



Save the Children®

Literacy Boost
Cross Country Analysis
Results

September 2013

**Amy Jo Dowd, Elliott Friedlander, Jarret Guajardo,
Noah Mann and Lauren Pisani**

TABLE OF CONTENTS

Introduction	1
Equity Overview	2
Equity and Presence at End-of-Year Assessment	2
Equity and Reading Skills at Baseline	4
Overall Literacy Boost Impact	6
Does Literacy Boost Help at-risk Students Catch up?	7
Equity and Reading Skills: Gender	7
Equity and Reading Skills: Poverty	9
Equity and Reading Skills: Home Literacy Environment	12
Challenges and Next Steps	15
Appendix A	18

INTRODUCTION

Literacy Boost is Save the Children's innovative, evidence-based program to support the development of reading skills in young children. Literacy Boost holistically pursues the goal of literacy by using assessments to identify gaps and measure improvements in the five core reading skills, training teachers to teach national curriculum with an emphasis on reading skills, and mobilizing communities to support children's reading. Learning to read does not happen overnight. Unlike walking or language, that are innate abilities with which healthy children are born, reading requires the combination of discreet skills that are learned over time. In its approach to measuring reading skills, Literacy Boost recognizes that young readers possess a spectrum of different abilities. This is reflected in our instruments: we assess foundational skills such as concepts about print and letter identification as well as higher order skills like reading fluency and comprehension. Over time, the goal of the program is for all children to be reading with comprehension by the end of primary school. In this way, the Literacy Boost program espouses the Literacy Breakthrough supported by Save the Children and other organizations around the world.

In spring 2013, the Research Team in the Department of Education and Child Development at Save the Children USA undertook a cross-country analysis of the equity impact of Literacy Boost. Using data from Save the Children Literacy Boost sites in Bangladesh, Ethiopia, Malawi, Mozambique, Nepal, Pakistan, and Zimbabwe, seven countries where a year of Literacy Boost implementation has taken place, we performed multivariate analyses of presence at endline and learning gains by three different dimensions of equity: gender, socioeconomic status, and home literacy environment (HLE).¹ Each analysis controlled for baseline scores, age as well as equity dimensions not under direct investigation. For example, when investigating learning gains for girls, analyses controlled for baseline reading skill score, age, socioeconomic status, and home literacy environment. The research questions were as follows:

1. Are children – and especially those at risk – in Literacy Boost schools more often present at endline than those in comparison schools?
2. What dimensions of inequity are significantly correlated with children's reading skills?
3. Does Literacy Boost help at-risk children catch up to their more advantaged peers?
4. How do learning gains for at-risk children compare with more advantaged children within Literacy Boost schools?
5. How do girls, the poor, and children of deprived HLE benefit from Literacy Boost as compared to similar peers in comparison schools?

After an overview of inequality, we will present findings from investigating these research questions. First, we present a brief report on presence how equity relates to presence in school at two points in time and baseline reading scores with Literacy Boost and comparison samples. Then, after a review of overall Literacy Boost impact, we present a section on whether at-risk groups caught up with the more advantaged peers. Finally, we consider each of the dimensions of equity: gender, SES and HLE and report findings relating to performance within Literacy Boost and across Literacy Boost and comparison schools.

EQUITY OVERVIEW

Primary school enrollment reached 90 percent in 2010 for children in developing regions, highlighting the continued progress toward the Millennium Development Goal (MDG) of achieving universal primary education.² However, while advances in access to primary education have been achieved, stark inequalities in enrollment and learning outcomes persist. Traditionally marginalized groups such as girls, those living in rural areas, and families with fewer financial resources still struggle to make educational progress.³ Persistent gaps in advancement for the neediest children, as well as a dearth of evidence surrounding improvements in educational quality, have propelled policy makers to call for learning and equity as essentials for education in the post-2015 agenda.⁴ Save the Children's Literacy Boost experience further highlights the need for simultaneous attention to learning and equity. By providing enriched in and out-of-school learning environments for students regardless of their background or access to resources, Literacy Boost aims to enable *all* students to become independent readers and minimize or close any existing skill gaps.

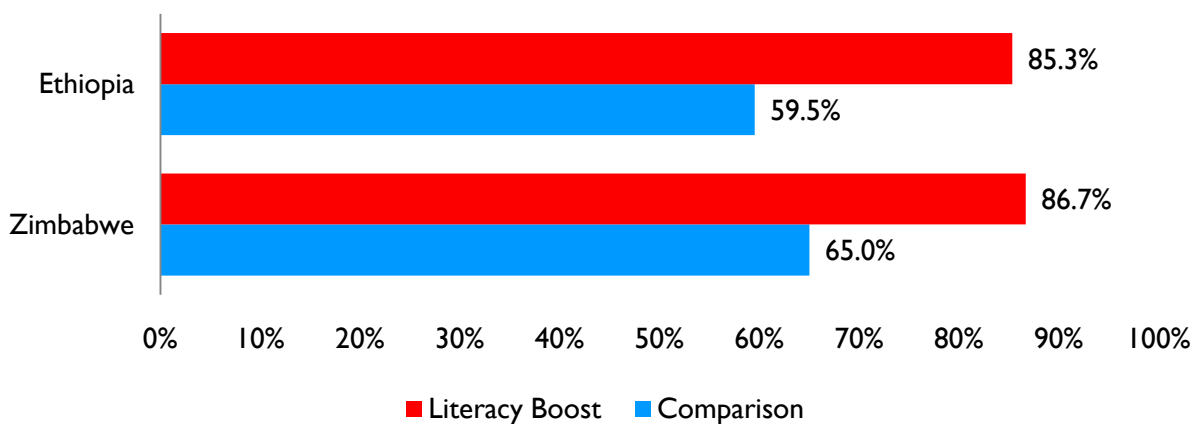
EQUITY AND PRESENCE AT END-OF-YEAR ASSESSMENT

Improving students' ability to read with comprehension is difficult without consistent student attendance in the early primary grades, and completion of the full course of primary education is an important enabler of improving students' ability to read with comprehension. Students cannot benefit from the enhanced learning environments and improved teaching practices encouraged by Save the Children's Literacy Boost program if they are not present at school. Thus, creating learning environments that are engaging, safe, and ultimately motivating children to continue attending school is an important goal of the Literacy Boost program.

In order for Literacy Boost to measure learning gains, assessments are given to the same students at the beginning and end of a school year. Analyses find that, in four out of six countries with at least one year of Literacy Boost implementation, significantly more Literacy Boost than comparison students who were assessed at the beginning of the year are present in school on the day of the end-of-year assessment. Overall, students in Literacy Boost schools in Ethiopia and Zimbabwe are more likely than students in comparison schools to be in school for assessments given at both the beginning and end of the year. Delving deeper into these findings, we see that overall improvements in school presence at year-end assessments also extend to disadvantaged students.

Importantly, in addition to a significantly greater number of students overall found in school at the end-of-year assessment in Ethiopia and Zimbabwe, Literacy Boost also produces the same result with girls in these countries compared to girls in comparison schools. Girls in Ethiopia and Zimbabwe are 43 and 33 percent more likely to be present in school at endline than their peers in comparison schools, respectively. Figure 1 displays the proportion of girls who could be located for the end of the year assessment by teachers in Literacy Boost and comparison schools in these countries.

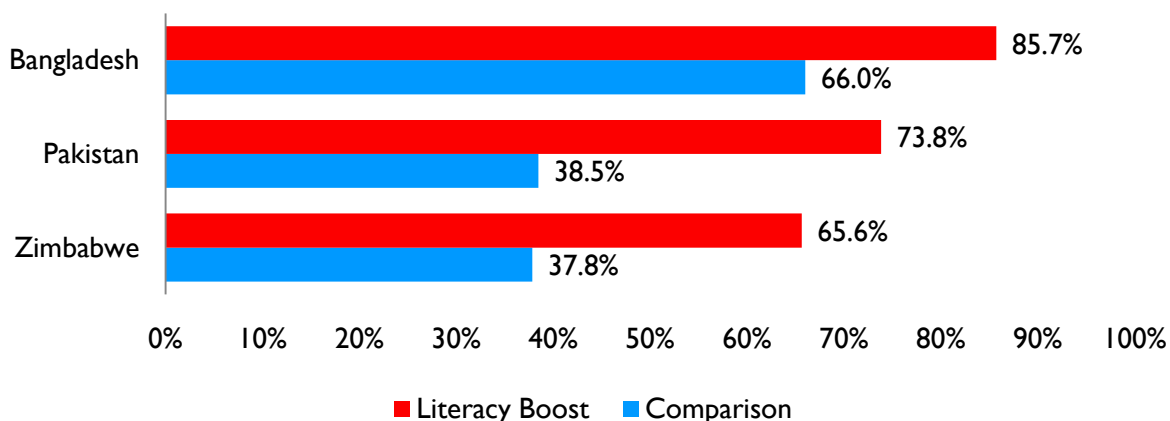
Figure 1. Presence of Girls at End-of-Year Assessment, by Group



Note: All differences presented between Literacy Boost and comparison groups are statistically significant ($p < .05$).

In addition to improving likelihood of being found in school at endline for girls, children from families in the lowest socioeconomic quintile in our sample also benefit. In fact, in Bangladesh, Pakistan and Zimbabwe the poorest 20 percent of Literacy Boost students are more likely than their peers in comparison schools to be found in school at endline (Figure 2).

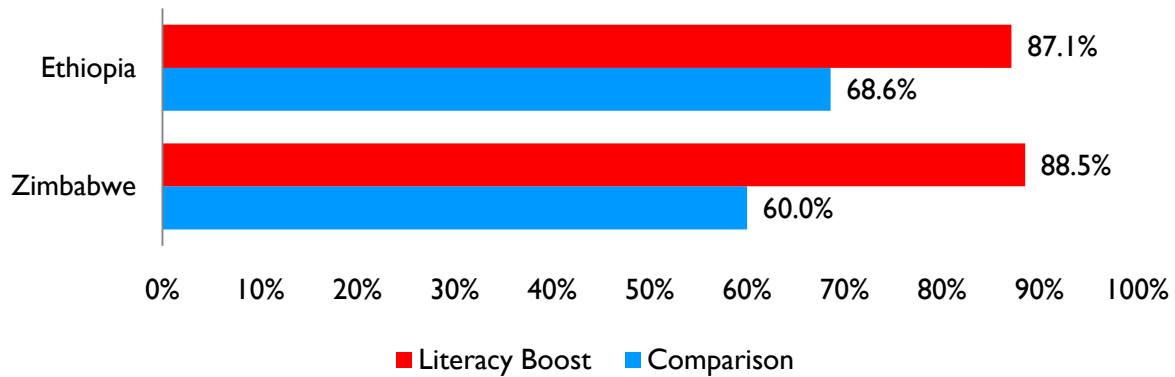
Figure 2. Presence of Poorest 20% of Students at End-of-Year Assessment, by Group



Note: All differences presented between Literacy Boost and comparison groups are statistically significant ($p < .05$).

Finally, we see that students with the fewest home literacy resources (e.g. reading materials and family members at home who read to children) in Ethiopia and Zimbabwe are 27 and 48 percent more likely to be found in school at the end of the year in Literacy Boost schools compared to peers in other schools, respectively. Figure 3 displays the percent of students living in the most literacy deprived homes who were present at endline in Ethiopia and Zimbabwe.

Figure 3. Presence of Students with Weakest Home Literacy Environments at End-of-Year Assessment, by Group



Note: All differences presented between Literacy Boost and comparison groups are statistically significant ($p < .05$).

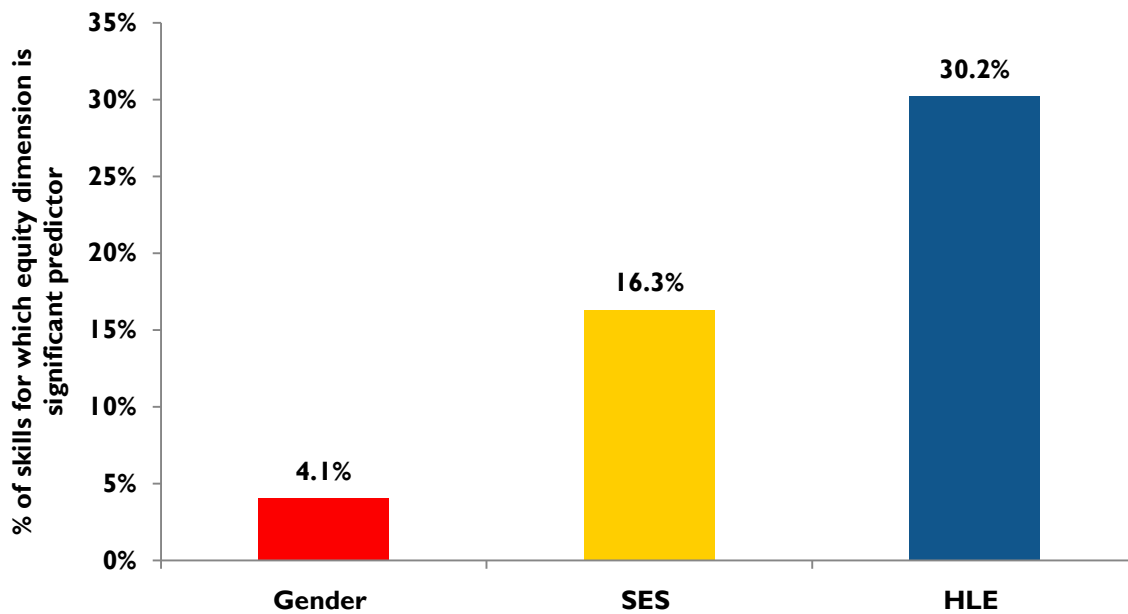
It appears that Literacy Boost may be helping children stay in and attend school, but more work is left to be done. As Literacy Boost takes up implementation at greater scale, attention to sustaining this impact on attendance and/or retention, as measured through presence at end-of-year assessment, will be essential to realizing enhanced systemic efficiency and ensuring learning for all. In addition, more detailed measures of attendance and further research will be needed to determine the potential cost savings of this trend over time.

EQUITY AND READING SKILLS AT BASELINE

Multivariate regression analyses of baseline assessments for all Literacy Boost and comparison students find significant relationships between each of the three equity dimensions and literacy skills. However, the prevalence of the relationship of each dimension with children’s early reading skills differs as seen in Figure 4.

Of the seven country samples included in this analysis, significant gender differences in baseline literacy skills are only found in Ethiopia, where girls scores significantly lower than boys on half of the skills assessed. Literacy skill differences related to socioeconomic status are most prevalent in Bangladesh and Nepal, where, on average, wealthier students in these countries tend to have significantly more advanced skills than poorer students in three literacy skills at baseline.

Figure 4. Multivariate Predictors of Reading Skills across Seven Countries



Note: Each model controlled for age, SES, HLE and sex, as well as chore load and ECD as available. Forty-three models were fitted incorporating all three dimensions, an additional five with just sex and SES as Nepal's limited HLE data had no variation.

Overall, home literacy environment (HLE) has the most prevalent relationship with literacy skills for children in this analysis. Five of the six countries collecting HLE information show positive relationships between HLE and literacy skills. That is, in five of six countries assessed, children with stronger home literacy environments tend to score significantly higher on at least one emergent literacy skill than students with weaker home literacy environments. Figure 4 demonstrates the prevalence of relationships between home literacy environment and reading skills. In almost one-third of all skills assessed at baseline across six countries this relationship is statistically significant, making home literacy is the strongest driver of literacy skill inequities found in this analysis. The robust relationship of home literacy environment with emergent literacy skills highlights the importance of incorporating focus on this area into programming for young children in developing contexts. Literacy Boost directly addresses this source of inequity by combining interventions to enhance teaching with interventions to strengthen the HLE.

OVERALL LITERACY BOOST IMPACT

Controlling for baseline scores, age and equity factors, Literacy Boost students learned statistically significantly more on average than comparison students in Ethiopia, Malawi, Nepal, Pakistan, and Zimbabwe. Table 1 details these impact results by country and skill.

Table 1. Overview of samples and effect size of impact by skill in countries where Literacy Boost students learn significantly more in one school year than comparison students

	Ethiopia (N=390)	Malawi- Standard 2 (N=340)	Malawi- Standard 4 (N=272)	Nepal (N=214)	Pakistan (N=243)	Zimbabwe (N=200)
Concepts about print	.38			.40	.40	
Letter identification	.42			.50	.73	
Most-used word reading	.61	.57				.43
Fluency (words per minute read correctly)	.66	.44		.39	.56	.67
Accuracy (proportion of words read correctly)	.56	.47	.35		.36	
Reading Comprehension		.60	.35		.90	
Writing		.68				

Note: Difference in difference effect size shown in each cell. Analyses presented control for baseline reading scores, socioeconomic status, home literacy environment, sex, and age. In order to measure learning gains, students are randomly chosen for participation in baseline assessments and the same students are re-assessed at the end of the school year. Intervention and comparison schools are typically chosen by in-country teams and baseline analyses are performed in order to determine whether students in the two groups are comparable. All intervention/comparison groups presented in this analysis are similar across relevant, measurable characteristics (e.g. literacy skills, socioeconomic status, home literacy environment, etc.) and all differences presented between Literacy Boost and comparison groups are statistically significant ($p < .05$). Analyses that involve the end-of-year assessment sample usually exhibit differing rates of attrition between Literacy Boost and comparison sub-samples, and analyses are performed to determine whether these remaining students in the two groups are comparable. The two groups are usually broadly similar and any observable differences are controlled for, but other unobservable differences may exist.

Effect sizes for statistically significant learning gains largely fell between .25 and .75, meaning that the increased learning experienced by students in Literacy Boost schools was also educationally significant.⁵ Comparison students did not learn significantly more than Literacy Boost students in any of the endline reports, but impact comparisons in the two additional sites of Bangladesh and Mozambique are difficult due to implementation of community reading activities for both intervention and control groups in Bangladesh, and a high degree of measurement error and a high level of attrition across two years of intervention in Mozambique.⁶ The comparisons in the remainder of this report will focus on Ethiopia, Malawi, Nepal, Pakistan, and Zimbabwe and all differences presented are statistically significant ($p < .05$).

DOES LITERACY BOOST HELP AT-RISK STUDENTS CATCH UP?

To explore whether or not Literacy Boost helps at-risk students catch up with the more advantaged peers over time, we fit multilevel regressions examining children's learning interacting participation in Literacy Boost with each indicator: gender, SES and HLE. This analysis incorporated the end-of-year assessment sample of students only, and yielded mixed results. In Malawi and Nepal, Literacy Boost helped the poorest of the poor catch up with their less-poor peers in some skills. However, in Pakistan boys learned significantly more than girls from Literacy Boost. Otherwise, this analysis yielded no systematic evidence that Literacy Boost had a disproportionate impact on these disadvantaged groups. That is, overall while traditionally disadvantaged groups benefitted from Literacy Boost impact, they did not benefit significantly more than their traditionally advantaged peers. Thus, where there is evidence of baseline inequities, if Literacy Boost is to ensure equal outcomes for all children, then more work will need to be done to refine the program to help disadvantaged students not only keep pace, but actually catch up to more advantaged students.

After investigating the above research question we look at trends in inequality in Literacy Boost schools only and across Literacy Boost and comparison schools. These findings are reported the following sections for each of the gender, SES, and HLE dimensions of inequality. It should be noted that because analyses within schools excludes comparison students, the findings cannot be attributed to Literacy Boost. Results may represent program impact, but could also represent general trends in the area.

EQUITY AND READING SKILLS: GENDER

In the developed world, girls are usually more precocious readers than boys, meaning that they often outscore their male counterparts in assessments of early reading. However, the same is not true in developing countries. Due to differences in culture and expectations placed on boys and girls, it often happens that girls fall behind boys in early reading development.

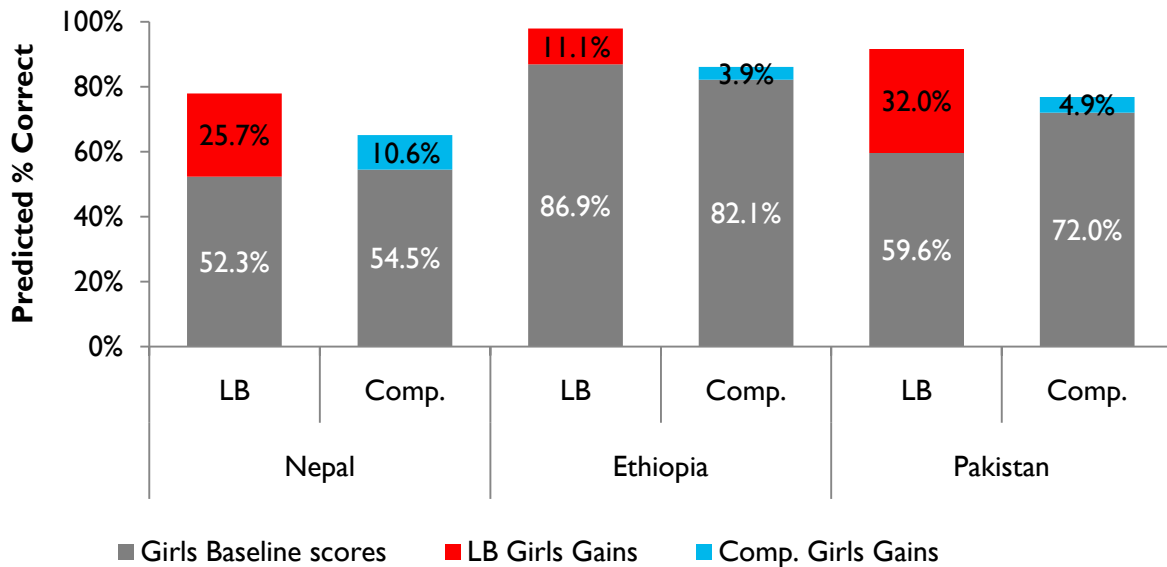
Findings within Literacy Boost Schools

While we do not see girls falling behind boys anywhere but in Ethiopia, girls also fail to exhibit the higher reading scores of girls in the developed world. We first investigate scores within Literacy Boost schools only. Overall we see few significant differences between the emergent literacy skills of boys and girls in Literacy Boost schools in the baseline assessment or end-line assessments (see Appendix A for table of results by country). Girls and boys are gaining the same skills from the Literacy Boost program.

Findings across Literacy Boost and Comparison Schools

When we compare female Literacy Boost students with other female students who did not attend Literacy Boost-participating schools, we do identify significant trends. From Pakistan, Ethiopia, Malawi, Nepal and Zimbabwe comes evidence that girls attending Literacy Boost schools learn significantly more than girls in comparison schools. This is displayed for the lower order skill of letter knowledge in Figure 5, below. In three countries, Ethiopia, Nepal, and Pakistan, girls in Literacy Boost schools gain significantly more letter knowledge than their peers in comparison schools. This graph compares the average baseline scores for each group of girls in grey, and above them the gain scores that each group of girls achieved: red for Literacy Boost and blue for comparison students.

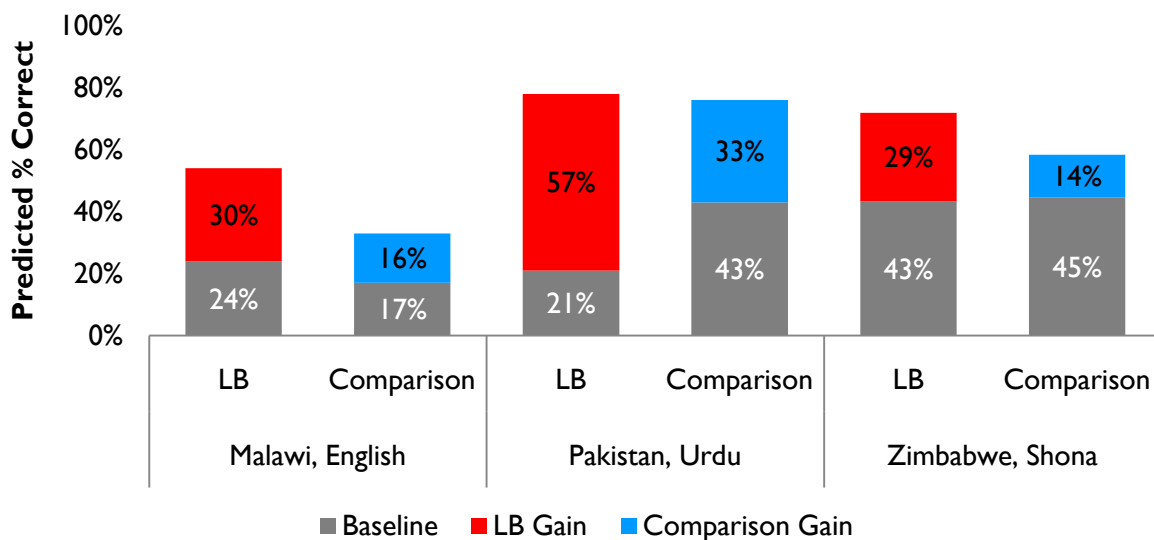
Figure 5. Literacy Boost Girls Gain more Letter Knowledge across Countries



Note: This figure displays predicted baseline and gain scores. Multivariate regressions were performed to determine statistical significance. Differences in gains presented between Literacy Boost and comparison groups are statistically significant ($p < .05$). No baseline skills are significantly different between groups.

In Ethiopia, Malawi, Pakistan, and Zimbabwe, Literacy Boost girls gained significantly more in reading accuracy than did comparison girls in the higher order skill of reading accuracy. As can be seen in Figure 6, in Pakistan, Literacy Boost girls start out significantly lower than comparison girls on this skill, and controlling for initial scores, their gain in accuracy is not only larger, but their final average accuracy score at endline is actually higher than their comparison girl peers. It is also important to note that Literacy Boost girls closed this gap in both the language of the home and the language of instruction at school.

Figure 6. Literacy Boost Girls Gain more Accuracy across Countries and Languages



Note: This figure displays predicted baseline and gain scores. Multivariate regressions were performed to determine statistical significance. Differences in gains presented between Literacy Boost and comparison groups are statistically significant ($p < .05$). No baseline skills are significantly different between groups.

Despite the impressive gains made by girls in Literacy Boost schools, there is still work to be done. In all countries and languages in Figure 6, there is still room for growth towards 100 percent accuracy. In addition, only in Pakistan and Ethiopia was there a significant impact on reading comprehension for Literacy Boost girls relative to girls in comparison schools. Subsequent investigation is needed to determine whether Literacy Boost helps to maintain equal learning gains for girls and boys over time.

EQUITY AND READING SKILLS: POVERTY

Reaching the poorest children continues to be a concern for education initiatives around the world, including Literacy Boost. Providing equitable educational opportunities for all children is a foundational goal of Literacy Boost across the communities and contexts within which Save the Children works.

Findings within Literacy Boost Schools

We investigate scores within Literacy Boost schools only to determine whether equity gaps existed at baseline, and how poorer students’ achievement differed from their wealthier peers. As seen in Table 3, baseline assessments find five instances where students with the lowest socioeconomic status have weaker literacy skills than their wealthier peers (red arrows pointing down), predominantly in Bangladesh. There is evidence that these initial disparities disappear over time, including two skills for which the lowest SES children gained significantly more than wealthier students (green arrows pointing up). At the end of the year assessment, no significant disparities between high and low SES students exist, suggesting that either Literacy Boost programming, other factors, or a combination of both are generating progress toward equal learning gains for all in all country sites (see Appendix A, Table B for full table of results by country).

Table 3. Average baseline, endline and reading skill gains by socioeconomic status within Literacy Boost schools in Bangladesh and Pakistan

		Concepts about print	Letter identification	Single word reading	Fluency	Accuracy	Reading comprehension
Bangladesh (N=465)	Base	=	▼	▼	=	▼	=
	Gain	=	▲	=	=	=	=
	End	=	=	=	=	=	=
Pakistan (N=134)	Base	=	=		▼	▼	=
	Gain	=	▲		=	=	=
	End	=	=		=	=	=

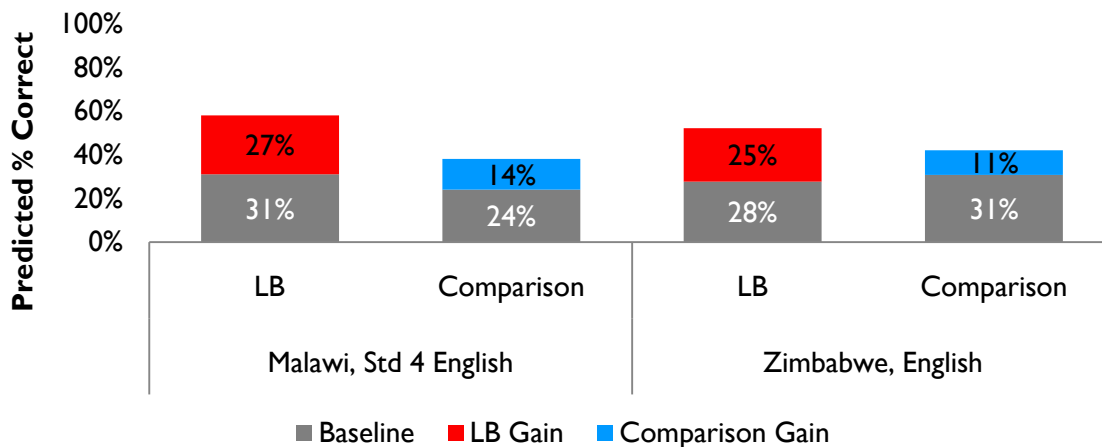
▲ Low SES students score significantly higher than high SES students; = Scores for low and high SES do not differ significantly; ▼ Low SES students score significantly lower than high SES students. All models control for sex, HLE, chores and age, and significance tests are $p < .05$. Multiple symbols associated with a single skill indicate that students were assessed in multiple languages.

Findings across Literacy Boost and Comparison Schools

When we compare poorer Literacy Boost students with their counterparts who did not attend Literacy Boost-participating schools, we do identify significant trends. Through consistent assessments measuring students' literacy skill growth over time, we see that in six of the seven countries for whom we have a full year of data, children from the poorest families in Literacy Boost schools are learning more than their poor peers in comparison schools. Additionally, in contrast to typical trends in which the effects of socioeconomic disadvantage become compounded by other marginalizing factors, we find that among poor students, girls and children from families with the least literacy resources at home are learning more in Literacy Boost schools than similarly disadvantaged peers in other schools.

Figure 7 provides an example of single word reading scores acquired by the poorest 20 percent of students in Literacy Boost and comparison schools in Malawi and Zimbabwe.

Figure 7. Single Word Reading Gains for Lowest SES Students by Group

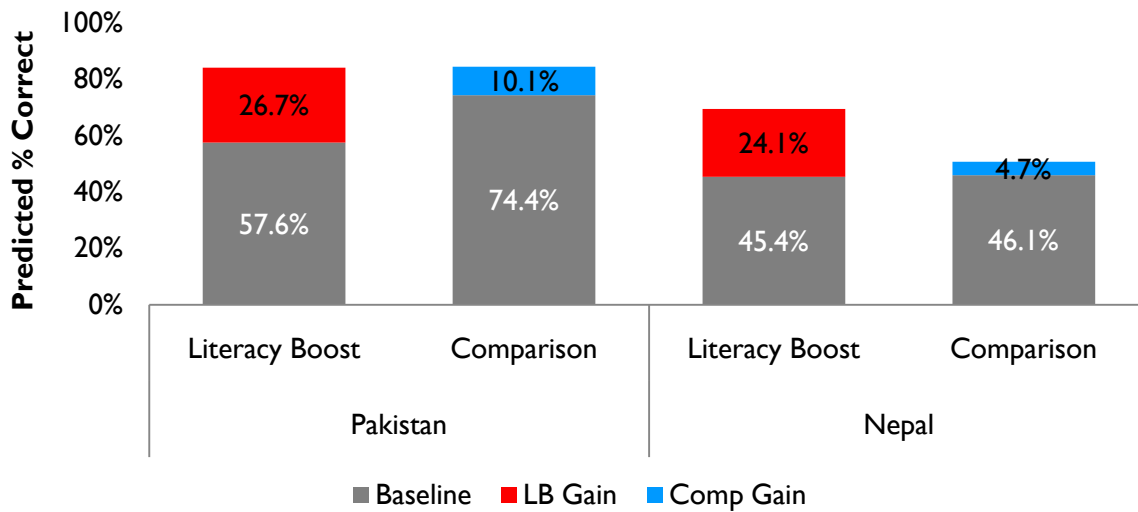


Note: This figure displays predicted baseline and gain scores. Multivariate regressions were performed to determine statistical significance. Differences in gains presented between Literacy Boost and comparison groups are statistically significant ($p < .05$). No baseline scores are significantly different.

Over the course of an academic year, these poorest Literacy Boost students learned about twice as many words as the poorest students in comparison schools in both countries.

In some countries, strong learning gains are also seen for the poorest girls in Literacy Boost schools compared to socioeconomically disadvantaged girls in other schools. Figure 8 displays results from Pakistan and Nepal where the poorest girls in Literacy Boost schools learned between 2.5 and 4.5 times more letters than their peers in comparison schools.

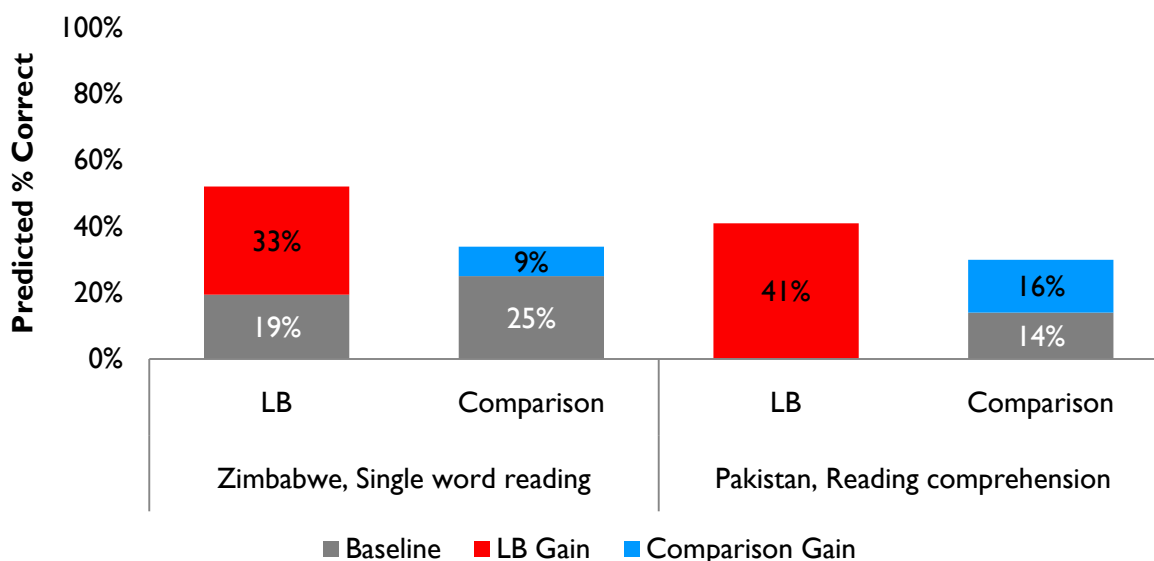
Figure 8. Letter Knowledge Gains for Lowest SES Girls by Group



Note: This figure displays predicted baseline and gain scores. Multivariate regressions were performed to determine statistical significance. Differences in gains presented between Literacy Boost and comparison groups are statistically significant ($p < .05$). No baseline scores are significantly different.

Finally, Figure 9 displays evidence from Zimbabwe and Pakistan indicating that students in Literacy Boost schools who lack both financial and educational resources (e.g. family members at home who read to them) learn more than similarly disadvantaged peers in comparison schools.

Figure 9. Skill Gains for Poorest Students with Fewest Home Reading Resources by Group



Note: This figure displays predicted baseline and gain scores. Multivariate regressions were performed to determine statistical significance. Differences in gains presented between Literacy Boost and comparison groups are statistically significant ($p < .05$). No baseline scores are significantly different.

Literacy Boost has made great inroads in supporting the poorest and most vulnerable children to demonstrate their learning. However, greater comprehension gains as compared to peers in comparison schools were only seen in Pakistan and Malawi, leaving much work to be done in supporting children in all target countries to read with comprehension. In general, more work needs to be done to ensure that Literacy Boost helps the poorest catch up with the less-poor where disparities exist.

EQUITY AND READING SKILLS: HOME LITERACY ENVIRONMENT

Just as children come from both wealthy and poor households, children may also be born into households with a wealthier or poorer home literacy environment (HLE). The HLE encompasses both the availability of reading materials in the home as well as how those materials are used to engage the child in reading and learning. Five dimensions of the home literacy environment relate to reading achievement in children: *value placed on literacy, press for achievement, availability and use of reading materials, reading with children, and opportunities for verbal interaction.*⁷ The Literacy Boost Assessment operationalizes these dimensions into questions for children on the types of print they see in their homes as well as the reading, homework support and storytelling habits of the people they live with. In analyzing the results of Literacy Boost with an eye toward equity, children’s responses to these questions are synthesized into an HLE index⁸ to investigate the impact of Literacy Boost for those children falling into lower levels of HLE.

Findings within Literacy Boost Schools

As with the previous two dimensions of equity, we begin with an analysis of students within Literacy Boost. Overall, we find evidence that, students with the weakest home literacy environments have

lower emergent reading skills than students with richer home literacy environments in Zimbabwe (see Table 4). However, by the time of endline assessment this disparity no longer exists, suggesting that weak HLE students caught up to strong HLE students in Zimbabwean Literacy Boost schools. As we concluded with the SES within-Literacy Boost school findings, this could be due to either Literacy Boost programming, other factors, or a combination of both. Elsewhere outcomes are equitable between weak and strong HLE students, except in Ethiopia, where we see five instances with deficits related to HLE in which the children with weakest home literacy are outperformed by those with stronger HLE. Further programmatic action is needed in Ethiopia.

Table 4. Average baseline, endline and reading skill gains by home literacy environment within Literacy Boost schools in Ethiopia and Zimbabwe

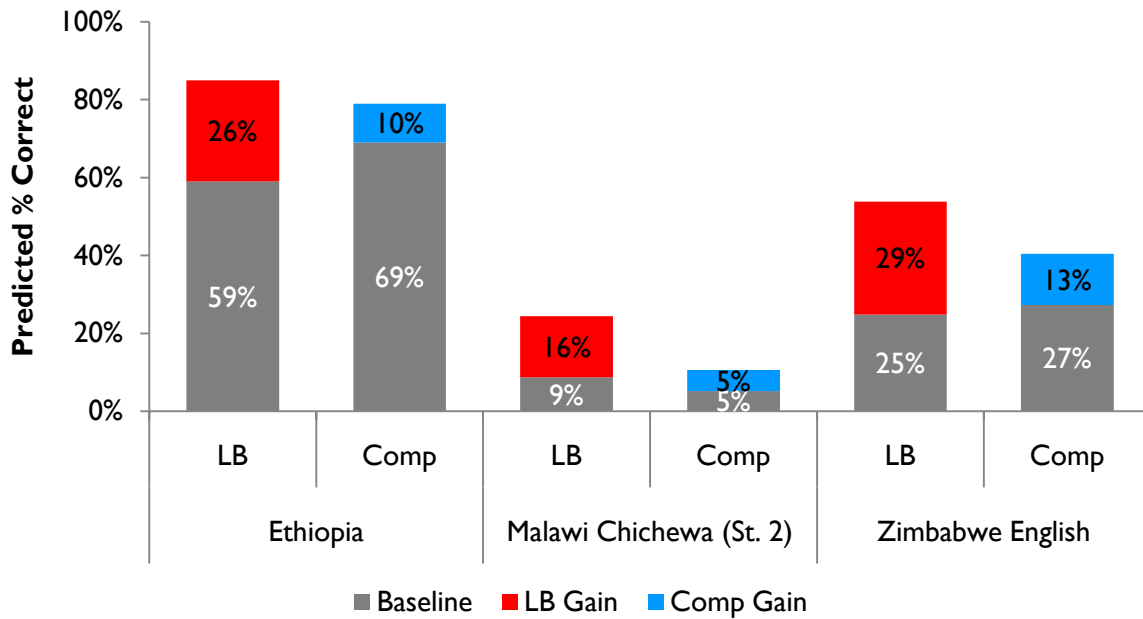
		Concepts about print	Letter identification	Single word reading	Fluency	Accuracy	Reading comprehension
Ethiopia (N=259)	Base	=	=	=	=	=	=
	Gain	=	=	=	=	=	=
	End	▼	=	▼	▼	▼	▼
Zimbabwe (N=104)	Base	=	=	▼ ▼	= =	= =	= =
	Gain	=	=	= =	= =	▲ =	= =
	End	=	=	= =	= =	= =	= =

▲ Weak HLE students score significantly higher than strong HLE students; =Scores for weak and strong HLE do not differ significantly; ▼ Weak HLE students score significantly lower than high HLE students. All models control for sex, SES, chores and age, and significance tests are $p < .05$. Multiple symbols associated with a single skill indicate that students were assessed in multiple languages.

Findings across Literacy Boost and Comparison Schools

In addition to promoting learning gains for HLE deprived students within Literacy Boost schools, Figure 10 shows that in Ethiopia, Malawi and Zimbabwe, Literacy Boost children who at baseline fell into the lower levels of the HLE index improved significantly more in single word reading than children in comparison schools who were equally HLE deprived at baseline.

Figure 10. Literacy Boost Helps HLE Deprived Children Learn Single-Word Reading

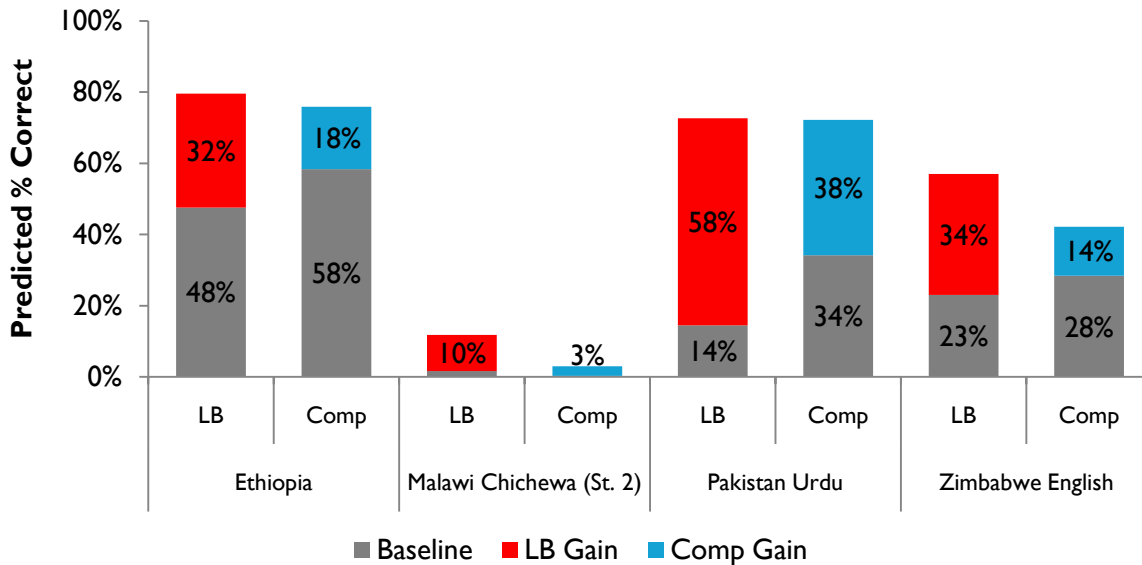


Note: This figure displays predicted baseline and gain scores. Multivariate regressions were performed to determine statistical significance. Differences in gains presented between Literacy Boost and comparison groups are statistically significant ($p < .05$). No baseline scores are significantly different.

With baseline scores in grey, the larger red portions of the columns in Figure 10 represent the significantly larger gains for HLE-deprived Literacy Boost children’s single word reading while the smaller blue portions of the columns represent the significantly smaller gains for HLE-deprived comparison children. The gains for HLE-deprived Literacy Boost children are more than double the gains for HLE-deprived comparison children.

Similarly, Figures 11 and 12 show the same dynamic for children with limited home literacy environments. Figure 11 presents accuracy – the percent of words in a grade-level text read correctly – and Figure 12 presents comprehension – the percent of questions linked to that text correctly answered by the child.

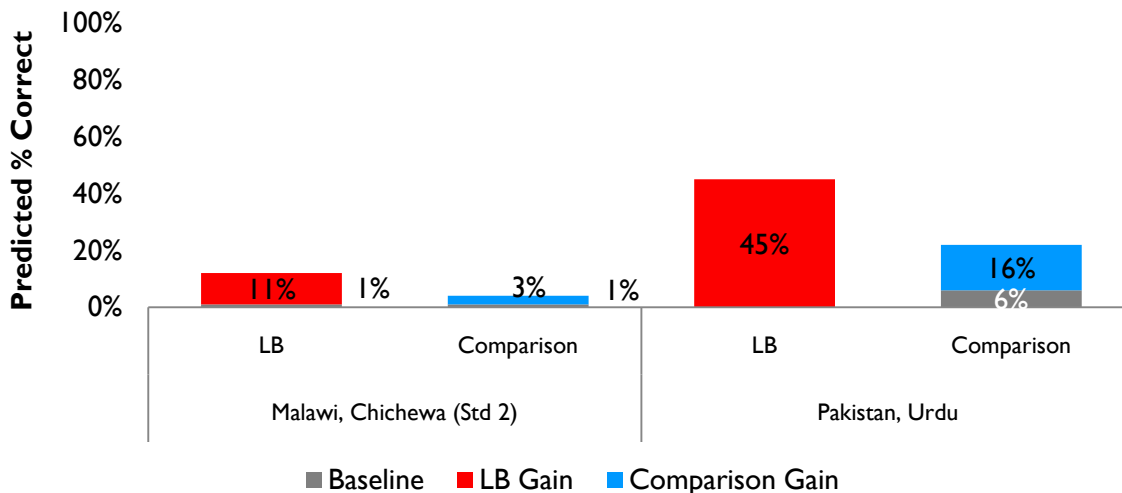
Figure 11. Literacy Boost Helps HLE Deprived Children Learn to Read Connected Text More Accurately



Note: This figure displays predicted baseline and gain scores. Multivariate regressions were performed to determine statistical significance. Differences in gains presented between Literacy Boost and comparison groups are statistically significant ($p < .05$). No baseline scores are significantly different.

In every case shown, the gains demonstrated by Literacy Boost children with the lowest HLE are more than twice as large as those from comparison children with the lowest HLE – sometimes as much as three times as large as the gains of those similarly challenged comparison children.

Figure 12. Literacy Boost Helps HLE Deprived Children Improve their Reading Comprehension



Note: This figure displays predicted baseline and gain scores. Multivariate regressions were performed to determine statistical significance. Differences in gains presented between Literacy Boost and comparison groups are statistically significant ($p < .05$). No baseline scores are significantly different.

Despite these impressive gains, there is still work to be done in order to improve both the home learning environments of children and also their literacy skills. While HLE-deprived children in the Literacy Boost group improved dramatically more than HLE-deprived children in the comparison group, more attention is warranted in contexts such as Ethiopia, where disparity in learning outcomes appears to be increasing between strong and weak HLE students. Furthermore, more can be done within Literacy Boost to help HLE-deprived children actually catch up to their better-off peers. Continued attention to improving support to all students over time, and especially to those who were born into households with fewer reading materials and less active reading habits, is necessary to ensure that equitable outcomes are achieved by all students.

CHALLENGES & NEXT STEPS

Through Literacy Boost, strong progress has been made towards improving education for many children in developing countries, but more work is left to be done to ensure stronger equity outcomes by this program as well as by the international community. While socioeconomic and home literacy environment deficits disappear over time in Literacy Boost schools in Bangladesh, Pakistan, and Zimbabwe, more work is needed to ensure that disadvantaged children catch up with their more advantaged peers in all countries. Thus, especially in Ethiopia, reconsideration of how program interventions can reach the most challenged economically and those with few home literacy resources is warranted. With the exception of Pakistan which has a full-scale program, Literacy Boost has been working in specific regions of partner countries. In the future, efforts will be made to expand the program to include all children who could benefit and future research will investigate how students' skills develop over the course of their time in primary school as well as how Literacy Boost may or may not affect out-of-school children's reading achievement. Additionally, after one year of programming, the same learning gains are not seen in each country and further research is needed to determine where this is due to local contextual differences and where adaptations could make the program more effective. Finally, Literacy Boost will continue to use evidence to improve quality and equity in education for the neediest children, to inform initiatives developed for the post-2015 agenda, and to expand global education goals beyond universal enrollment.

Endnotes

¹ Since each Literacy Boost assessment is adapted to the context and the specific needs of the target community not all countries collect the same data uniformly. Table 1 displays which countries collected which outcomes and all countries collected sex and socioeconomic status. Nepal did not collect sufficient information on the home literacy environment to be included in the HLE portions of this analysis.

² United Nations. (2013). Goal 2: Achieve Universal Primary Education. *United Nations*. Retrieved August 1, 2013 from <http://www.un.org/millenniumgoals/education.shtml>

³ UNESCO. (2011) EFA Global Monitoring Report. Paris: UNESCO.

⁴ Save the Children International. (2013). Ending the Hidden Exclusion: Learning and Equity in education post-2015. London : Save the Children International. Available at: http://www.savethechildren.net/sites/default/files/libraries/Ending_the_hidden_exclusion_full_report.pdf

⁴ UNESCO. (2012). Education and skills for inclusive and sustainable development beyond 2015: Thematic think piece. Paris: UNESCO.

⁵ Widely cited statistician Jacob Cohen describes effect sizes of .2 as small, .5 as medium, and .8 as large. Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*. (2nd ed.) Hillsdale, NJ: Erlbaum.

⁶ While in the Mozambique sample we detect effect sizes that demonstrate that sampled Literacy Boost students on average improved more than sampled comparison students, but we cannot conclude with 95 percent confidence that the full population Literacy Boost students learned more than the full population of comparison students

⁷ Hess, R. D., & Holloway, S. (1984). Family and School as Educational Institution. In R. D. Parke, (ed.), *Review of Child Development Research, 7: The Family*. (pp.179—222) Chicago: University of Chicago Press.

⁸ The HLE index was created by combining the materials available to children in the household with the household literacy habits of other household members as reported by children. Specifically, the number or percentage of household members (whichever contained the most variation) seen reading and reading to the child were added together, with twice as much weight given to the number/percentage of household members reading to the child as seen reading. The resulting figure was then multiplied by the number of types of reading materials in the household, and this figure was split into five quintiles of home literacy environment.

APPENDIX

Table A. Average baseline, endline and reading skill gains of girls relative to boys within Literacy Boost schools

		Concepts about print	Letter identification	Single word reading	Fluency	Accuracy	Reading comprehension
Bangladesh (N=465)	Base	=	=	=	=	=	=
	Gain	=	=	=	=	=	=
	End	=	=	=	=	=	=
Ethiopia (N=259)	Base	▼	▼	=	=	=	=
	Gain	▲	=	=	=	=	=
	End	=	=	=	=	=	=
Malawi (N=125)- Standard 2	Base	=		▼	=	=	=
	Gain	=		=	=	=	=
	End	▼		=	=	=	=
Malawi (N=116) - Standard 4	Base			==	==	==	==
	Gain			==	==	==	==
	End			==	==	==	==
Mozambique (N=107)	Base	=	=	=	=	=	
	Gain	=	=	=	=	=	
	End	=	=	=	=	=	
Nepal (N=176)	Base	=	=		=	=	
	Gain	=	=		=	=	
	End	=	=		=	=	
Pakistan (N=134)	Base	=	=		=	=	=
	Gain	=	=		=	=	=
	End	=	=		=	=	=
Zimbabwe (N=104)	Base	=	=	=	==	==	==
	Gain	=	=	=	==	==	==
	End	=	=	=	==	==	==

▲ Girls score significantly higher than boys; = Scores for girls and boys do not differ significantly; ▼ Girls score significantly lower than boys. All models control for SES, HLE, chores and age, and significance tests are $p < .05$. Multiple symbols associated with a single skill indicate that students were assessed in multiple languages.

Table B. Average baseline, endline and reading skill gains of students with low socioeconomic status compared to those with high socioeconomic status within Literacy Boost schools

		Concepts about print	Letter identification	Single word reading	Fluency	Accuracy	Reading comprehension
Bangladesh (N=465)	Base	=	▼	▼	=	▼	=
	Gain	=	▲	=	=	=	=
	End	=	=	=	=	=	=
Ethiopia (N=259)	Base	=	=	=	=	=	=
	Gain	=	=	=	=	=	=
	End	=	=	=	=	=	=
Malawi (N=125)- Standard 2	Base	=		=	=	=	=
	Gain	=		=	=	=	=
	End	=		=	=	▼	=
Malawi (N=116) - Standard 4	Base			= =	= =	= =	= =
	Gain			= =	= =	▲ =	= =
	End			= =	= =	= =	▲ =
Mozambique (N=107)	Base	=	=	=	=	=	
	Gain	=	=	=	=	=	
	End	=	=	=	=	=	
Nepal (N=176)	Base	=	=		=	=	
	Gain	=	=		=	=	
	End	=	=		=	=	
Pakistan (N=134)	Base	=	=		▼	▼	=
	Gain	=	▲		=	=	=
	End	=	=		=	=	=
Zimbabwe (N=104)	Base	=	=	= =	= =	= =	= =
	Gain	=	=	= =	▼ ▼	= =	= =
	End	=	=	= =	= =	= =	= =

▲ Low SES students score significantly higher than high SES students; = Scores for low and high SES do not differ significantly; ▼ Low SES students score significantly lower than high SES students. All models control for sex, HLE, chores and age, and significance tests are $p < .05$. Multiple symbols associated with a single skill indicate that students were assessed in multiple languages.

Table C. Average baseline, endline and reading skill gains of students with weak home literacy environment compare to those with strong home literacy environment within Literacy Boost schools

		Concepts about print	Letter identification	Single word reading	Fluency	Accuracy	Reading comprehension
Bangladesh (N=465)	Base	=	=	=	=	=	▼
	Gain	=	=	▲	=	=	=
	End	=	=	=	=	=	=
Ethiopia (N=259)	Base	=	=	=	=	=	=
	Gain	=	=	=	=	=	=
	End	▼	=	▼	▼	▼	▼
Malawi (N=125)- Standard 2	Base	=		=	=	=	=
	Gain	=		=	=	=	=
	End	=		=	=	=	=
Malawi (N=116) - Standard 4	Base			==	==	==	==
	Gain			==	==	==	==
	End			==	==	==	==
Mozambique (N=107)	Base	=	▲	=	=	=	
	Gain	=	=	=	▲	=	
	End	=	=	=	▲	=	
Nepal (N=176)	Base						
	Gain						
	End						
Pakistan (N=134)	Base	▼	=		=	=	=
	Gain	▲	▲		=	=	=
	End	=	=		=	=	=
Zimbabwe (N=104)	Base	=	=	▼▼	==	==	==
	Gain	=	=	==	==	▲	==
	End	=	=	==	==	==	==

▲ Weak HLE students score significantly higher than strong HLE students; =Scores for weak and strong HLE do not differ significantly; ▼ Weak HLE students score significantly lower than high HLE students. All models control for sex, SES, chores and age, and significance tests are $p < .05$. Multiple symbols associated with a single skill indicate that students were assessed in multiple languages.