Overview

Library For All is developing a digital library platform ("app") that enables the delivery of ebooks to people living in developing countries via low-cost devices such as tablets and mobile phones, at a much lower cost than building physical libraries. This report details the findings from our technical pilot at Respire Haiti School, from October 2013 to March 2014.

In February and April 2013, the Library For All team conducted two preliminary research trips to Respire Haiti School in Haiti to evaluate the learning and technical environment. These trips shaped the initial development of the app and thinking about how to re-imagine a system for the distribution of educational resources. This initial thinking was undertaken in partnership with major technology firm ThoughtWorks and the Stern School at New York University. In these initial sessions, the Library For All team defined three key value propositions that separate our approach from other models:

1. High quality, relevant content in an easily searchable library; including OER and publisher resources
2. Device agnostic for access on a range of low-cost digital devices; starting with Android and built on flexible web-based technology
3. Specific low-bandwidth network topology that will work offline and update when possible

In July 2013, Library For All completed its seed funding round for the project, raising $109,955 on Kickstarter. This funding enabled us to complete Phase 1 of our project: to build and pilot a version of the Library For All platform in Haiti. We invested our seed funding in building our team, sourcing and curating relevant content, and partnering with an existing app focused on the US market. We launched our pilot on schedule in October 2013 at Respire Haiti School in Gressier, a school for 530 children where 70% of the students are former restaveks (child slaves), and teachers and students have very little access to educational resources.

The purpose of this document is to share our learning from the pilot with partners and stakeholders, and detail how we will integrate the lessons that we learned from Phase 1 into Phase 2 of the project. Phase 2 will launch in April 2014 with the release of our built-for-purpose Library For All platform. We welcome feedback from partners on the ground, content providers and others as we continue to refine our model.
Purpose of the Pilot

The pilot was primarily a technical pilot with the main purpose of challenging our technological and design assumptions. The secondary purpose was to give our team insight into the kinds of content that was most popular with our users. Finally, the pilot gave us insight into how the Library could be implemented in schools and libraries.

A key limiting factor was that we wanted to be able to support DRM for commercial content as well as Open Educational Resources (OER). To keep costs within budget while still developing our design for a custom app, we decided to take advantage of the opportunity to partner with an existing app platform that supported DRM – Page Foundry. Page Foundry offered not only their Android application, but also their library backend.

The initial Library contained about 300 books, including 200 public domain books for children and young adults in English and French, 50 children’s books in Haitian Creole from our publishing partner, Educa Vision, and other teacher resources including math textbooks. The books were organized by language, reading level, and subject. Since the initial launch we have added another 200 titles in French, English, Spanish and Creole from the public domain, several small Creole publishing organizations, and NGO partners.

The implementation began with a 10-day trip for 4 staff members to Respire Haiti. We brought 22 devices, including four different models, donated from Datawind. Datawind is the maker of the Aakash, an Android-based tablet that retails in India for $40. In Haiti, we began by introducing the device and Library to the administration and teachers, and then introduced it to classes of students from Kindergarten to 8th grade. We didn’t do any formal training for teachers or students as we wanted to see their initial responses to the Library. Following the pilot, one staff member made a follow-up visit to the school three months later, and we have received regular updates and a log of the use of the Library from the school.

Findings

Network Topology: Despite Page Foundry’s efforts to create a robust offline experience for our app, we found that several key functions still relied on an internet connection, making the app essentially unusable with the school’s intermittent internet connection. Therefore, during the pilot we decided to change tack and preload the content that we had onto a free Android reader app. We loaded each device manually with the app, ebook content in ePUB and PDF, and then tagged the content into collections. We also tested pieces of the network topology we had designed by getting a local hub working and completing data transfers between the hub and tablets.

User Experience: Overall, the app was sufficient for the purpose of reading a specific book and searching the library. However, students encountered several issues: many of the buttons in the user interface were too small, making some actions unclear. This problem was exacerbated by the low-quality touch screens on the
devices, making searching for books difficult. For our staff, integrating categories and tags onto books required 1-2 hours of configuration for each device.

**Devices:** Despite user interface issues, students understood the capabilities of the devices very quickly. Some children discovered that they could turn pages using volume buttons; this was a feature we were not aware of. When introducing teachers to the devices, half of the teachers were more hesitant to use the new technology, while the other half began searching and reading immediately. Within two weeks, 60% of the devices malfunctioned or broke. Five months later, only nine of the original 22 devices are still in use at Respire. During the January follow-up trip, we brought 12 Google Nexus 7 devices (retailing at $120) and 10 Haitian Surtab devices (retailing at $75) for testing, and so far the feedback has been much more positive.

**Power:** The Respire team were able to use one Datawind device for a week without charging, by turning the devices off right before and after use. When the power for the school turned on, the staff could charge the devices. Although power is intermittent in Haiti, Respire has found a sustainable solution. However, we plan to look into better power management systems in the future, including solar charging.

**Implementation Model:** The devices were managed by two school staff members, who checked out the group of devices to classes. Some classes were small enough to have one device per student, and other classes shared devices among students. Sharing devices worked well for the youngest students, where teachers used the Library to read to small groups. Among older students, sharing worked in some cases but was frustrating in others, i.e., when one student took control of the device. In addition, the devices were used for tutoring, weekend adult English classes, and teacher training. The class set model worked very well in each of these scenarios.

**Content:** Local content by Haitian Creole publishers was by far the most popular, followed by French early readers, literature and textbooks. Some of the students had never seen a book in Haitian Creole, and were delighted to see children who looked like them in the illustrations. Overall, users cited Creole early readers, the Bible in Creole and French, English early readers, dictionaries, and textbooks as their favorite books. Students and teachers requested more content in English and Spanish, especially easy readers for youth and adult language learners. We noted that since most book titles and authors were unfamiliar to the students, book covers were extremely important in helping students select what to read.

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**Quotes from Respire’s log on using the Library**

- The kids were amazed at the pictures
- The teacher knew exactly which book she wanted to have read to the students (Haitian holidays) and then discussed it with kids after
- Had some problems with Surtab screens, under sensitive to touch
- Teachers loved the textbooks and resources, didn’t want us to end library time
Phase 2: Integrating Findings from the Pilot

The technical challenges we encountered led to some great learning opportunities for our team. In Phase 2 we plan to incorporate these learnings, and also expand the Library to include content that is most relevant to our users. Finally, Phase 2 is about scaling access, to provide even more students and teachers access to content they so urgently need. Our goal is to expand the Library to 60 schools and libraries in Haiti, and pilot in two new countries in sub-Saharan Africa. Our strategy relies upon scaling access while developing a sustainable model, integrating distribution with existing efforts, sourcing local products and service providers where possible, and ensuring that our users continue to be at the core of our product development.

Technology
For Phase 2 we are developing a simple reading experience on low-cost tablets and a system for managing low-bandwidth environments with the following features:

- The potential to include content from major publishers by providing digital rights management (DRM).
- A custom reader with large buttons and an easy-to-use interface that can work on 7-inch and smaller devices.
- A scaleable back-end so that publishers and content providers can upload their content directly onto the Library.
- Basic data collection systems to better understand how students and teachers use the Library.

Based on our fundraising in 2014, we hope to add a number of features to provide a higher-quality experience tailored to school environments that make learning more effective. New features will include:

- Simple user accounts that enable users to maintain a personal collection of books, as well as maintain the last page read, bookmarks, and other personal information, allowing devices to move from student to student without any loss in progress.
- Enabling teachers to push learning materials to student devices before or during class time, to reduce the delay in aligning all the students in a classroom to the same material.
- A built-in dictionary where students can tap on any word in a book to get a definition.
- Reading assessment technologies to better gauge student progress.
- In-class management tools for teachers to automatically move students to a certain page in a book and provide notes on assignments.

Finally, we must expand our infrastructure to support the 450,000 students we plan to reach by the end of 2015. This includes additional servers for the library as well as staff to maintain the library and provide support for schools.

Content
Based on feedback from the pilot, we are refocusing our efforts on local language publishers, as well as continuing to source the best of international resources. We are building relationships with content providers to source new content, and tagging books to the local curriculum to make resources easier to find in the classroom.
Phase 2: Integrating Findings from the Pilot (continued)

Content (continued)
Teachers requested textbooks in more subjects, and a wider selection of French and English literature for their personal and professional development. Students quickly read through the 50 Creole children’s books and looked for more. We must continue to expand our partnerships with Haitian publishers to include the “classic” textbooks for Haitian schools in our library. In many cases, books that would benefit our students do not yet exist in Haitian Creole, such as classroom resources and a wider selection of children’s books. To encourage the development of new books in Haitian Creole, we are designing a sustainable business model that will generate revenue for Haitian authors and publishers through our Library.

Implementation
The pilot helped define our strategy for implementing the Library in schools and community libraries. In particular, it became clear that teacher training and ongoing technical support would be to the success of this program. Some level of technical support will be provided by our team remotely through the hub, and we plan to experiment with incorporating training materials and instructions into the app experience itself.

In Phase 2, we are establishing a partnership with a network of certified local technicians called BATI, who can provide schools in Haiti with training and technical support. We will also experiment with a peer training program where teachers in the same area train teachers at other schools. Finally, this year our Library will be incorporated into a large-scale local teacher training program, which will provide us with more data on how to train teachers to use the app in the classroom. Developing and adopting sustainable, effective systems is vital to ensuring that we can provide access to all partners at scale.