Save the Children

Literacy Boost

Lao, P.D.R

Baseline Report

December 2013

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I. Executive Summary

This report examines the results of a student background survey and reading assessment conducted in October 2013. The survey and reading assessment covered 714 grade 2 learners throughout 40 schools in two provinces in Lao P.D.R. Twenty-five of the schools are located in Bolikhamxay province, in a Save the Children International (SCI) intervention area, and 15 are located in Attapeu province, in a World Food Program (WFP) intervention area. The 40 schools are split into 23 primary schools designated to receive Save the Children's Literacy Boost program and 17 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.

In both Attapeu and Bolikhamxay children in comparison and intervention schools are found to be similar almost all background characteristics and literacy skills. The only difference noted was that comparison students in Attapeu have higher average socioeconomic status than intervention students. Taking this slight difference into account, we confirm that comparison students in both provinces will serve as an appropriate control groups against which to compare learning growth for Literacy Boost students.

However, there are differences between students in Attapeu and Bolikhamxay that make it appropriate to separate the two groups for the skill-by-skill review of students' early literacy abilities. Most notably, children in the two provinces have different ethnicities and therefore different home languages. Fifty-one percent of children in Attapeu identified as Khmer, where as 46 percent of children in Bolikhamxay were Hmong. The other main ethnic group in both provinces is Lao-Thai (38 and 48 percent, respectively). There were also background and family differences between students in the two provinces, but no differences were found on composite indicators like socioeconomic status, home literacy environment, and chore/work responsibilities. Finally, analyses find that children in Attapeu have significantly stronger literacy skills than their peers in Bolikhamxay in two of the four skills analyzed, common word identification and listening comprehension.

Overall, children in this sample have very low literacy skills in the Lao language. On average, Literacy Boost and comparison learners in Attapeu and Bolikhamxay correctly identified 45 percent of all letters presented (15 letters). Literacy Boost and comparison learners in Attapeu were able to read significantly more common words than students in Bolikhamxay (four compared to two common words read correctly). On average, children in Attapeu and Bolikhamxay were able to decode 1.5 new words correctly. Finally, only seven percent of students were able to independently read a short story presented by assessors. Therefore, most children were assessed on their listening comprehension ability, and there was not enough variation in the fluency, accuracy, or reading comprehension measures to discuss results in this report. There were no statistically significant differences between the proportion of readers in Attapeu and Bolikhamxay but, on average, children in Attapeu were able to answer more comprehension questions correctly (three compared to one question). There were no

statistically significant differences between intervention and control groups in either province for any skills.

The Literacy Boost program emphasize students' home literacy environment (HLE) as an important factor for children's reading skill development. In this sample, HLE is relatively high with 87 percent of children report having some kind of reading material at home, and 86 percent having seen someone at home reading. However, the majority of books that children have at home are textbooks and only 21 percent of students have access to a storybook at home. In general, students are experiencing some type of literacy activities at home such as being read to, receiving help with homework or being told stories. There were no differences between the HLE of students in Attapeu or Bolikhamxay or between comparison and intervention students.

Looking at factors that are related to children's baseline literacy skills which may also have implications for the equity of Literacy Boost program implementation, multivariate regression analysis find several notable trends. First, ethnicity has the strongest correlation with early reading ability for children in this sample, with Hmong and Khmer children scoring significantly lower than Lao-Thai children in all skill areas. This is not surprising given that these children are learning a second language, whereas Lao-Thai children are not, but it is notable for programming nonetheless. Beyond ethnicity, analyses find that half of the skills analyzed are significant related to gender, attendance at school, and home literacy environment. Specifically, girls, children who attend school more often, and those with more literacy activities at home tend to score higher than their peers without these characteristics. Boys, children often absent, and those with few literacy resources at home represent important target groups for support.

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Introduction

This report examines the results of a student background survey and reading assessment conducted in October 2013. The survey and reading assessment covered 714 grade 2 learners throughout 40 schools in two provinces of Lao P.D.R. Twenty-five of the schools are located in Bolikhamxay province, in a Save the Children International (SCI) intervention area, and 15 are located in Attapeu province, in a World Food Program (WFP) intervention area. 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 letter awareness, single word reading of common words, decoding of simple words, reading fluency, reading accuracy, and listening/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 2 learners in these schools and to inform the adaptation of Save the Children's Literacy Boost program to this context.

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

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

To investigate these questions, 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 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 and environment variables using multilevel regression analysis.

II. Methods

Sampling

The sample for this baseline assessment encompasses 714 grade 2 learners, divided between 23 schools set to receive the Literacy Boost intervention (494 learners) and 17 comparison schools (290 learners). Schools were selected based on multiple characteristics (e.g., population served, school size, distance from urban areas, access to early childhood programs, etc.). As seen in Table 1, the schools are located in two different provinces in Lao.

Table 1. Sample schools, by province

	Attapeu	Bolikhamxay
Comparison school	7	10
Literacy Boost school	8	15

At each of the Literacy Boost and comparison schools where data was collected, 20 children in grade 2 were targeted for sampling. If there was more than one section of grade 2 at a given school, one section was randomly selected. Ten boys and ten girls were randomly and voluntarily selected where there were more than 20 learners in the classroom. In schools with less than 20 children in grade 2, all of the children who consented to participating were surveyed. As a result, the sample consists of 355 boys and 359 girls, and the Literacy Boost sample is 49.7 percent male and the comparison sample is 50.3 percent female.

Measurement

School profile data were collected via direct observation and a survey of school head teachers or principals at every school in the sample. This data includes information on enrolment and class size, availability of textbooks, school facilities and construction, and teacher backgrounds. For the student assessment, all learners in the sample were asked about their background characteristics (age, household possessions, household building materials, etc.). Learners were also asked about their family members and reading habits in their home (who they had seen reading in the week prior to the assessment, who had read to them, etc.). Table 2 describes the information collected from students during the baseline assessment in October 2013.

Table 2: Literacy Boost Assessment Instruments

Student background	**Examples**
General	Sex, age, language spoken at home, work/chores
School-related	Attendance, repetition history
Socioeconomic status	Type of home, household size, household amenities/possessions
Health	Sickness, breakfast, vision, hearing
Home Literacy Environment	
Access to print	Materials present in home, types of materials
Reading activities at home	Presence and percentage of family members who children see read, and who engage in literacy activities with children
Reading Outcome	**Description**
Alphabet knowledge	Number of letters/sounds known of 33
Single word reading	Number of single words read correctly of 20
Decoding skills	Number of constructed words read correctly of 20
Fluency	Number of words in a short story read correctly in a minute
Accuracy	Percentage of words in a short story read correctly
Comprehension	Questions related to short story read aloud by student or assessor

After collecting background information, all learners were also given an emergent literacy test composed of six components administered through five sub-tests: letter awareness, single word recognition (reading of most used words), decoding of nonsense words, reading fluency and accuracy (words per minute read correctly and total percentage of passage read correctly; both within the same sub-test), and a set of comprehension questions linked to the fluency and accuracy passage. The same set of comprehension questions were administered for both those learners who could read independently (reading comprehension) and those who could not and thus had the assessor read to them (listening comprehension). Details on inter-rater reliability are provided in Appendix A.

Analysis

To test the comparability of learners in the Literacy Boost and comparison 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. Summary statistics, accompanied by clustered t-tests, will be used to analyze learners' performance in each of the reading sub-tests. Finally, this report will look to multivariate regression models to explore relationships between literacy skills and student background characteristics, school environment, and home literacy environment.

Note about benchmarks

While Save the Children has implemented the Literacy Boost approach to reading assessment and intervention in Afghanistan, Bangladesh, Burundi, El Salvador, Ethiopia, Guatemala, Indonesia, Kenya, Malawi, Mali, Mozambique, Pakistan, Peru, the Philippines, Rwanda, South Africa, Sri Lanka, Uganda, 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.

III. Children's Background

Important differences exist between children in Attapeu (ATP) and Bolikhamxay (BOL) provinces, and therefore students' literacy skills will be discussed separately. Most notably, children in Bolikhamxay are more likely to identify as being Hmong whereas children in Attapeu identify as Khmer (see Figure 1 & 2). In fact, Hmong people do not live in Attapeu so the identification of children as Hmong in this province was likely due to child or assessor error. Lao-Thai, Hmong and Khmer are the three major ethnic groups in Lao and are associated with speaking the Lao, Hmong or Khmer languages at home, respectively. Given that Lao is the language of instruction in schools, the Hmong and Khmer-speaking children are learning to read in a second language. Within each province, there was no statistically significant difference in the ethnic make-up of the comparison samples versus the Literacy Boost samples.

Figure 1. Student Ethnicity, Attapeu

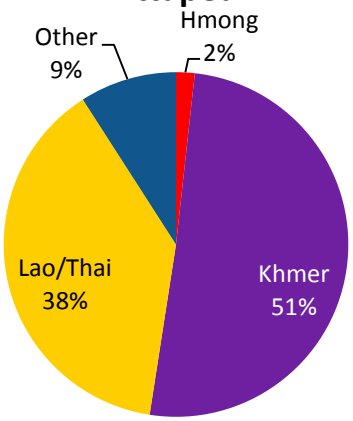
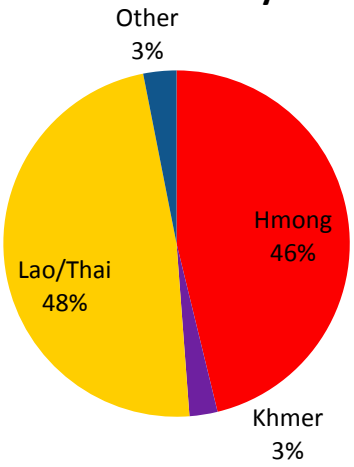


Figure 2. Student Ethnicity, Bolikhamxay



Further, as seen in Table 3, children in Attapeu tend to be older and are more likely to have repeated a grade than children in Bolikhamxay. Whereas children in Bolikhamxay reported attending school more regularly, feeling ill less frequently, and eating breakfast more often than children in Attapeu. Finally, students in Attapeu tended to have higher emergent literacy skills than children in Bolikhamxay, specifically in the areas of common word knowledge and listening comprehension.

Students in Bolikhamxay and Attapeu were comparable on indexes of socioeconomic status (SES Index), home literacy environment (HLE), and chore/work responsibilities (Chore-work Index). The SES index was created by combining information about the type of house a child lives in as well as possessions owned by their family (e.g., radio, electricity, refrigerator, bicycle, latrine, mobile phone, television, motorbike, car, tractor). The HLE index is a combination of information about the types of reading materials students have access to outside of school and the literacy activities their family engages in. The chore-work index is a creating by combining the amount of time children spend on chores within their homes or work outside their homes.

Student background in Attapeu

As seen in Table 4, control and intervention students in Attapeu were found to be comparable on all background characteristics, except their average SES quintile in SES Index. On average, grade students in Attapeu were 8.5 years old, 39 percent had attended early childhood development programs, 53 percent had repeated grade 1 and 28 percent had repeated grade 2. Children reported attending school 4.3 out of 5 days per week and the majority of children reported having breakfast every day before going to school. Finally, comparison and intervention students in Attapeu were also comparable on indexes of home literacy environment and chore/work responsibilities.

Student background in Bolikhamxay

Control and intervention students in Bolikhamxay were found to be comparable on all background characteristics (see Table 5). On average, 38 percent of children had attended early childhood development programs, 30 percent had repeated grade 1 and 13 percent had repeated grade 2. Children reported attending school 4.5 out of 5 days per week and the majority of children reported having breakfast every day before going to school. Finally, comparison and intervention students in Bolikhamxay were also comparable on indexes of socioeconomic status, home literacy environment, and chore/work responsibilities.

Gender Differences in both provinces

Overall, boys and girls in this sample are very similar on measurable background characteristics that were captured by the assessment. In fact, no statistically significant differences were found between boys and girls in either Attapeu or Bolikhamxay. See Appendix B for full details.

IV. Children's Reading Skills

Letter Identification

A chart of 33 letters was shown to children and they were asked to name each letter or pronounce the letter sound. On average, Literacy Boost and comparison learners in Attapeu correctly identified 54 percent of all letters presented (18 letters), and students in Bolikhamxay correctly identified 42 percent (13 letters) of all letters presented. The most difficult letters were combination letters that indicate tonal changes. These combinations are taught after the most basic consonants and vowels, and are foundational learning to read words correctly. There were no significant differences between the skills of Literacy Boost and comparison students in either province.

Single Word Reading: Most Used Words

The single word reading or most used words (MUW) sub-test consists of a chart of 20 words that each student is asked to read. Words are typically identified as 'most used' by tabulating the number of times they appear in learners' language textbooks. However, in this case the team was able to build on work already completed for the EGRA launched in Lao earlier in 2013, and 20 words from the 50-word EGRA list were chosen.

On average, learners in Literacy Boost and comparison schools in Attapeu were able to read 4 common words and there were no statistically significant differences between these groups of students. Learners in Literacy Boost and comparison schools in Bolikhamxay were able to read an average of 2 common words correctly and there were no statistically significant differences between the two groups of students.

Decoding Words

The decoding word sub-test consists of a chart of 20 nonsense words that a student is asked to read to the best of their ability. Nonsense words, also called pseudo-words, are created by analyzing common spelling patterns in the language and then, following those patterns, new words that don't actually mean anything in that language are created using predictable orthographical patterns. They serve to test whether the child can read new words that he/she has never encountered before. The 20 nonsense

words in this assessment were also taken from the 50 nonsense words chosen for the decoding portion of the 2013 EGRA assessment launched in Lao.

On average, children in Attapeu were able to decode two words and learners in Literacy Boost and comparison schools in Bolikhamxay were able to decode one word. There were no statistically significant differences between intervention and control groups in either province.

Fluency and 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 are asked to read a passage aloud. The number of words students read correctly in one 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.

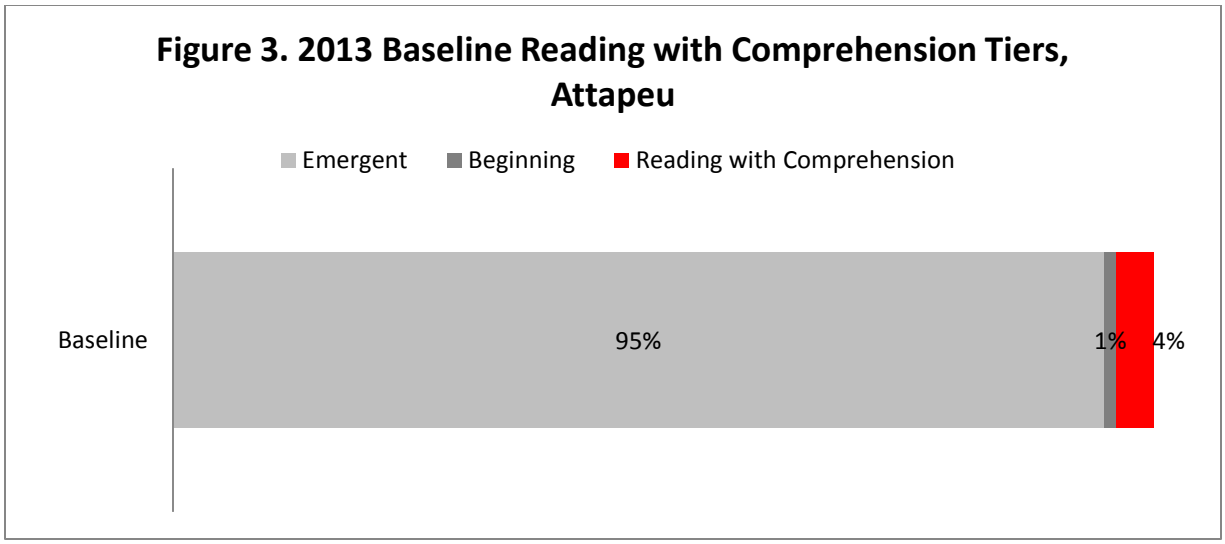
Nine percent of children in Attapeu and four percent in Bolikhamxay were able to read the passage independently. There were no differences between the proportions of intervention and comparison students identified as independent readers in either province. However, due to the small percentage of children able to read the story, there is not enough variation to investigate differences between the fluency and accuracy of intervention and comparison students at this time.

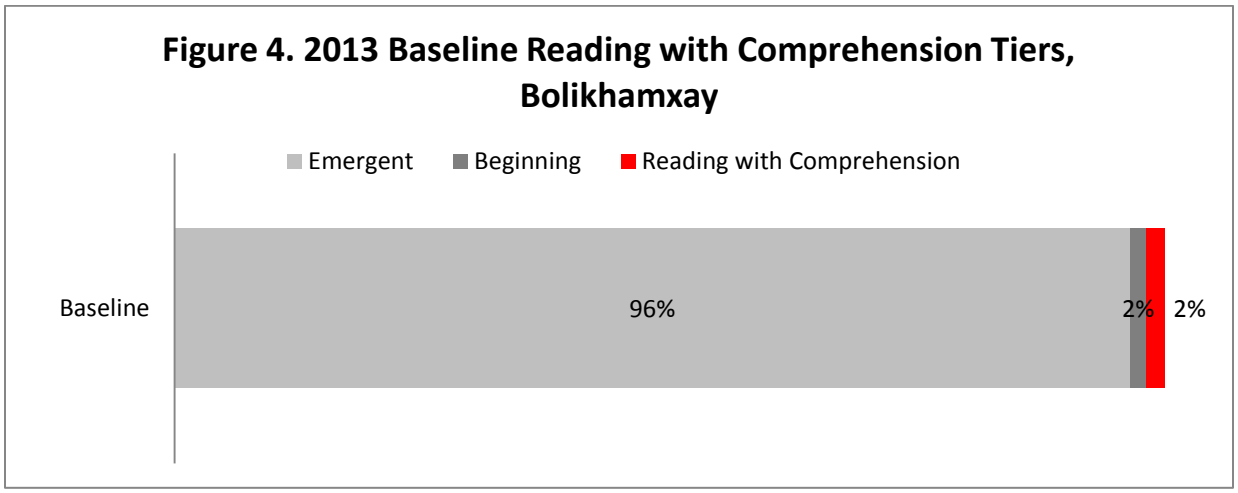
Comprehension

For the final sub-test, learners were asked a series of eight comprehension questions related to the reading passage presented in the fluency and accuracy sub-test. For those learners who were unable to read five words of the passage within 30 seconds, the assessor read the passage to the student before asking the comprehension questions. As mentioned previously, very few children were able to read the passage to themself so most were tested for listening comprehension.

In general, Literacy Boost and comparison students in Bolikhamxay answered one listening comprehension question correctly, compared to 3 questions answered correctly in Attapeu. There were no statistically significant differences between the scores of Literacy Boost students and comparison students in either province.

The Literacy Boost program classifies students into Emergent, Beginning, and Reading with Comprehension tiers based on their fluency, accuracy and comprehension skills. In this sample, we see that 95 and 96 percent of Literacy Boost students are classified as being non-readers in Attapeu and Bolikhamxay, respectively (Figure 3 & 4). This indicates that reading and comprehension skills are quite low. There were no statistical differences in the scores of Literacy Boost students and comparison students or between students in either province.





Note: Emergent Readers correctly answers less than 40-50 percent of the comprehension questions; Beginning readers correctly answers between 40-50 and 75-80 percent of the questions correctly; Readers with Comprehension correctly answers more that 75-80 percent of the comprehension questions. Tier cut-offs were set in combination with associated fluency and accuracy levels in each language and country, vary based on the number of comprehension questions asked.

V. Children's Home Literacy Environment

Differences in the Home Literacy Environment

An important aspect of reading development concerns children's home literacy environment (HLE). How are children exposed to the printed word in their homes? 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 their HLE. As such, it is important to measure where learners' HLEs begin, and how they change over time.

The HLE is not only about materials in the home, but also how those materials are used to engage the child in reading and learning. Hess and Holloway (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. There were no significant differences between children's HLE in Attapeu and Bolikhamxay so averages are presented together in Table 6.

Table 6. Home literacy environment, by group

	Average	Comparison	Literacy Boost	Significant Difference
Textbook	85.2%	86.8%	84.1%	
Magazine	7.1%	4.9%	8.6%	
Newspaper	10.0%	8.7%	10.9%	
Story book	21.4%	21.5%	21.4%	
Coloring book	47.0%	51.7%	43.7%	
# reading materials types	1.7	1.7	1.7	
Someone at home seen reading	86.7%	87.9%	85.8%	
Someone at home helping child study	90.2%	91.4%	89.4%	
Someone at home reading to child	80.4%	85.2%	77.1%	
Someone at home telling stories to child	62.9%	65.2%	61.3%	
Lend books with family/community	40.9%	43.6%	39.0%	
Read books with family/community	52.1%	55.2%	50.0%	

Nearly all learners have some type of reading materials at home. In both provinces, the most common reading resource in students' homes is a textbook, and the least common is a magazine. In terms of child-friendly reading materials, 21 percent of learners report having storybooks at home and 47 percent have a story book at home. No statistically significant differences exist between Literacy Boost and comparison children in either province.

Over 85 percent of learners in both provinces come from a home that has at least one person who actively reads. In addition, almost 90 percent of children have someone at home who tells or helps them study and more than half of students have someone at home who reads to them or tells them stories. Relatively lower levels of community reading activities were reported but half of children reported reading with someone in their family or community. No significant differences exist between Literacy Boost and comparison schools in Attapeu or Bolikhamxay.

Gender Differences

No differences exist between the reading materials or home literacy activities available to boys and girls in either province.

VI. Literacy Boost Site profiles: Skills and Home Literacy Environment

This section summarizes reading skills and home literacy environments across Literacy Boost schools. It includes a chart summarizing letter identification, single word reading, fluency, accuracy, and comprehension scores as well as a chart summarizing students' home literacy environments. Figure 5 displays Literacy Boost students' average scores on all literacy sub-skill assessments, with the white segments on top of the red baseline averages representing the benchmarks against which to measure Literacy Boost students' skill growth at the end-line assessment. Students from Attapeu and Bolikhamxay are both included in this figure. While there are differences between these two groups of students the overall skill profile is similar and we would hope that with similar levels of implementation, children in different areas could reach the same literacy levels. Endline benchmarks indicate suggested goals for skill gains in each area. Due to the low skill level in this sample, we propose two benchmarks – one for all children (including nonreaders) as well as a benchmark for the small sample of children who could read independently at baseline. Finally, Figure 6 displays students' average home literacy environment.

Figure 5. Literacy Skill Profile with Endline Benchmarks, Literacy Boost

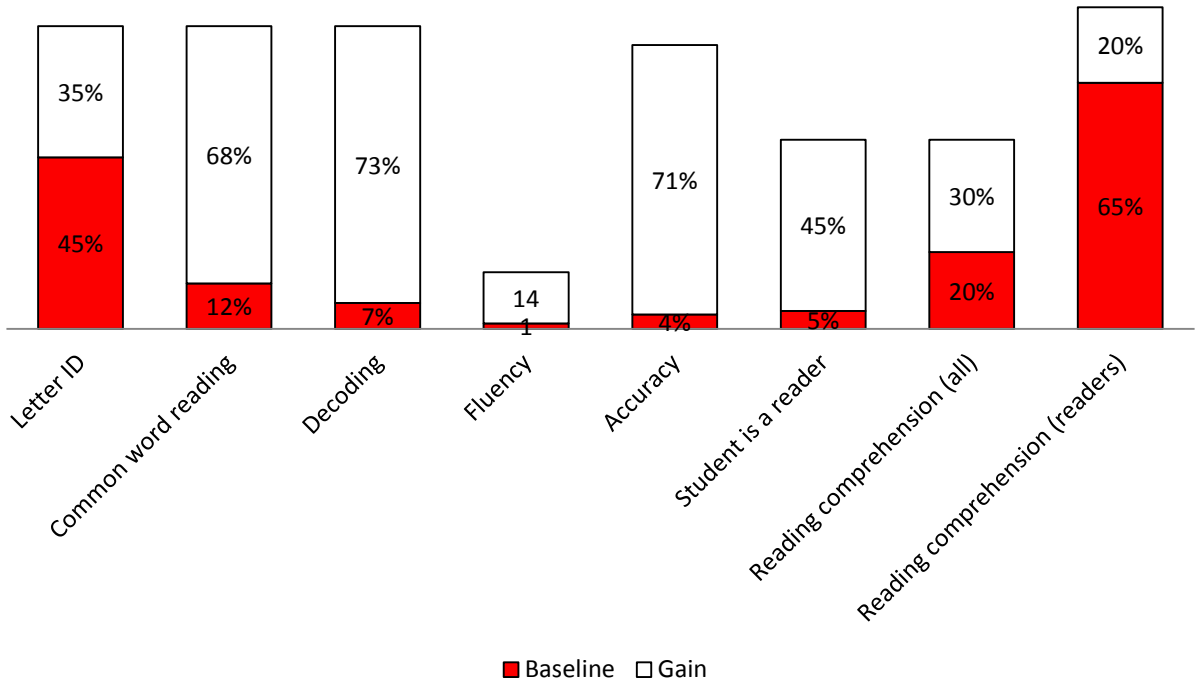
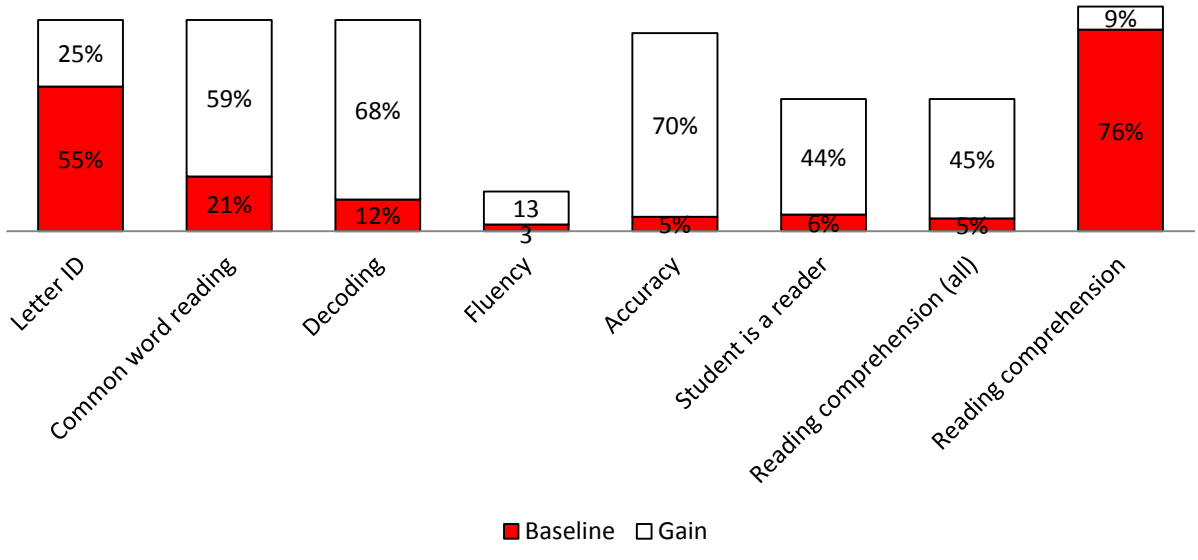


Figure 5a. Literacy Skill Profile with Endline Benchmarks, Literacy Boost Attapeu



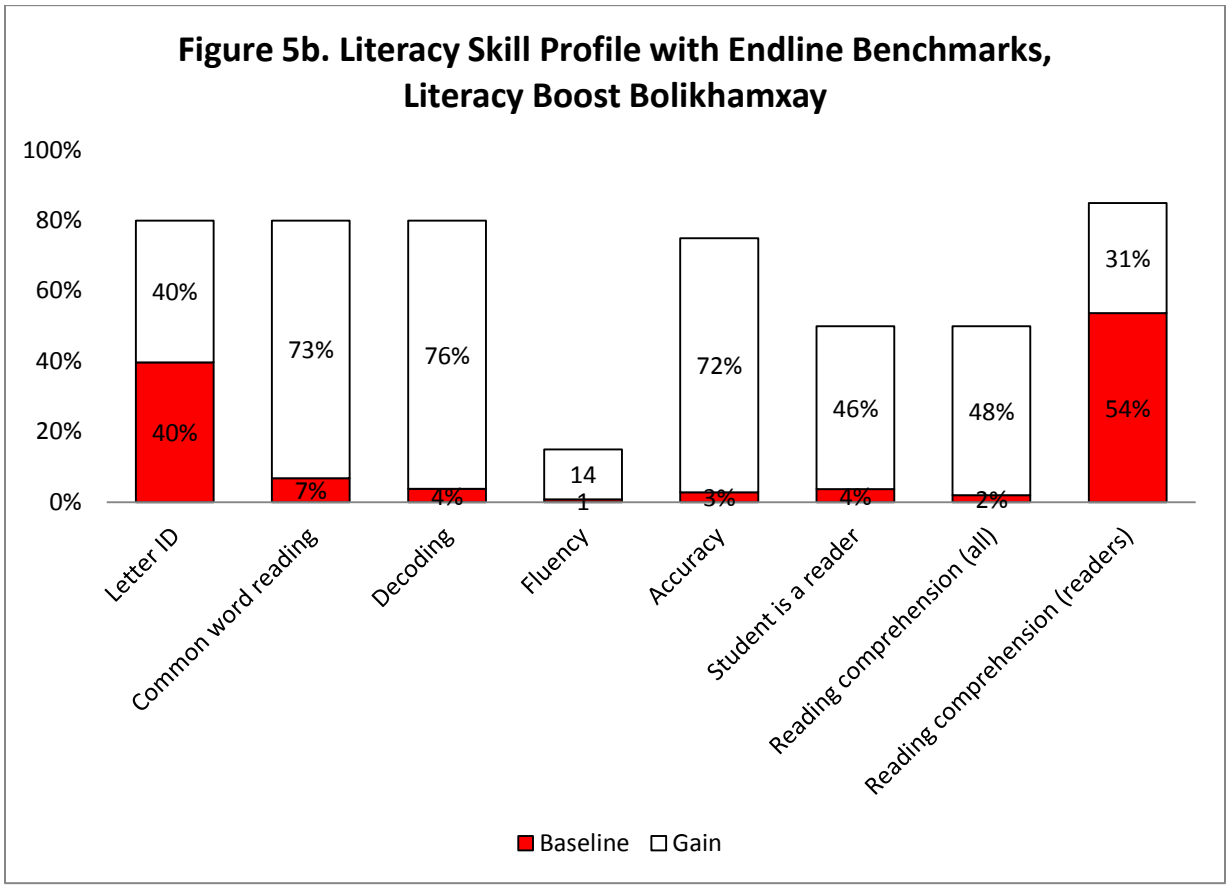


Figure 5b. Literacy Skill Profile with Endline Benchmarks, Literacy Boost Bolikhamxay
100%
80%
60%
40%
20%
0%
40%
40%
73%
7%
76%
4%
14
1
72%
3%
46%
4%
48%
2%
31%
54%
Letter ID
Common word reading
Decoding
Fluency
Accuracy
Student is a reader
Reading comprehension (all)
Reading comprehension (readers)
Baseline
Gain

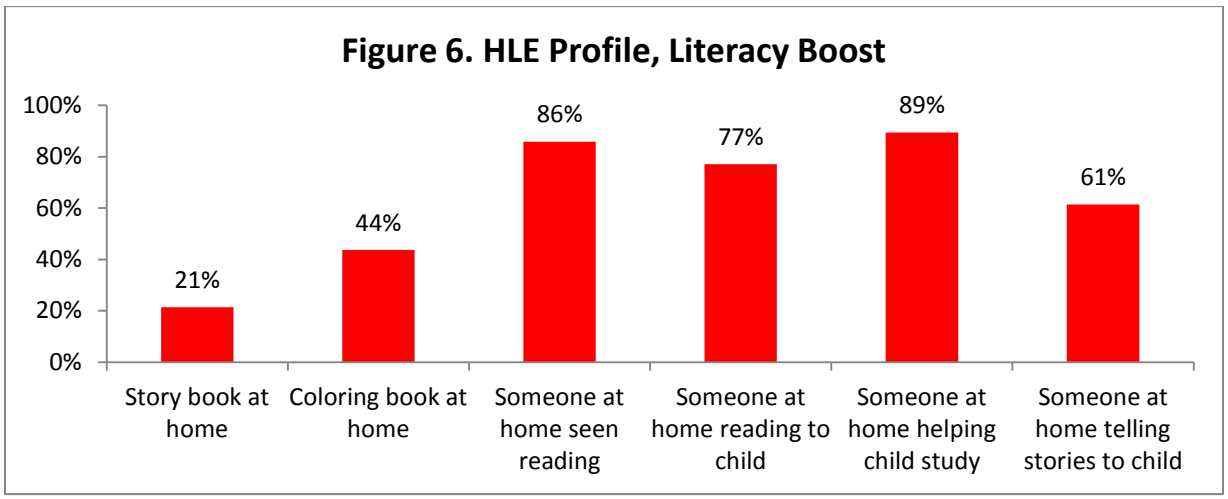


Figure 6. HLE Profile, Literacy Boost
100%
80%
60%
40%
20%
0%
21%
44%
86%
77%
89%
61%
Story book at home
Coloring book at home
Someone at home seen reading
Someone at home reading to child
Someone at home helping child study
Someone at home telling stories to child

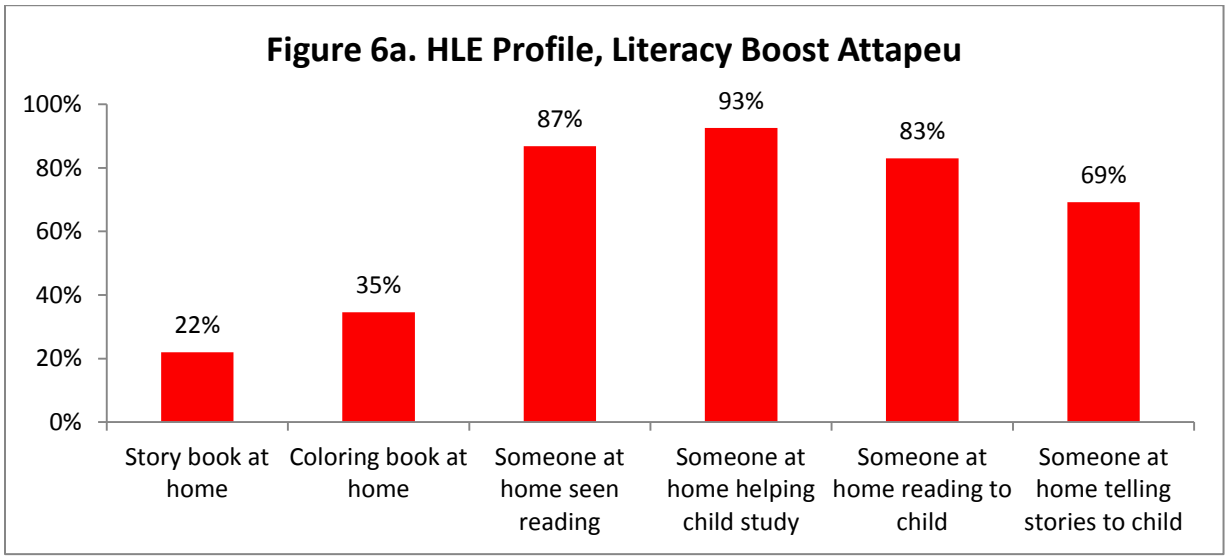


Figure 6a. HLE Profile, Literacy Boost Attapeu
100%
80%
60%
40%
20%
0%
22%
35%
87%
93%
83%
69%
Story book at home
Coloring book at home
Someone at home seen reading
Someone at home helping child study
Someone at home reading to child
Someone at home telling stories to child

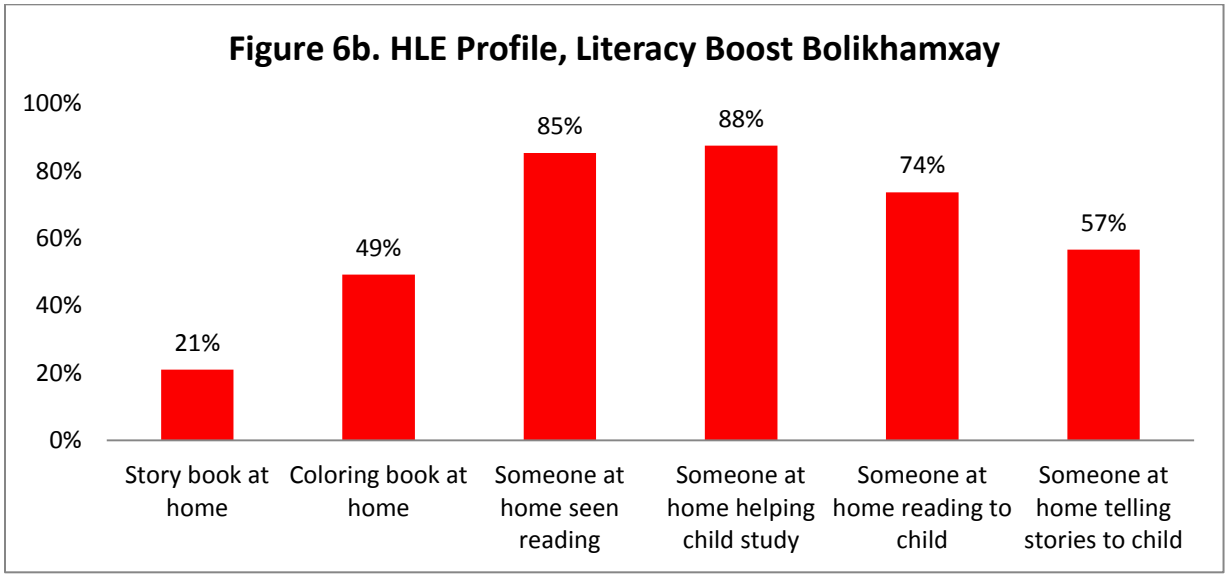


Figure 6b. HLE Profile, Literacy Boost Bolikhamxay
100%
80%
60%
40%
20%
0%
21%
49%
85%
88%
74%
57%
Story book at home
Coloring book at home
Someone at home seen reading
Someone at home helping child study
Someone at home reading to child
Someone at home telling stories to child

The average literacy skills and home literacy environments seen in Figures 5 and 6 will be used to help decide on appropriate benchmarks for Literacy Boost students at the end-line assessment. The following is an outline of the skill goals we have for students as well as in-school and out-of-school activities associated with improving these skills.

1. Letter identification – Endline benchmark: 80 percent
    a. Given that combination letters and were the most difficult for students to identify and are also foundational to word reading, the teacher training activities should encourage teachers to focus on daily activities that emphasize these letters.
2. Single Word Reading (MUW) – Endline benchmark: 80 percent
    a. Single word reading should be a strong focus of in and out of school programming, especially as children gain more comfort with letter identification. Most children report having textbooks at home which contain exactly the grade level words that students should be gaining familiarity with and can be used as a resource here.
3. Decoding – Endline benchmark: 80 percent
    a. Decoding is a foundational skill related to the ability to read fluently and this skill can be practiced in school with teachers and also at reading camps. In addition, children can practice this skill by reading aloud or silently.
4. Student is a reader – Endline benchmark: 50%
    a. A primary goal for this group of students is to increase the number of independent readers. Teachers and community leaders should work with children on the letter, word, and decoding skills needed to begin reading on their own. Practice reading aloud in small groups in classrooms or in reading camps, with supervision if possible, can be helpful.
5. Fluency & Accuracy – Endline benchmark: 15 words per minute & 75 percent correct
    a. Given that a major goal is for more children to become independent readers, only modest fluency gains are expected because more children will be beginning to read at a basic level. Teachers and community leaders should work with children on the letter, word, and decode skills needed to begin reading with fluency.
6. Reading Comprehension (all) – Endline benchmark: 50 percent
    a. Given the baseline scores and existing second language learning issues listening comprehension is an important skill to focus on for the children in this sample. Improving students' oral language stills is crucial to their success in school and can be practiced both in class and at home.
7. Reading Comprehension (readers) – Endline benchmark: 85%
    a. For those students who can read on their own, it is recommend that teachers and program staff work with them independently so that they can continue to improve their comprehension skills and not become bored with reading. In addition, if possible, they can be used to help other students who are struggling to read.

Figure 6 displays that students' home literacy environment are generally strong with reading materials and literacy activities occurring in most homes. However, almost 80 percent of students do not have story books at home so Book Banks have the opportunity to encourage more child-friendly books in the

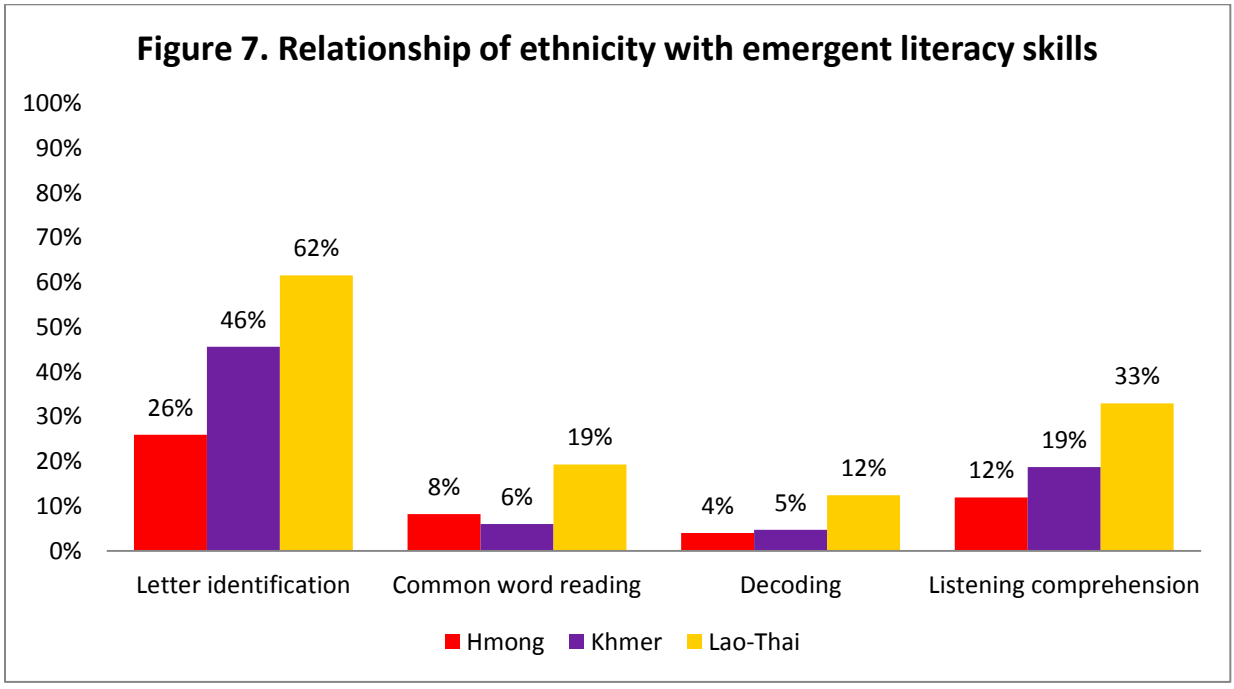
home. In addition, efforts should be made to reach those students who do not have family members reading to them or telling them stories as they are the vulnerable to falling behind their peers living in stronger home literacy environments.

VII. Relationships between Skills and Home Literacy Environment

This final section explores the results of a series of multivariate regressions, accounting for clustering of students within schools. To arrive at the most relevant regression model, the significance of student background and home literacy environment variables were tested in both univariate and combined multivariate models, using reading skill sub-tests as the dependent variables. Variables associated with equity were areas of specific focus. In addition, children from Attapeu and Bolikhamxay were analyzed together with province used as a control variable in order to increase the power of the analysis and create an overall picture of factors driving early literacy development in Lao. Appendix D presents the results of the final multivariate models for each literacy sub-test. It should be noted that these relationships are correlations, and do not imply that causation. To establish causation requires a more rigorous research design with a much larger sample.

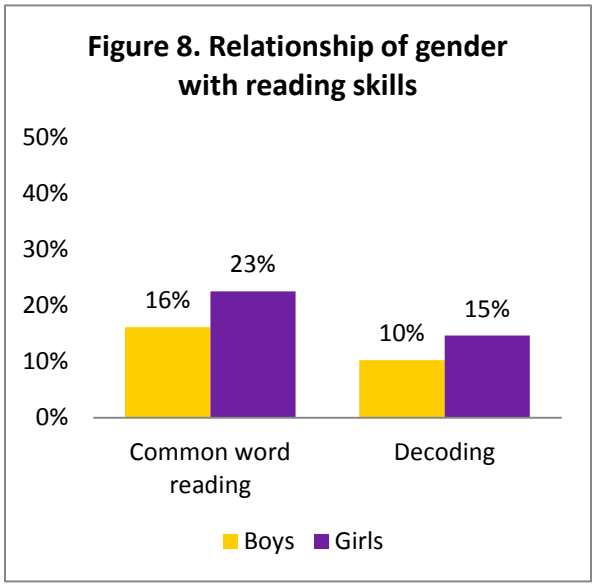
Student Background

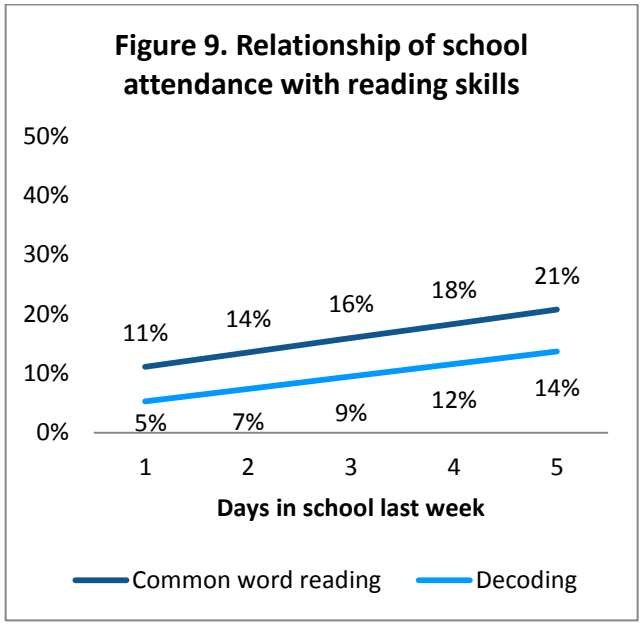
Overall analyses show consistent relationships between student characteristics and reading skills. First, as discussed earlier, the results find that children in Bolikhamxay have lower literacy skills than children in Attapeu. However, the most notable and consistent result was that students from the Hmong and Khmer ethnic groups scored statistically significantly lower in all areas assessed when compared to students from a Lao-Thai background (Figure 7).



Note: Lao-Thai children significantly outperform Hmong and Khmer children on all sub-tests (p<.05).

In addition to these results we see that girls have stronger emergent skills than boys in common word knowledge and decoding, and students who report attending school more often tend to have stronger skills in the same areas (Figure 8 & 9). Finally, in some Literacy Boost samples analyses find that children who attended an early childhood education program or those who have families with greater relative wealth (measured by SES Index) have stronger literacy skills at baseline compared to children who did not attend an ECD program or who come from poorer families. However, we do not see any significant connections between participation in an early childhood program or SES Index with baseline skills.

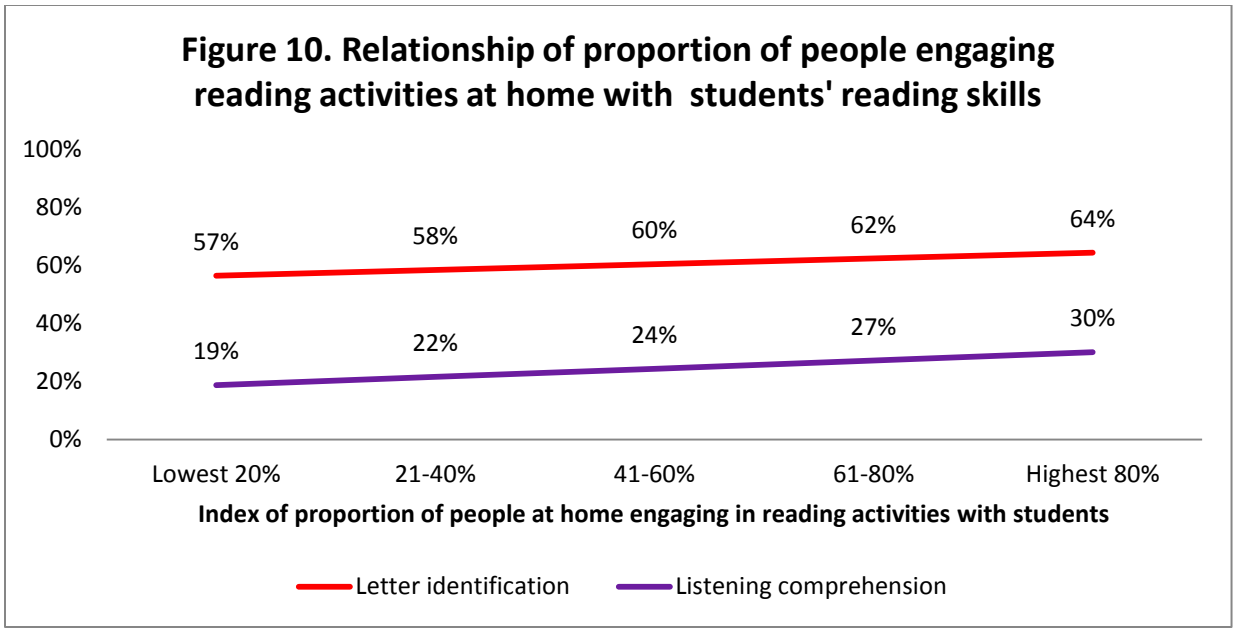




Note: All differences in relationships shown are statistically significant (p<.05).

Home Literacy Environment

Similar to trends seen in other Literacy Boost countries, strong home literacy environments are found to be positively related to early literacy skills. Specifically, having more people at home participating in home literacy activities (e.g., reading to children or telling stories) was related to increased letter knowledge and listening comprehension (Figure 10).



VIII. Conclusion

Overall, very few significant differences exist between Literacy Boost and comparison students, indicating that these groups will be appropriate for comparing students' literacy skill gains at endline. However, significant baseline skill differences do exist between other groups of interest in this sample.

The strongest predictor of baseline literacy skills is language spoken at home. Children from Hmong and Khmer families are significantly behind Lao-Thai children in all skill areas. In addition, some students lacked the language skills needed to understand the directions for the assessment without a translator. It will be very important that teacher training and programming focus specifically on this issue.

We also see that children who report attending school more often have more advanced skills in two of the four skills analyzed. It is unclear why some children are missing more school than others, but suggests that school and program staff should be attentive children missing school or after school activities. If children are missing school due to work or chore responsibilities at home, program staff should take care to plan community reading activities at times when these vulnerable children are available.

Boys represent another possible vulnerable group in this sample. While no gender differences were found when comparing children's average literacy skills, after controlling for other background characteristics multivariate regression results suggest that girls are outperforming boys in two of the four skills analyzed. Teacher training sessions should touch on this issue, and activities and reading materials for community activities should appeal to both boys and girls.

Finally, as we have seen in numerous other Literacy Boost assessments, children with stronger home literacy environments tend to have more advanced literacy skills. In this sample, HLE is relatively high

with 87 percent of children report having some kind of reading material at home, and 86 percent having someone at home who reads. However, the majority of books that children have at home are textbooks and only 21 percent of students have access to a storybook at home. In general, students are experiencing some type of literacy activities at home and more family members' engaging in these activities is related to stronger early reading skills. If more child-friendly reading materials can be brought into the home, these activities could be made even more engaging and meaningful.

Appendix A: Inter-rater reliability

To test inter-rater reliability, about 6 percent of learners (43 out of 714) 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. Using Fleiss' benchmarks for excellent (ICC>0.75), good or fair (0.75>=ICCA>0.4), and poor (0.4>=ICC) we find that all of the literacy outcome variables exhibited excellent inter-rater reliability. Table A1 shows the percent of agreement between the raters**.**

Table A1. Inter-rater Reliability

Literacy Skill Sub-Test	Inter-rater Reliability	Rating
Letter Knowledge	.958	Excellent
Most Used Words	.994	Excellent
Decoding Words	.973	Excellent
Fluency	.999	Excellent
Accuracy	.776	Excellent
Comprehension	.994	Excellent

Inter-rater reliability was excellent on all measures except accuracy. It should be noted that while the IRR for fluency and accuracy is in the acceptable range, there were very few students who were able to read independently so there was an extremely small sample of readers with which to establish this reliability. Overall, inter-rater reliability was very high and therefore we can be confident that the internal validity of the scores is good.

Appendix B. Additional Descriptive Statistics

Table B1. Student Background Information in Attapeu, by Intervention Group

	Comparison (N=126)	Literacy Boost (N=159)	Significant Difference
Female	48.4%	51.6%	
Age	8.49	8.54	
Attended ECD	37.8%	39.0%	
Repeated Grade 1	54.7%	51.6%	
Repeated Grade 2	29.1%	27.7%	
Lao-Thai ethnicity	43.0%	34.8%	
Khmer ethnicity	52.3%	49.4%	
Hmong ethnicity	0.0%	3.2%	
Other ethnicity	4.6%	12.6%	
Days per week attending school	4.4	4.2	
Frequency of illness (Never=0, a few times=1, sometimes=2, many times=3)	1	1	
Eats breakfast (Never=0, sometimes=1, always=2)	1.7	1.7	
Has trouble seeing in class	3.9%	10.7%	
Has trouble hearing in class	8.7%	21.4%	
# of people at home	4.3	4.1	
Average SES Index	2.7	2.4	
Average HLE Index	3.1	2.5	*
Average Chore-work Index	3.0	2.6	
Someone at home seen reading	89.1%	86.8%	
Someone at home helping child study	93.0%	92.5%	
Someone at home reading to child	89.1%	83.0%	
Someone at home telling stories to child	68.8%	69.2%	
# types of reading materials at home	1.6	1.5	

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

Table B2. Student Background Information in Bolikhamxay, by Intervention Group

	Comparison (N=162)	Literacy Boost (N=265)	Significant difference
Female	50.0%	50.6%	
Age	7.4	7.8	
Attended ECD	41.6%	35.2%	
Repeated Grade 1	24.2%	33.8%	
Repeated Grade 2	10.6%	14.1%	
Lao/Thai ethnicity	46.5%	49.0%	
Khmer ethnicity	1.3%	3.5%	
Hmong ethnicity	49.7%	44.9%	
Other ethnicity	2.5%	3.5%	
Days per week attending school	4.5	4.5	
Frequency of illness (Never=0, a few times=1, sometimes=2, many times=3)	0.6	0.7	
Eats breakfast (Never=0, sometimes=1, always=2)	1.9	1.9	
Has trouble seeing in class	8.7%	7.2%	
Has trouble hearing in class	10.6%	7.2%	
# of people at home	4.6	4.6	
Average SES Index	2.9	2.7	
Average HLE Index	3.2	2.9	
Average Chore-work Index	3.2	3.0	
Someone at home seen reading	87.0%	85.3%	
Someone at home helping child study	90.1%	87.5%	
Someone at home reading to child	82.1%	73.6%	
Someone at home telling stories to child	62.3%	56.6%	
# types of reading materials at home	1.8	1.8	

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

Table B3. Student Background and Literacy Skill Information, by Province

	Attapeu (N=287)	Bolikhamxay (N=427)	Significant difference
Female	50.2%	50.4%	
Age	8.5	7.7	***
Attended ECD	38.5%	37.6%	
Repeated Grade 1	53.0%	30.2%	***
Repeated Grade 2	28.3%	12.7%	**
Lao-Thai ethnicity	38.0%	48.0%	
Khmer ethnicity	51.0%	3.0%	***
Hmong ethnicity	2.0%	46.0%	***
Other ethnicity	9.1%	3.1%	
Days per week attending school	4.3	4.5	*
Frequency of illness (Never=0, a few times=1, sometimes=2, many times=3)	0.9	0.6	***
Eats breakfast (Never=0, sometimes=1, always=2)	1.7	1.9	***
Has trouble seeing in class	7.7%	7.8%	
Has trouble hearing in class	15.7%	8.5%	
# of people at home	4.2	4.6	*
Average SES Index (out of 5)	2.8	3.0	
Average HLE Index (out of 5)	2.8	3.1	
Average Chore-work Index (out of 5)	2.6	2.8	
Letter Identification	54.2%	41.5%	
Common word knowledge	19.1%	7.9%	*
Decoding	11.5%	5.1%	
Student is a reader	9.4%	4.7%	
Listening comprehension	35.8%	12.8%	***

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

Table B4. Student Background Information, by Sex and Province

	Attapeu			Bolikhamxay		
	Boys (N=143)	Girls (N=144)	Significant difference	Boys (N=212)	Girls (N=215)	Significant difference
Age	8.6	8.4		7.756	7.546	
Attended ECD	37.1%	39.9%		36.5%	38.8%	
Repeated Grade 1	51.7%	54.2%		31.8%	28.6%	
Repeated Grade 2	34.5%	22.2%		13.3%	12.1%	
Lao-Thai ethnicity	38.0%	38.9%		46.4%	49.8%	
Khmer ethnicity	50.7%	50.7%		2.4%	2.8%	
Hmong ethnicity	2.8%	0.0%		48.8%	43.6%	
Other ethnicity	4.5%	9.7%		2.4%	3.8%	
Days per week attending school	4.2	4.3		4.5	4.6	
Frequency of illness (Never=0, a few times=1, sometimes=2, many times=3)	1.0	0.9		0.6	0.7	
Eats breakfast (Never=0, sometimes=1, always=2)	1.7	1.7		1.9	2.0	
Has trouble seeing in class	6.3%	9.0%		8.1%	7.5%	
Has trouble hearing in class	15.4%	16.1%		7.6%	9.3%	
# of people at home	4.3	4.1		4.5	4.7	
Average SES Index	2.8	2.7		3.0	3.0	
Average HLE Index	2.7	2.8		2.9	3.2	
Average Chore-work Index	2.7	2.5		2.6	3.0	

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

Appendix C. Individual Item Scores

Table C1. Letter identification scores, Literacy Boost students only

Attapeu		Bolikhamxay	
Letter	**% Correct**	**Letter**	**% Correct**
ກ	82.4%	ກ	60.2%
ປ	81.1%	ຈ	58.9%
ອ	79.9%	ດ	56.8%
ນ	78.6%	ຊ	56.2%
ຈ	78.0%	ປ	56.1%
ດ	78.0%	ອ	55.8%
ມ	75.5%	ນ	55.5%
ຕ	73.6%	ມ	52.7%
ງ	71.1%	ງ	51.7%
ສ	70.4%	ສ	51.3%
ວ	69.2%	ຂ	51.1%
ຊ	68.6%	ຮ	50.6%
ທ	68.6%	ຕ	50.4%
ລ	67.9%	ວ	50.2%
ບ	67.3%	ບ	49.8%
ຍ	66.7%	ລ	49.1%
ຂ	65.4%	ທ	47.2%
ຄ	65.4%	ຖ	45.3%
ຖ	62.3%	ຄ	45.3%
ຢ	57.9%	ຫ	44.9%
ຮ	55.3%	ຍ	42.6%
ຜ	54.7%	ຜ	38.1%
ຫ	50.3%	ຜ	38.1%
ຝ	47.2%	ຢ	36.6%
ຜ	42.8%	ຝ	34.7%
ຝ	40.3%	ຝ	31.1%
ຣ	27.7%	ຣ	26.0%
ໝ	13.8%	ໝ	9.8%
ຫຍ	11.3%	ຫຼ	4.9%
ຫນ	9.4%	ຫນ	4.9%
ຫວ	8.8%	ຫຍ	3.0%
ຫຼ	8.8%	ຫວ	1.9%
ຫງ	6.9%	ຫງ	1.1%

Table C2. Common word reading, Literacy Boost students only

Attapeu		Bolikhamxay	
Word	**% Correct**	**Word**	**% Correct**
ດີ	40.3%	ດີ	16.7%
ມາ	39.6%	ໄປ	14.0%
ໄປ	37.7%	ແມ່	12.1%
ອາ	34.6%	ອາ	11.7%
ໄກ່	34.6%	ມາ	10.9%
ແມ່	32.7%	ໄກ່	9.8%
ທຸງ	20.8%	ຂ້ອຍ	6.0%
ຂ້ອຍ	17.0%	ທຸງ	5.3%
ເສື້ອ	16.4%	ຜົນຕົກ	5.3%
ໂສ້ງ	16.4%	ໂສ້ງ	4.9%
ຜົນຕົກ	15.7%	ເອ້	4.5%
ງາມ	15.1%	ຕັ້ງ	4.5%
ຍ່າງ	15.1%	ຍ່າງ	4.2%
ຕັ້ງ	14.5%	ເອືອຍ	4.2%
ລ້າງມື	13.8%	ລ້າງມື	4.2%
ເອືອຍ	12.6%	ດັ່ງ	3.8%
ດັ່ງ	10.1%	ງາມ	3.8%
ເອ້	9.4%	ອ້າຍ	3.8%
ອ້າຍ	9.4%	ໝູ່ເພື່ອນ	3.4%
ໝູ່ເພື່ອນ	8.8%	ເສື້ອ	3.4%

Table C3. Words correctly decoded, Literacy Boost students only

Attapeu		Bolikhamxay	
Word	**% Correct**	**Word**	**% Correct**
ດີ	29.6%	ດີ	7.9%
ຖ	21.4%	ຕື	6.4%
ຕື	20.8%	ຖ	6.4%
ເສ	19.5%	ເສ	5.3%
ຜື	17.0%	ງ່	5.3%
ແດ	14.5%	ຜ້	4.9%
ຢ້າ	14.5%	ໄອ້	4.9%
ເຜ	14.5%	ໂຂ່	4.5%
ງ່	12.6%	ຢ້າ	4.2%
ຮາຍ	11.9%	ເຜ	3.8%
ໄອ້	11.3%	ຜ່	3.4%
ໂຂ່	10.7%	ແດ	2.7%
ຢາບ	7.5%	ຢາບ	2.6%
ຜ່	6.9%	ໂຜ້	2.6%
ເບີ	6.3%	ເຢະ	2.3%
ໂຜ້	6.3%	ຜາມ	2.3%
ຜາມ	5.7%	ຮາຍ	2.3%
ເງາ	3.8%	ເຫາະ	1.9%
ເຢະ	3.1%	ເບີ	1.5%
ເຫາະ	2.5%	ເງາ	1.1%

Appendix D. Regression Results

Table D1. Multivariate regression results, focus on equity

VARIABLES	(1) Letter identification	(2) Common word reading	(3) Decoding	(4) Listening comprehension
1. Lao-Thai	Reference	Reference	Reference	Reference
2.Khmer	-0.159**	-0.133***	-0.0771**	-0.142**
	(0.0523)	(0.0370)	(0.0283)	(0.0417)
3.Hmong	-0.356***	-0.111**	-0.0842*	-0.210***
	(0.0442)	(0.0401)	(0.0336)	(0.0422)
Student=Female	0.0228	0.0640**	0.0434*	-0.0111
	(0.0265)	(0.0211)	(0.0199)	(0.0205)
Attended ECD program	-0.000230	-0.0258	-0.0290	0.000647
	(0.0338)	(0.0327)	(0.0270)	(0.0372)
Quintiles of SES index	0.000708	-0.00152	-0.000909	0.00188
	(0.00940)	(0.00883)	(0.00648)	(0.00823)
Index of HLE habits at home	0.0199*	0.00249	0.00221	0.0284***
	(0.00739)	(0.00556)	(0.00411)	(0.00744)
School attendance	0.0191	0.0241*	0.0211**	-0.00311
	(0.0137)	(0.0107)	(0.00706)	(0.0117)
Province=Bolikhamxay	-0.0461	-0.130*	-0.0692	-0.213***
	(0.0620)	(0.0593)	(0.0475)	(0.0555)
Constant	0.521***	0.268*	0.126	0.583***
	(0.122)	(0.120)	(0.0922)	(0.115)
Observations	602	602	602	558
R-squared	0.278	0.118	0.079	0.290
Adjusted R-squared	0.268	0.107	0.0671	0.279

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