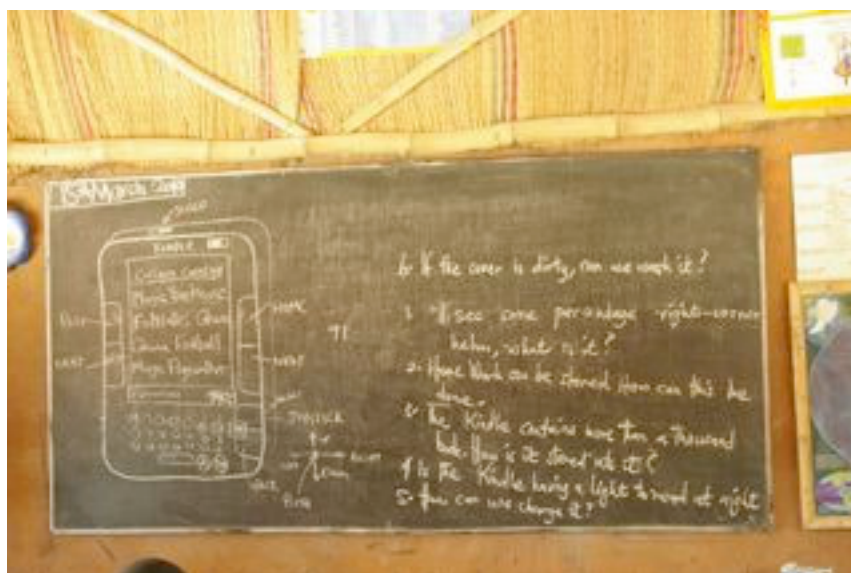
Figure 10: Kindle training and kids questions

On Friday morning of the first week, we completed training on the more advanced features, which we had meant to do Tuesday. We taught how to use Search, Go to Location, and add Bookmarks and Notes. Actual training time for all three days was about 4 hours.

4. **Daily activities and observation**

In addition to conducting their regular reading activities using the e-readers, we asked the teacher to also do specific «tasks» each day, such as having the students read the same book together both silently and aloud, having the teacher read out loud while the students followed along, and giving reading as homework. The students were asked to keep a diary of their experiences each day, as was the teacher.

Those of us conducting the trial (Mike, David, and Colin) also spent time observing in the classroom, and held discussions at the middle and the end

to elicit the experiences of the students and the class. We did inventory interviews with the teacher, as well as with the headmaster, community manager, and several individual students. We also visited several other area schools, including a public JHS (Junior High School) and a high school.

A summary of what we heard through all of these means is captured in the section: Trial Results.

H. Budget

The total cost of the trial was US$12,657, out of which $5,800 was received from partners as in-kind contributions, and the balance funded by Worldreader.

Direct costs		
E-reader device	5,400	43%
Ruggedization	400	3%
Content and connectivity	61	0%
Set-up and training	1,350	11%
Documentation	1,645	13%
Indirect costs		
Travel	2,986	24%
Lodging	750	6%
Gifts	45	0%
Office supplies	20	0%
Total costs	12,657	100%

Figure 11: Trial Costs

IV. Trial Results

The impact that the introduction of e-readers into Class 6 had on the students, classroom, and community in the long term is still to be determined. However, after weeks of observation, daily diaries, class discussions, and interviews with participants, a number of patterns emerged. In this section, we list some of the key observations, describe the context under which they occured, and discuss possible implications and follow-up required to verify our findings. Trial results are divided up into sections based on the methodology outlined earlier in this document to include the Impact (both positive and negative), the Barriers to success, the Gaps in capability, and other Potential Challenges.

Figure 12: Kindle Diary for student Naomi, Age 16

A. Impact

The table below lists the most visible effects we observed during the trial, on the students, the classroom, the school, and the community, along some possible reasons why we saw these effects, and the implications and follow-up.

Observation	Rationale	Implications and Follow-up
More reading: students spent significant more time reading outside of class - both at recess and lunch and at home - using the e-readers than they previously had done using paper books. This was reported by the students, the teacher, and the headmaster, and was	The devices were new and the students were getting a lot of attention for being chosen to use them, so the «cool factor» was definitely at play in the first two weeks.

However, there was also evidence of other factors, such as more choice and | The long term impact on reading time that is caused by the introduction of e-readers cannot be concluded from this short test, but the signs were encouraging.

Follow-up: need a quantitative measure of reading time before and after introduction of e-readers, |

observed by us.	learning support (see next sections) that appeared to play a part.	over a long enough period of time that the «cool factor» of a new device is negated. Also need to find a way to measure the «causes» of any change in reading time.
Quick learners: all the students learned how to use the Kindle in less than a week. Several one-hour training sessions and a few days of practice resulted in sufficient understanding for independent use.	Although concepts such as a joystick and search were new, the kids had used mobile phones before, so the concept of button presses effecting what was visible on a screen was familiar. And their enthusiasm for learning this new gadget definitely helped.	Learning how to read and navigate on the Kindle, at least, is not likely to be a barrier for even the least technical of participants. Follow-up: since there was no wireless coverage in Ghana, we still need to study the ability of students to navigate and download reading material from online libraries.
Enthusiasm: the students were very enthusiastic about the ability to choose more books in a series they liked (such as Curious George and Magic Treehouse), as well as to immediately get new books that were similar to books they liked. This was evident in class discussions and in the book signup sheet that was popular.	Currently, new textbooks arrive every 3-4 years, and other books are donated sporadically, often by organizations who know little about the students' interests or abilities («Welcome to Utah» was one book spotted amongst the shelves). So the ability to **choose** books was new to them, and peaked their interest in reading more.	It is likely that giving students the ability to choose books and series that interest them most will result in more interest and enthusiasm for reading. Follow-up: longer-term quantitative study of the effect of choice on interest in reading, and time spent doing so.
Learning tool: several students reported that the e-readers were helping them learn to read because they could look up words they did not know, and the dictionary was the most popular reported feature among the class. The teacher estimated that the reading standard in the class increased by 15% after using the Kindles	Because most of the students were still learning English, they were not very familiar with alot of the vocabulary in a number of books they read. The dictionary allowed them easily look up new words, and seemed to make them feel more successful and less anxious about reading independently.	E-readers could very well turn out to be an important tool for teaching not only how to read one language, but also for learning a new language. Follow-up: conduct additional trials in elementary schools to test the effectiveness of e-readers as a tool to help students learn both language and

during the trial.		reading.
Pronunciation help: a number of the students found and used the text-to-speech capability (it was not taught in class). We observed that many had difficulty pronouncing new words while reading, but they liked the text-to-speech capability because it «taught» them how words were pronounced (albeit in a mechanical voice).	The students were not native English speakers, so hearing the correct pronunciation of written words not only helped them learn how to say the words, but also to associate words they understood verbally with words they were still learning in written form.	Previously we would never have thought that a mechanical voice would be a good way to learn pronunciation, but for students who had never heard some of the words spoken out loud, this turned out to be useful. Follow-up: look at e-readers and the use of text-to-speech with non-native language learners, and study the potential impact on the acquisition of language.
Parental involvement: the text to speech capability was used by some of the kids to «read» with their parents at home.	90% of the parents in the village were illiterate, so most of the kids were never read to as children. The text-to-speech capability allowed the parents to become involved in their child's reading. This was significant as many illiterate parents discourage their children from education. Involvement allows them to be advocates.	Being read to as a child is one of the ways we learn language and reading, as well as social mores. Children who grow up with illiterate parents may miss out on this developmental step, but text-to-speech may help serve much of the same purpose. Follow-up: look at e-readers and the use of text-to-speech with non-readers and beginning readers to study the potential impact on their acquisition of language and reading.
Multiple copies: the ability for an entire class to read the same book opened up new opportunities for reading and discussing the same story together as a class.	Other than the math or English text book, there were few other books that the school had more than one copy of.	With e-readers, the ability to have copies for every child opens up new possibilities for teaching. Follow-up: experiment with new ways of making use of this capability.
No loss: No devices were lost, stolen, or broken.	Community was very tight-knit, and students and	This observation was actually unexpected, and it is likely

	teacher seemed motivated to be successful at the trial. Consequently the kids took extra care with their devices.	that a longer-term, less controlled study would find some devices being lost.
Portable: the ability to carry many books around without the weight was seen as a big positive by the kids.		

Figure 13: Impact

B. Potential Challenges

One of the purposes of this trial was to uncover potential barriers to the adoption of e-readers in communities and schools in developing countries, and to identify shortcomings in the technology itself. This section outlines the potential challenges that we identified based on direct observations in the school in Ayenyah, or that we learnt from our discussions with others.

1. Cultural / Social

The OrphanAid Africa school draws students primarily from the village of Ayenyah. It is important to understand how life in the village and conditions in the family have the potential to affect a project like this. Below are a few of our observations from the trial. See the «School and Community» section for more background on the village.

a)   Reading vs. Oral

The students come from an oral story-telling tradition, and music and dance in particular play a big part of their lives. The children all take music and dance classes, and there is a performance in the village every Sunday afternoon.

We were concerned that introducing more ways to read would be a cultural challenge in a place that values oral storytelling. What we discovered certainly supports this concern: more than 90% of the parents are illiterate, and there are almost no books in households, so most of the children were not read to as children. This is a big challenge, since there is no habit of reading in the community.

However, we did discover several things that lessen the potential challenges posed by this. 1. The school already values and teaches reading as a big part of their curriculum, and, as the headmaster said, the «parents will do whatever the school asks». 2. The kids loved the

stories they found in books, since they are still stories. 3. Reading aloud may fit in to the culture even more than reading silently.

While the first part of this is certainly effected by the relatively frequent exposure the village has had with westerners due to the presence of OrphanAid Africa, the others are likely to hold true in other communities in Ghana as well. But overall, in this one school, there does not seem to be any visible cultural barrier against reading.

b) Parental support

One of the biggest frustrations voiced by Philip, the teacher, was that he had trouble getting his students to do homework on a regular basis. He gave two reasons for this. The first was that parents expect school-age children to help around the house and with the family business, so parents were reticent to let them do schoolwork at home, after they already spent most of the day at school. The second was that this particular school had a strong after-school activities program, and so many of the children played soccer or volleyball or took dance or drum lessons. By the time they got home it was dark, and there was no electricity or light by which to do homework.

Both of these elements would have a similar effect on extracurricular reading. The problem of light by which to read and do homework is relatively easy to solve (and e-readers with built-in light would be of benefit), but changing the cultural value of working for the family vs. doing schoolwork at home is a deeper issue that may takes years to change, if at all.

As far as the e-readers and reading in general, however, many children reported that their parents (mothers in particular) were curious about them, and participated in reading with their child. We did not hear any parental objections to reading in general, or to the reading material in particular, however, this is something worth observing in a longer-term study.

c) Western literature

One of the biggest potential challenges we observed was that almost all of the books available to the students either in paper (through donations), or electronically (through the Kindle store), are written by western authors. While we heard no objection to this in principle, the practical consequence that we observed was that the students often didn't have the life experience to understand a lot of what they were reading.

In a Magic Treehouse book that takes place in the ocean, for example, nobody in the class knew what a «dolphin» was, or what many of the other sea creatures were in the story. In Curious George, they did not know what a «squeak» was (a western English description of the

sound made by a mouse). And without the context for some of these words, the built-in dictionary did not help much (the definition of the word «dolphin» was something like, «A marine cetacean of the Delphinidae family.»).

One could argue that this is the very point of reading: to expand a child's knowledge of the world. However, if the students have too little context for what they are reading, then it is possible that they will need a lot of help from a teacher (who also may not have that context), or might even lose interest in what they are reading.

This points clearly to the need for more locally-written reading materials, and materials more specifically intended for this audience. The Anansi the Spider stories in «Folktales from Ghana», for example, were more familiar to the students, and thus comfortable for them to read. Both the headmaster and the teacher also requested our help in finding more local materials.

d) School attendance

One unexpected challenge we observed is the general lack of habituation to school. Most of the parents in the Ayenyah village had not attended school as children, and compulsory education in Ghana has only been in force for a few years, so parents and children are still getting used to long schooldays.

Philip reported having a significant problem with attendance: his 5th and 6th graders were leaving school after the morning recess. He reported that this was mostly boys who did not really want to be in school, and he realized that they felt free to leave after recess because attendance was taken in the morning, so the school did not count them as missing. Philip in fact changed the timing of taking attendance to the end of the day, and as a result managed to keep most of the students in school throughout the whole of the day.

Boys are valued in society, particularly for their ability to work, and girls often get married at a fairly young age. This causes conflicts with school attendance, and challenges keeping kids in school beyond primary. There is a concerted effort by the government to change this situation (junior high school is now compulsory), but for now, there is a huge drop off of attendance after primary school.

2. Environment / Infrastructure

An important part of our interest in this trial was to observe whether these high-technology devices could withstand the environment. This was a remote village school, and the environment for this trial presented challenges that many schools in bigger cities would not, but even so, it was an excellent if demanding testing context.

a) Security / theft / loss

We were concerned ahead of time that these expensive devices would pose a temptation for theft in a place where daily income is a small fraction of their value. We did not, however, have any problem with theft, loss or breakage while we were there. In two weeks, not one Kindle was physically broken, lost, or stolen.

Several factors may have played a part in this. First, because one of the houses in the village had been the victim of a raid by persons from a neighboring village in recent years, OrphanAid Africa had funded a full-time security guard for the school grounds, so there was less threat of theft from outside the village. And theft within the village was highly discouraged, as we observed when one of our party's wallet went missing (it had been misplaced), and several adults took it very seriously and immediately went around asking children in the village if anybody had taken it. There was obviously a strong internal village taboo against theft.

During the training, we also very clearly gave each student full responsibility for the care of their Kindle; having them write their name on it, providing them with a case, and having them keep it for the full two weeks. School administrators seemed a bit worried about this approach, and gave stern lectures to the kids. All of this probably combined to give the students a collective feeling of both pride and responsibility in the care of their e-readers.

This is certainly an important area of study for longer term and less highly monitored test situations.

b) Ruggedness

This was a good real-world test of the Kindle in an environment for which it was not entirely designed. At the end of the two week trial, none of the Kindles in the trial were physically broken or disabled, although the students were able to find several ways to temporarily disable them by inadvertently deleting books or depleting the battery (see more in the Usability section).

As far as hardware ruggedness, we found no problems during the first two weeks, but it is likely that, over time, water and dust would find their way into the speaker grille, headphone jack, and keys and buttons. We did provide a neoprene case that provided the device with minimal protection from from shock, water, and dust, and although this was probably a significant factor in none of the Kindles getting damage, it is probably not enough for a future test. A longer-term study is needed here.

Figure 14: Kindles in their cases

Follow-up: meet with Amazon to share findings, and advocate for fixes in future versions of their software, and discuss potential hardware ruggedness issues.

c) Charging

The village where the kids lived had no electricity, but the village school had one working solar array with a set of 8 car batteries, running at 240 volts. In the pictures below, you can see that we set up a charging station with a powerstrip, and plugged in 5 Kindles at a time, which charged up to about ¾ full from empty in a little less than an hour.

Figure 15: Solar charging station

We did run into the one battery problem reported under the Ruggedness section, but once that was fixed, charging 5 Kindles at a time once a week or so did not seem to present too much of a challenge. The amperage draw seemed to be sufficient, and there was enough sun most days to provide several hours of power for this and several other uses. It did take some management, as Richard, the community manager, collected the Kindles and charged them for the kids while they were in class.

This will definitely present a scaling issue, however. If this whole school of 120 students had e-readers, then it is likely that another solar array like this (at $11,000 each), may be needed, and some other process would need to be created for charging so that one person didn't have to do it all. More testing is undoubtedly needed, especially when the rainy season sets in and there may not be sun for many days at a time.

d) Wireless / internet

Kindles have a built-in wireless cell phone technology to download books directly from mobile phone towers, but this service (at March 2010) is not turned on in Ghana, so the only alternative for the trial was to download books onto a computer, and transfer them via USB cable to each Kindle individually. While this makes it slower to get books, it is still much much faster than the current process for getting paper books.

The OrphanAid Africa school had a satellite internet dish up on a village-made wooden tower. As they they had not been able to continue paying for the service on their own, which was about $900 per year, it consequently had lapsed into disuse. For this trial, Worldreader.org paid for the service to be turned on for a year, and also needed to provide a computer to download and transfer books, but in a real-world deployment, it would be preferable to turn on the

built-in e-reader cell coverage, so as not to be dependent on internet and computers availability.

Figure 16: Wind and Satellite Internet hut

The satellite coverage in the village was fairly fast, and worked well: we were able to download Curious George and other books that were around 1MB in size, in less than a minute. But the process for loading even one book onto 16 Kindles was fairly cumbersome, because each of the 16 Kindles had to be plugged into the computer using the USB cable, and the file dragged and dropped onto it.

So the two potential challenges that we discovered from this trial are:

1. Loading books onto 100's of Kindles via internet/computer/usb would be cumbersome, perhaps even prohibitively so. Since we didn't have Whispernet we could not try the wireless alternative, but from our experience, this would be significantly better.

2. A trained adult is required to manage the purchasing and loading of books, as the current process (for the Kindle at least) becomes somewhat cumbersome with scale. More on this in the Content section.

e) Reading at night

No electricity in the village, and limited light at night, means that reading at home after sundown would be a challenge without some way of providing light.

3. **Cognitive**

The kids we encountered in class 6 were bright and curious, but there were a few potential challenges to indroducing e-readers and appropriate reading material for them.

a) **Language**

English is the language of class instruction in Ghana, but none of the students nor the teacher were native English speakers, and because of the tendency for kids to come in and out of school and to enter late, there was a large range in English proficiency. Most had to understand spoken English fairly well, but their reading ability was much less, and their writing even less.

This presented a challenge for reading, because even though they could sound out the words, their vocabulary was limited so they did not understand it all. So language acquisition and reading acquisition were going on simultaneously, unlike the normal situation for reading learners, which just presented us an extra challenge.

b) **Age vs. reading level**

In this school, as in others in Ghana, classes are grouped more by ability than by age, so the age ranged considerably: the youngest being 10, and the oldest 17, with an average age of 15.

In class 6, about half the students were still sounding out individual words very slowly, and the other half were reading at around a 2nd to 3rd grade level. Yet the biggest challenge to reading was still understanding the context of much of the western material.

The other challenge was that the stories at their reading level did not always match their maturity and interests. So 12 year olds were reading about Curious George and his first day at school, which was written more for 6 or 7 year olds. In this case, the kids were still interested, because they seemed happy to have **anything** to read at their level More effort could be made to find books that match both context and maturity level, perhaps books for second language learners?

c) **Learning the device**

There were no real cognitive issues that we observed which would prevent these students from learning to use the Kindle. We lengthened the training from our intended 2 hours to around 4 hours total, and it proved more effective to teach a little bit each day and re-enforce previous day's learning as we went. Overall it took roughly twice as long for these 6th graders in Ghana to learn most of the capability of the Kindle as it took for 12th graders at the international school in Barcelona.

d) Internet literacy

Since the Kindles did not have wireless coverage in Ghana, we could not have the students browse the Kindle store and download books; therefore, we do not know how their lack of experience on the internet will affect their ability to get books. Based on what we saw, however, they pick up new concepts fairly quickly, and there are no obvious barriers to them learning this when the time comes.

4. Technical

There were some challenges posed by the Kindle device itself, although none that couldn't be addressed with training and more time.

a) Learning issues

The Kindle in general is a fairly easy-to-learn device, but what we realized from teaching its use to these students was that it derives many of its metaphors from computers. Since most of these students had not appeared to have used computers before, many of the basic concepts were novel to them.

The initial learning hurdles for this class were the concepts of highlighting, selecting, cursors, and the use of the joystick. On the Kindle, the highlight appears as a dark underline beneath the name of a book or a menu item. Selecting an item involves pushing the joystick in (as opposed to up and down). Learning to perform these actions successfully took less than 5 minutes for some students, but others were still learning them after an hour. Frequently when the trainer would say, «select this menu item», the students would highlight it, but would not think to then select it without prompting. After a repeat session, everyone learned to do this successfully.

Similarly, the joystick proved a bit of a challenge for a few of the students, as it requires fine motor control, and there is some subtlety in feeling the difference between pressing IN and pressing LEFT/RIGHT/UP/DOWN. Making a mistake, like pressing slightly to the RIGHT when attempting to press IN, had unexpected results, and they got into a screen that they did not immediately know how to get out of. Teaching them to use the HOME button whenever they got lost, solved this problem.

Navigating books using the NEXT and PREV buttons proved easy, but the concept of locations within a book was confusing to some. Because the text size can be varied in an e-book, the page number can change. This concept took several explanations and practice to get across. Varied text size also caused some confusion when the class is reading together out loud, since the teacher cannot know when it is time to turn the page for every e-reader in the room.

Using other navigation methods, like going to a location or going to the beginning of a book were fairly easy once the joystick and selection were mastered. However, adding notes and bookmarks proved to be more of a challenge, in part because typing on a keyboard was new to them so understanding delete keys and carriage returns took some time. And in part it was because the action of making a note or a bookmark created something «invisible» that had to be accessed through another fairly obscure menu (Notes and Marks). This concept that an action in one place causes a corresponding action in another (non-visible) place, was a bit puzzling for them.

All of these basic learning hurdles were overcome with training and practice, but extra time should be planned for training if users don't have experience with computers.

b) Usability issues

There were several key usability problems with the Kindles that were discovered by the students during the trial, and affected their use:

1. While they were learning to use the joystick, about half of the class managed to delete at least one book by mistake. It turns out that pushing slightly to the left on the joystick while selecting a book presents the option to remove a book, and then pressing in on the joystick removes it. This is a subtle movement that is easy to do by mistake when first learning.

2. About five of the Kindles ran out of battery within the first day, which was puzzling because they should last several weeks on a charge. It turns out that selecting the option to go to the Kindle store activates the radio, which, in a country without Whispernet coverage, depletes the battery within hours while trying unsuccessfully to connect.

3. On one Kindle, almost all of the books disappeared. It turns out that pushing up on the joystick when at the top of the book list gave options for filtering the books shown, and some of the filters result in the appearance that books had been removed.

One less serious usability problem was search. Many students would choose the, «Search this Book» menu item, but would not notice the (very subtle) blinking cursor appear at the bottom of the screen, and they would think nothing happened. Also, once a search term is entered, they often forgot that they had to flick the joystick to the right to highlight the Find button, then select this. There were a number of other subtle usability issues that will be passed on to the manufacturer.

Note that we did not test acquiring and archiving books (at least not intentionally!) because we did not have Whispernet service, so that is an area for further study.

While these and other software quirks can be corrected through training, we believe that these first three in particular should be fixed by the manufacturer before the Kindle is put to widespread use in classrooms.

c) Technical Bugs

The Kindles occasionally froze, and had to be restarted by holding the power button for 15 seconds.

During set-up, we occasionally encoutantered problems in which Amazon's book-counting system would get slightly confused: we would have downloaded a book to five devices, but were unable to download it to a sixth device because the Amazon system thought we had reached the six-device limit. This caused us not to be able to buy additonal copies of the book: until you have purchased six copies, you cannot purchase more.

The other apparent «bugs» turned out to be usability issues. By moving the joystick left and then clicking down, without encountering any kind of «confirm» screen, students discovered that they could delete e-books from their devices. This would require us to reload their content for them from a computer backup, to which most of the children did not have access. It was just as easy for students to accidentally switch into a view where only some, but not all their reading materials were displayed on the Kindle's main page.

d) Feature needs

The main requested feature by the students was a light to read at night. They also requested books in local languages like Ewe, Twi, and Ga-Adagbe, as well as dictionaries in local languages.

e) Dictionary

The dictionary was very useful to the students who were learning to read, but as mentioned in the Language section, they are also learning English and they don't have a lot of experience of life outside their village. The dictionary included with the Kindle is fairly standard, and is not particularly well suited to language learners, in that definitions often include words that are as difficult as the word itself (for example: the definition of «refer» is «mention or allude to»). Many of the definitions also assume a western point of view.

While it is curently possible to change the Kindle's default dictionary, it is not easy. For this audience, a dictionary that included more basic

descriptions of words and the objects they represent, would be preferable.

5. Content

For this trial, we included some Western and some African content, although all in English. Besides the need for e-reader wireless support in Ghana, we observed several potential issues with acquisition of appropriate content.

a) Cost

The cost of producing, printing, and distributing class materials on average should cost less digitally than with the current paper system. There has been a particular push in Ghana in the last few years to buy each student their own set of textbooks, so digital publishing could very well make sense.

Supplementary reading materials (novels, magazines, etc.) are mostly provided through libraries, but books in libraries are still in short supply in the Ghana schools we visited. And while popular novels from commercial publishers, are significantly less expensive to purchase digitally than their paper counterparts, they are still likely to be higher than Ghana public school budgets will allow, at least on a per-child basis. Purchasing books on the Kindles we used in Ghana was complicated by the fact that DRM (digital rights management) contracts don't currently cover the case of sharing one book across all the students in a classroom, so technically, a new book had to be purchased and downloaded separately for each Kindle/child, which was cumbersome and expensive.

Adapting the DRM systems to library lending practices, or vice-versa, is still one of the most complex issues to be resolved in order to distribute supplementary materials digitally.

b) Purchase process / DRM

The process for purchasing books on the Kindles we used in Ghana was complicated by the fact that there was no Whispernet to do it wirelessly, so they had to be downloaded to a computer and transfered to the Kindles by USB cable. This process had to be repeated for every Kindle, for every book.

In a real public-school situation, it would be preferable for a school or district to be able to purchase unlimited rights to a set of books, and download those books wirelessly onto any e-reader without additional cost. This would require creating alternative DRM models with publishers, as well as modifying the purchase process. One idea we had, for example, is to create a geo-locked DRM model where books would be purchased for a geography, like the country of Ghana,

and would not work when opened on an e-reader outside of that geography.

c) Local content

There is almost no digital content for the Kindle by Ghana writers and publishers. Ghana publishers will need to work with Amazon to find models to charge for their works in regions that don't have the means to pay western prices for them.

V.   Follow-up

A. Phase 2 of the Ayenyah Trial

Since ending the first trial on 26 March we have moved from a model of many Kindles and limited content to fewer Kindles and access to on line content (and consequently a more continuous flow of new content).

4 Kindles were left at the village under the control of Richard Adabrah Klu, the Community Center Manager. A small monthly budget will be allocated.

The objectives of this trial (phase 2) are to:

a) Continue to monitor the performance of the Kindle hardware in tropical conditions and in a library (lending) context; breakages, breakdowns, temporary faults etc

b) Monitor the quantitative use of the Kindle in terms of number of books ordered, and demand to borrow the Kindle from the Community Center.

c) Monitor the qualitative use of the Kindle in terms of type of reading material ordered (books, magazines, wiki type articles downloaded from internet, word documents etc)

Length of trial (phase 2):

To be reviewed, but initially six months.

Targeted Users

There exist three groups of potential users:

1. Grade 6 class of students that already have the experience of using the e–readers

2. Other students in the school

3. Other members of the community (of all ages)

Initially (first 4 weeks) groups 1) and 2) will be invited to utilize the Kindles but soon after we envision group 3) to be integrated.

Results of trial (phase 2)

To be communicated through a monthly reporting system.

B. Upcoming Trials in Ghana Public Schools

Worlrdeader.org met with the Deputy Minister of Education in Ghana, Hon. Dr. Joseph S. Annan on March 17. After a very positive meeting a written proposal was presented to the Ministry. On April 8 the Ministry confirmed in writing their wish to partner worldreader.org in the co-development of pilot study in Junior and Senior High Schools in Ghana, which will build upon the results of this trial. Preparation for these trials is currently underway, and they are scheduled to begin in the Fall of 2010 and run for the 2010-2011 school year.

In case of reply the
number and date of this
letter should be quoted

My Ref № **DA9/182/01**

Your Ref № _____

REPUBLIC OF GHANA

Ministry of Education
Ministry Branch Post Office
P. O. Box M. 45
Accra

8ᵗʰ April, 2010

Messrs David Risher And Colin McElwee
Worldreader.org
c/o OrphanAid Africa
Off Dzorwulu Traffic Light,
Otublohum Street
Opp. Medfam Medical Center/Hospital

Dear Sirs,

We acknowledge, with thanks, receipt of your recent letter on the proposed pilot programme on the use of kindles by Junior and Senior High School students.

The Ministry is happy to confirm its interest in partnering your organisation, Worldreader.org to conduct the pilot studies using the experience gained in the OrphanAid pilot in Ghana.
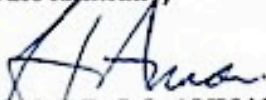
We are, therefore, happy to propose Nana Banchie Darkwah, a Ghanaian who is a retired Professor from the US to liaise between the Ministry and the Worldreader.org on the proposed pilot studies. Nana is also a writer and very familiar with Amazon books and the use of kindles. Infact, he currently has one of his book on kindles.

Nana can be reached at   yahoo.com and on telephone no. 02

We look forward to hearing from you on the way forward to organising the pilot studies programme.

Thank you.

Yours faithfully,

HON. DR. J.S. ANNAN, MP
DEPUTY MINISTER