Learning in Liberia

Literacy and Numeracy Gains in Year 3

Gbovadeh Gbilia

Head of the Education Delivery Unit
Ministry of Education, Republic of Liberia

Vice Chair for the Education Commission
United Nations Educational, Scientific and Cultural Organization (UNESCO)

Spencer Nash, Lisa Chen, and Steve Cantrell

Measurement & Evaluation
Bridge

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Executive Summary

Two years ago, an independent randomized controlled study showed Bridge students outperformed their peers in Liberia public schools, learning fully twice as much during the first year of the Partnership Schools for Liberia (PSL). Now in its third year and rebranded as Liberian Education Advancement Program (LEAP), Bridge-supported public schools in Liberia continue to improve learning outcomes for students. Math achievement remains high. Reading levels are higher in every grade, and growth has been most dramatic amongst students who joined at the program's inception.

In numeracy, Bridge-supported public schools continue their early promise. Students maintain prior performance estimates of 1.2 years more learning than their peers in comparable public schools. The durability of these results confirm that earlier strong performance was not a temporary blip caused by special effort or otherwise generated by extraordinary attention paid to these schools.

In early grade reading, students at Bridge-supported public schools are learning faster than ever. Oral reading fluency levels in grades 2 and 3 now exceed those in grades 3 and 4 during the 2016-17 school year.

Growth amongst students who started in 1st grade in the program's inaugural year has been even more dramatic. Their overall average fluency is above 55 words per minute, an increase of 45 words per minute in two years. In fact, these students, now in grade 3 with 2 ½ years of Bridge-supported instruction, read faster than grade 5 students did in 2017. Entering 1st grade as non-readers or emerging readers, 53% are now proficient readers and 28% are basic readers. The contrast to students in typical Liberian public schools is stark: In comparison public schools sampled in 2016-17, only 8% and 25% of 3rd graders were proficient and basic readers, respectively.

4 in 5 Students Become Readers in 2 ½ Years
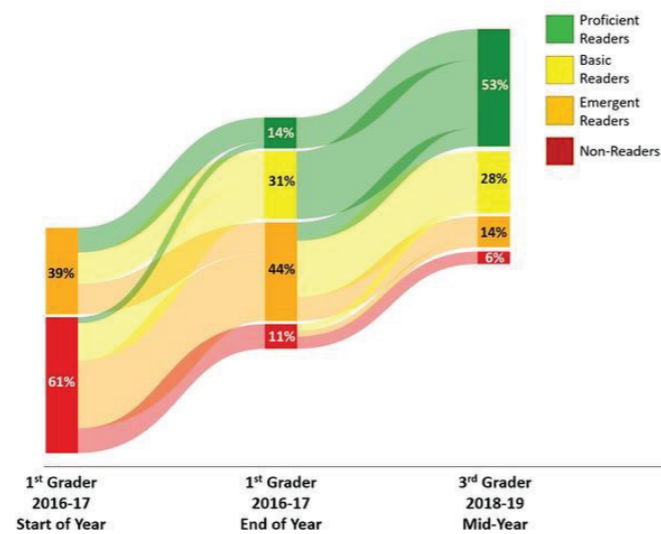
Finally, some of the latest findings from Bridge-supported public schools are of particular relevance to two core components of the Bridge approach - commitment to education for girls and understanding of the significance of early childhood education. Results across almost all grades and subtasks show reduction in the gender gap that Bridge-supported public schools inherited in its opening year. In literacy, most performance gaps are completely eliminated. In the past 2 ½ years, 5th grade girls' average performance on passage reading fluency increased by over 27 words per minute. Once lagging by 10 words per minute, girls now outperform boys.

Students who attended Bridge-supported public schools kindergarten outperformed their peers on nearly every literacy and numeracy task. These students nearly doubled the performance of their peers on recognizing letter sounds, an important literacy building block and a key component of the kindergarten curriculum.

Researchers measured performance on reading and math at 6 representative schools, using standard, widely adopted instruments, suitable for assessing progress in the earliest years of formal education. The analysis examines both absolute performance (status) and learning gains (growth).

This study provides Bridge and the Liberian Ministry of Education with an early signal on the impact of LEAP at Bridge-supported public schools, however it is not meant to replace the larger randomized controlled study of the LEAP program. In order to reduce time, reduce costs, and provide a rapid, if incomplete, performance comparison, the researchers have made trade-offs that impair precision and certainty, such as a small sample size, the use of a nonrandom comparison group, and taking no measures to track students who have left Bridge-supported public schools.

Despite these limitations, we are encouraged by these continued positive signals. There is no doubt that students at Bridge-supported public schools are more successful in primary school. This should help them tremendously as they face the increasing demands of secondary school, college, and beyond.
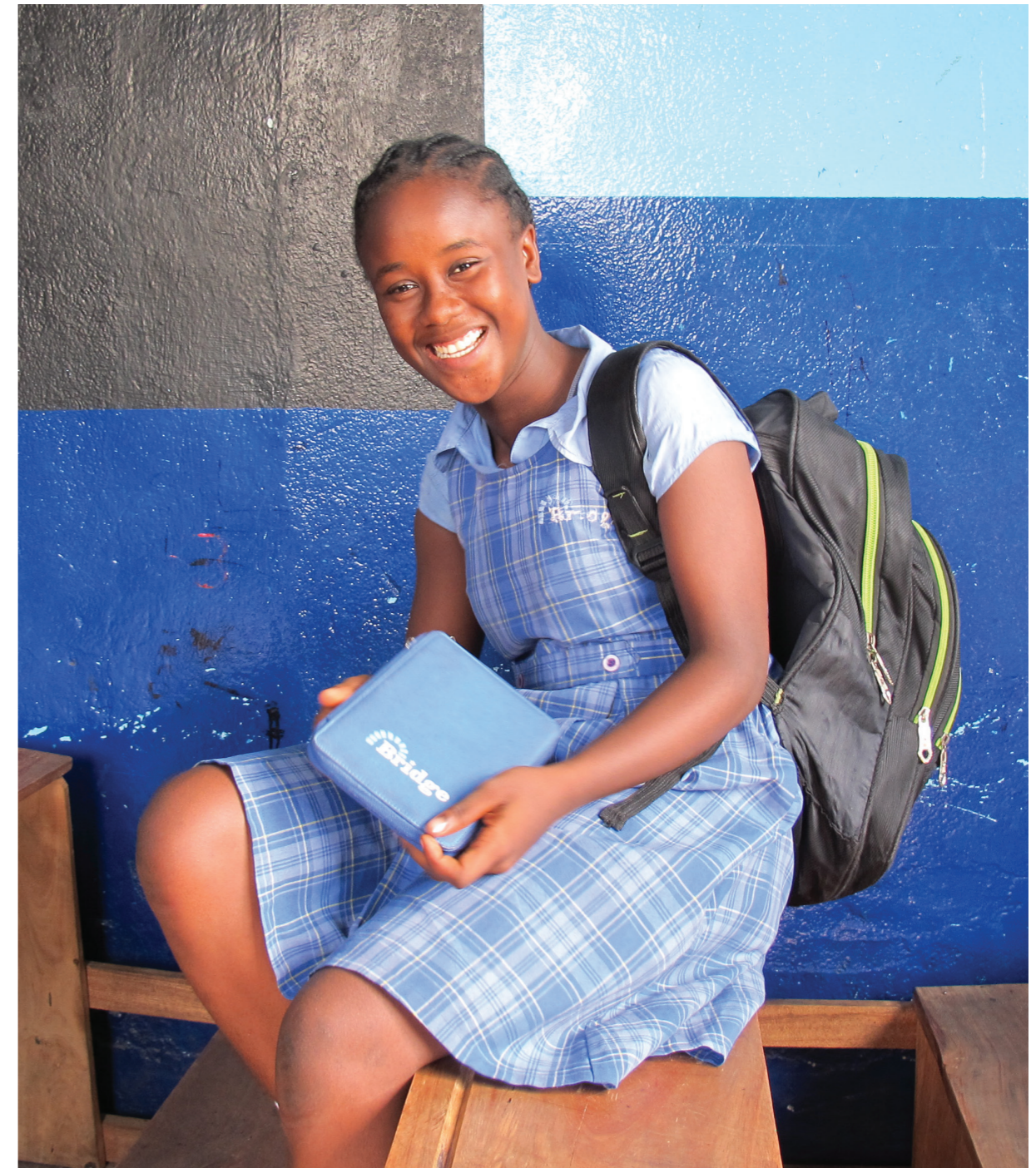
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Introduction

Since the start of the program in September 2016, collaborative, internal, and external studies have found that Bridge-supported public schools deliver significant learning gains in literacy and numeracy for its students. Researchers from Innovations for Poverty Action and the Center for Global Development conducted a randomized evaluation at the end the program's opening year (referred to as Year 1 in this paper), with results estimating that Bridge-supported public schools provide 0.8 additional years of schooling in English literacy and 1.2 additional years of schooling in mathematics, in comparison to similar public schools.[1]

In the second year, an internal analysis of termly assessment scores indicated that the Bridge-supported public schools continued to maintain the high learning levels achieved in its first year, even with the addition of 43 new schools in the relatively disadvantaged southeastern region of the country.[2] In the current study, we examine the state of learning in Bridge-supported public schools in the middle of its third year of operations (Year 3) to understand the following:

> (1) **Status**: Current levels of literacy and numeracy in the average Bridge-supported public school's classroom of each grade level and student sub-group;
> (2) **Tenure**: Growth achieved by students enrolled since the beginning of the program.

We assess differences in *status* across years and between different student populations:

> (a) How has student performance at each grade level changed since Year 1?
> (b) How have performance differences by gender changed since Year 1?
> (c) Did students who attended ECE at Bridge-supported public schools perform better than their peers who did not?

We assess to what extent longer *tenure* at Bridge-supported public schools accelerates learning:

> (a) What portion of continuously enrolled students are now proficient readers?
> (b) Do continuously enrolled students perform better than students in the same grade, but who have less tenure at Bridge-supported public schools?
> (c) What is the learning growth trajectory for continuously enrolled students at Bridge-supported public schools?

To answer these questions, we conducted Early Grade Reading (EGRA) and Early Grade Mathematics (EGMA) assessments in grades 1, 2, 3 and 5.[3] On EGMA, students start by identifying relative quantities, then do two addition and two subtraction exercises of increasing difficulty, and culminate with a word problems exercise. EGRA starts with the basic building blocks of identifying letter sounds, onset sounds, and non-word reading, and builds up to higher-order tasks of reading familiar words, reading a passage, and answering questions about the passage just read.

We revisited the six schools included in our Year 1 study, which examined schools and students representative of the Bridge-supported public schools network at the time. We assessed both a random sample of students and any students still enrolled who were assessed during Year 1. Note that we did not assess any students at comparison schools this round, and as such this is not designed as an impact evaluation, but rather as a high-fidelity examination of current learning levels and progress achieved within the Bridge-supported network of public schools.

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[1] See Romero, Sandefur and Sandholtz (2017), "Outsourcing Service Delivery in a Fragile State: Experimental Evidence from Liberia." Additional years of school estimates are calculated by dividing the estimated effect sizes for Bridge PSL in English and mathematics (p. 48) by the estimated amount of yearly learning in each subject in traditional public schools (p. 2).
[2] See "Bridge LEAP Year 2 Learning Outcomes."
[3] We did not assess grade 4 due to limits on the time and personnel available to conduct assessments.

Program Overview

The Liberia Educational Advancement Program (originally called Partnership Schools for Liberia in its first year) is a bold initiative developed in 2016 by the Government of Liberia to increase the quality of pre-primary and primary education in the country. Specifically, the Ministry of Education (MoE) invited Bridge and seven other non-state operators to bring their management and operational models to existing public schools nationwide.[4] Operators are responsible for the daily management of the schools and are held accountable to the Government of Liberia for their performance across several indicators.[5]

LEAP public schools do not charge fees and students are enrolled on a first-come, first-served basis. Each operator is given limited autonomy to run schools and improve upon student achievement, provided they do so in keeping with the regulations of the MoE and the Liberian national curriculum. The school buildings remain under the ownership of the Government of Liberia. Teachers remain civil servants on the government payroll, and while operators may supply the Ministry with records to support their decision-making, all hiring and transfer authority remains with the government. Operators are encouraged to supplement the curriculum with remedial programs, a focus on literacy and numeracy, longer school days, and non-academic activities.

In the opening year of the program, Bridge was assigned 25 public schools to operate across eight counties: Bomi, Bong, Grand Bassa, Grand Cape Mount, Margibi, Montserrado, Nimba, and River Cess. In the second year, Bridge was allocated an additional 43 public schools, predominantly in the relatively disadvantaged counties of the southeast, Maryland County and Grand Kru County. Bridge has continued to operate this total of 68 public schools through the current 2018-19 school year.

Other key differences between Year 1 and Years 2 and 3 were mandated by the Ministry, under a new contract. They include, but are not limited to, an increase in the maximum allowable class size (from 55 to 65), teacher transfer requests were limited to 25%, and Bridge would receive $50/$60 per student enrolled.

Results

A. Status: What are the literacy and numeracy levels at Bridge-supported public schools?

We compare EGRA and EGMA achievement levels at each grade across three samples: Bridge-supported public schools in Year 3 (2018-19), Bridge-supported public schools in Year 1 (2016-17), and Comparison Public Schools in Year 1 (2016-17).[6]

1. How do learning levels at Bridge-supported public schools today compare with Bridge-supported public schools and comparison public schools 2 years ago?

Achievement levels on the majority of skills assessed at Bridge-supported public schools remain well above typical public schools, and some subtasks have seen increases in average performance since Year 1.

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[4] These schools were randomly selected and assigned to the operators by a team of independent researchers, with each operator supplying feasibility criteria ex-ante. For the discussion of their randomization, see Romero (2017).
[5] Operators are to receive funding on a per-student basis, but can supplement their budget through individual fundraising.
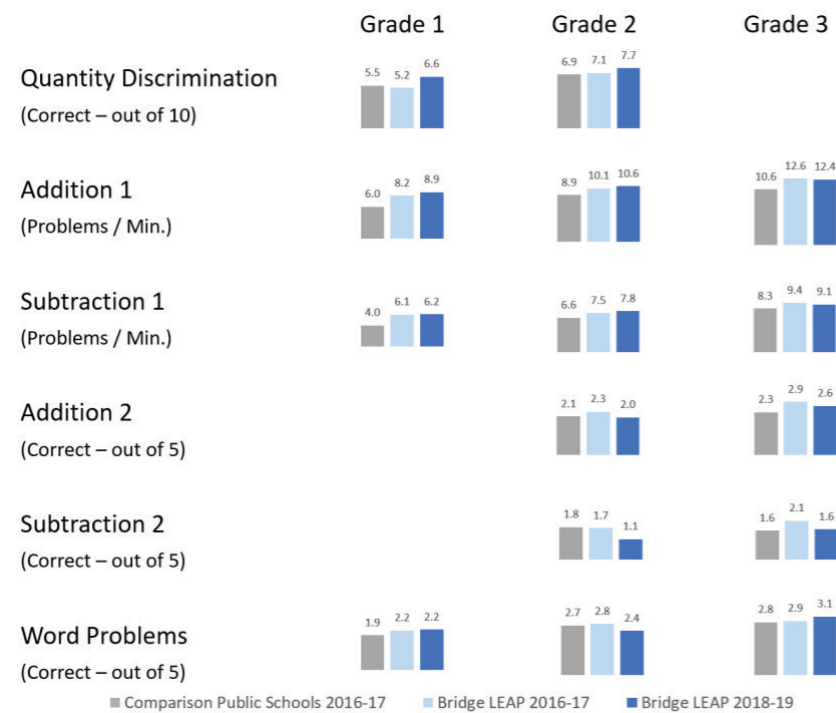[6] Year 1 data is from the Year 1 midline conducted in January-February 2017. Year 3 data is from March 2019.

Student performance in numeracy and more basic literacy skills in this third year of implementation is similar to the first year of implementation, where Bridge-supported public school students learned roughly twice as much as their counterparts in government-run schools. Student performance on higher-order literacy skills has generally improved at Bridge-supported public schools since Year 1. Students are attaining fluency sooner and reading with greater comprehension, especially those students who attended Bridge-supported schools for the entire 2 ½ years.

Early Grade Mathematics

Across most subtasks and grades, Bridge-supported public schools performance levels have remained consistent and consistently higher than the comparison school sample from Year 1 through Year 3. On the more basic subtasks of Quantity Discrimination, Addition 1 and Subtraction 1, Bridge-supported public schools averages are generally 1-2 items higher than comparison public school averages. Within Bridge-supported public schools, students performed similarly (+/- 5%) on most of the numeracy subtasks from year to year. There were two exceptions; Quantity Discrimination performance was better and Subtraction 2 performance was worse in Year 3 than in Year 1.
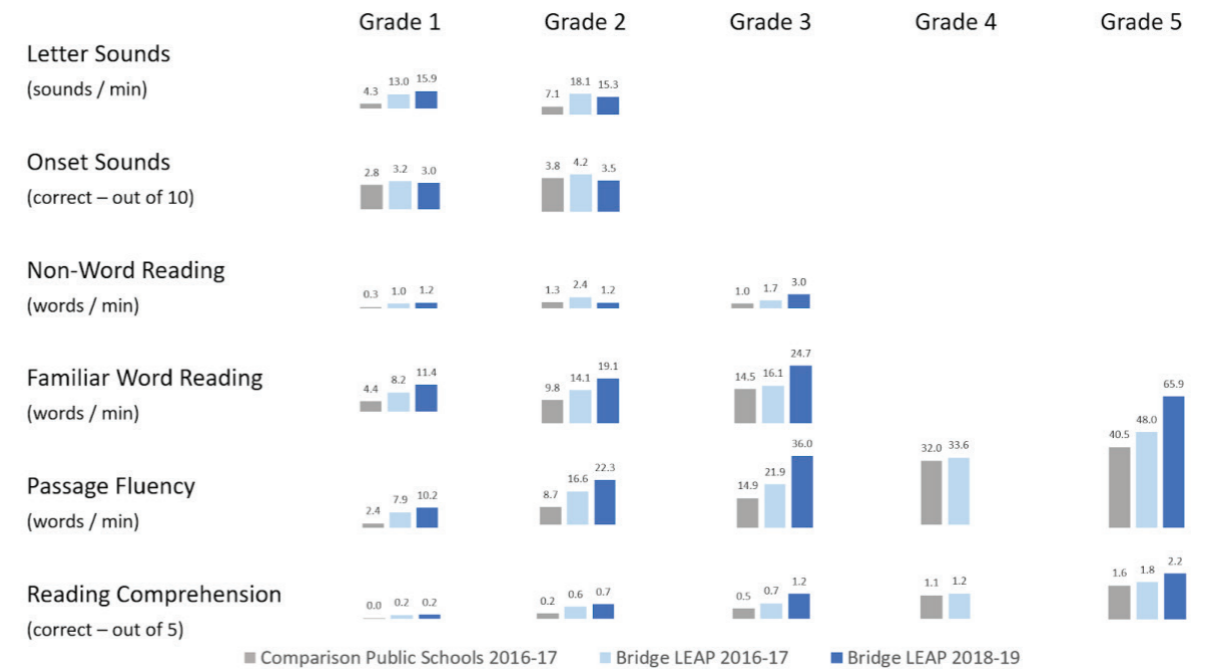
Figure 1. EGMA Grade Level Performance Comparisons

Word Reading and Passage Fluency, where 2018-19 2nd and 3rd graders are learning a full grade level above their 2016-17 peers. That is to say, student performance in grade 2 and 3 now surpasses prior student performance in grades 3 and 4. See full subtask by subtask results in Figure 2 below.

Figure 2. EGRA Grade Level Performance Comparisons

Early Grade Reading

On the basic building blocks of literacy (Letter Sounds, Onset Sounds and Non-Word Reading), students at Bridge-supported public schools perform consistently higher than students at comparison public schools on Letter Sounds. Performance on Onset Sounds and Non-Word Reading is similar across all three samples.

The pattern changes dramatically for the higher-order tasks of Familiar Work Reading, Passage Fluency, and Reading Comprehension, where students at Bridge-supported public schools strongly outperform their peers at government run schools. Within Bridge-supported public schools, average performance on higher-order literacy subtasks has increased across all grades. The magnitude of these gains tends to increase with grade level. The improvements are most pronounced in Familiar

2. How have performance differences by gender changed since Year 1?

During the 2 ½ years of Bridge support, girl students have improved faster than boy students, resulting in a significant reduction in the gender gap in literacy and numeracy. In numeracy, girls have narrowed the gap, although performance differences remain on most subtasks. In literacy, increases in girl performance have essentially eliminated the gap for most grades and subtasks.

Early Grade Mathematics

For numeracy subtasks, gender performance gaps remain, but most are much smaller now than before. On Addition 1 and Subtraction 1, the gaps are half as large as they once were. On Quantity Discrimination the gaps have not decreased, though performance has increased for both girls and boys. On Addition 2 and Subtraction 2 the gaps have almost disappeared, but overall average performance has also declined. See Figures 3 and 4 below.

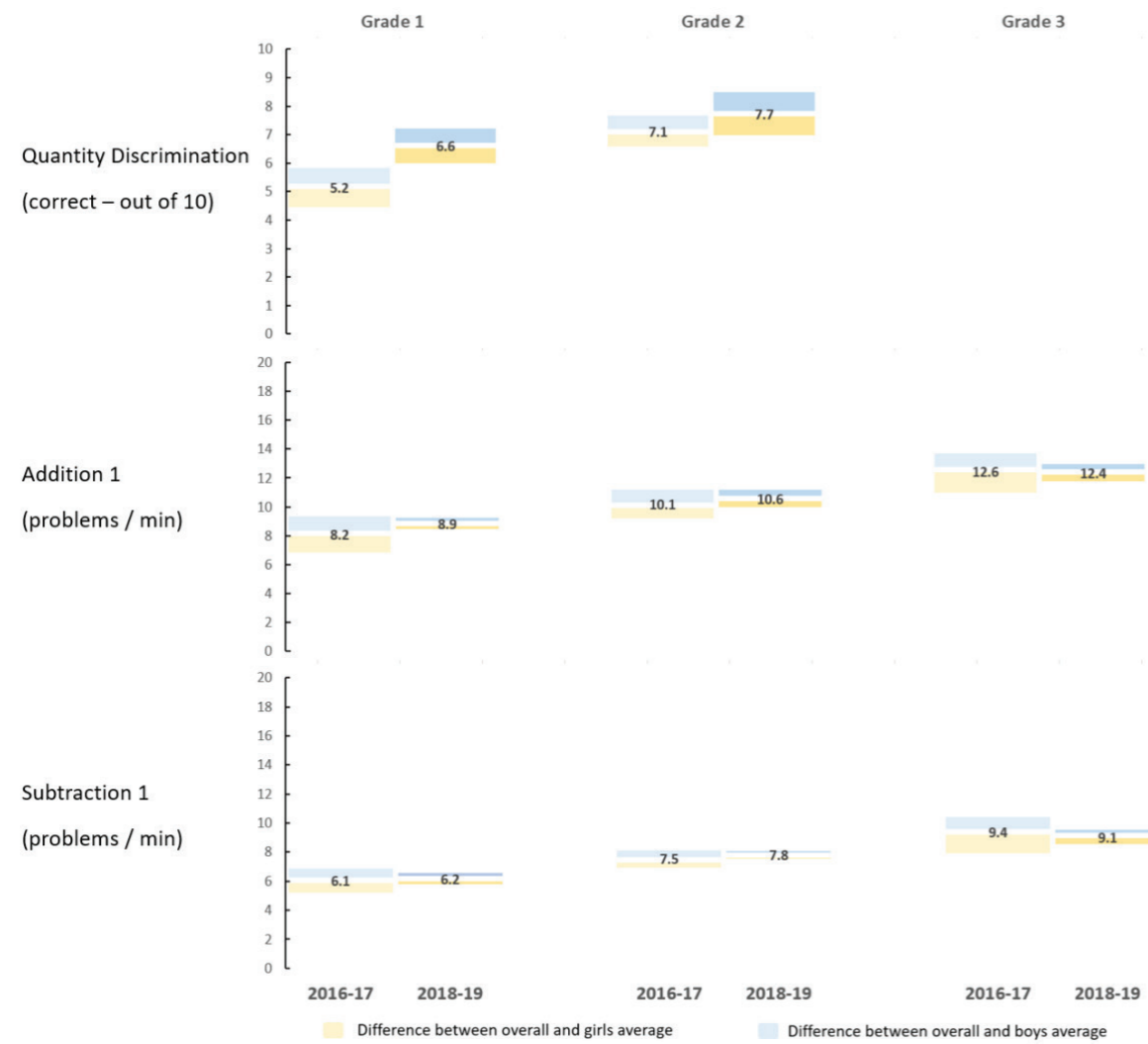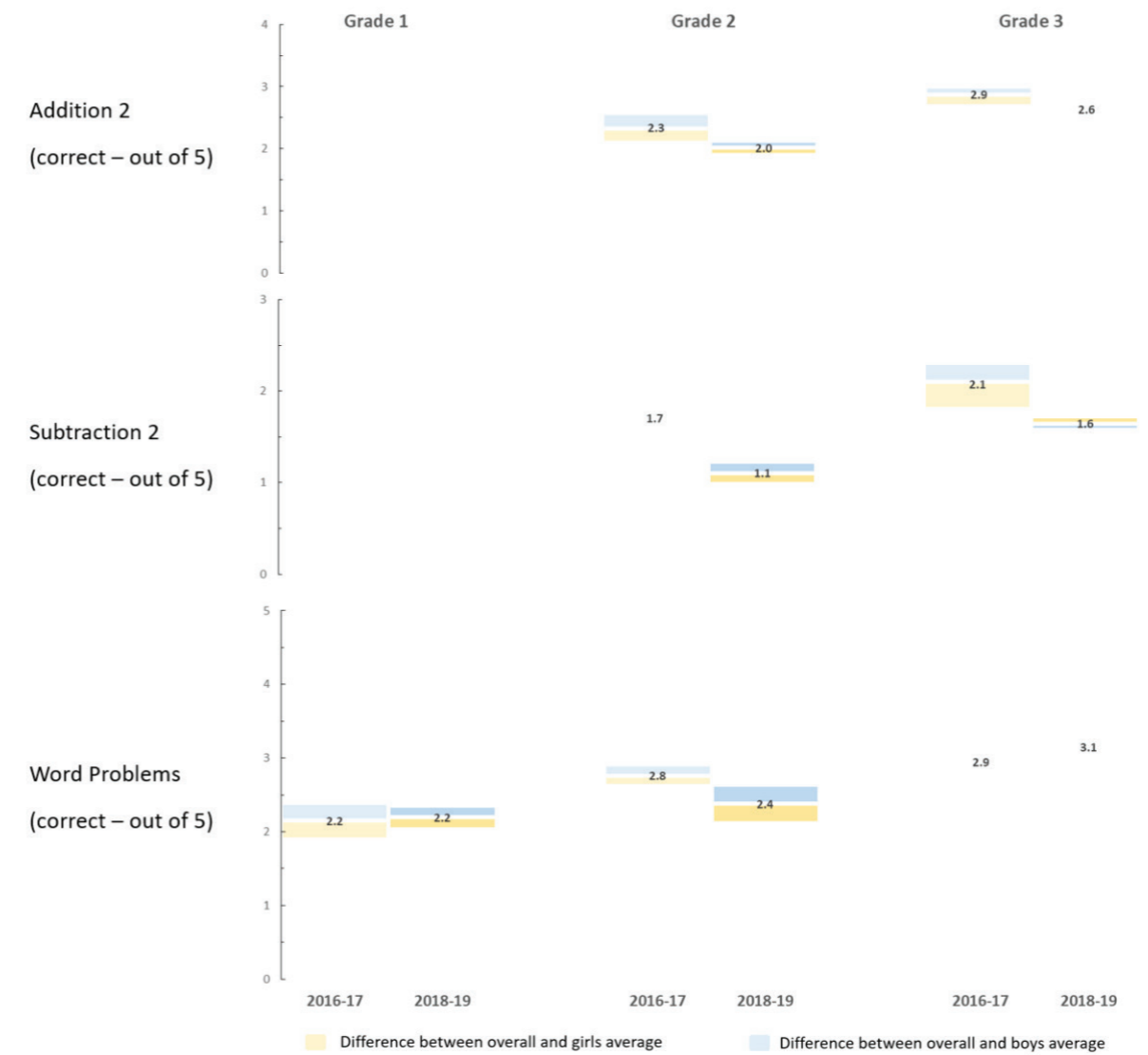*Figure 3. Gender Gap in Basic Numeracy Subtasks, Inherited vs. Year 3*

Grade 1 Grade 2 Grade 3

Quantity Discrimination
(correct – out of 10)

5.2 6.6 7.1 7.7

Addition 1
(problems / min)

8.2 8.9 10.1 10.6 12.6 12.4

Subtraction 1
(problems / min)

6.1 6.2 7.5 7.8 9.4 9.1

2016-17 2018-19 2016-17 2018-19 2016-17 2018-19

Difference between overall and girls average   Difference between overall and boys average

Figure 4. Gender Gap in Arithmetic Subtasks, Inherited vs. Year 3

Grade 1 Grade 2 Grade 3

Addition 2
(correct – out of 5)

2.3 2.0 2.9 2.6

Subtraction 2
(correct – out of 5)

1.7 1.1 2.1 1.6

Word Problems
(correct – out of 5)

2.2 2.2 2.8 2.4 2.9 3.1

2016-17 2018-19 2016-17 2018-19 2016-17 2018-19

Difference between overall and girls average   Difference between overall and boys average

Early Grade Reading

The Bridge-supported public schools inherited a literacy gap between boys and girls, with boys performing much better than girls on most subtasks. By the middle of Year 3, this gap has closed significantly; in many cases, the gap has been completely eliminated.

For example, girls now perform equal to or better than boys on Passage Fluency and Reading Comprehension across all grades (see Figure 6). Gains for girls were most pronounced in grade 2, where they improved by almost 14 cwpm on Passage Fluency. In fact, gains for girls explain most of the overall grade level improvements on these subtasks achieved in Bridge-supported public schools since Year 1.

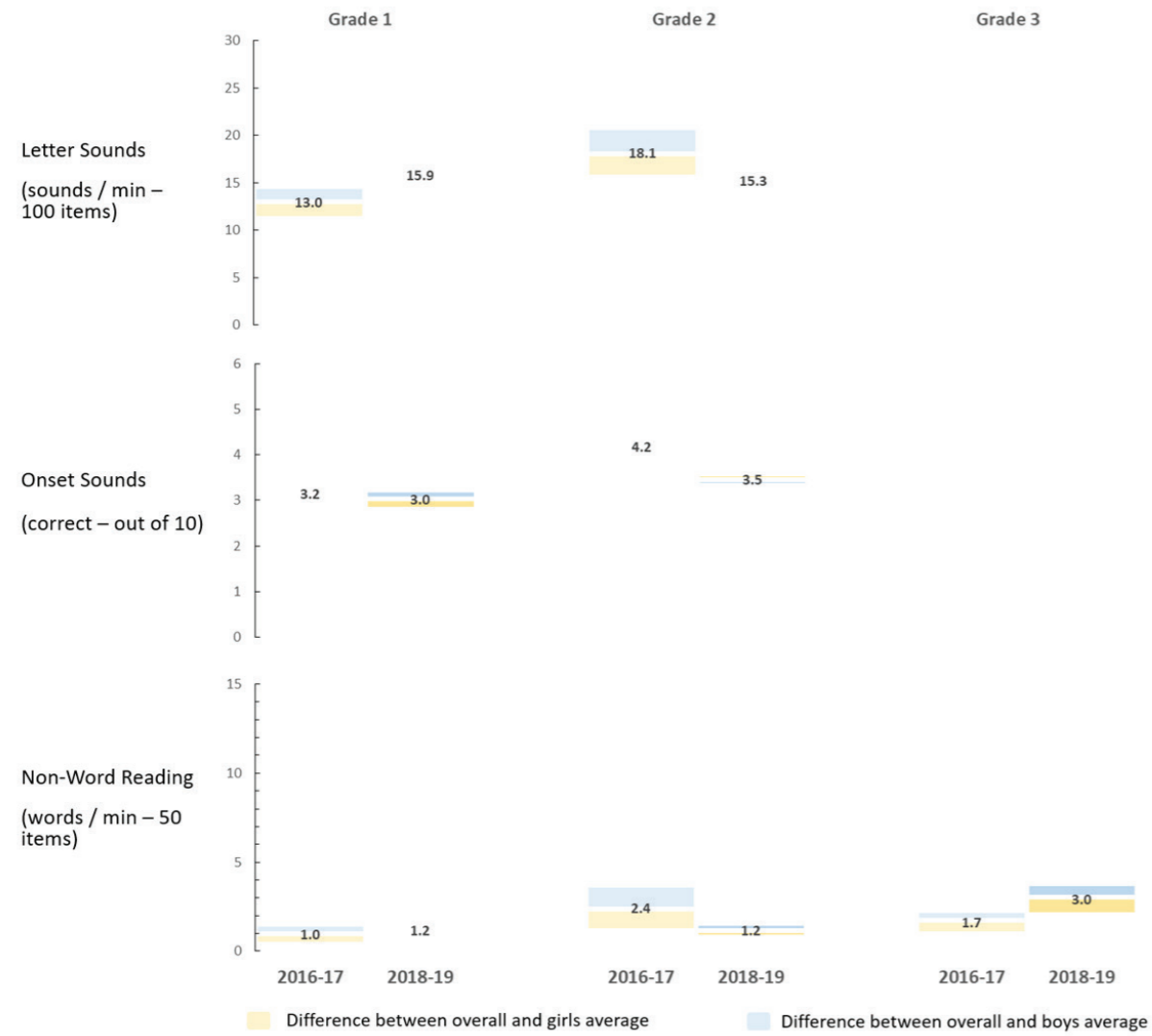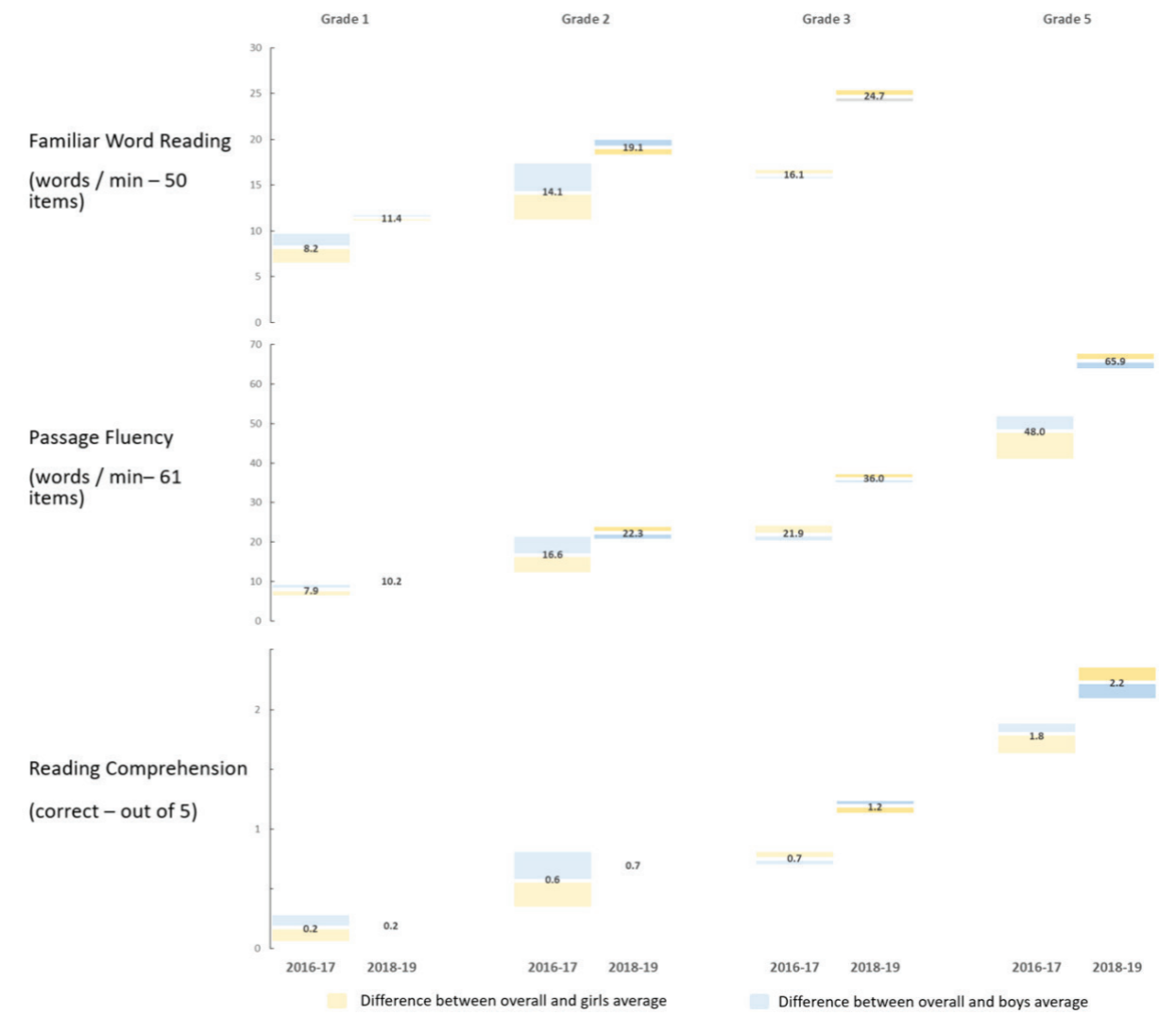## Figure 5. Gender Gap in Basic Literacy Subtasks, Inherited vs. Year 3

Grade 1   Grade 2   Grade 3

Letter Sounds
(sounds / min – 100 items)

13.0   15.9   18.1   15.3

Onset Sounds
(correct – out of 10)

3.2   3.0   4.2   3.5

Non-Word Reading
(words / min – 50 items)

1.0   1.2   2.4   1.2   1.7   3.0

2016-17   2018-19   2016-17   2018-19   2016-17   2018-19

Difference between overall and girls average   Difference between overall and boys average

Figure 6. Gender Gap in Reading Subtasks, Inherited vs. Year 3

Grade 1   Grade 2   Grade 3   Grade 5

Familiar Word Reading
(words / min – 50 items)

8.2   11.4   14.1   19.1   16.1   24.7

Passage Fluency
(words / min– 61 items)

7.9   10.2   16.6   22.3   21.9   36.0   48.0   65.8

Reading Comprehension
(correct – out of 5)

0.2   0.2   0.6   0.7   0.7   1.2   1.8   2.2

2016-17   2018-19   2016-17   2018-19   2016-17   2018-19   2016-17   2018-19

Difference between overall and girls average   Difference between overall and boys average

3. How have students who attended ECE at Bridge-supported public schools performed compared to those who did not?

Students who attended ECE Kindergarten at Bridge-supported public schools performed better on many subtasks then their peers who went elsewhere for Kindergarten or did not attend at all. There are statistically significant differences on Letter Sounds, Familiar Word Reading, and Passage Fluency.[7] Bridge-supported ECE attendees scored 68% higher on Letter Sounds, which may be consistent with the instructional design of Bridge-supported public schools ECE. Note that most of the students who did not attend Bridge kindergarten did report attending kindergarten somewhere, so differences are likely a contrast between Bridge-supported public school ECE and other ECE options available in these communities.[8] See the differences across EGRA and EGMA subtasks in Figures 7 and 8 below.

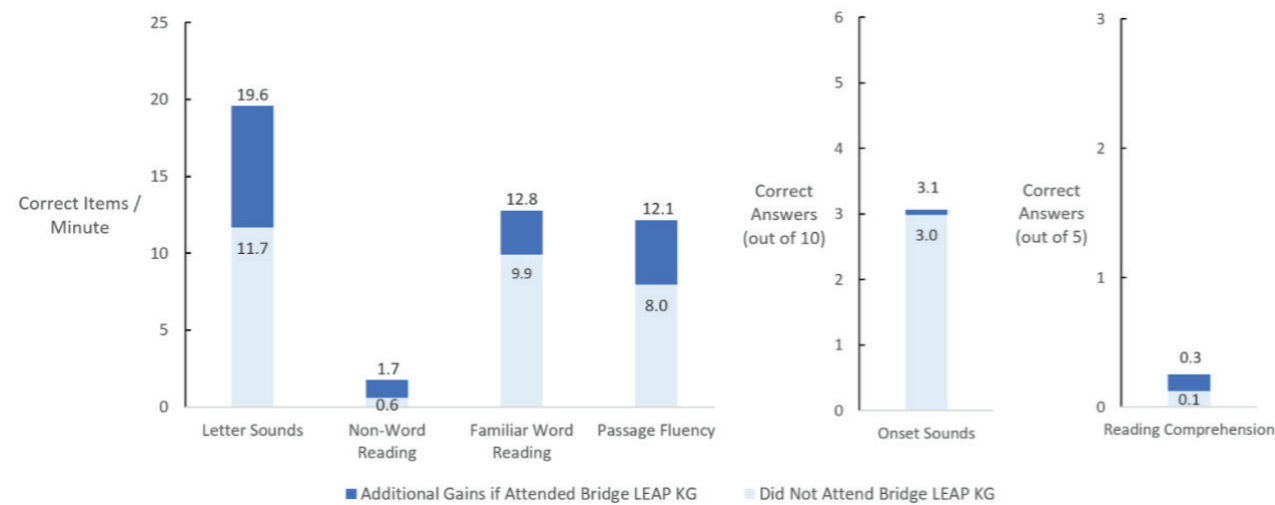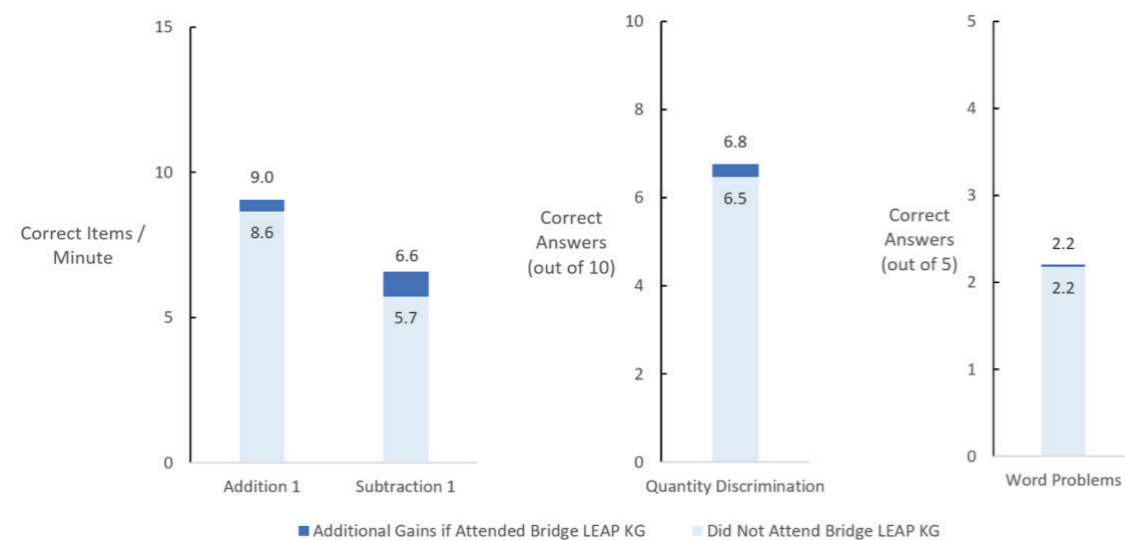*Figure 7. Grade 1 EGRA by Enrolment in Kindergarten at Bridge-Supported Public Schools*

Figure 8. Grade 1 EGMA by Enrolment in Kindergarten at Bridge-Supported Public Schools


B. Tenure: What is the growth achieved by students who have been enrolled since the beginning of the program?

1. Have students who have been enrolled since the start of Bridge-supported public schools achieved proficiency in reading?

Passage fluency results can be translated into reading benchmarks for early grade readers, ranging from non-reader to proficient.[9] We examine the current proficiency rates achieved by the sample of current students who enrolled at the start of Bridge-supported public schools as 1st graders, and we see that the proportion of basic and proficient readers in this sample has increased dramatically over time.[10]

In Year 1, as 1st graders, there were no basic or proficient readers. After one year in the program, 45% achieved basic or proficient status. After 2 ½ years, 81% of them are considered basic or proficient readers – 53% proficient and 28% basic readers.

Figure 9. Increase in Proficiency Rate for Continuously Enrolled Year 1 Grade 1 Students
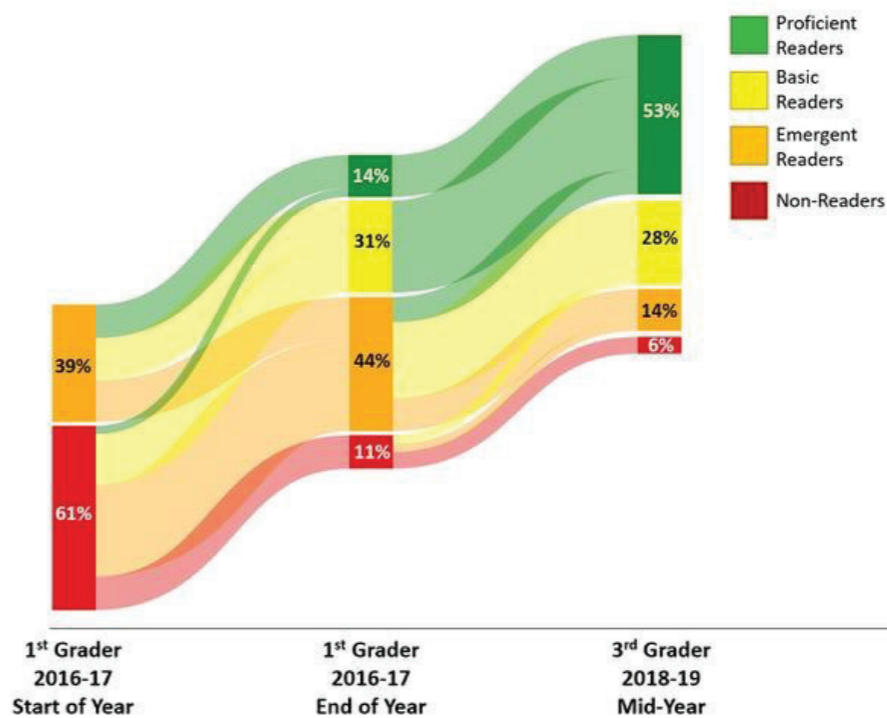
The achieved reading rate of these 3rd graders also vastly exceeds the rates of 3rd graders in Year 1, both in Bridge-supported public schools and comparison public schools. 81% of the above cohort are basic or proficient readers today, compared to 40% of 3rd graders in Bridge-supported public schools and 33% of comparison public school 3rd graders two years ago. The 53% rate of reading proficiency is almost 7 times that of the comparison public school 3rd graders from two years ago.[11] Still, there is room for improvement: One in five students still struggles through the EGRA passage, with some unable to read a single word.[12] See Figure 10 below for comparisons.
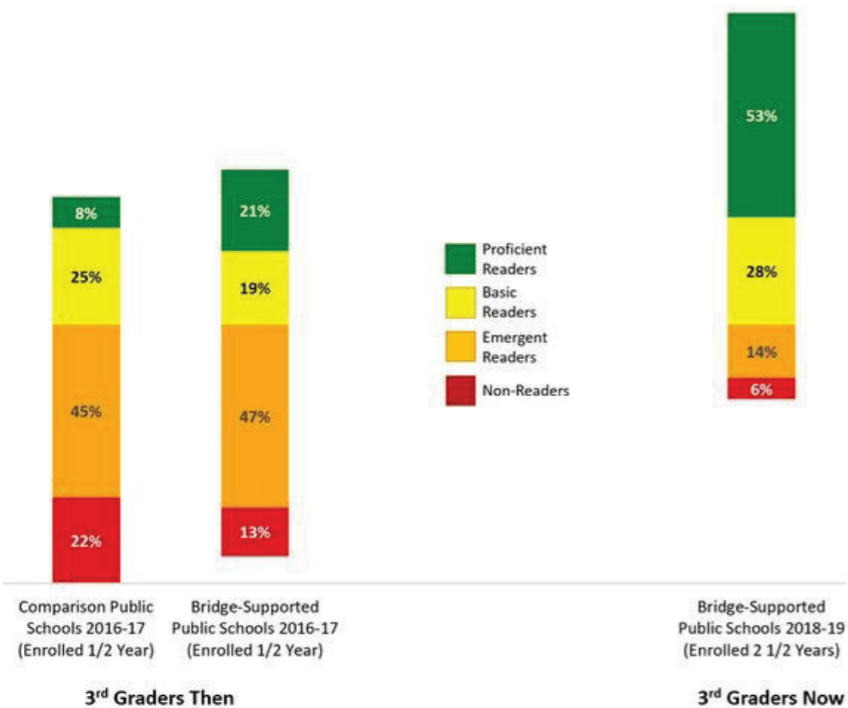

Figure 10. Comparison of Grade 3 Reading Proficiency Rates

2. Within Bridge-supported public schools, how have students who enrolled at the start of Bridge-supported public schools performed relative to a representative sample of students in their grade level?

The longer a student stays in a Bridge-supported public school, the better the student performs. Tenure within Bridge-supported public schools is driving significant learning for students. Performance differs between students who have been enrolled since the program's inception and students who enrolled later.

We tracked a group of students who started as 1st graders in Year 1 and examined their achievement over time. We then compared their performance with a representative sample of students in their class.[13] Differences in performance between these two groups are large on EGRA subtasks but smaller on EGMA subtasks. For higher order EGRA tasks, we also tracked and compared students who started as 3rd graders in Year 1. These students slightly outperform the average student in their class for reading fluency though not comprehension.[14]

Early Grade Mathematics

Continuously enrolled students at Bridge-supported public schools perform better than more recent joiners. Their growth trajectories are similar. The Bridge-supported numeracy curriculum appears to advance students at a consistent rate, irrespective of prior performance. See Figure 11 below for the performance trajectory of Year 1 1st graders, now as 3rd graders.

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[13] The sample of continuously enrolled students with scores in each period contains 31 students. The overall sample is the sample that is most representative of each assessed class level at Bridge-supported public schools. For the Start of Year 1 and the Middle of Year 3, this is a truly random selection of students from that grade in each assessed school. For the Middle of Year 1, the "random sample" is not perfectly random, as students who were assessed at the Start of Year 1 were specifically sought out. However, for the Middle of Year 1, random replacements were selected when Start of Year 1 students were not found. The End of Year 1 sample only contains students previously assessed at Start of Year 1 or Middle of Year 1.
[14] Year 1 3rd graders are not compared on EGMA subtasks because grade 5 students did not do EGMA.

Figure 11: EGMA Performance of Bridge-Supported Public Schools Average vs Continuously Enrolled Year 1 Grade 1 Students
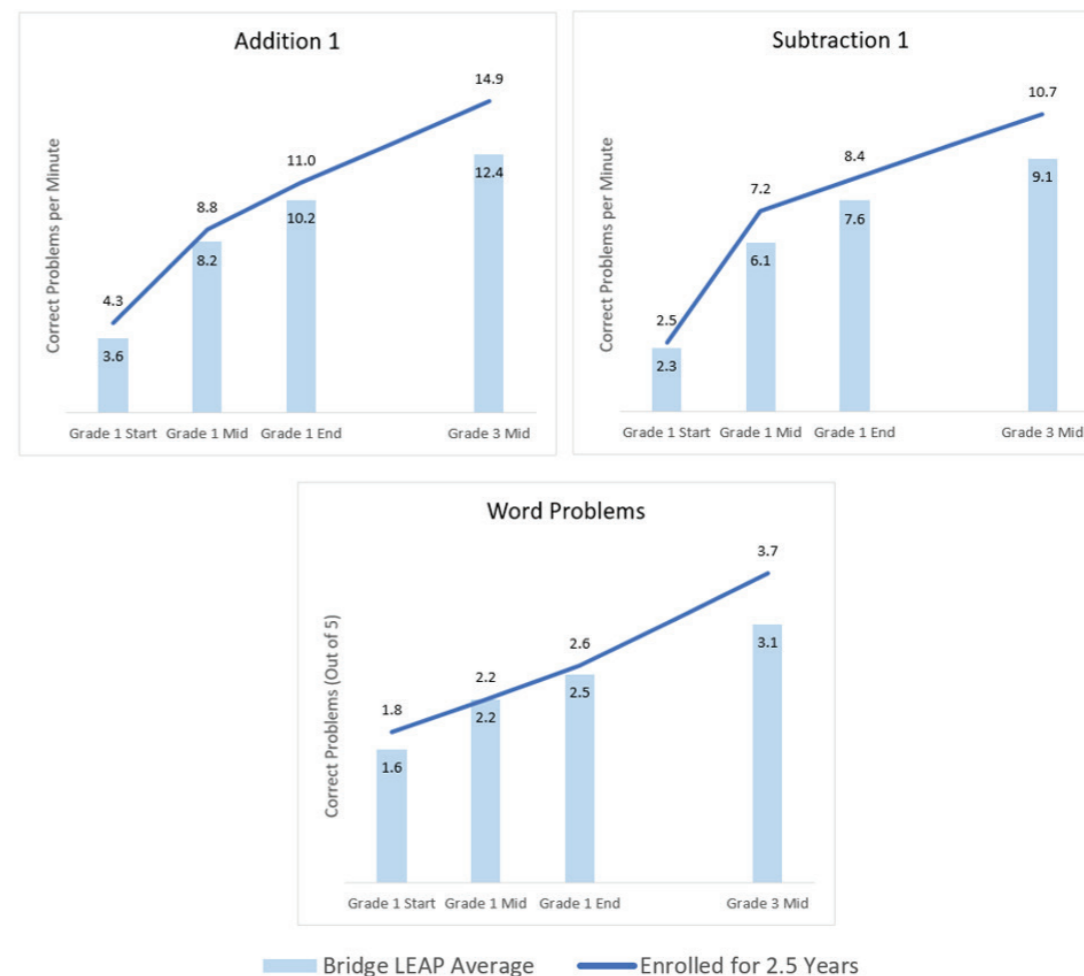

Early Grade Reading

3rd graders who have been at Bridge-supported public schools since inception perform significantly better now on all subtasks than 3rd graders who have spent less time in a Bridge-supported public school. In fact, they perform at least 1.5 times better than the overall average. Furthermore, learning begets more learning: year after year, students who continuously attend Bridge-supported public schools increase their performance margin over the average student in the grade level. These findings suggest that the effect of Bridge, while large, could be even larger in the future as more students begin school well-supported and build upon their foundational understanding. This holds great promise for accelerated learning and significant proficiency gains in communities with Bridge-supported public schools as more students join and stay.

We offer a slight caution, however, because the type of student who has been able to stay enrolled at the same school for the past 2.5 years may have advantages over other students.[15] We do in fact see that this sample was already performing above average by the middle of Year 1.[16] Even so, the performance edge of this sample is dramatic and increasing, suggesting that tenure within Bridge-supported public schools is likely to accelerate literacy learning gains. See Figure 12 below.

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[15] For example, students who are able to stay in the same school for multiple years likely have more stable households, which on its own may foster more learning.
[16] See a more detailed comparison of attritors and non-attritors in the Limitations section, and in Figure 20 in the Appendix.

Figure 12. EGRA Performance of Bridge-supported Public School Average vs. Continuously Enrolled Year 1 Grade 1 Students
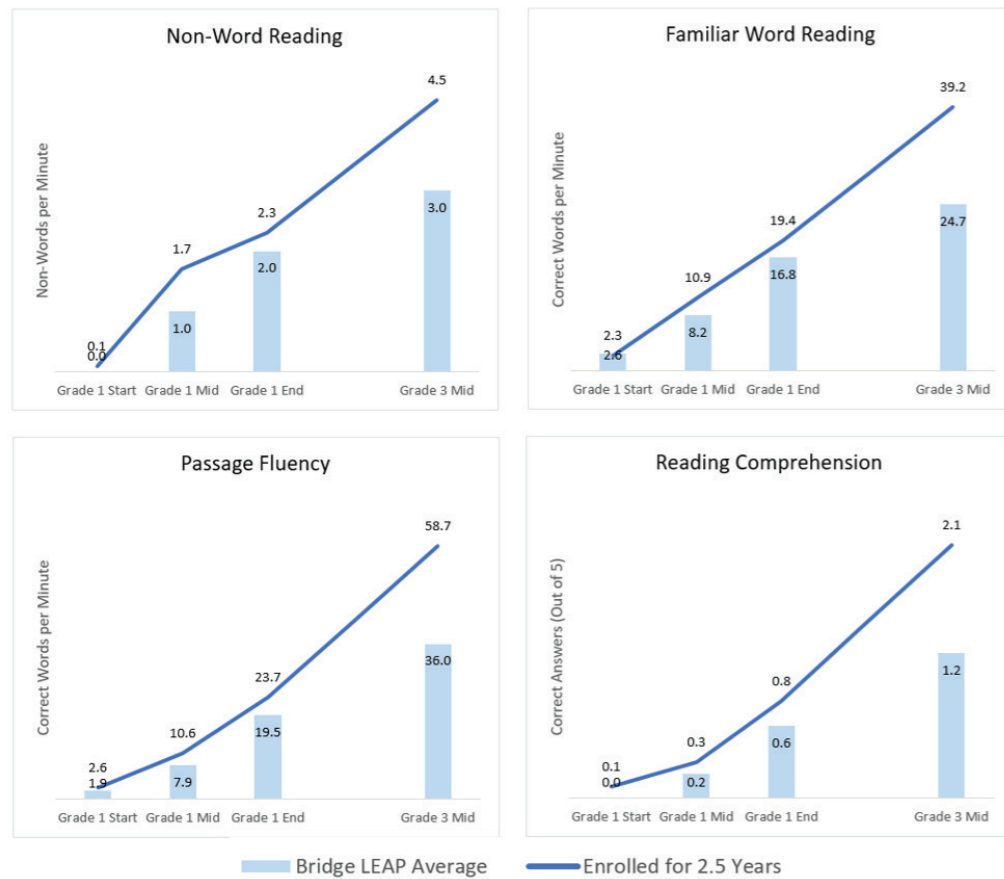
We also examine 5th graders who enrolled 2.5 years ago at Bridge-supported public schools as 3rd graders. The pattern here is noisier: Those that have been continuously enrolled perform slightly above average on Passage Fluency, but slightly below average on Reading Comprehension. This suggests that investment in the fundamentals of reading yields greater returns to literacy when made in the first year of a child's formal education. See Figure 13 below for the performance of Year 1 3rd graders.

Figure 13. EGRA Performance of Bridge-Supported Public School Average vs. Continuously Enrolled Year 1 Grade 3 Students
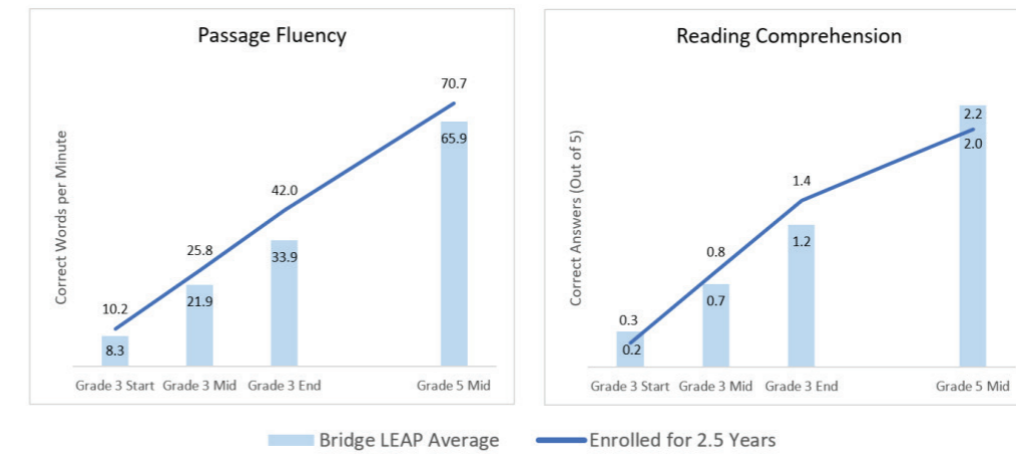
3. What are the growth trajectories of students who enrolled at the start of Bridge-supported public schools? Are they reaching reasonable expectations of growth based on the gains achieved in Year 1?

In 2016-17, we captured learning gains over the course of the school year for both Bridge-supported public schools and comparison public schools. We used these results to create projection ranges for expected achievement by the middle of Year 3. The upper bound of this range is a linear extrapolation of Year 1 growth, maintaining the same slope. It assumes students maintain the same pace of learning as in Year 1. The lower bound is the highest subtask average achieved by students in that grade during Year 1.[17] This range maintains high standards but allows for non-linear growth, which is expected as students approach skill mastery. For comparison, we also plot the upper bound of expected growth for comparison public school students.[18] It is important to note that we are not assuming public school student performance to be at, or even near, the upper bound. This is simply a reference point to indicate a maximum performance estimate, if students within the traditional public school system were to improve at a constant rate year-over-year.

Overlaid on these projections are results of actual growth from the end of Year 1 to the middle of Year 3. We then examine the growth trajectories of students who enrolled at the start of Bridge-supported public schools and understand if their progress is meeting promises and expectations.
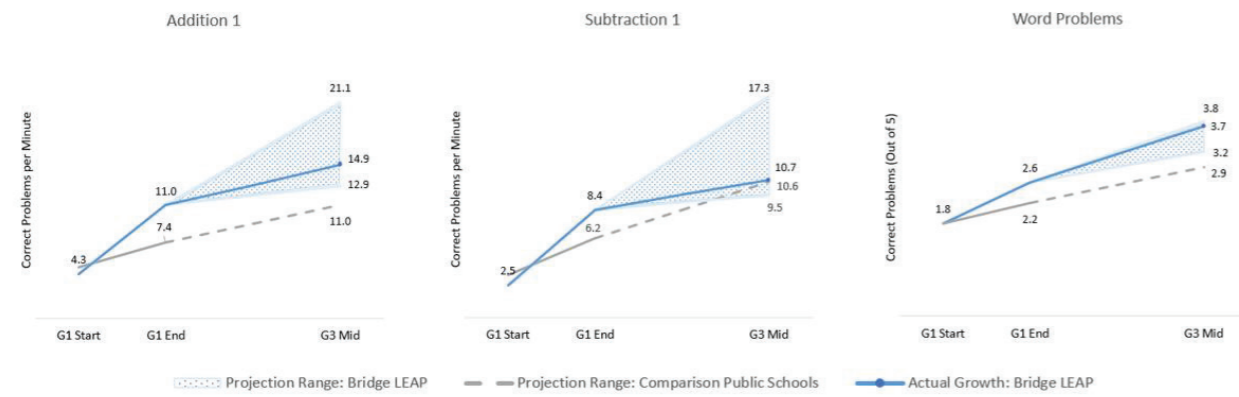
Early Grade Mathematics

Numeracy results also show performance within the projection range. On Addition 1, performance is within the range but closer to the lower bound, while performance on Word Problems almost reaches the upper bound. On Subtraction 2, the average score is close to the lower bound and virtually

equivalent to the linear projection of comparison school growth. On both Addition 1 and Subtraction 1, the trajectory of growth since the end of Year 1 has flattened.

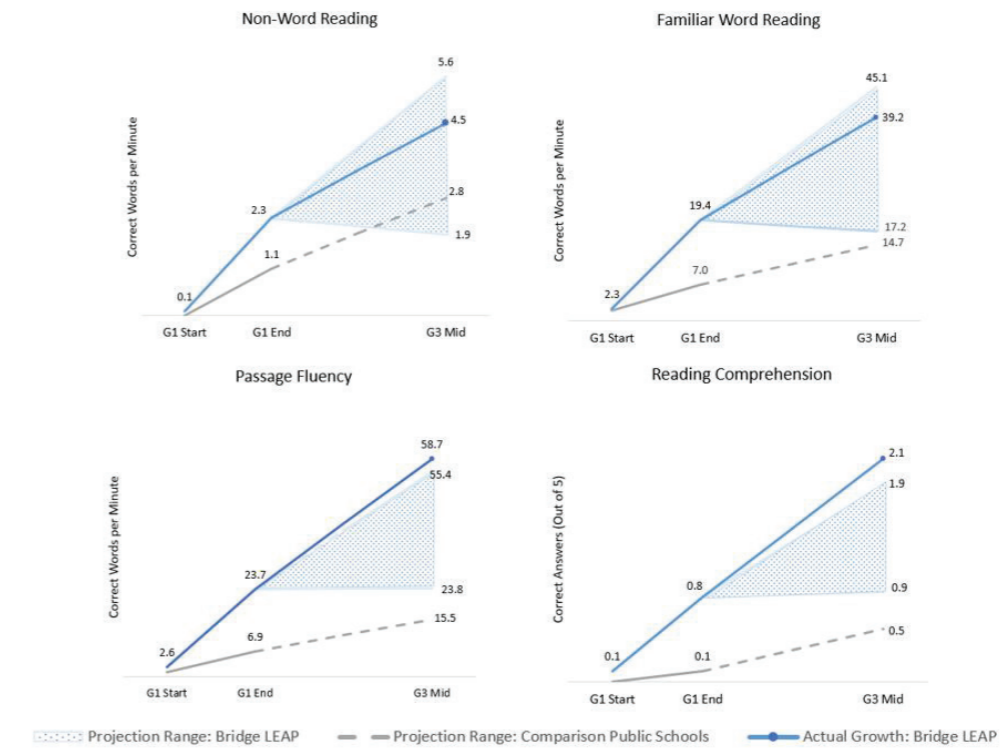*Figure 14. EGMA Actual Growth and Projections for Year 1 Grade 1 Students*[19]

Addition 1 / Subtraction 1 / Word Problems

Projection Range: Bridge LEAP — Projection Range: Comparison Public Schools — Actual Growth: Bridge LEAP

Early Grade Reading

Students starting in both 1st grade and 3rd grade have improved in all literacy subtasks during their 2.5 years at Bridge-supported public schools. Achievement of growth expectations differs distinctly between grade levels.

The average 1st grader in Year 1 has maintained the expected pace and now sits well within the Bridge-supported public schools projection range (and well above the comparison public school upper projection) on all four subtasks tested in both periods. In fact, on Passage Fluency and Reading Comprehension, current levels remarkably exceed the linear projections, with the average student reading nearly 59 words per minute and correctly answering slightly more than two of five comprehension questions. Achievement on Non-Word reading, however, is still quite low: on average, students read less than 5 made-up words per minute. See Figure 15 below.

Figure 15. EGRA Actual Growth and Projections for Year 1 Grade 1 Students

Non-Word Reading / Familiar Word Reading / Passage Fluency / Reading Comprehension

Projection Range: Bridge LEAP — Projection Range: Comparison Public Schools — Actual Growth: Bridge LEAP

As students approach mastery, we expect to see the rate of growth slow. Such is the case for students starting in 3rd grade and now in 5th grade. Average performance on Passage Fluency is closer to the lower bound of the projected range, at just over 70 correct words per minute. For additional context, the initial and rapid growth rate for this cohort, from 10.2 to 42.0 correct words per minute during grade 3, influenced our projection model. The current grade 3 students begin well above 10.2, so we fully expect to modify our model as performance patterns change and students make greater progress toward fluency in earlier grades. Thus, this flattened trajectory is not surprising, as this fluency range is approaching full accuracy on the passage used in EGRA.[20]

On Reading Comprehension, the average of 2 correct answers is roughly equivalent to both the Bridge-supported public schools lower bound and the upper bound of comparison public school performance. It is notable that the average for these current 5th graders is also below Reading Comprehension performance for current 3rd graders who have been continuously enrolled since Year 1. These results suggest a need for additional attention on continued reading comprehension improvement, particularly in grades 4 and 5. See Figure 16 below.

[19] No EGMA subtasks were administered to 5th graders due to the assumption that the tasks would have significant ceiling effects, so we do not have growth estimates for students who started in 3rd grade in Year 1.

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[20] The passage contains 61 words. Note that the 61+ score range is only *approaching* full fluency because a score of at least 61 cwpm does not necessarily mean the student correctly read *every* word. They could have missed some words but completed the passage in less than a minute, creating a cwpm score above 61. See Appendix Figures 21 and 22 for the distribution of 5th grade scores counting the total number of words correct in the passage, rather than the correct words per minute. This provides a sense of how many 5th graders are essentially reading the full passage correctly.

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Figure 16. EGRA Actual Growth and Projections for Year 1 Grade 3 Students
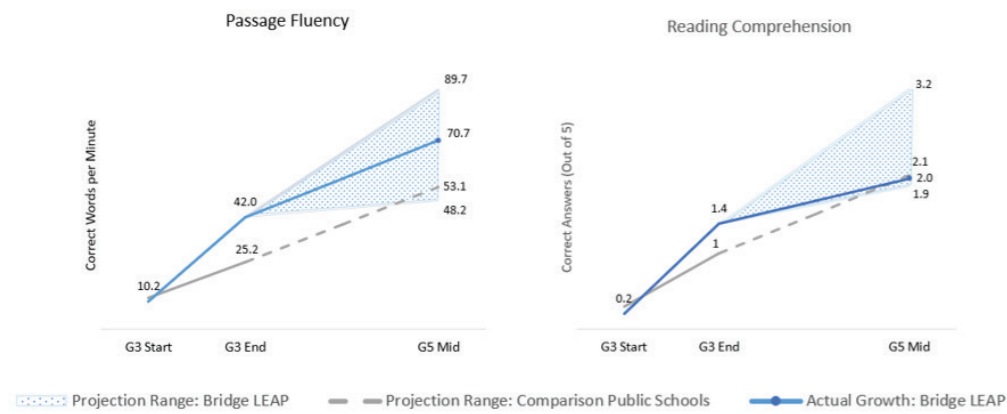
Limitations

Findings from this study should be considered with the limitations of significant sample attrition, small sample of schools, no comparison public school results in Year 3, and imperfect comparability of samples across years. Through our study methods, we have mitigated some of these concerns.

First, attrition between Year 1 and Year 3 is high: only 40% of 1st graders (n=40) and 33% of 3rd graders (n=39) from Year 1 remain in our study sample.[21] This attrition is also driven by lower performing students. On Year 1 endline assessments, attritors perform worse than non-attritors on all subtasks. For example, on passage Fluency, 3rd grade attritors averaged 35 cwpm, while students still enrolled today averaged 41 cwpm.[22]

Figure 17. Attrition in Tenure Sample

Year 1 Grade Level	Count at Year 1 Baseline	Count at Year 1 Endline	% at Year 1 Endline	Count at Year 3 Mid-Year	% at Year 3 Mid-Year
Grade 1	99	69	69%	40	40%
Grade 3	117	74	63%	39	33%

Second, students are drawn from only six schools, all from the original group of 25 Bridge-supported public schools. We examined internal system metrics for intermediate outcomes such as lesson completion, teacher attendance, and rate of student attendance taking, and it appears that these six schools are fairly representative of all Bridge-supported public schools.[23] See sample averages and distribution charts below.

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[21] The sample of students in the growth trajectory analysis includes those with scores in each of the four data collection periods - Year 1 baseline, Year 1 midline, Year 1 endline, and Year 3.
[22] See Appendix Figure 20 for full grade and subtask breakdown.
[23] Metric averages are from the period from the start of Semester 2 on Feb. 18, 2019 to the end of April 2019.

Figure 18. Year 3 Semester 2 Internal KPI Averages

Metric	Bridge-supported public schools Average	Study Average
Smart Phone Syncing	52%	48%
Teacher Attendance	74%	76%
Student Attendance Taking	41%	41%
Lesson Completion	31%	25%

Figure 19. Year 3 Semester 2 Key Performance Indicators Across Schools
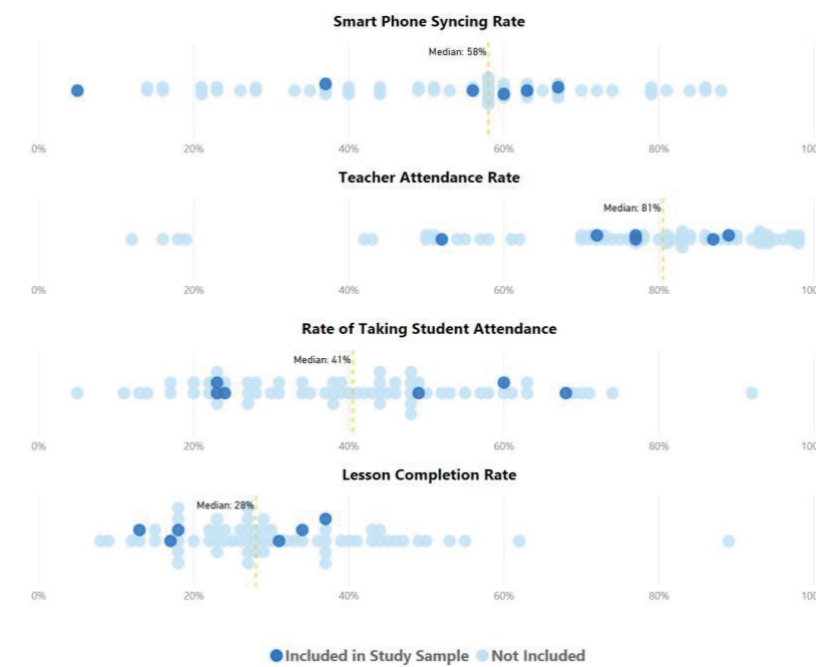
Third, we were unable to collect data at comparison public schools since 2016-17. All references to comparison public school performance are based on 2016-17 data, so if any programs were implemented at these schools since then, the contrasts we draw across school type in this study are no longer valid.

Finally, the comparison of samples across years is imperfect. The Year 3 sample contains a true random cross section of each classroom at the time of assessments, while the Year 1 sample mostly contains students who were also present at the beginning of the school year.

Path Forward

We are pleased by the progress achieved by students at Bridge-supported public schools during LEAP pilot program. Student achievement has continued in all areas. For those who benefited from the program since its inception, learning has accelerated beyond already large gains. The gender gap in educational outcomes is closing; in fact, some have reversed. Age-appropriate ECE shows the promise of a stronger foundation in primary school.

Bridge should build on these successes by both strengthening implementation and further raising the quality of training and instructional design. These efforts should be coupled with well-communicated, easy-to-understand reading proficiency targets that align with the Ministry's key policy objectives.

Should improvements be continuous, as they have been during the pilot years, Bridge should be well-positioned to serve more students, more schools, more communities. It should also seek to both leverage and strengthen existing Ministry teams, partnering with the Ministry to put performance data in the hands of those who can affect the most change.

Appendix

Figure 20. Year 1 Endline Performance of Attritors vs. Non-Attritors

	Attritors	Non-Attritors	Difference
Grade 1	N=33	N=36	
Letter Sounds	19.0	25.5	6.5
Onset Sounds	4.5	4.6	0.1
Non-Word Reading	2.0	2.4	0.3
Familiar Word Reading	18.1	18.2	0.2
Passage Fluency	21.5	22.1	0.6
Reading Comprehension	0.5	0.8	0.3
Number Identification	24.3	24.9	0.6
Quantity Discrimination	7.6	8.4	0.8
Addition 1	9.9	10.8	0.8
Subtraction 1	7.2	8.3	1.0
Word Problems	2.5	2.6	0.1
Grade 3	N=42	N=32	
Non-Word Reading	1.7	2.7	0.9
Familiar Word Reading	22.4	26.0	3.6
Passage Fluency	35.0	41.4	6.4
Reading Comprehension	1.2	1.4	0.2
Addition 1	14.5	17.2	2.7
Addition 2	2.9	3.6	0.7
Subtraction 1	8.6	10.7	2.1
Subtraction 2	8.6	10.7	2.1
Word Problems	3.0	3.3	0.3

Figure 21. Year 3 Passage Fluency Performance Distribution of Bridge-Supported Public School 2018-19 Grade 5 Students:
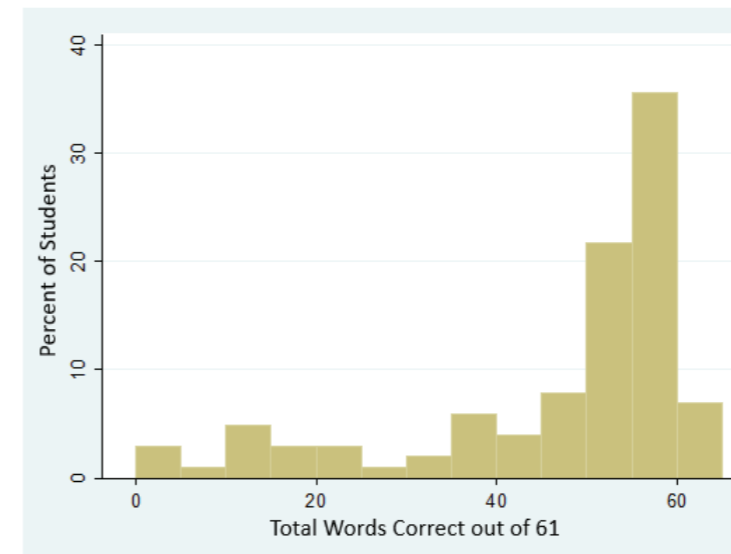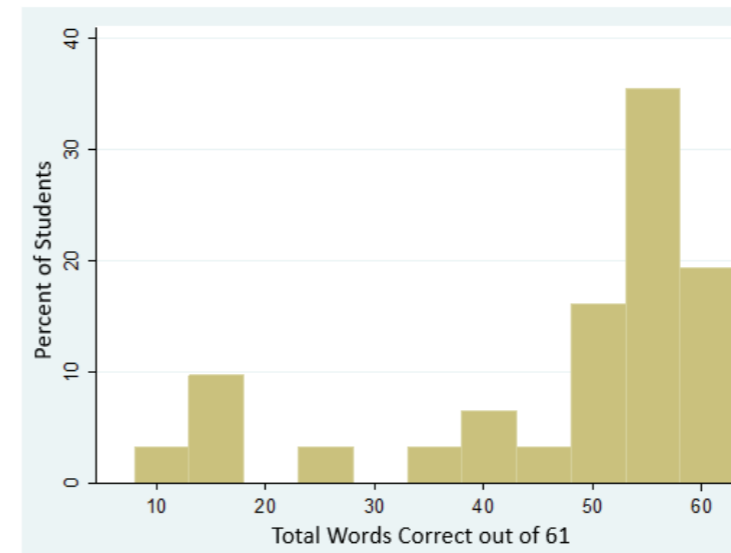

Figure 22. Year 3 Passage Fluency Performance Distribution of Bridge-Supported Public School Students who Started Year 1 in Grade 3.

Learning
in Liberia

Literacy and Numeracy Gains in Year 3