Literacy Boost Zambia: Baseline Report

January 2014

Elliott Friedlander, Agnes Zalila, Kelvin Kasuba and Bias Sichamba


© 2013 Save the Children
Executive Summary

Introduction
This report examines the results of a learner background survey and reading assessment conducted in June 2013 as part of a Save the Children sponsorship baseline data collection.

The report analyzes data from a survey and reading assessment covering 383 grade 3 learners throughout 24 schools in Lufwanyama, in the Copperbelt province of Zambia. The 24 schools are split into 12 primary schools designated to receive Save the Children's (SC) Literacy Boost program, and 12 comparison primary schools receiving no intervention. The Literacy Boost program includes teacher training, community reading activities, and age-appropriate local language material creation to support emergent literacy skills among early-grade children. These skills include concepts about print, letter awareness, single word reading of most used words, reading fluency, reading accuracy, and reading comprehension.

The key research questions to be explored in this report include the following:

1. How comparable are learners in Literacy Boost schools versus comparison schools in terms of reading skills, background characteristics, home literacy environment, and school environment?
2. What can the baseline tell us about learners’ emergent reading skills? What does this mean for Literacy Boost programming?

Student Descriptives
Students are roughly 9.85 years of age, with girls significantly younger than boys. Approximately 14% of students reported attending early childhood development centers, and roughly 25% have repeated grade one, and another 25% have repeated grade 2. Nearly everyone (97 percent) have latrines at home. Students come from families that on average have approximately 5 members, and all students report doing 2.5 different chores at home. This could be a potential advocacy point in communities. LB should encourage families to give students, regardless of sex, adequate time to study at home and practice their emerging reading skills.

There are significant differences in language use at home that could raise challenges for the endline analysis. Because more students in Literacy Boost schools speak Bemba at home, which is also the language of instruction, there is the possibility that these students will have an easier time learning to read since learning to read happens best when it happens in a child’s mother tongue. Also, because a significant minority of students speaks Lamba at home, it is recommended to provide and/or create books in the Lamba language so that students may experience literacy in their mother tongue, provided Lamba is a written language.

Reading Skills
Children seem to have good mastery of their concepts about print, but efforts should still be made to make sure all students have access and are using books to practice their reading skills.
Students on average knew far too few letters (30 percent, on average) when compared with the number of years they have been in school. Literacy Boost should focus on these basic letter skills as well as the higher order skills of reading fluency, accuracy, and comprehension. While it can be easy to assume that older students know their letters, the evidence generated from this assessment clearly indicates that they do not. Particular attention should be paid to language minority students here as well, as there is some indication that Lamba speakers are falling further behind than their peers who speak another language at home.

Literacy Boost learners correctly read more of the Most Used Words in Bemba than did their comparison counterparts. However, at 13 percent of the Most Used Words, there is still much room for improvement in the performance of the Literacy Boost learners. While no significant differences were found for English, the scores for English word identification were also very low. Children need to be supported in reading simple words.

Unfortunately not enough learners could read independently to permit analysis on the fluency accuracy, or reading comprehension portions of the assessment, either in English or Bemba. As Literacy Boost gets underway, the challenge will be helping students gain a mastery of their letters and decoding skills so that they can make the switch from non-readers to being able to read independently.

Home Literacy Environment
Over half of Literacy Boost students report having religious books in their home, fewer than a quarter report having a textbook, and fewer than one in five students report having story books at home. As children cannot learn to read unless they have something to read, it is critical that Literacy Boost helps provide children with reading materials and emphasizes the importance of materials, both homemade and store-bought, to parents and community members.

While over half of students’ families have been seen reading, very few of them are reported as engaging the child in reading activities. As Literacy Boost is implemented, it is important to capitalize on the strong presence of readers that currently exists in the homes already. Encourage parents and community members to participate in reading awareness workshops as a way to help them learn how to best support their children to learn.

In multivariate regression analyses, there is a clear correlation between the HLE and students’ reading skills. Students from the lowest quintile of HLE have lower scores than students from the middle and the highest quintile of HLE. While this does not necessarily mean that improving the HLE will improve reading scores, it does confirm that some relationship exists between the two, and underscores the important role that families and communities might play.

Conclusion
As Literacy Boost is implemented, a strong focus on providing children diverse access to texts should be featured, and strong community activities and education around supporting children to learn should play an important role in Literacy Boost.
# Table of Contents

Executive Summary .............................................................................................................. 2
1 Introduction ....................................................................................................................... 5  
  1.1 Overview .................................................................................................................. 5
  1.2 Context ...................................................................................................................... 5
2 Methods ............................................................................................................................ 6  
  2.1 School Assignment ................................................................................................. 6
  2.2 Student Selection ...................................................................................................... 7
  2.3 Instruments ............................................................................................................... 7
  2.4 Data Collection ........................................................................................................ 7
  2.5 Analysis .................................................................................................................... 8
3 Student Background and Demographic Data .................................................................. 8
4 Individual Skill Analysis ............................................................................................... 9  
  4.1 Concepts about Print ............................................................................................... 9
  4.2 Letter Knowledge ................................................................................................... 10
  4.3 Word Recognition .................................................................................................. 10
  4.4 Fluency & Accuracy ............................................................................................... 11
  4.5 Listening & Reading Comprehension ..................................................................... 11
  4.6 Reading Skill Profile: Literacy Boost Students ...................................................... 12
5 Home Literacy Environment Data .................................................................................. 14  
  5.1 Materials at Home .................................................................................................... 14
  5.2 Engagement with Print ........................................................................................... 15
6 Trends in Reading Skill Data .......................................................................................... 16
7 Conclusion ....................................................................................................................... 17
Appendix A. Inter-rater Reliability ..................................................................................... 20
Appendix B. Background Averages and Significant Differences between Groups ........ 21
Appendix C. Individual Reading Skill Average Values .................................................... 24
Appendix D. Reading Skill Averages and Significant Differences between Groups ....... 27
Appendix E. Regression Models by Outcome .................................................................... 29
Introduction
This report examines the results of a learner background survey and reading assessment conducted in June 2013 as part of a Save the Children sponsorship baseline data collection.

1.1 Overview
The report analyzes data from a survey and reading assessment covering 383 grade 3 learners throughout 24 schools in Lufwanyama, in the Copperbelt province of Zambia. The 24 schools are split into 12 primary schools designated to receive Save the Children’s (SC) Literacy Boost program, and 12 comparison primary schools receiving no intervention. The Literacy Boost program includes teacher training, community reading activities, and age-appropriate local language material creation to support emergent literacy skills among early-grade children. These skills include concepts about print, letter awareness, single word reading of most used words, reading fluency, reading accuracy, and reading comprehension. As part of Literacy Boost, learners are periodically assessed in each of these skills through an adaptable assessment tool to inform programming and estimate program impact. The data gathered from these schools is analyzed to present a snapshot of the emergent literacy skills of grade 3 learners in these schools and to inform the adaptation of SC’s Literacy Boost program to this context.

The key research questions to be explored in this report include the following:

3. How comparable are learners in Literacy Boost schools versus comparison schools in terms of reading skills, background characteristics, home literacy environment, and school environment?
4. What can the baseline tell us about learners’ emergent reading skills? What does this mean for Literacy Boost programming?
5. How do learners’ reading skills vary by student background, school environment, and home literacy environment? What does this mean for targeting Literacy Boost’s two strands of intervention?

To investigate the questions above, this report will first describe the research methods used; including sampling, measurement, and analysis. Next, in order to see if groups are statistically similar, the comparability of scores of both the regular sample and the purposively selected sample of slow learners from Literacy Boost and comparison schools will be examined through clustered t-tests. The comparability of Literacy Boost and comparison learners’ scores for each of the emergent literacy skills, exploring learners’ strengths and weaknesses in each skill will also be examined. The report will then examine what are the literacy skills that are already present in the sample, and what areas should Literacy Boost focus on. The report will then investigate student backgrounds examined through clustered t-tests. Finally, the report will investigate any correlations with student background, school environment, or home literacy practices & environment variables using multilevel regression analysis.

1.2 Context
There are 48 government and 43 community schools, and only 2 high schools in the whole district of Lufwanyama. Though early childhood development and education is considered one of the key components in education in the whole district there is only one ECCD centre as the Zambian government does not fund these. Formal government services (e.g. health and
education) are sparsely distributed and often understaffed. While enrolment and completion rates within the education sector reflect a good take-up of the free education policy, they hide huge challenges within the provision of quality education.

The provision of quality education, especially among community schools is hampered by the poor staffing and qualifications of teachers and a poor learning environment. According to Ministry of Education officials, a survey conducted on literacy for teachers and pupils among 15 countries Zambia came out number 14, while in government school though they have qualified staff they are still understaffed, with an average teacher to pupil ratio of about 1 teacher to 48 students in government schools and 1 teacher to 158 students in community schools. There is a high teacher to pupil ratio and thus little individual attention is given to every pupil. Within these circumstances, girls and children from poor and remote households are more likely to drop-out largely unnoticed.

Based on the primary and secondary data gathered during the situational analysis conducted by Save the Children in January and February 2012, it was learnt that since the introduction of the 2002 free basic education, primary school enrolment has steadily increased. While school enrolment rates exceed the MGD target, significant concerns remain regarding enrolment age, attendance and retention, progression and completion, and quality, especially in relation to learning achievement. Despite the integration of grades 8 and 9 in the former primary school system, just 53 per cent of children complete grade 9. Children from poor households, rural children and girls are typically the last to enroll and the first to drop out, and are significantly underrepresented in the upper grades of basic education as well as the secondary level.

The schools in Zambia are divided into 3 levels of schools: Basic or Upper Basic Schools which includes Grades 1-9; Middle Basic Schools, grades 1-7; and High School with grades 10-12. Children start first grade around age 6-7. According to District Education Board Secretary statistics, the district has 2 High Schools (1 GRZ (Government of Republic of Zambia) and 1 Grant Aided Special School), 33 Upper Basic Schools, 15 Middle Basic Schools, 43 Community schools and 2 IRI centres (centre where interactive radio listening lessons are done). The District has 43 registered community schools with high percentage of unqualified teachers.). Enrolment rates in general are more among boys than girls. This is all data from IAPP.

2 Methods
This section reviews the methods used in this study.

2.1 School Assignment
The sample for this baseline assessment encompasses 383 grade 3 learners, divided between 12 schools set to receive the Literacy Boost intervention (n of learners = 197) and 11 comparison schools (N of learners = 186). The criteria for selecting which schools should receive Literacy Boost and which would be controls were as follows:

- Relatively same socio-economic status
- Similar level of the educational achievement
• All the schools in the area where sponsorship has just begun its implementation as intervention schools and schools where sponsorship program may be implemented in the next three to five years.

Sponsorship in Lufwayama will only be implemented in twelve communities which is only part of the whole district. In the twelve communities where operations and programming has only been initiated in 4 communities, operations and programming will eventually phase into the other eight communities. Thus the 12 intervention schools are schools in the four communities where operations has already started. In the four communities, community schools were given priority and as well as one government school.

2.2 Student Selection

All the students in the grade three at the selected schools were interviewed.

2.3 Instruments

Table 1 offers examples of background and home literacy indicators and offers a detailed description of reading indicators.

<table>
<thead>
<tr>
<th>Table 1: Data Collected</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Student background</strong></td>
<td></td>
</tr>
<tr>
<td>General</td>
<td>Sex, age, language spoken at home, work</td>
</tr>
<tr>
<td>School-related</td>
<td>Distance to walk to school, repetition history</td>
</tr>
<tr>
<td>Socioeconomic status</td>
<td>Type of home, household size, household amenities/possessions</td>
</tr>
<tr>
<td><strong>Home Literacy Environment</strong></td>
<td></td>
</tr>
<tr>
<td>Access to print</td>
<td>Materials present in home, types of materials</td>
</tr>
<tr>
<td>Reading at home</td>
<td>Presence and percentage of family members who children see read, and who read</td>
</tr>
<tr>
<td><strong>Reading Outcome</strong></td>
<td>Description</td>
</tr>
<tr>
<td>Concepts About Print</td>
<td>N of concepts demonstrated correctly of 10</td>
</tr>
<tr>
<td>Alphabet knowledge</td>
<td>N of letters/sounds known of 61</td>
</tr>
<tr>
<td>Vocabulary/Decoding</td>
<td>N of single words read correctly of 20</td>
</tr>
<tr>
<td>Fluency</td>
<td>N of words in a connected text read correctly in a minute</td>
</tr>
<tr>
<td>Accuracy</td>
<td>Percentage of words in a connected text read correctly</td>
</tr>
<tr>
<td>Listening Comprehension</td>
<td>N of 9 comprehension questions answered correctly after listening to a text read aloud by the assessor (only for non-readers)</td>
</tr>
<tr>
<td>Reading Comprehension</td>
<td>Number of comprehension questions answered correctly of 9 after reading a text read aloud (only for readers)</td>
</tr>
</tbody>
</table>

These assessments were developed and pilot tested prior to baseline data collection using the Literacy Boost Toolkit Assessment Component.

In addition to the data specified above, school background information was collected, including resources present at the school, student attendance, and teacher-level data.

2.4 Data Collection
Each assessment team visited one school per day over the course of two weeks in June 2013. Each team was composed of one team leader (a representative of Save the Children in Zambia and group leader among the assessors).

The team of assessors was selected through an advert for school leavers who were later trained in how to use the tools they were provided with. The assessors were trained for three days and conducted a trial before they could go and collect the actual data in the school.

For procedures concerning inter-rater reliability data collection, and for the inter-rater reliability results, refer to Appendix A.

2.5 Analysis
This analysis has two purposes: first, to test whether the Literacy Boost learners and the comparison learners are equal in terms of background and skills. That is, do these learners possess the same resources and capabilities? This question is important so that at end-line, we can know how much Literacy Boost has, or has not, contributed to learners’ accelerated reading development.

The second purpose is to assess what skills the students currently have, and what areas and skills Literacy Boost should focus on.

To test the comparability of learners in the samples, this report will use comparison of means through t-tests, with clustered standard errors to account for the grouping of student-level data within schools. When differences are expected (i.e. in the reading skills between slow learners and non-slow learners) a one-tailed t-test will be used to assess differences. Otherwise a two-tailed t-test will be used when no predictions exist of which group may be statistically significantly higher or lower in terms of background data or reading skill data. Summary statistics will be used to analyze learners’ performance in each of the reading sub-tests. Finally, this report will look to multilevel regression models to explore relationships between literacy skills and student background characteristics, school environment, and home literacy environment.

Data in this report will be disaggregated by group (e.g. LB/comparison school, boys/girls, Bemba/Lamba/Other language spoken at home), only when the aforementioned clustered t-tests indicate statistically significant differences between groups.

3 Student Background and Demographic Data
In general, very few significant differences in background and demographics exist between groups, whether Literacy Boost and comparison students, boys and girls, or Bemba, Lamba, and other speakers. However, a few of these significant differences are very important to take note of as they could affect the outcomes of the Literacy Boost program.

Students are roughly 9.85 years of age, with girls significantly younger than boys. Approximately 14% of students reported attending early childhood development centers, and roughly 25% have repeated grade one, and another 25% have repeated grade 2. Nearly everyone (97 percent) have latrines at home. Students come from families that on average have
approximately 5 members, and all students report doing are 2.5 different chores at home. For this last figure, there is a significant difference between LB and comparison students, with LB students reporting significantly more chores than comparison students. The same is true for girls when compared to boys: girls report doing more kinds of chores/work on average than boys do. **This could be a potential advocacy point in communities. LB should encourage families to give students, regardless of sex, adequate time to study at home and practice their emerging reading skills.**

One last difference between groups concerns the language that students speak at home. Learners throughout the sample speak a total of 15 different languages at home, presenting a real challenge to effective programming. For the purpose of analysis, learners were categorized into 3 groups: Bemba speakers, Lamba speakers, and other language speakers. Within the Literacy Boost group, 46 percent of learners speak Bemba, the language of instruction. This is a much larger proportion of students than those who speak Bemba in control schools. By contrast, over half of comparison students speak Lamba at home, versus less than a third of Literacy Boost students.

**These significant differences in language use at home will raise challenges for the endline analysis. Because more students in LB speak Bemba, the language of instruction, at home, there is the possibility that these students will have an easier time learning to read since learning to read happens best when it happens in a child’s mother tongue.**

Also, because a significant minority of students speaks Lamba at home, it is recommended to provide and/or create books in the Lamba language so that students may experience literacy in their mother tongue, provided Lamba is a written language.

For the exact background averages by group and all statistically significant differences, refer to Appendix B.

### 4 Individual Skill Analysis

This section will review the individual reading skills that Literacy Boost assessed. Each sub-skill (concepts about print, letter knowledge, word identification, fluency, accuracy, listening comprehension, and reading comprehension) will be examined in depth, and significant differences between groups, if any, will be explored. Implications of these findings will be presented at the end of this section following a graphic that sums up student skills. For complete group averages and significant differences, if any, refer to Appendix C.

#### 4.1 Concepts about Print

The first sub-test of the reading assessment consisted of 11 ‘concepts about print’ (CAP) questions. These questions concern familiarity with books – where to start, which way to read, what is a letter, what is a word, etc. In general, students know about 75 percent of 11 of their concepts about print, indicating a moderately high familiarity with books.
In general, students had the easiest time with opening a book. The most difficult item had to do with turning to a particular page (45%). On average, only over 75 percent of students correctly could hold a book correctly when asked. They had the easiest time with opening of books which constituted 98% accuracy.

No significant differences were observed between groups on the Concepts about Print sub test.

4.2 Letter Knowledge
The next sub-test examined learners’ letter awareness. Learners were shown a chart of 26 uppercase and another chart of 26 lowercase letters, and were asked to name the letter or pronounce the letter sound. On average, Literacy Boost and comparison learners correctly identified only 30% of their letters, or 8 uppercase and 8 lowercase letters. This is particularly distressing as learners have been assessed in grade 3, meaning over the course of grade 1 and grade 2 learners had only learned an average of four uppercase and four lowercase letters a year, or 1 letter per month of schooling. This numbers sink lower if you factor into the equation that 41% of learners had repeated at least one grade.

The students had the easiest time identifying the following uppercase letters: “B”, and the easiest time identifying the following lower case letters: “O”

The students had the hardest time identifying the following uppercase letters: “Y”, and the hardest time identifying the following lower case letters: “q”

One significant difference was observed between speakers of Lamba and speakers of other languages besides Bemba. Lamba speakers correctly identified 25 percent of their letters, which was significantly less than the 35 percent of letters that other language speakers scored.

4.3 Word Recognition
The most used words (MUW) sub-test consists of a chart of 20 words that the student is asked to read. These 20 words were identified as ‘most used’ by tabulating the number of times a word appeared in learners’ language arts textbooks. Students were presented with 20 words in Bemba and 20 words in English.

4.3.1 Bemba Most Used Words
Overall, the students had the easiest time reading the following words: “ku”, “mu”, “na” (12%) and the hardest time reading the following words: “elyo”, “lya”, “lilo” (6%)

On average, learners in Literacy Boost were able to read 13% of the Most Used Words in Bemba, which was statistically significantly higher than their comparison counterparts. Figure 1 shows this relationship graphically.
This difference between the groups may relate to the fact that the Literacy Boost students have a larger proportion of learners who speak Bemba as their mother tongue. This fact will have to be taken into account during endline analysis.

4.3.2 English Most Used Words

On average, students identified just 7 percent of the English Most Used Words, or just over 1 out of 20 of the words in the chart. Overall, the students had the easiest time reading the following words: “the” and “to”, and the hardest time reading the words “after”.

4.4 Fluency & Accuracy

Fluency (words per minute read correctly) and accuracy (percent of the passage read correctly) are presented together here because they are measured together in a single sub-test in which learners read a passage aloud. Students who could read at least 2 of the Most Used Words presented in the section above were asked to read a passage given to them. Students were asked to read the passage and upon starting the task, a time was started. If the student could read at least 5 words correctly within the first 30 seconds, the student was marked as a reader and was allowed to continue reading the passage to the end. The number of words learners read correctly in a minute is tracked for fluency. As the student continues to read after the first minute, the total number of words read correctly from the passage as a whole, no matter how long it takes the student, is computed for accuracy.

In Zambia, unfortunately, there were extremely few students who were able to read fast enough to have scores on fluency and accuracy. On the Bemba passage, only 1.5 percent of all students (6 students) had a score for fluency, and only 2.9 percent of all students (11 students) had a Bemba accuracy score. Not surprisingly, the same is true for English: only 1 percent of students (4 students) had an English fluency score, and only 2.6 percent of students (9 students) had an English accuracy score. Because so few students were able to read independently, no further analysis is possible on these measures at baseline due to a lack in variance.

4.5 Listening & Reading Comprehension
The final sub-test quizzed learners on a series of ten comprehension questions related to the reading passage. For those learners who were unable to read a single word from the passage, the assessor read the passage to the student before asking the comprehension questions. Since only 2.9 students could read the Bemba passage independently, and only 1.6 students could read the English passage, the reading comprehension data will be set aside due to insufficient sample size. The rest of this section and following analysis will focus on the listening comprehension questions.

4.5.1 Bemba Listening Comprehension
On average, Literacy Boost and comparison students answered 60 percent of listening comprehension questions correctly. For listening comprehension, a statistically significant difference did exist between male and female students. Male students scored 65 percent on listening comprehension on average, versus the 55 percent that girls scored on average, significant at a p<.001 level. Figure 2 displays this relationship graphically.

It is not immediately clear why girls do not perform as well as boys do on Listening Comprehension. This may be related to their age (girls are on average approximately 7 months younger than boys), but further investigation is required to find out the reason behind this difference.

4.5.1 English Listening Comprehension
Students on average answered 28 percent of listening comprehension questions correctly, or approximately 3 of 10 questions. No significant differences existed for any of the groups.

4.6 Reading Skill Profile: Literacy Boost Students
In this section we summarize the findings from the individual skill differences and present an overview of the skills that Literacy Boost students possessed at baseline. Using this information, we will also provide recommendations for areas on which to focus during Literacy Boost implementation.
Children seem to have good mastery of their concepts about print, but efforts should still be made to make sure all students have access and are using books to practice their reading skills.

Students on average knew far too few letters when compared with the number of years they have been in school. Literacy Boost should focus on these basic letter skills as well as the higher order skills of reading fluency, accuracy, and comprehension. While it can be easy to assume that older students know their letters, the evidence generated from this assessment clearly indicates that they do not. Particular attention should be paid to language minority students here as well, as there is some indication that Lamba speakers are falling further behind than their peers who speak another language at home.

Literacy Boost learners correctly read more of the Most Used Words in Bemba than did their comparison counterparts. However, at 13 percent of the Most Used Words, there is still much room for improvement in the performance of the Literacy Boost learners. While no significant differences were found for English, the scores for English word identification were also very low. Children need to be supported in reading simple words.
Unfortunately not enough learners could read independently to permit analysis on the fluency, accuracy, or reading comprehension portions of the assessment, either in English or Bemba. As Literacy Boost gets underway, the challenge will be helping students gain a mastery of their letters and decoding skills so that they can make the switch from non-readers to being able to read independently.

For Listening Comprehension, students perform reasonably well, answering approximately 60% of the questions correctly. However, an interesting puzzle presents itself in the data: girls are not scoring as high as boys on this portion of the assessment. It is important that community discussions take place to encourage community members to support all children in their learning development.

5 Home Literacy Environment Data
An important aspect of reading development concerns the home literacy environment (HLE). How are children exposed to the printed word in the home? How much access do they have to books and print to practice their nascent reading skills? Many Literacy Boost activities are centered on helping parents and communities to enhance the HLE. As such, it is important to measure where learners’ HLEs begin, and how they change over the course of time. We break the home literacy environment down into two important domains: materials at home and engagement with print.

5.1 Materials at Home
All students were asked whether they had various types of reading materials at home. As the numbers reveal, there are very few significant differences in the groups. What significant differences do exist (such as Bemba students reporting more often that they have storybooks at home) are of a small enough magnitude to be considered inconsequential for programming. For instance, 12 percent of Literacy Boost students report having ‘other books’ (besides textbooks, religious books, and storybooks) at home, where as 2 percent of comparison
students report having ‘other books’. This difference, while significant, does not suggest any programming recommendations. In general, this lack of significant differences indicates that all the students are starting off with the same basic resources prior to entering the Literacy Boost program. For an illustration of what precisely these resources are, Figure 4 below displays the different types of printed materials that Literacy Boost students may or may not have at home as well as the interactions the child experienced at home in the past week.

![Figure 5: Home Literacy Environment of Literacy Boost Students](image)

The first four bars on the left hand side of Figure 5 show that students are starting off with a low level of print materials in their home. While over half of Literacy Boost students report having religious books in their home, fewer than a quarter report having a textbook, and fewer than one in five students report having story books at home. As children cannot learn to read unless they have something to read, it is critical that Literacy Boost helps provide children with reading materials and emphasizes the importance of materials, both homemade and store-bought, to parents and community members.

### 5.2 Engagement with Print

Reading materials alone do not a home literacy environment make. That is, the HLE is not only about materials in the home, but how those materials are used to engage the child in reading and learning. Hess and Halloway (1984) identified five dimensions of the home literacy environment that are theoretically related to reading achievement in children. The first is value placed on literacy, which we operationalize by asking the learners whether they see anyone reading at home. The second is press for achievement, which we operationalize as individuals telling or helping the student to study. The third is the availability and use of reading materials,
which we operationalize as the amount of printed materials at home. The fourth dimension is reading with children, which we operationalize by asking the learners whether anyone reads to them at home. The last is opportunities for verbal interaction, which we operationalize as family members telling stories to learners. The four bars on the right of Figure 5, above, show the how Literacy Boost students measure up in terms of engagement in these four home literacy environment activities.

What is discernible from these bars is that, while over half of students’ families have been seen reading, very few of them are engaging the child in reading activities. As Literacy Boost is implemented, it is important to capitalize on the strong presence of readers that currently exists in the homes already. Encourage parents and community members to participate in reading awareness workshops as a way to help them learn how to best support their children to learn.

6 Trends in Reading Skill Data
In this section we briefly share one further figure highlighting two important trends observed in the data, the difference between boys and girls and the importance of materials in the home. Relationships in this section are based off of multivariate regression models that control for age, sex, socioeconomic status (SES), and home literacy environment (HLE), and cluster students in schools to account for the multi-level nature of the data. For a full list of control variables, r-squared values, and standard errors, please refer to Appendix E.

Due to the low variance in many of the skills assessed, we examined the data for trends when predicting the outcomes for Concepts About Print scores, Letter Knowledge Scores, and both Bemba and English Listening Comprehension scores. All of the other reading skills had too many zero scores to make them eligible for analysis.

The one significant trend we identify was found in three out of four of the outcomes listed above. That trend concerns the relationship between the HLE and students’ scores. Figure 5 displays this relationship graphically.
In order to discover this finding, we created a composite variable that served as an index of the variety of HLE measures collected. This index was separated into 5 parts (quintiles) to better understand how children from homes with a lower quality HLE compare with those from higher quality HLEs.

As seen in figure five, there is a clear correlation between the HLE and students reading skills. Students from the lowest quintile of HLE have lower scores than students from the middle and the highest quintile of HLE. While this does not necessarily mean that improving the HLE will improve reading scores, it does confirm that some relationship exists between the two, and underscores the important role that families and communities might play.

As Literacy Boost is implemented, a strong focus on providing children diverse access to texts should be featured, and strong community activities and education around supporting children to learn should play an important role in Literacy Boost.

7 Conclusion
Children in Zambia’s Literacy Boost program have a long road ahead of them to becoming fluent readers with comprehension. Below, we offer targets in the form of benchmarks that Save the Children staff should aim to reach by the end of the program cycle.
While Save the Children has used this approach to reading assessment and intervention in Bangladesh, Ethiopia, Guatemala, Indonesia, Malawi, Mali, Mozambique, Nepal, Pakistan, Peru, the Philippines, South Africa, Sri Lanka, Uganda, and Zimbabwe, comparison across countries and languages is less helpful than more detailed contextual information for setting expectations of impact. For each measure used in these assessments, the upper end of the range of scores can be used to consider what is currently possible among these children. The scores at the 75th percentile of each measure function as locally-derived benchmarks for Literacy Boost students at the end-line assessment. Below, we consider what the scores were for the 75th percentile in Zambia and consider whether this would be an appropriate benchmark to set as a goal for endline. We also present recommendations for programming to meet the benchmarks based on the evidence in this report. After taking up in the intervention phase the recommendations for moving these key skills forward, the end-line assessment will check our progress towards them. Table 2 outlines the skill benchmarks this evidence proposes for students as well as suggested in-school and out-of-school activities associated with improving these skills.
<table>
<thead>
<tr>
<th>Skill</th>
<th>75th percentile</th>
<th>Suggested Benchmark</th>
<th>Program implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAP</td>
<td>91% of items</td>
<td>91% of items</td>
<td>Knowing the beginning, where to start reading, and what direction to go will help those lagging behind in print awareness to master this foundational skill. The program team, teachers and reading camp leaders should focus on activities that support children reading in groups in reading camps as well as reading buddy pairs to have the children who are listening or reading following the words with their finger as a more advanced reader reads to them.</td>
</tr>
<tr>
<td>Letter identification</td>
<td>46% of letters</td>
<td>80% of letters</td>
<td>Children in Zambia find the basic skill of letter identification challenging. We believe that setting the benchmark at 75th percentile is too low, and encourage the team to set a higher benchmark of at least 80 percent of all letters, because knowing the letters and the sounds they make is very important for reading, The program team should encourage teachers to focus on activities/games/strategies that teach and review these letters and their sounds, as well as emphasizing the daily decoding of multi-letter words both in class and in reading camps.</td>
</tr>
<tr>
<td>Reading Single Words</td>
<td>Bemba: 0%</td>
<td>50% of both Bemba and English words</td>
<td>Students significantly struggled to read these isolated words, and even the child at the 75th percentile read 0 words correctly. We suggest a benchmark of 50% of both word lists read correctly. Activities should revolve around helping students recognize words and help students learn to sound out words based on the letters in the word.</td>
</tr>
<tr>
<td>Fluency (words per minute)</td>
<td>Bemba: 0 wpm</td>
<td>Bemba: 20 wpm</td>
<td>Given that nearly none of the sample could read independently, Zambia Literacy Boost has a large challenge ahead of it. Using the 75th percentile results in 0 words per minute. In this case, we suggest a benchmark of 20 words per minute in Bemba and 10 words per minute in English. Students should have stories and other text read aloud to them, and given the opportunity to practice their reading with fluent readers, like siblings or reading buddies, who can provide correction for errors.</td>
</tr>
<tr>
<td>Accuracy</td>
<td>Bemba: 0%</td>
<td>Bemba: 75%</td>
<td>Given that nearly none of the sample could read independently, Zambia Literacy Boost has a large challenge ahead of it. Using the 75th percentile results in 0% read correctly. As such, we suggest a benchmark of 75% reading accuracy in Bemba and 50% in English. If numbers go much below this, students will struggle to understand what they are reading. Program staff, teachers and reading camp leaders should encourage daily reading – with reading buddies, family members and groups in reading camps – and during these practice times to listen to each other carefully, follow along in the text and offer input to correct reading and intonation.</td>
</tr>
<tr>
<td>Reading Comprehension</td>
<td>Bemba: 0%</td>
<td>Bemba: 75%</td>
<td>Program staff should communicate with teachers, reading camp leaders and parents about the importance of not only reading with children, but also asking children questions and opinions about the text afterwards. This will enhance both understanding and confidence in expression. Given that children’s reading comprehension scores were higher than their non-reading peers’ listening comprehension scores, program staff will also need to focus on promotion of oral language development activities included in the flipbook, parent workshops and camps to ensure that children have the vocabulary and verbal skills necessary to understand the text and demonstrate that comprehension.</td>
</tr>
</tbody>
</table>
Appendix A. Inter-rater Reliability

To test inter-rater reliability, 5 percent of learners (18 out of 384 learners) were assessed by two enumerators simultaneously. Long one-way ANOVA techniques were used to calculate the intra-class correlation within pairs of assessors for a measure of reliability. Table A1 presents the results below. Using Fleiss’ benchmarks for excellent (ICC>0.75), good or fair (0.75>=ICCA>0.4), and poor (0.4>=ICC); many of the literacy outcome variables exhibited excellent inter-rater reliability.

Table A1. Interrater Accuracy and Reliability

<table>
<thead>
<tr>
<th>Literacy Skill Sub-Test</th>
<th>Inter-rater Reliability</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concepts about Print</td>
<td>0.990</td>
<td>Excellent</td>
</tr>
<tr>
<td>Letter Knowledge</td>
<td>0.998</td>
<td>Excellent</td>
</tr>
<tr>
<td>Bemba Most Used Words</td>
<td>0.997</td>
<td>Excellent</td>
</tr>
<tr>
<td>English Most Used Words</td>
<td>0.997</td>
<td>Excellent</td>
</tr>
<tr>
<td>Bemba Fluency</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Bemba Accuracy</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Bemba Comprehension</td>
<td>0.919</td>
<td>Excellent</td>
</tr>
<tr>
<td>English Fluency</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>English Accuracy</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>English Comprehension</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Note that due to a lack of students who displayed reading fluency and accuracy during the assessment, it was not possible to obtain inter-rater reliability estimates for these skills. However, for all other skills, there was excellent inter-rater reliability on every measure. In general, inter-rater reliability was very high, and we can be confident that the internal validity of the scores is good.
Appendix B. Background Averages and Significant Differences between Groups

Table B1. Averages and Significant Differences by LB and Comparison Groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>Comparison (N=188)</th>
<th>Literacy Boost (N=196)</th>
<th>Significant difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Female</td>
<td>51%</td>
<td>50%</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>9.83</td>
<td>9.87</td>
<td></td>
</tr>
<tr>
<td>Attended ECD</td>
<td>11%</td>
<td>17%</td>
<td></td>
</tr>
<tr>
<td>Repeated Grade 1</td>
<td>23%</td>
<td>30%</td>
<td></td>
</tr>
<tr>
<td>Repeated Grade 2</td>
<td>27%</td>
<td>22%</td>
<td></td>
</tr>
<tr>
<td>Speaks Bemba at home</td>
<td>26%</td>
<td>46%</td>
<td>*</td>
</tr>
<tr>
<td>Speaks Lambda at home</td>
<td>51%</td>
<td>31%</td>
<td>*</td>
</tr>
<tr>
<td>Speaks Kaonde at home</td>
<td>12%</td>
<td>1%</td>
<td>**</td>
</tr>
<tr>
<td>Speaks Other Language at home</td>
<td>11%</td>
<td>21%</td>
<td></td>
</tr>
<tr>
<td>Has a Radio at home</td>
<td>63%</td>
<td>73%</td>
<td></td>
</tr>
<tr>
<td>Has Electricity at home</td>
<td>10%</td>
<td>15%</td>
<td></td>
</tr>
<tr>
<td>Has a TV at home</td>
<td>26%</td>
<td>40%</td>
<td></td>
</tr>
<tr>
<td>Has a Bicycle at home</td>
<td>85%</td>
<td>82%</td>
<td></td>
</tr>
<tr>
<td>Has a Cellphone at home</td>
<td>75%</td>
<td>78%</td>
<td></td>
</tr>
<tr>
<td>Has a Latrine at home</td>
<td>99%</td>
<td>96%</td>
<td></td>
</tr>
<tr>
<td>Has Sheep at home</td>
<td>16%</td>
<td>8%</td>
<td>*</td>
</tr>
<tr>
<td>Has Cattle at home</td>
<td>15%</td>
<td>16%</td>
<td></td>
</tr>
<tr>
<td>Has Chickens at home</td>
<td>86%</td>
<td>90%</td>
<td></td>
</tr>
<tr>
<td>Has Goats at home</td>
<td>56%</td>
<td>29%</td>
<td>**</td>
</tr>
<tr>
<td>Has Pigs at home</td>
<td>6%</td>
<td>15%</td>
<td></td>
</tr>
<tr>
<td>Average SES quintile</td>
<td>2.59</td>
<td>2.74</td>
<td></td>
</tr>
<tr>
<td>N of Different Chores</td>
<td>2.39</td>
<td>2.71</td>
<td>*</td>
</tr>
<tr>
<td>Has Books at home</td>
<td>56%</td>
<td>57%</td>
<td></td>
</tr>
<tr>
<td>Has Textbooks at home</td>
<td>21%</td>
<td>23%</td>
<td></td>
</tr>
<tr>
<td>Has Religious Books at home</td>
<td>55%</td>
<td>56%</td>
<td></td>
</tr>
<tr>
<td>Has Storybooks at home</td>
<td>13%</td>
<td>18%</td>
<td></td>
</tr>
<tr>
<td>Has Other Books at home</td>
<td>2%</td>
<td>12%</td>
<td>**</td>
</tr>
<tr>
<td>Average HLE quintile</td>
<td>2.79</td>
<td>3.13</td>
<td></td>
</tr>
<tr>
<td>N of family members</td>
<td>4.96</td>
<td>4.75</td>
<td></td>
</tr>
<tr>
<td>% of family seen reading</td>
<td>51%</td>
<td>53%</td>
<td></td>
</tr>
<tr>
<td>% of family who help child study</td>
<td>32%</td>
<td>37%</td>
<td></td>
</tr>
<tr>
<td>% of family who read to child</td>
<td>31%</td>
<td>36%</td>
<td></td>
</tr>
<tr>
<td>% of family who told child a story</td>
<td>46%</td>
<td>39%</td>
<td></td>
</tr>
</tbody>
</table>

Significant at *p<.05, **p<.01, ***p<.001
Table B2. Averages and Significant Differences by LB and Comparison Groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>Boys (N=191)</th>
<th>Girls (N=193)</th>
<th>Significant difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>In LB school</td>
<td>51%</td>
<td>51%</td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td>10.13</td>
<td>9.57</td>
<td>***</td>
</tr>
<tr>
<td>Attended ECD</td>
<td>15%</td>
<td>14%</td>
<td></td>
</tr>
<tr>
<td>Repeated Grade 1</td>
<td>26%</td>
<td>28%</td>
<td></td>
</tr>
<tr>
<td>Repeated Grade 2</td>
<td>24%</td>
<td>25%</td>
<td></td>
</tr>
<tr>
<td>Speaks Bemba at home</td>
<td>41%</td>
<td>32%</td>
<td></td>
</tr>
<tr>
<td>Speaks Lamba at home</td>
<td>39%</td>
<td>43%</td>
<td></td>
</tr>
<tr>
<td>Speaks Kaonde at home</td>
<td>7%</td>
<td>6%</td>
<td></td>
</tr>
<tr>
<td>Speaks Other Language at home</td>
<td>13%</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>Has a Radio at home</td>
<td>68%</td>
<td>69%</td>
<td></td>
</tr>
<tr>
<td>Has Electricity at home</td>
<td>12%</td>
<td>13%</td>
<td></td>
</tr>
<tr>
<td>Has a TV at home</td>
<td>32%</td>
<td>34%</td>
<td></td>
</tr>
<tr>
<td>Has a Bicycle at home</td>
<td>85%</td>
<td>81%</td>
<td></td>
</tr>
<tr>
<td>Has a Cellphone at home</td>
<td>79%</td>
<td>74%</td>
<td></td>
</tr>
<tr>
<td>Has a Latrine at home</td>
<td>98%</td>
<td>97%</td>
<td></td>
</tr>
<tr>
<td>Has Sheep at home</td>
<td>10%</td>
<td>14%</td>
<td></td>
</tr>
<tr>
<td>Has Cattle at home</td>
<td>12%</td>
<td>19%</td>
<td></td>
</tr>
<tr>
<td>Has Chickens at home</td>
<td>87%</td>
<td>89%</td>
<td></td>
</tr>
<tr>
<td>Has Goats at home</td>
<td>43%</td>
<td>41%</td>
<td></td>
</tr>
<tr>
<td>Has Pigs at home</td>
<td>9%</td>
<td>13%</td>
<td></td>
</tr>
<tr>
<td>Average SES quintile</td>
<td>2.65</td>
<td>2.69</td>
<td></td>
</tr>
<tr>
<td>N of Different Chores</td>
<td>2.21</td>
<td>2.89</td>
<td>***</td>
</tr>
<tr>
<td>Has Books at home</td>
<td>55%</td>
<td>58%</td>
<td></td>
</tr>
<tr>
<td>Has Textbooks at home</td>
<td>21%</td>
<td>23%</td>
<td></td>
</tr>
<tr>
<td>Has Religious Books at home</td>
<td>55%</td>
<td>57%</td>
<td></td>
</tr>
<tr>
<td>Has Storybooks at home</td>
<td>14%</td>
<td>18%</td>
<td></td>
</tr>
<tr>
<td>Has Other Books at home</td>
<td>7%</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>Average HLE quintile</td>
<td>2.97</td>
<td>2.95</td>
<td></td>
</tr>
<tr>
<td>N of family members</td>
<td>4.89</td>
<td>4.82</td>
<td></td>
</tr>
<tr>
<td>% of family seen reading</td>
<td>51%</td>
<td>52%</td>
<td></td>
</tr>
<tr>
<td>% of family who help child study</td>
<td>36%</td>
<td>33%</td>
<td></td>
</tr>
<tr>
<td>% of family who read to child</td>
<td>34%</td>
<td>34%</td>
<td></td>
</tr>
<tr>
<td>% of family who told child a story</td>
<td>48%</td>
<td>37%</td>
<td></td>
</tr>
</tbody>
</table>

Significant at *p<.05, **p<.01 ***p<.001
Table B3. Averages and Significant Differences by Language Spoken at Home

<table>
<thead>
<tr>
<th>Variable</th>
<th>Bemba (N=139)</th>
<th>Lamba (N=157)</th>
<th>Other (N=88)</th>
<th>Significant differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Female</td>
<td>44%</td>
<td>52%</td>
<td>57%</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>9.67</td>
<td>9.91</td>
<td>10.05</td>
<td></td>
</tr>
<tr>
<td>Attended ECD</td>
<td>15%</td>
<td>15%</td>
<td>13%</td>
<td></td>
</tr>
<tr>
<td>Repeated Grade 1</td>
<td>27%</td>
<td>27%</td>
<td>25%</td>
<td></td>
</tr>
<tr>
<td>Repeated Grade 2</td>
<td>21%</td>
<td>25%</td>
<td>30%</td>
<td></td>
</tr>
<tr>
<td>Has a Radio at home</td>
<td>78%</td>
<td>61%</td>
<td>66%</td>
<td>**Bemba &gt; Other</td>
</tr>
<tr>
<td>Has Electricity at home</td>
<td>14%</td>
<td>10%</td>
<td>15%</td>
<td></td>
</tr>
<tr>
<td>Has a TV at home</td>
<td>38%</td>
<td>27%</td>
<td>35%</td>
<td></td>
</tr>
<tr>
<td>Has a Bicycle at home</td>
<td>81%</td>
<td>86%</td>
<td>81%</td>
<td></td>
</tr>
<tr>
<td>Has a Cellphone at home</td>
<td>76%</td>
<td>71%</td>
<td>85%</td>
<td></td>
</tr>
<tr>
<td>Has a Latrine at home</td>
<td>96%</td>
<td>98%</td>
<td>98%</td>
<td></td>
</tr>
<tr>
<td>Has Sheep at home</td>
<td>11%</td>
<td>14%</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>Has Cattle at home</td>
<td>13%</td>
<td>16%</td>
<td>19%</td>
<td></td>
</tr>
<tr>
<td>Has Chickens at home</td>
<td>88%</td>
<td>88%</td>
<td>89%</td>
<td></td>
</tr>
<tr>
<td>Has Goats at home</td>
<td>27%</td>
<td>54%</td>
<td>44%</td>
<td>***Lamba &gt; Bemba; * Other &gt; Bemba</td>
</tr>
<tr>
<td>Has Pigs at home</td>
<td>9%</td>
<td>13%</td>
<td>9%</td>
<td></td>
</tr>
<tr>
<td>Average SES quintile</td>
<td>2.62</td>
<td>2.65</td>
<td>2.76</td>
<td></td>
</tr>
<tr>
<td>N of Different Chores</td>
<td>2.58</td>
<td>2.45</td>
<td>2.68</td>
<td></td>
</tr>
<tr>
<td>Has Books at home</td>
<td>60%</td>
<td>52%</td>
<td>58%</td>
<td></td>
</tr>
<tr>
<td>Has Textbooks at home</td>
<td>25%</td>
<td>19%</td>
<td>24%</td>
<td></td>
</tr>
<tr>
<td>Has Religious Books at home</td>
<td>56%</td>
<td>55%</td>
<td>56%</td>
<td></td>
</tr>
<tr>
<td>Has Storybooks at home</td>
<td>21%</td>
<td>11%</td>
<td>17%</td>
<td>*Bemba &gt; Lamba</td>
</tr>
<tr>
<td>Has Other Books at home</td>
<td>9%</td>
<td>6%</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>Average HLE quintile</td>
<td>3.19</td>
<td>2.77</td>
<td>2.94</td>
<td>*Bemba &gt; Lamba</td>
</tr>
<tr>
<td>N of family members</td>
<td>4.84</td>
<td>4.95</td>
<td>4.72</td>
<td></td>
</tr>
<tr>
<td>% of family seen reading</td>
<td>55%</td>
<td>48%</td>
<td>52%</td>
<td></td>
</tr>
<tr>
<td>% of family who help child study</td>
<td>42%</td>
<td>28%</td>
<td>35%</td>
<td></td>
</tr>
<tr>
<td>% of family who read to child</td>
<td>37%</td>
<td>31%</td>
<td>34%</td>
<td></td>
</tr>
<tr>
<td>% of family who told child a story</td>
<td>43%</td>
<td>46%</td>
<td>36%</td>
<td></td>
</tr>
</tbody>
</table>

Significant at *p<.05, **p<.01 ***p<.001
## Appendix C. Individual Reading Skill Average Values

### Table C1. Concepts about print, ordered from most difficult to easiest

<table>
<thead>
<tr>
<th>Item on Concepts about Print</th>
<th>% of students who answered correctly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question 8: Turn to page 10</td>
<td>45%</td>
</tr>
<tr>
<td>Question 11: Show me the last party of the story</td>
<td>63%</td>
</tr>
<tr>
<td>Question 7: Point to the word that I am reading as I read each one</td>
<td>66%</td>
</tr>
<tr>
<td>Question 10: Show me the last part of the story.</td>
<td>72%</td>
</tr>
<tr>
<td>Question 5: Which direction do I go? If child hesitates, ask: What is the next word I should read?</td>
<td>74%</td>
</tr>
<tr>
<td>Question 6: Show me where I go after that?</td>
<td>77%</td>
</tr>
<tr>
<td>Question 4: Show me the word on which I should start.</td>
<td>78%</td>
</tr>
<tr>
<td>Question 3: We will look at this book about &lt;&lt;insert name of story&gt;&gt;. You help me. Show me, where do I begin to read?</td>
<td>80%</td>
</tr>
<tr>
<td>Question 9: Show me one word and run your finger under the length of the word.</td>
<td>81%</td>
</tr>
<tr>
<td>Question 1: Give the child the book (book handling).</td>
<td>84%</td>
</tr>
<tr>
<td>Question 2: Can you open the book?</td>
<td>98%</td>
</tr>
</tbody>
</table>
Table C2. Uppercase and lowercase letters, in order from most difficult to easiest

<table>
<thead>
<tr>
<th>Uppercase Letter</th>
<th>% of students who identified letter correctly</th>
<th>Lowercase Letter</th>
<th>% of students who identified letter correctly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>13%</td>
<td>q</td>
<td>4%</td>
</tr>
<tr>
<td>X</td>
<td>18%</td>
<td>l</td>
<td>7%</td>
</tr>
<tr>
<td>Q</td>
<td>18%</td>
<td>i</td>
<td>12%</td>
</tr>
<tr>
<td>L</td>
<td>18%</td>
<td>d</td>
<td>15%</td>
</tr>
<tr>
<td>J</td>
<td>18%</td>
<td>y</td>
<td>16%</td>
</tr>
<tr>
<td>U</td>
<td>20%</td>
<td>h</td>
<td>18%</td>
</tr>
<tr>
<td>V</td>
<td>23%</td>
<td>n</td>
<td>18%</td>
</tr>
<tr>
<td>I</td>
<td>23%</td>
<td>x</td>
<td>18%</td>
</tr>
<tr>
<td>R</td>
<td>23%</td>
<td>r</td>
<td>19%</td>
</tr>
<tr>
<td>H</td>
<td>23%</td>
<td>g</td>
<td>22%</td>
</tr>
<tr>
<td>W</td>
<td>26%</td>
<td>u</td>
<td>23%</td>
</tr>
<tr>
<td>T</td>
<td>27%</td>
<td>i</td>
<td>24%</td>
</tr>
<tr>
<td>G</td>
<td>28%</td>
<td>v</td>
<td>24%</td>
</tr>
<tr>
<td>N</td>
<td>28%</td>
<td>e</td>
<td>26%</td>
</tr>
<tr>
<td>E</td>
<td>28%</td>
<td>f</td>
<td>26%</td>
</tr>
<tr>
<td>F</td>
<td>29%</td>
<td>w</td>
<td>27%</td>
</tr>
<tr>
<td>P</td>
<td>36%</td>
<td>p</td>
<td>32%</td>
</tr>
<tr>
<td>D</td>
<td>37%</td>
<td>t</td>
<td>34%</td>
</tr>
<tr>
<td>S</td>
<td>41%</td>
<td>b</td>
<td>39%</td>
</tr>
<tr>
<td>Z</td>
<td>42%</td>
<td>s</td>
<td>39%</td>
</tr>
<tr>
<td>M</td>
<td>47%</td>
<td>a</td>
<td>39%</td>
</tr>
<tr>
<td>K</td>
<td>48%</td>
<td>m</td>
<td>40%</td>
</tr>
<tr>
<td>C</td>
<td>48%</td>
<td>z</td>
<td>43%</td>
</tr>
<tr>
<td>O</td>
<td>55%</td>
<td>k</td>
<td>48%</td>
</tr>
<tr>
<td>A</td>
<td>58%</td>
<td>c</td>
<td>49%</td>
</tr>
<tr>
<td>B</td>
<td>65%</td>
<td>o</td>
<td>51%</td>
</tr>
</tbody>
</table>
Table C3. Most Used Words in order from most difficult to easiest

<table>
<thead>
<tr>
<th>Most Used Word in Bemba</th>
<th>% of students who read word correctly</th>
<th>Most Used Word in English</th>
<th>% of students who read word correctly</th>
</tr>
</thead>
<tbody>
<tr>
<td>lya</td>
<td>6%</td>
<td>after</td>
<td>3%</td>
</tr>
<tr>
<td>elyo</td>
<td>6%</td>
<td>day</td>
<td>4%</td>
</tr>
<tr>
<td>lilo</td>
<td>6%</td>
<td>many</td>
<td>4%</td>
</tr>
<tr>
<td>bwino</td>
<td>7%</td>
<td>have</td>
<td>4%</td>
</tr>
<tr>
<td>kwa</td>
<td>7%</td>
<td>from</td>
<td>4%</td>
</tr>
<tr>
<td>ilyo</td>
<td>7%</td>
<td>said</td>
<td>4%</td>
</tr>
<tr>
<td>bonse</td>
<td>7%</td>
<td>there</td>
<td>5%</td>
</tr>
<tr>
<td>panono</td>
<td>8%</td>
<td>that</td>
<td>5%</td>
</tr>
<tr>
<td>muli</td>
<td>8%</td>
<td>took</td>
<td>6%</td>
</tr>
<tr>
<td>ine</td>
<td>9%</td>
<td>he</td>
<td>6%</td>
</tr>
<tr>
<td>ico</td>
<td>9%</td>
<td>was</td>
<td>6%</td>
</tr>
<tr>
<td>wa</td>
<td>9%</td>
<td>you</td>
<td>7%</td>
</tr>
<tr>
<td>we</td>
<td>9%</td>
<td>are</td>
<td>7%</td>
</tr>
<tr>
<td>mayo</td>
<td>10%</td>
<td>for</td>
<td>8%</td>
</tr>
<tr>
<td>ni</td>
<td>10%</td>
<td>and</td>
<td>9%</td>
</tr>
<tr>
<td>pa</td>
<td>11%</td>
<td>of</td>
<td>10%</td>
</tr>
<tr>
<td>tata</td>
<td>11%</td>
<td>so</td>
<td>11%</td>
</tr>
<tr>
<td>ku</td>
<td>12%</td>
<td>in</td>
<td>12%</td>
</tr>
<tr>
<td>mu</td>
<td>12%</td>
<td>the</td>
<td>15%</td>
</tr>
<tr>
<td>na</td>
<td>12%</td>
<td>to</td>
<td>15%</td>
</tr>
</tbody>
</table>
## Appendix D. Reading Skill Averages and Significant Differences between Groups

### Table D1. 2013 Baseline Student Reading Skill Data by Literacy Boost and Comparison Schools

<table>
<thead>
<tr>
<th></th>
<th>Comparison (N=188)</th>
<th>Literacy Boost (N=196)</th>
<th>Significant Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concepts about Print (% correct)</td>
<td>72%</td>
<td>74%</td>
<td></td>
</tr>
<tr>
<td>Letter Knowledge (% correct)</td>
<td>26%</td>
<td>34%</td>
<td></td>
</tr>
<tr>
<td>Bemba Familiar Words (% correct)</td>
<td>4%</td>
<td>13%</td>
<td>*</td>
</tr>
<tr>
<td>English Familiar Words (% correct)</td>
<td>4%</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>Bemba Fluency (words per minute correct)</td>
<td>0.19</td>
<td>0.34</td>
<td></td>
</tr>
<tr>
<td>English Fluency (words per minute correct)</td>
<td>0.13</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>Bemba Accuracy (% read correctly)</td>
<td>1%</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>English Accuracy (% read correctly)</td>
<td>0%</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Student=Bemba Reader (% of sample)</td>
<td>2%</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td>Student=English Reader (% of sample)</td>
<td>1%</td>
<td>2%</td>
<td></td>
</tr>
<tr>
<td>Bemba Reading Comprehension (% correct)</td>
<td>1%</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>English Reading Comprehension (% correct)</td>
<td>1%</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Bemba Listening Comprehension(% correct)</td>
<td>62%</td>
<td>59%</td>
<td></td>
</tr>
<tr>
<td>English Listening Comprehension(% correct)</td>
<td>27%</td>
<td>28%</td>
<td></td>
</tr>
</tbody>
</table>

Significant at  *p<.05, **p<.01, ***p<.001

### Table D2. 2013 Baseline Student Reading Skill Data by Sex

<table>
<thead>
<tr>
<th></th>
<th>Boys (N=191)</th>
<th>Girls (N=193)</th>
<th>Significant Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concepts about Print (% correct)</td>
<td>74%</td>
<td>73%</td>
<td></td>
</tr>
<tr>
<td>Letter Knowledge (% correct)</td>
<td>32%</td>
<td>28%</td>
<td></td>
</tr>
<tr>
<td>Bemba Familiar Words (% correct)</td>
<td>10%</td>
<td>8%</td>
<td></td>
</tr>
<tr>
<td>English Familiar Words (% correct)</td>
<td>7%</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>Bemba Fluency (words per minute correct)</td>
<td>0.42</td>
<td>0.11</td>
<td></td>
</tr>
<tr>
<td>English Fluency (words per minute correct)</td>
<td>0.25</td>
<td>0.13</td>
<td></td>
</tr>
<tr>
<td>Bemba Accuracy (% read correctly)</td>
<td>3%</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>English Accuracy (% read correctly)</td>
<td>1%</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Student=Bemba Reader (% of sample)</td>
<td>4%</td>
<td>2%</td>
<td></td>
</tr>
<tr>
<td>Student=English Reader (% of sample)</td>
<td>3%</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Bemba Reading Comprehension (% correct)</td>
<td>3%</td>
<td>2%</td>
<td></td>
</tr>
<tr>
<td>English Reading Comprehension (% correct)</td>
<td>2%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Bemba Listening Comprehension(% correct)</td>
<td>65%</td>
<td>55%</td>
<td>***</td>
</tr>
<tr>
<td>English Listening Comprehension(% correct)</td>
<td>28%</td>
<td>27%</td>
<td></td>
</tr>
</tbody>
</table>

Significant at  *p<.05, **p<.01, ***p<.001
Table D3. 2013 Baseline Student Reading Skill Data by Language Spoken at home

<table>
<thead>
<tr>
<th></th>
<th>Bemba Speakers (N=139)</th>
<th>Lambda Speakers (N=157)</th>
<th>Other Lang. Speakers (N=88)</th>
<th>Significant Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concepts about Print (% correct)</td>
<td>74%</td>
<td>71%</td>
<td>75%</td>
<td></td>
</tr>
<tr>
<td>Letter Knowledge (% correct)</td>
<td>32%</td>
<td>25%</td>
<td>35%</td>
<td>* Other &gt; Lamba</td>
</tr>
<tr>
<td>Bemba Familiar Words (% correct)</td>
<td>11%</td>
<td>7%</td>
<td>9%</td>
<td></td>
</tr>
<tr>
<td>English Familiar Words (% correct)</td>
<td>8%</td>
<td>6%</td>
<td>9%</td>
<td></td>
</tr>
<tr>
<td>Bemba Fluency (words per minute correct)</td>
<td>0.18</td>
<td>0.14</td>
<td>0.63</td>
<td></td>
</tr>
<tr>
<td>English Fluency (words per minute correct)</td>
<td>0.00</td>
<td>0.05</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>Bemba Accuracy (% read correctly)</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td></td>
</tr>
<tr>
<td>English Accuracy (% read correctly)</td>
<td>0%</td>
<td>0%</td>
<td>3%</td>
<td>* Other &gt; Lamba</td>
</tr>
<tr>
<td>Student=Bemba Reader (% of sample)</td>
<td>4%</td>
<td>3%</td>
<td>2%</td>
<td></td>
</tr>
<tr>
<td>Student=English Reader (% of sample)</td>
<td>1%</td>
<td>2%</td>
<td>2%</td>
<td></td>
</tr>
<tr>
<td>Bemba Reading Comprehension (% correct)</td>
<td>3%</td>
<td>2%</td>
<td>2%</td>
<td></td>
</tr>
<tr>
<td>English Reading Comprehension (% correct)</td>
<td>1%</td>
<td>1%</td>
<td>2%</td>
<td></td>
</tr>
<tr>
<td>Bemba Listening Comprehension(% correct)</td>
<td>61%</td>
<td>60%</td>
<td>60%</td>
<td></td>
</tr>
<tr>
<td>English Listening Comprehension(% correct)</td>
<td>30%</td>
<td>27%</td>
<td>24%</td>
<td></td>
</tr>
</tbody>
</table>

Significant at *p<.05, **p<.01 ***p<.001
### Appendix E. Regression Models by Outcome

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1) Concepts About Print % Correct</th>
<th>(2) Letter Identification % Correct</th>
<th>(3) Bemba Listening Comprehension % Correct</th>
<th>(4) English Listening Comprehension % Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.0122</td>
<td>0.00148</td>
<td>-0.00713</td>
<td>-0.00213</td>
</tr>
<tr>
<td></td>
<td>(0.0115)</td>
<td>(0.0121)</td>
<td>(0.00821)</td>
<td>(0.0119)</td>
</tr>
<tr>
<td>Sex (1=Female)</td>
<td>0.00711</td>
<td>-0.0273</td>
<td>-0.101***</td>
<td>-0.0114</td>
</tr>
<tr>
<td></td>
<td>(0.0217)</td>
<td>(0.0281)</td>
<td>(0.0252)</td>
<td>(0.0287)</td>
</tr>
<tr>
<td>Quintile of SES</td>
<td>0.00791</td>
<td>0.00181</td>
<td>0.00338</td>
<td>0.00158</td>
</tr>
<tr>
<td></td>
<td>(0.00853)</td>
<td>(0.0124)</td>
<td>(0.00883)</td>
<td>(0.011)</td>
</tr>
<tr>
<td>Quintile of HLE</td>
<td>0.0344***</td>
<td>0.0427***</td>
<td>0.00670</td>
<td>0.0235**</td>
</tr>
<tr>
<td></td>
<td>(0.00849)</td>
<td>(0.0106)</td>
<td>(0.00855)</td>
<td>(0.00771)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.489**</td>
<td>0.173</td>
<td>0.703***</td>
<td>0.233</td>
</tr>
<tr>
<td></td>
<td>(0.146)</td>
<td>(0.134)</td>
<td>(0.105)</td>
<td>(0.155)</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.051</td>
<td>0.044</td>
<td>0.044</td>
<td>0.017</td>
</tr>
<tr>
<td>N</td>
<td>365</td>
<td>365</td>
<td>365</td>
<td>365</td>
</tr>
<tr>
<td>Adjusted R-Squared</td>
<td>0.0407</td>
<td>0.0330</td>
<td>0.0329</td>
<td>0.00604</td>
</tr>
</tbody>
</table>

*** p<0.001, ** p<0.01, * p<0.05
Robust standard errors in parentheses