LITERACY, LANGUAGE AND LEARNING INTITIATIVE (L3)

NATIONAL FLUENCY AND MATHEMATICS ASSESSMENT OF RWANDAN SCHOOLS

ENDLINE REPORT

JANUARY 2017

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USAID
LITERACY, LANGUAGE AND LEARNING INITIATIVE (L3)

NATIONAL FLUENCY AND MATHEMATICS ASSESSMENT OF RWANDAN SCHOOLS: ENDLINE REPORT

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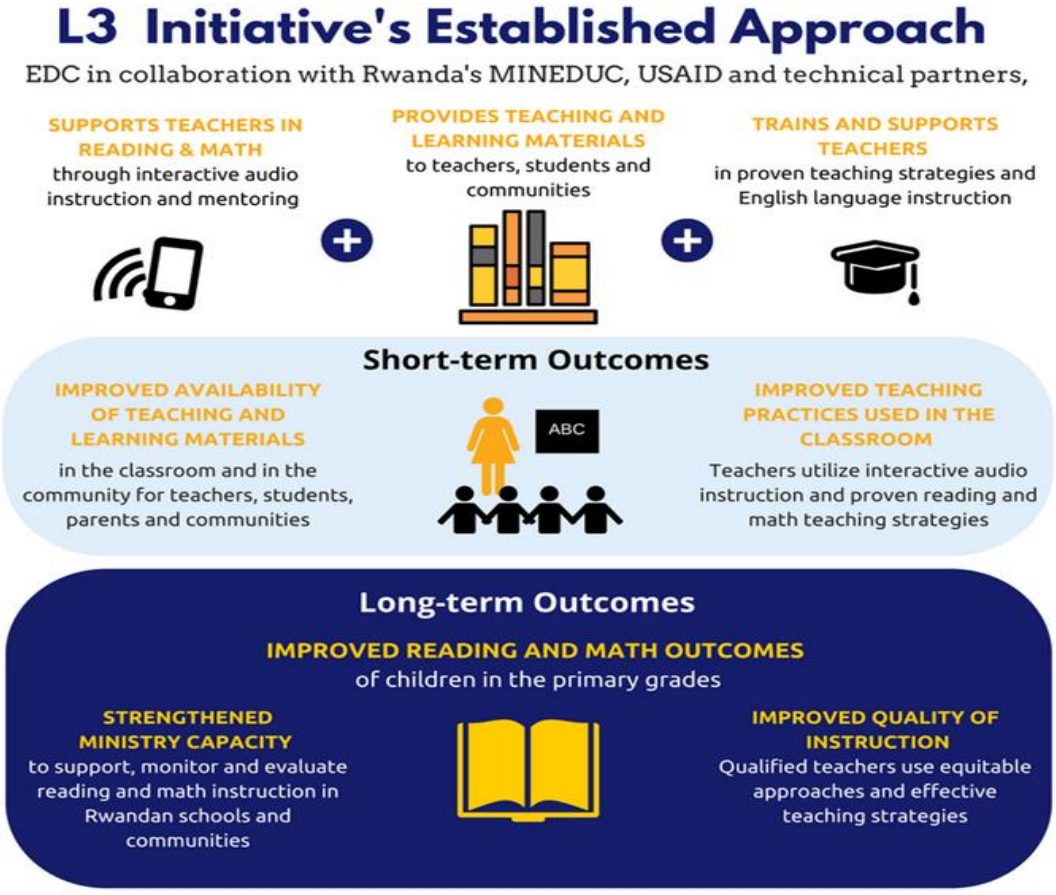
EXECUTIVE SUMMARY

The Literacy, Language and Learning Initiative (L3), funded by the U.S. Agency for International Development (USAID) and implemented by a partnership led by the Education Development Center, Inc. (EDC), was designed to help improve Rwandan early grade learners' language and mathematics skills. From 2011 to 2016, L3 assisted the Rwandan Ministry of Education (MINEDUC) in the implementation of a comprehensive early literacy and mathematics program, including support for transition to English as a medium of instruction in P4.

To gather information on learner achievement and to support the Rwandan Education Board (REB) in establishing a system of regular national assessments, L3 conducted annual literacy and mathematics assessments with a random sample of learners drawn from a nationally representative sample of schools. Assessments were conducted in the language of instruction (Kinyarwanda in grades P1 through P3, and English in P4), and were developed by a team of experts from the Rwandan Education Board (REB) and L3 based on a) international standards for testing and measuring learners' oral reading fluency in the early grades, b) existing Rwandan grade level standards in literacy and mathematics and c) Rwanda's Competence-based Curriculum. This report presents results of the October 2016 L3 endline assessment in 60 schools of 2,387 learners, 470 teachers and 60 head teachers. The results of this assessment are compared with the baseline assessment conducted in October 2014 at the beginning of the L3 intervention.



Literacy, Language and Learning (L3) Initiative

KEY FINDINGS

Reading Assessments

- After 2 years of L3 intervention, P1-P3 learners showed significant gains in Kinyarwanda reading performance. P4 results remained unchanged. P4 learners showed significant improvements in English reading after 1 year.
- P1-P3 learners showed a significant increase in oral reading fluency and reading comprehension. On average, P1-P3 learners could read between 3 to 6 additional words correct per minute in Kinyarwanda.
- The percent of P1-P3 learners who were unable to read a single word decreased from baseline to endline by 7-10%, on average.

Math Assessments

- P1 learners' mathematics performance increased significantly from baseline to endline. P2 – P4 learner performance remained unchanged.
- P1 and P3 learners showed significant decreases in zero scores from baseline to endline. On average, less than 7% of P1-P4 learners could not solve a single mathematics problem at endline.

Performance Benchmarks

At endline, 35% of P2 learners read with fluency and comprehension, surpassing L3's target of 20%.

Transition from Kinyarwanda to English in P4

- P4 learners performed significantly better reading Kinyarwanda than reading English.
- Findings at endline found a significant relationship between reading skills in Kinyarwanda and reading skills in English.

Gender

- At endline, girls read better than boys in Kinyawanda (P1-4) and English (P4); whereas they performed about the same as boys in mathematics (P1, P3, & P4). In P1, P3 and P4, the gender gap in reading worsened slightly from baseline to endline. However, in mathematics the gender gap improved from baseline to endline.

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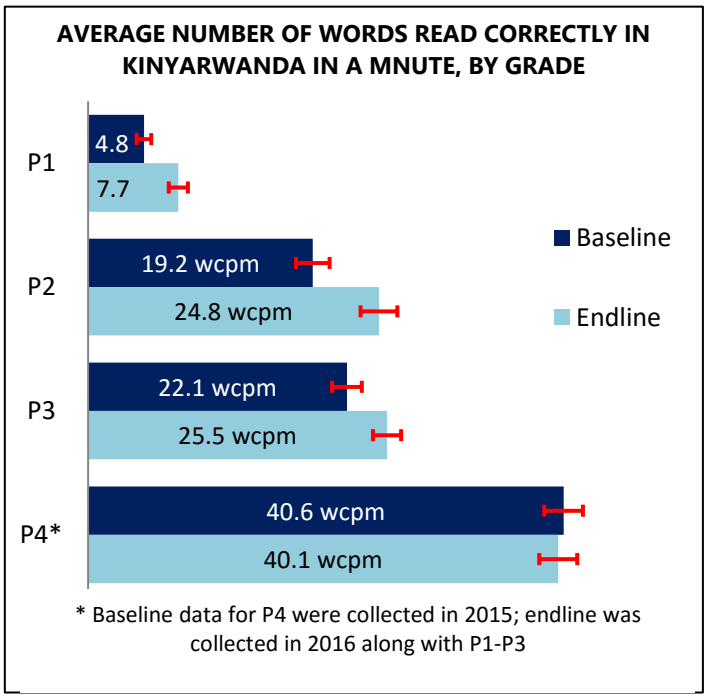
ORAL READING FLUENCY ASSESSMENT (FARS) FINDINGS

KINYARWANDA



Analysis of Kinyarwanda FARS results from baseline to endline showed that significant gains in P1-P3 reading performance have been achieved after two years of the L3 intervention. Learners in P1, P2 and P3 showed statistically significant improvements in oral reading fluency (ORF),[1] and reading comprehension from baseline to endline. P1-P3 learners demonstrated significant gains in the number of words they could read correctly per minute (wcpm) at endline. P1 showed an average increase in ORF of 2.9 wcpm (± 1.0 wcpm). P2 showed an average increase of 5.7 wcpm (± 2.1 wcpm). P3 showed an average increase of 3.4 wcpm (± 1.8 wcpm). P4 ORF results remained largely unchanged from baseline to endline, which may be explained due to the language of instruction switching from Kinyarwanda to English in P4. The largest improvements in ORF were seen in P2 and P3. Results showed that P1-P3 learners could also read more of the grade-level text at endline: learners in P1, P2, and P3 could read 10.1%, 11.8%, and 6.2% more of the text at endline, respectively.

Similar to oral reading fluency results, **P1-P3 learners showed a significant increase in the number of reading comprehension questions they could answer correctly[2] from baseline to endline**; P4 results remained unchanged. At endline, 12.8% of P1 learners, 35.5% of P2 learners, and 12.7% of P3 learners and 41.3% of P4 learners, could meet the threshold of 80% reading comprehension in Kinyarwanda.

Overall reading performance in Kinyarwanda shows that P1-P4 learners are still "learning to read."

[1] Oral reading fluency (ORF) is the ability to read quickly and accurately with proper expression.

[2] A learner who "reads with comprehension" is defined as being able to answer at least 4 out of 5 (80 to 100%) reading comprehension questions.

ENGLISH

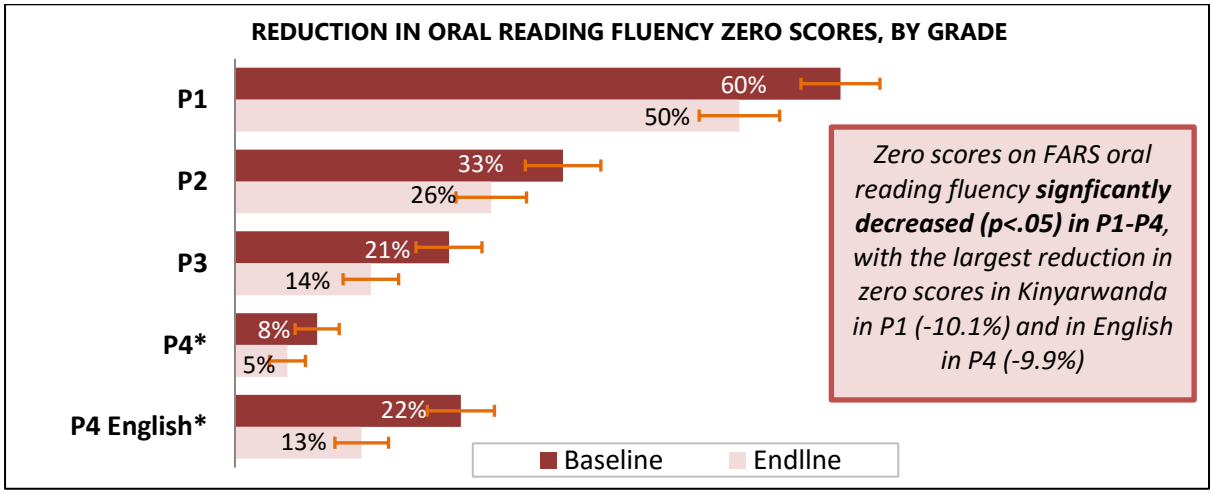
Given that the language of instruction changes from Kinyarwanda to English in P4, a Kinyarwanda and an English FARS assessment was conducted with a sample of P4 learners in October 2015, and a year later in October 2016. **Overall, analysis of the P4 English FARS data showed statistically significant improvements in English oral reading fluency and reading comprehension after one year of L3 intervention**. Learners could read, on average, 9.0 wcpm (±3.0 wcpm) more words correct per minute after one year of L3 intervention – a substantial improvement. Significant improvements of 6.1% (±3.7%) were also seen in English reading comprehension. After one year of L3 intervention, 16.6% of P4 learners could answer at least 4 reading comprehension questions correctly.

REDUCTION IN ZERO SCORES

Overall, the results of the endline assessment found statistically significant reductions in all grades (P1-P4) in zero scores (learners who are unable to read a single word or answer a single reading comprehension question correctly) on Kinyarwanda FARS subtests from baseline to endline, with the exception of the P4 Kinyarwanda reading comprehension subtest.

English results showed that, in P4, significant reductions were also seen in the percentage of learners who were unable to read a single word in an English passage or answer at least one reading comprehension question.

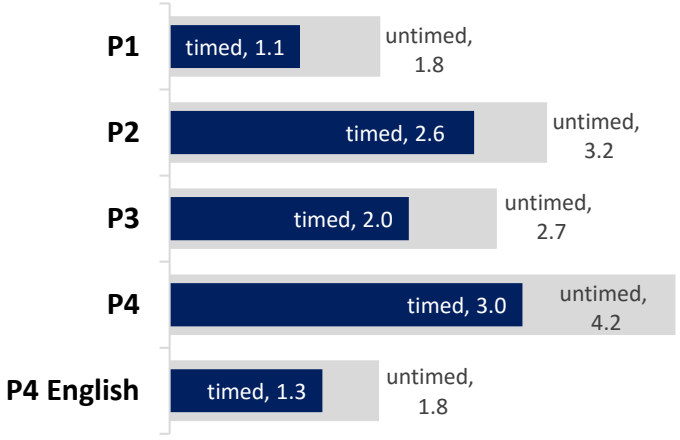
The box below shows the reduction in zero scores in oral reading fluency in Kinyarwanda and English.



FINDINGS FROM TIMED AND UNTIMED TESTING

At endline, timed and untimed testing procedures were explored and learner results were compared. **Students in all grades had significantly higher comprehension scores during the untimed administration**, in which assessors gave the text back to the learners and allowed learners three minutes to finish reading the passage (if they had not done so already), and then asked them comprehension questions without taking the text away. This data suggests that the timed procedure might be underestimating students' comprehension skills; future research and consideration of the untimed procedure is recommended.

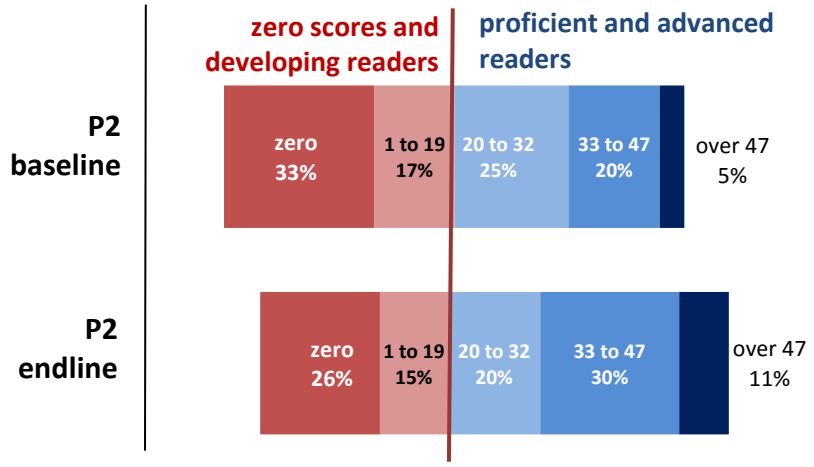
COMPARISONS OF THE NUMBER OF READING COMPREHENSION QUESTIONS CORRECT DURING TIMED AND UNTIMED READING, BY GRADE

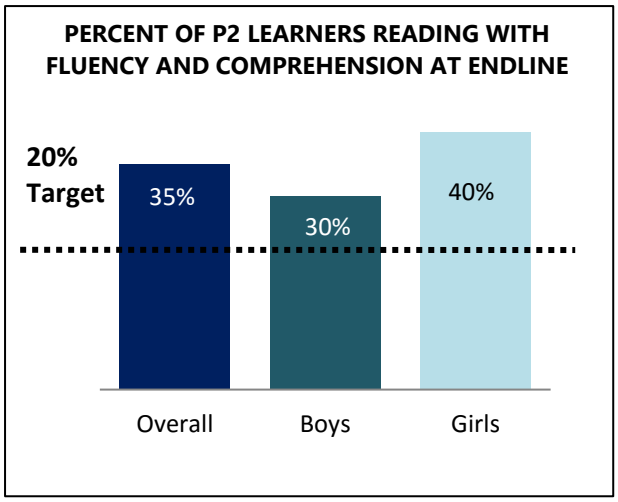


ORAL READING PROFICIENCY AND PERFORMANCE BENCHMARKS

The assessment found that the percentage of P1 - P2 learners meeting oral reading fluency performance standards significantly improved from baseline to endline, **while in P3, significant improvements were not seen.** According to the oral reading proficiency standards established by REB, the percentage of learners in P1 with non-zero scores increased by 10%, and the percentage of P1 learners who could read 20 or more wcpm more than doubled between the baseline and the endline. The percent of P2 learners meeting performance standards (20+ wcpm) increased from 50% at baseline to 60% at endline, as seen in the box to the right. In P3, 28% of learners met performance standards of 33 or more words correct per minute at endline, compared to 25% at baseline.

PERCENT OF P2 LEARNERS READING AT GRADE LEVEL

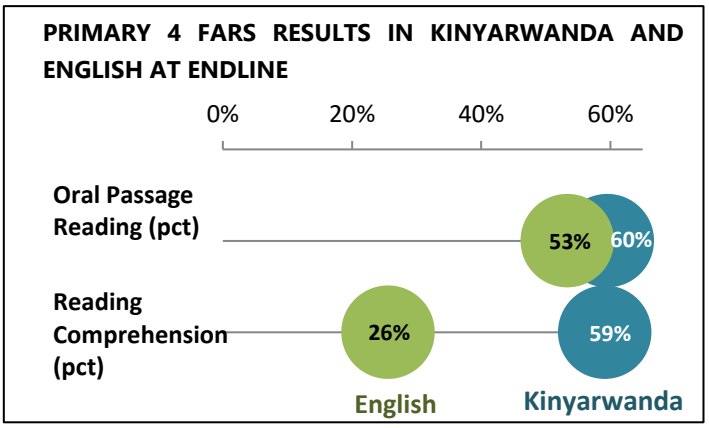




Analysis of endline results show that at endline, L3 exceeded its target of 20% of P2 learners reading with fluency (20+ wcpm) and comprehension (80% reading comprehension). After two years of L3 intervention, 35.0% (±3.8%) of P2 learners can read with fluency and comprehension. Analysis by sex showed that significantly more girls are meeting the fluency and comprehension benchmark than boys, in which 10% more girls were able to read and understand a grade-level text than boys.

FINDINGS ON THE TRANSITION FROM KINYARWANDA TO ENGLISH IN PRIMARY 4

To explore learner performance in oral reading fluency and comprehension in Kinyarwanda and English, assessments in both languages were administered to P4 learners in 2015 and 2016. Overall, **the endline results show that P4 learners performed significantly better on the Kinyarwanda FARS reading assessment compared to the English FARS assessment**. This trend is consistent at baseline and endline. Kinyarwanda endline results suggest that, by the end of P4, learners were, on average, able to read aloud nearly two-thirds of a grade-level Kinyarwanda passage (59.5%) and were able to answer roughly 3.0 (60.0%) reading comprehension questions. By contrast, on the English FARS assessment, P4 learners were able to read aloud roughly half (53.3%) of the English passage, however struggled on the reading comprehension subtest, correctly answering 1.3 (25.6%) reading comprehension questions.



These findings suggest that, although P4 learners have developed decoding and word recognition skills in English, the majority of learners have not progressed to understanding and interpreting what they have read, which is needed for English reading comprehension. Further analysis of the data suggests a moderate-to-strong relationship between learner reading performance in Kinyarwanda and in English. In other words, learners who demonstrate strong reading skills in Kinyarwanda will also likely demonstrate strong reading skills in English,

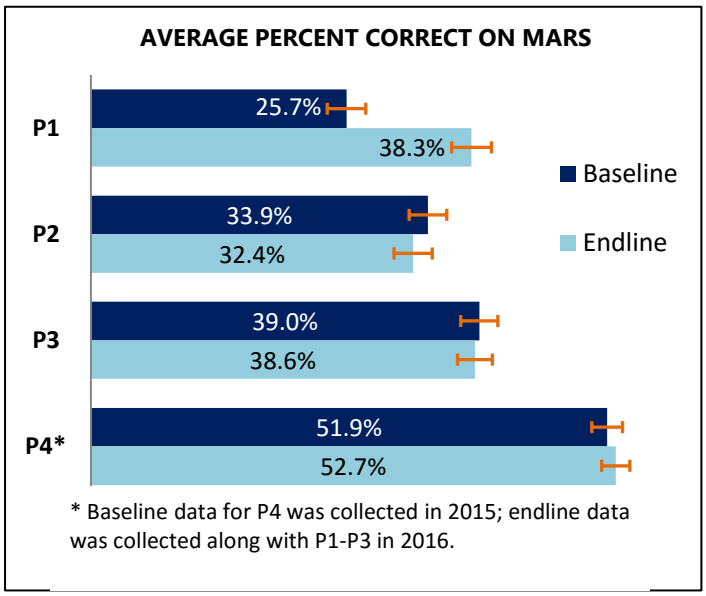
and vice versa. These findings suggest that learners who develop the necessary reading skills in their mother-tongue, Kinyarwanda, can likely transfer these skills to reading in English. Additional research is needed to better understand the relationship between reading acquisition in Kinyarwanda and English.

FINDINGS ON BOYS' AND GIRLS' READING PROFICIENCY

Data analysis found that **girls, on average, continued to demonstrate far better FARS reading results than boys in both Kinyarwanda (P1-P4) and English (P4).** At endline, girls were able to read more of the passage than boys by nine percentage points or more, on average, in all grades (P1-P4); in fact, in P4, girls outperformed boys in Kinyarwanda oral passage reading by 15 percentage points, on average. Similarly, in English, girls could read aloud 9% more of the P4 English passage than boys. In terms of Kinyarwanda and English oral reading fluency, girls were able to read aloud, on average, between two to eleven more words correct per minute than boys at endline. Significantly, more girls met the P2 fluency and comprehension benchmark than boys, in which 10% more girls were able to read and understand a grade-level text than boys.

Endline results also suggested that the gender gap in Kinyarwanda oral passage reading and oral reading fluency may be increasing as learners progress in primary school. Statistical analysis showed that in P3 and P4, larger differences between boys and girls FARS results were detected in oral passage reading, compared to much smaller differences between boys and girls in grades P1 and P2. Analysis of Kinyarwanda and English FARS subtest results showed that the gender gap increased slightly from baseline to endline in P1, P3 and P4. In these grades, girls improved at a particularly faster rate than boys and, boys fell even further behind girls. One exception to this trend was in P2. Although boys, on average, performed worse than girls on P2 FARS subtests, the gender gap was slowly closing. Boys in P2 showed larger gains than girls on Kinyarwanda FARS subtests from baseline to endline. Further investigation is needed to establish the reasons why girls are learning to read better than boys, and why the gap tends to increase in higher grades.

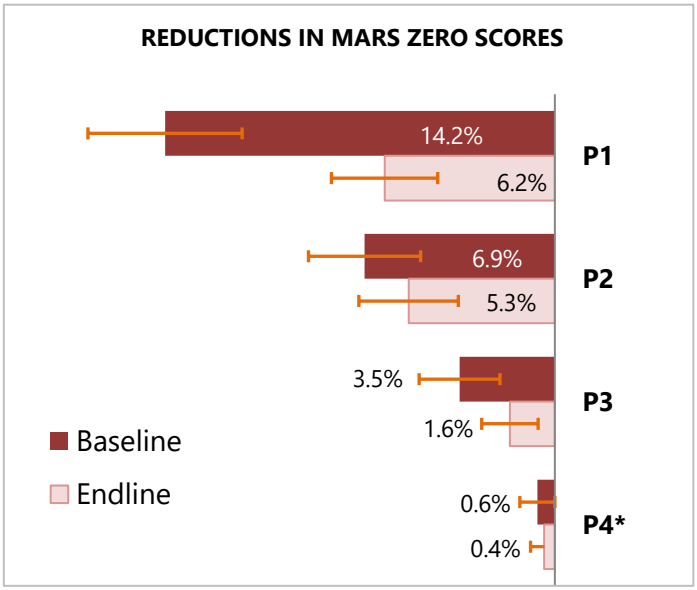
MATHEMATICS ASSESSMENT (MARS) FINDINGS



Analysis of average MARS results at baseline and endline found that learners in Primary 1 showed substantial gains from baseline to endline with an average increase of 12.6% (± 2.8%) in the average percent of MARS tasks solved correctly. **Average MARS results remained unchanged in P2-P4**.

Analysis of changes in MARS performance from baseline to endline by subtest showed varied results by subtest and grade. In Primary 1, significant gains from baseline to endline were seen on all MARS subtests, with the largest gains seen in Comparing Numbers and Subtraction. Changes in P2-P4 MARS subtests from baseline to endline were very small, meaning that little difference was seen in MARS scores from baseline to endline. In Primary 2, results showed a significant increase in the Multiplication subtest; average Subtraction results showed a significant decrease of 5.2% from baseline to endline. In Primary 3 MARS results remained largely unchanged from baseline to endline. In Primary 4, learners showed a substantial increase (12.7%) in average scores on the Comparing Numbers subtest. Significant decreases from baseline to endline in Multiplication and Division scores were also noted in P4.

At endline, the majority of P1-P4 learners were able to answer at lease one mathematics question correctly. Overall, the percent of P1-P4 learners who were unable to answer a single mathematics question (zero score) decreased from baseline to endline. By endline, the percent of P1 learners with zero scores had decreased significantly to 6.2%. P3 also showed significant decreases in zero scores to from 3.5% to 1.6%. P2 and P4 learners showed small, not statistically significant decreases in overall zero scores on the MARS assessment.



FINDINGS ON BOYS' AND GIRLS' NUMERACY PROFICIENCY

At endline, comparisons by sex showed that in P1, P3 and P4, girls and boys were performing similarly in overall MARS performance; statistically significant differences were not found. However, in P2, although at baseline, boys and girls performed similarly, at endline, significant differences were seen, in which boys significantly outperformed girls. Of interest is that the gender gap between boys and girls decreased over time for P1, P3 and P4. In fact, in P1 and P4, girls largely caught up to boys. Improvements in decreasing the gender gap in mathematics for P1, P3 and P4 may be due to the contribution of the L3 program in making the learning environment more gender-sensitive. The L3 materials have been carefully constructed to reinforce positive messages regarding boys' and girls' gender roles.

SCHOOLS, TEACHERS AND LEARNERS

In addition to testing learners, the assessment team also collected a vast amount of data on the school, teacher and learner-level factors that might impact learning including: school infrastructure, learner/teacher ratio, dropout and repetition rates, teaching and learning materials and continuous professional development opportunities. The study found that observations of sampled schools showed varying conditions in the school infrastructure and learning environment in these schools. Assessors scored the majority of schools as having "adequate" or "good" school buildings, roofs and separate latrines for boys and girls. Roughly two-thirds of schools had "adequate" or "good" electricity and a safe space for children to run and play outside. A quarter of observed schools did not have any electricity. Half of observed schools (46.7%) had "good" or "adequate" drinking water available for learners; however, roughly a quarter (28.3%) of schools did not have any drinking water available.

Schools were found to have over-crowded classrooms, particularly in the early grades: average learner to teacher ratio in P1 was found to be 64 learners to one teacher, 56 learners to a teacher in P2, 50 learners to a teacher in P3 and 43 learners to a teacher in P4. Teachers reported large ranges in age of learners in their classes, in which learners could be up to 6 years older, on average, than the expected enrolment age for their grade.

LEARNER/TEACHER RATIO, BY GRADE

Grade	№ of classes	№ of teachers	Learner/ Teacher ratio
P1	2.3	3.9	64 : 1
P2	2.3	3.8	56 : 1
P3	2.0	3.6	50 : 1
P4	1.7	3.3	43 : 1

Sampled schools reported relatively low dropout rates during the 2016 school year. Overall the majority of schools reported total dropout rates by grade, ranging between zero and four percent. On average, teachers reported that 14.1% of learners in their classrooms were

repeaters or had repeated the same grade. The percentage of repeaters by grade was fairly consistent with the exception of P1, which had, on average, the largest reported percentage of repeaters per classroom (22.7%). The average percent of learners repeating the grade across the first three primary grades was 17.5%. Teachers reported moderately high absenteeism of their learners: teachers reported that 9.1% of their learners in their classrooms were absent on the day of data collection.

L3-provided printed teachers' guides and learner's books were largely observed in sampled schools. Primarily they were observed in use by teachers and by learners. The majority (86.0%) of sampled teachers reported that they used L3 materials. Out of the teachers who reported using L3 materials, the most common L3 material used by teachers were teachers' guides, in which almost all surveyed teachers (96.5%) reported using teachers' guides. Out of the teachers who received L3 technology (cell phones, speakers, and memory cards), teachers reported using the technology often. In fact, almost three-quarters (71.6%) used L3 technology at least once a week; of which, half reported using technology two to four times a week. Teachers were also asked what L3 materials they find helpful to use in teaching. They found teachers' guides the most useful by a wide margin, followed by daily readers, read-alouds, and L3 technology.

For teachers that reported that teaching reading was easy, teachers largely cited having enough books as a key resource that made teaching reading easier. Others cited their training or the methodology they were given as reasons that teaching reading was easy. Teachers reported that overcrowded classrooms and insufficient amounts of learning materials were the main challenges to teaching reading.

Head teachers were asked about challenges they faced in their schools that inhibited teaching and learning. The most common challenges reported were lack of support of parents/caregivers for their child's education; lack of help at home for learners with their homework; overcrowding in classrooms; and low literacy levels of parents/caregivers.

The amount and type of support to teachers and head teachers in the form of provision of literacy

CHALLENGES TO TEACHING READING IN PRIMARY GRADES:

- Overcrowded classrooms
- Not enough learning materials
- Children did not attend nursery school
- Family issues, including lack of parental involvement in learning
- Pupil absences
- Children come to school hungry
- Disability, including hearing problems
- Poverty
- Children do not understand the language (English or Kinyarwanda)
- Children are different ages or read at varying levels
- Some children are promoted to the next grade when they should not have

and numeracy information and support, as well as training and professional development varied from school to school. Three-quarters (76.5%) of head teachers reported receiving information on literacy and numeracy from the District Continuous Professional Development Committee. About a third (35.0%) of schools indicated that they received support from other organizations, largely in the form of teacher training (71.4%); and the provision of teaching and learning materials (47.6%). Most head teachers reported that their schools had a school-based mentor (95.0%), of which 84.2% said that the mentor had provided training for teachers and head teachers on the use of L3 materials. Several teachers remarked that their school-based mentor did not have enough time to train and support teachers since they had their own lessons to teach. Some teachers also commented that school-based mentors would benefit from additional training to better support them in literacy and numeracy instruction.

IMPACT OF CONTEXTUAL FACTORS ON LITERACY AND NUMERACY ACHIEVEMENT

Data analysis revealed a variety of factors associated with learners' performance in oral reading, in mathematics, or in both, albeit the relationships were weak. Having a literate mother, having someone reading to a learner at home, having a parent/caregiver check homework regularly and having electricity at home were found to be positively associated with reading results. Repeating a grade, having a sibling who repeated a grade, missing school or being late for school and age were, unsurprisingly, found to be negatively associated with reading results.

Similar to literacy findings, having a literate mother and having electricity at home was positively correlated with better mathematics results. Additionally, missing school and being late to school was found to be negatively correlated with mathematics performance.

Among school characteristics, such factors as having a nursery attached to the school, as well as better school leadership practices such as having a head teacher trained in school leadership and who monitors student progress through classroom observation, were found to be positively associated with better learner FARS and MARS results. Additionally, the availability of a school library showed positive correlations with better FARS results in select grades. Distance to Kigali was found to be negatively correlated with learner achievement in reading and mathematics; learners closer to Kigali tended to do better than those in schools farther away. Additionally, schools farther from local District offices tended to perform worse in reading than those schools that were closer.

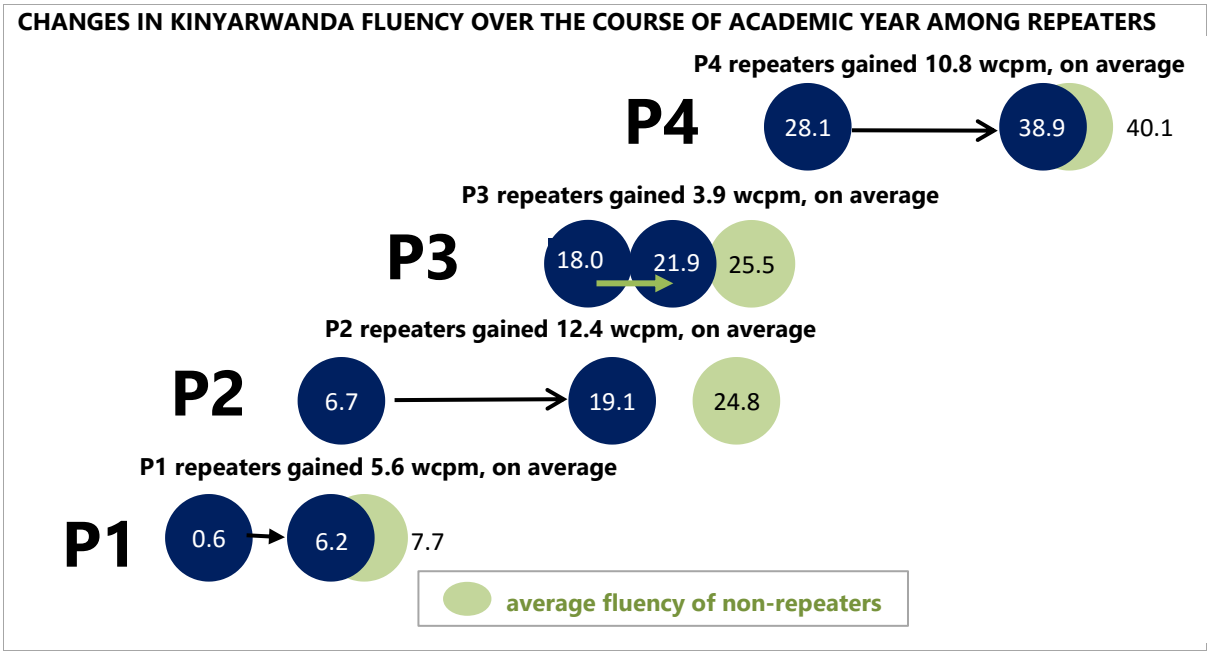
Finally, a few factors in the classroom environment, more teacher professional preparation and the use of L3 materials when teaching, were found to have statistically significant positive relationships with fluency and comprehension scores in select grades.

FINDINGS ON GRADE REPETITION

In order to better understand grade repetition in Rwandan primary schools, a Repeater Study was conducted as part of the L3 national assessment in 2015 and 2016. The study aimed (a) to examine key issues surrounding grade repetition in Rwanda, particularly characteristics of grade repeaters, the extent to which grade repetition impacts learner achievement in reading and mathematics and (b) to assess whether learners who are retained "catch up" to their peers.

On average, teachers reported that 14.1% of learners in their classrooms were repeaters. Most repeaters were found to be in P1 and to be, on average, older than their non-repeating peers. Overall, more boys were more found to be repeating a grade than girls. Repeaters reported missing school or being late for school more often than their non-repeating peers. Teachers reported that the majority of repeaters were not orphans and did not have learning barriers. The most common reason teachers cited that learners were retained in the current grade was government policy on promotion and repetition, low academic performance and poor attendance.

The study tracked 208 learners who were found to be repeating the same grade they were in 2015. Assessment results of those learners were analyzed to determine how effective grade repetition was in improving learner achievement. **The majority of repeaters were found to have made substantial gains in reading and mathematics over the course of one academic year. In fact, many repeaters had largely "caught up" to their non-repeating peers and had similar oral reading fluency and mathematics results.** These findings were corroborated by teachers, in which surveyed teachers indicated that overall the majority (80%) of tracked repeaters had improved sufficiently in the year to be promoted to the next grade the following year.



To further explore what happens to learners after repeating a grade, during endline data collection, the assessment team longitudinally tracked 75 learners that were identified as P1-P3 repeaters in 2015 to see what happened to learners after repeating a grade for one year. Of those learners, 12 (16%) learners were found to still be repeating the same grade; 63 (84%) learners were found to have been promoted to the next grade. Learners in Primary 1 were found to have the largest percentage of learners who were still repeating the same grade a second year in a row. For those learners who were promoted, analysis was conducted to see how they compared to their peers. Results showed that for some learners who previously repeated a grade, they did not necessarily "catch up" to their peers once promoted, especially among those who repeated early grades – Primary 1 and Primary 2 — as seen in lower oral reading fluency and mathematics scores for these learners compared to their peers. Correlational analysis showed an interesting relationship between repeating a grade and higher average mathematics scores in Primary 1. However, in Primary 2 the reverse was found; grade repeaters tended to have lower average MARS scores compared to non-repeaters. It is important to interpret these results with caution given the small sample size of longitudinally tracked repeaters. These results are only intended to suggest possible trends in grade repetition.

Based on these findings, the study of repeaters found that repeating a grade was academically beneficial for most of the learners that the study could track and test twice in 2015 and 2016. These findings are moderated by existing research that shows that initial achievement gains that occur during the year the student is retained will decline within 2-3 years of retention. Many studies have shown that grade retention had a negative impact on all areas of achievement (reading, mathematics and language) and socio-emotional adjustment (peer relationships, self-esteem, problem behaviors, and attendance).

More research is needed on the long-term outcomes of grade repetition on academic achievement as well as the outcomes associated with early or later grade retention.

SUMMARY OF FINDINGS

Oral reading fluency assessment results show substantial gains in the proportion of P1-P3 learners reading at grade level in Kinyarwanda over the course of two years of L3 implementation nation-wide. Most of those learners who were able to read the text were also able to answer some or all comprehension questions. However, overall reading performance suggests that many learners were still struggling to read at grade level in the lower primary grades. Comparisons in Kinyarwanda comprehension rates between timed and untimed reading showed a significant improvement in comprehension rates when learners were allowed more time to finish reading the text and to refer to the text when answering comprehension questions.

Significant improvements were also seen in English reading fluency of P4 learners from 2015 to 2016; however, English reading comprehension results were still low. These findings suggest that although Primary 4 learners have developed decoding and word recognition skills in English, the majority of learners have not progressed to understanding and interpreting the vocabulary and the ideas in the text, which is needed for English reading comprehension.

Mathematics assessment results showed that, at endline, a large proportion of P1, P2 and P3 learners were still developing basic mathematics skills that would enable them to perform grade-level number operations with accuracy and speed. The majority of P1, P2 and P3 learners were able to work out several adding and subtracting problems correctly at endline, but very few learners demonstrated grade-level procedural fluency on elementary mathematics operations. However, analysis of MARS results revealed that learners in Primary 1 showed statistically significant gains in average scores from baseline to endline. Average MARS results remained largely unchanged in P2-P4. Notably, the gender gap in mathematics between boys and girls decreased over the course of the L3 intervention for P1, P3 and P4. In fact, in P1 and P4, girls largely caught up to boys. These findings suggest that although substantial improvements in mathematic achievement were only noted in Primary 1, the L3 nationwide intervention in primary schools has been effective, particularly among girls, in reducing the gender gap in mathematics achievement in P1, P3 and P4.

RECOMMENDATIONS

Review, revision and sensitization of system-level policies could have a positive impact on overall learner achievement. The results of such a review could impact the process of instruction, bilingual transitional programming, learner repetition and class promotion, assessment of learners and continuous professional development. Specifically, the L3 Initiative recommends the review/revision of policies relating to the following issues:

- **SENSITIZE SCHOOL STAFF REGARDING POLICIES ON CLASS PROMOTION, REPETITION AND DROPOUT.** School staff should be sensitized on the correct application of the promotion and repetition policy. The policy should be reviewed and revised to ensure schools staff are accountable for their learners' progress.

- **CONSIDER BILINGUAL LATE-EXIT TRANSITIONAL PROGRAMMING.** L3 recommends a bilingual late-exit transitional programming for primary schools with English as the language of instruction in P6 or later. Studies have demonstrated that "late-exit" transitional programs, i.e. those that develop their mother tongue language skills for four to five years (as opposed to only three years), have much better results in terms of student performance.

- **ESTABLISH EXPLICIT LITERACY AND NUMERACY STANDARDS.** Priority should be given to developing specific standards and benchmarks for P1 through P3 based on key literacy competencies.

- **PROVIDE SCRIPTED TEACHER GUIDES.** REB should consider investing in the development of scripted teacher guides to ensure that teachers have the needed guidance and knowledge in the implementation of the new competence based curriculum.

- **PROVIDE ASSESSMENT TOOLS WHICH SCHOOL STAFF CAN USE TO MONITOR PROGRESS.** Assessment tools for head teachers should be developed for measuring and reporting student literacy and numeracy progress and teacher performance/improvement. These tools should be based on set literacy standards and, when utilized, should provide teachers and school management with useful feedback to guide their instructional planning.

- **PROVIDE REGULAR CONTINUOUS PROFESSIONAL DEVELOPMENT (CPD).** The L3 Initiative recommends that District Continuous Professional Development Committees coordinate and monitor regular CPD on early grade literacy and numeracy practices.

- **PROVIDE SUPPLEMENTARY READING MATERIALS.** School management should be encouraged and supported to develop and maintain school libraries, where learners may take books home to read to a parent and or sibling.

- **ENCOURAGE COMMUNITY AND FAMILY SUPPORT.** Head teachers and School General Assembly Committees (SGACs) should receive guidance and training on how to provide a direct and structured on-going communication between the classroom, the family and the community to ensure success in reading.

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ACRONYMS

EDC	Education Development Center, Inc.
EGRA	Early Grade Reading Assessment
EGMA	Early Grade Mathematics Assessment
ESSP	Education Sector Strategic Plan
FARS	Oral reading fluency Assessment of Rwandan Schools
MARS	Mathematics Assessment of Rwandan Schools
IIEP	International Institute for Educational Planning
IRR	Inter-rater reliability
L3	Literacy, Language and Learning Initiative
LARS	Learning Achievement in Rwandan Schools
LOI	Language of Instruction
MINEDUC	Ministry of Education of Rwanda
MT	Mother-tongue
M&E	Monitoring and Evaluation
ORF	Oral Reading Fluency
REB	Rwanda Education Board
SGAC	School General Assembly Committee
UNESCO	UN Education, Scientific, and Cultural Organization
USAID	U.S. Agency for International Development
Wcpm	Words correct per minute

ACKNOWLEDGMENTS

The L3 Monitoring and Evaluation Department wishes to acknowledge the important contributions of the numerous people who made this study possible. Many Ministry of Education officials provided key inputs into the development and implementation of the study, including aligning the reading assessment instruments and methodologies to the Rwandan context and participating in the data collection. Last but not least, the study team owes a debt of gratitude to communities, head teachers, teachers, and learners in the sample schools for their cooperation with the data collection. We sincerely appreciate the help of all concerned.

INTRODUCTION

The Literacy, Language and Learning Initiative (L3), funded by the U.S. Agency for International Development (USAID) and implemented by a partnership led by the Education Development Center, Inc. (EDC), is designed to help improve learners' language and mathematics skills in the primary grades (P1-P4). From 2011 to 2016, L3 assisted the Ministry of Education (MINEDUC) in the implementation of a comprehensive early literacy and mathematics program, which included pre-service and in-service teacher training in proven reading and mathematics teaching strategies, support for the transition from Kinyarwanda to English as the language of instruction in Primary 4 (P4), and development and provision improving the availability and use of innovative reading and mathematics instructional materials. The exhibit below summarizes the main objectives of the L3 initiative. A more detailed overview of the L3 Initiative can be found in Appendix A.

STRUCTURE OF THE REPORT

To gather information on learner achievement, as well as to support the Rwandan Education Board (REB) in establishing a system of regular national assessments, L3 conducted annual assessments of learner achievement in literacy and mathematics during the project rollout stage (2014-2016) with a random sample of learners drawn from a nationally representative sample of schools. The assessment had the following main objectives:

1. Evaluate the outcomes of the L3 initiative[3]:
    a. After two years of national implementation of the L3 intervention, document changes in P1 – P3 learner achievement in oral reading fluency in Kinyarwanda against established benchmarks, and in mathematics on grade-level procedural fluency tasks after two years of national implementation of the L3 intervention.
    b. Given that the language of instruction changes from Kinyarwanda to English in P4, document changes in and the relationship between P4 learner performance in oral reading fluency in Kinyarwanda and English.
2. Investigate factors impacting learner achievement:
    a. Analyze variance in learner achievement using school-level data, such as active School General Assembly Committee (SGACs), and classroom-level data such as teacher background characteristics, using instructional technology, teaching experience, etc.

[3] The outcome evaluation is designed based on the principles of the impact attribution articulated in USAID Evaluation Policy (2011), and recommendations in the Technical Notes of the Education Strategy (2012, 2015). The counterfactual for the project impact is captured through the baseline conducted with the nationally representative sample of primary schools in October of 2014.

   b. Analyze variance in learner achievement using learner background characteristics, such as parental literacy, support with homework at home, etc.
3. Analyze learner achievement among learners who repeated the same grade to establish to what extent repeating a grade affects learner achievement.
4. Develop recommendations for L3 and REB with regard to support systems needed to accelerate improvements in learner achievement.

This report presents results that address each of these research objectives and draws conclusions and recommendations based on those data. The report starts with a brief overview of the evaluation design and methodology. A more detailed description of the methodology, data collection and tools can be found in Appendix B.

Chapters 1 and 2 provide an overview of the context of early grade reading in study schools in terms of the classroom environment, school leadership, learning environment as well as findings from the learner interview. In Chapter 3, oral passage reading (accuracy), oral reading fluency and comprehension results from the FARS assessment are presented. Reading performance of P1-P3 learners collected at the initial roll-out of the L3 intervention are compared to results after two years of project implementation in order to measure changes in learner reading achievement associated with two years of L3 intervention. Additionally, given that the language of instruction changes from the mother tongue (MT), Kinyarwanda, to English in P4, reading achievement of P4 learners in Kinyarwanda and English are explored.

Chapter 4 examines the performance of P1-P4 learners in mathematics on grade-level procedural fluency tasks. Results from the baseline are compared to endline results in order to measure changes in learner grade-level mathematics achievement associated with the L3 intervention. The next chapter explores the reading and mathematics assessment results at the school-level in which trends are explored in outlier schools that have extreme FARS/MARS results: either performing substantially worse than other schools in the sample or performing substantially better. Lastly, results from a Repeater Study are presented in Chapter 6, which explores the characteristics of grade-level repeaters as well as to what extent repeating a grade impacts learner achievement. The report concludes with recommendations for REB with regard to support systems needed to accelerate improvements in learner achievement.

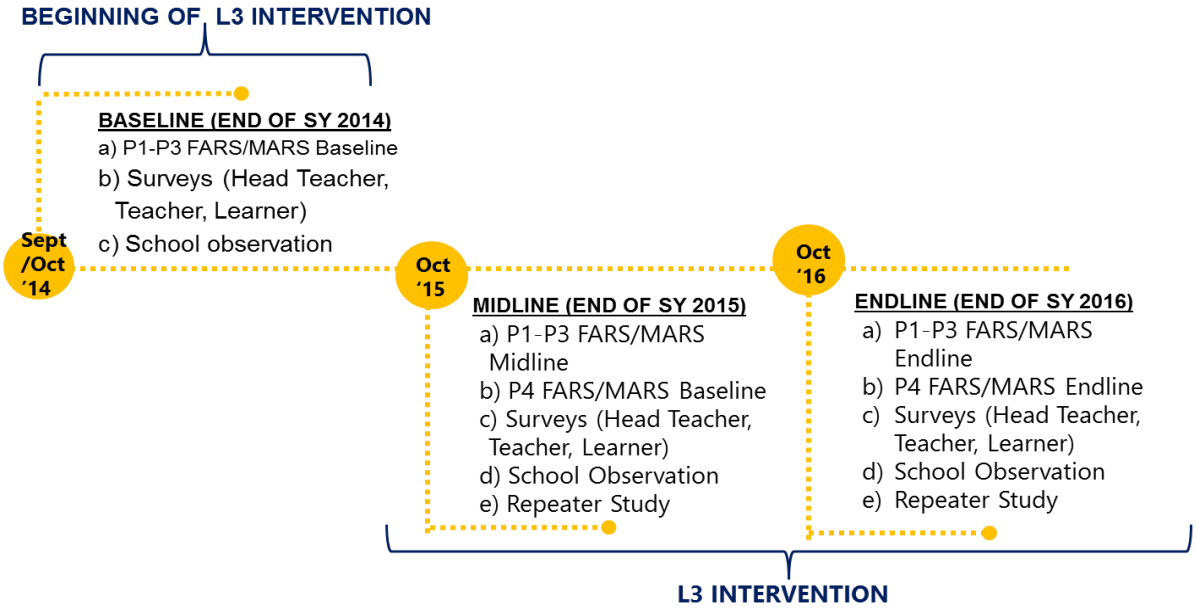
EVALUATION DESIGN

METHODOLOGY

The purpose of this evaluation study is to: 1) measure changes in P1-P3 learner achievement in reading and mathematics; 2) explore the relationship between P4 learner performance in oral reading fluency in Kinyarwanda and English; 3) collect data on the school and learning context, 4) explore whether variance in learner achievement is explained by contextual factors; and 5) explore to what extent repeating a grade impacts learner achievement.

The evaluation followed a quasi-experimental, cross-sectional design in which the same sample of schools and, to the extent possible, the same cohorts of learners are tracked over the life of the project. In order to document changes in P1-P4 learner achievement in reading and mathematics over the course of the L3 Initiative, our evaluation was designed to collect learner, teacher and school data at three time periods (baseline, midline and endline). In 2014, before the full L3 intervention began, a comparison cohort of P1-P3 learners in a nationally representative sample of schools in Rwanda was assessed in reading (Kinyarwanda) and mathematics at the end of the school year. Each subsequent year, in 2015 and 2016, P1-P4 learners were assessed in reading and mathematics to compare to baseline scores before the full L3 intervention rolled-out.[4] The figure below shows the timeline of evaluation activities for data presented in this report.

FIGURE 1. TIMELINE OF L3 EVALUATION ACTIVITIES



[4] In 2015 and 2016, an assessment of P4 learners in English, Kinyarwanda and mathematics was added to data collection activities.

To measures learner's competencies in reading and mathematics, grade-level oral reading and mathematics assessments were conducted in sample schools. Assessments were conducted in the language of instruction, which is Kinyarwanda in P1 through P3, and English in P4. The following tests are included in the assessment:

- **Oral Reading Fluency Assessment of Rwandan Schools (FARS)**[5] includes a grade-level passage and five comprehension questions based on the passage. This test measures oral reading fluency (speed and accuracy of reading) and comprehension of a grade-level text.
- **Mathematics Assessment of Rwandan Schools (MARS)** includes grade-level problems designed to measure grade-level procedural fluency.

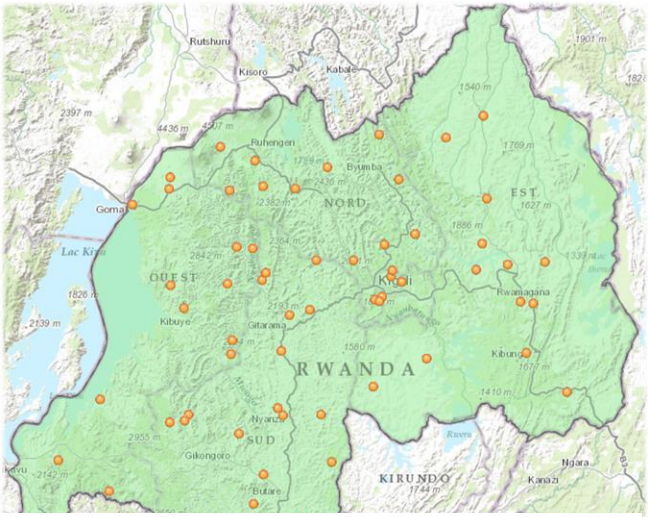
The assessments were developed by a team of experts from the REB and L3 and are based on a) international standards for testing and measuring learners' oral reading fluency in the early grades, b) on Rwandan[6] grade level standards in literacy and mathematics, and c) Rwanda's Competence-based Curriculum. The assessments were extensively piloted through a number of pilot activities. (For further detail on the FARS/MARS tools, please see Appendix B).

To assess changes in reading and mathematics performance of primary learners over the course of the L3 intervention, this report presents learner achievement data collected at the end of the 2014 (baseline) and 2016 (endline) school years utilizing the established national reading performance standards.

SAMPLE

The assessment collected nationally representative data on oral reading fluency and mathematics achievement among learners in Primary 1, 2, 3 and 4. The detailed sampling parameters are found in the Methodology section in Appendix B.

The sampling approach followed a random clustered sampling method to obtain a



Study schools on a map, October 2014, 2015, 2016

[5] The FARS, is an Early Grade Reading Assessment (EGRA) -lite assessment tool designed to measure learner's competencies in oral reading fluency and comprehension. The FARS assessment tool is shorter than the EGRA, which often includes subtests such as letter recognition, phonemic awareness, reading simple words, and listening comprehension. The FARS is designed to test only oral reading fluency and comprehension in which learners are asked to read a grade-level passage aloud and answer five reading comprehension questions.

[6] Since 2012, the REB and L3 worked closely to create national reading performance standards for primary grades 3 and 5. A national assessment of P3 and P5 to validate those standards was conducted at the end of the 2012 school year. In 2014, this work continued with proposing reading standards for Primary 2 (P2) and validating them through national sample-based testing, which were approved in August 2015.

nationally representative sample of public or government-aided schools. The clustered sampling process involved randomly selecting 2 schools from each of the 30 districts in five provinces, with the total of 60 schools randomly selected using the Complex Samples module of the Statistical Package for the Social Sciences (SPSS). The same schools participated in the baseline, midline and endline assessments. Because there are a different number of districts in each province, the number of schools in a sample is also different in each province. To compensate for the fact that school districts are different in size, the results of the assessment were weighted during the data analysis. Applying post-stratification weights to the sample ensures that some provinces or school districts are not over or under-represented in the nation-wide estimates. Consequently, actual sample sizes (*n*'s) are only reported in this section and Chapters 1 and 2 that focus on background school, teacher and learner-level context findings; in subsequent sections *n*'s will not be reported and weighted data will be used.

In each visited school, the Head Teacher was asked to complete the School Survey Form to collect contextual information that could help explain variation in learner results across schools. In addition to that, 470 teachers selected from P1, P2, P3 and P4 classrooms completed a teacher survey (See Appendix B for description and Appendix D for a copy of the survey). Table 1 shows the breakdown of teachers by grade and province. A relatively even numbers of teachers from each grade and subject (Kinyarwanda, English and mathematics) were selected for the sample. The majority (65.3%) of teachers sampled were female, which is a slight decrease from the 70.7% of teachers who were female, sampled at baseline. The lower primary grades (P1 and P2) had higher percentages of female teachers, on average, (79% and 70% respectively), compared to the middle primary grades (58% in P3 and 46% in P4).

TABLE 1. ENDLINE SAMPLE OF SCHOOLS AND TEACHERS, BY GRADE AND PROVINCE

Province	Number of schools	P1	P2	P3	P4	TOTAL
Eastern	12	28	28	28	28	112
Kigali City	6	12	12	11	12	47
Northern	10	19	19	20	19	77
Southern	18	31	31	30	31	123
Western	14	28	28	28	27	111
TOTAL	60	118	118	117	117	470

For the learner sample, at baseline, P1-P3 learners were randomly selected to participate in the FARS/MARS assessment. Learners were tracked longitudinally to the extent possible. Longitudinally tracked P2, P3 and P4 learners who were absent on the day of midline and endline testing, dropped out or were found to be repeating the same grade were replaced with randomly selected learners of the same sex and grade as the missing ones. All P1 learners for the midline and endline assessments were randomly selected.

The table below details the sample of learners used in the report. Given that assessment results between baseline (SY 2014) and midline (SY 2015) were compared in the midline evaluation report, this report will focus on assessing improvement in reading and mathematics skills of P1-P3 learners after two years of L3 intervention, comparing results from baseline (SY 2014), before the full roll-out of the L3 intervention, and endline, after two years of L3 (SY 2016). For P4 learners, given that data was not collected at baseline (SY 2014), results from the data collection (SY 2015) will be compared to endline results (SY 2016).

TABLE 2. LEARNER SAMPLE

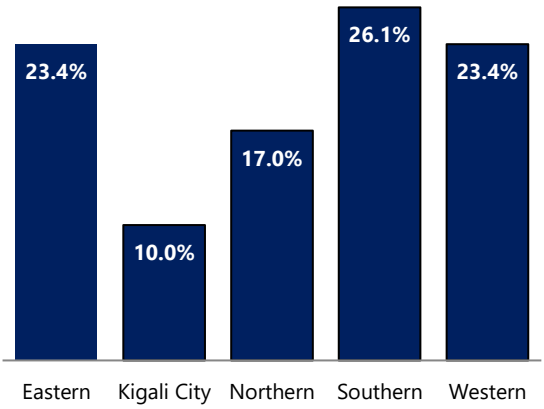
Cohort	Number of schools	P1	P2	P3	P4	TOTAL
Baseline (SY'14)	60	599	600	600	---	1799
Midline (SY'15)	60	604	602	606	601*	2413
Endline (SY'16)	60	602	595	592	598	2387

*Baseline data for P4 was collected in 2015; endline data was collected in 2016 along with P1-P3

In order to better understand grade repetition in Rwandan primary schools, a repeater study was conducted as part of L3's FARS/MARS national assessment in SY 2015 and SY 2016. The study aimed to examine key issues surrounding grade repetition in Rwanda, particularly characteristics of grade repeaters, to what extent grade repetition impacts learner achievement in reading and mathematics and to assess whether learners who are retained "catch up" to their peers. To answer these questions, the study longitudinally tracked two cohorts of learners: (1) to assess learner achievement after repeating a grade for one academic year, learners who were assessed in SY 2015 and who were found to be repeating the same grade in SY 2016 were tracked and tested in SY 2016; (2) to better understand the longer-term outcomes of grade repetition, learners who were identified as repeaters in SY 2015 were tracked and tested in SY 2016. The assessment team was able to locate and test 1,233 learners from the P1-P3 sample who were tested at midline (68.0% of the midline P1-P3 sample) and 37 P4 learners from the midline sample who were found to be repeating the same grade. Of the tracked learners who were present on the day of endline testing, 171 P1-P3 learners (13.9% of the tracked midline P1-P3 sample) and 37 P4 learners tracked from midline were found to be repeating the same grade they were in at midline testing a year previously (midline repeaters). The assessment team also longitudinally tracked how many learners who were identified as repeaters during midline data collection in 2015 (baseline repeaters) were still repeating the same grade at endline and how many learners had been promoted to the next grade. Of the 175 baseline repeaters identified at midline, the assessment team was able to track and test 75 (42.8%) at endline. Detailed analysis of repeaters versus non-repeaters is found in the dedicated Chapter 6 of the report.

In total, the final endline sample was 2,670 learners, including 75 baseline repeaters (tracked learners from the original baseline sample who were repeaters at midline), and 208 midline repeaters (learners from the sample who were repeating the same grade at endline as they were tested in at midline). The endline report is based on the analysis of data 2,387 learners and does not include results of 283 learners tracked from the baseline and midline who were repeating the same grade. Instead, the results of repeaters are reported in Chapter 6 dedicated to the analysis of data on repeaters.

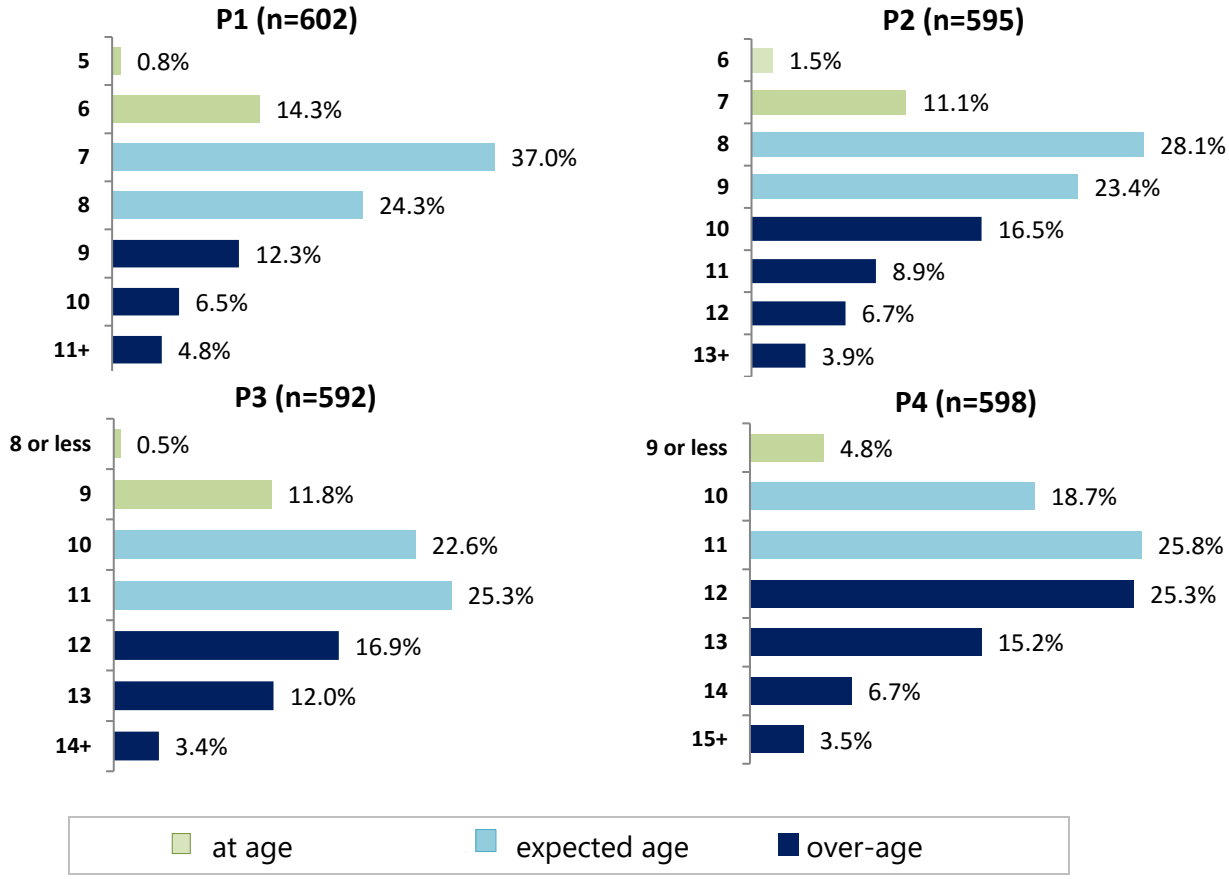
FIGURE 2. SAMPLED LEARNERS BY PROVINCE (N=2,387)



The sample was constructed to be *nationally* representative for P1, P2, P3 and P4. While it is stratified by district to ensure adequate representation of learners from all districts of the country, the province-level or district-level sub-samples are not large enough to be treated as separate samples. These sub-samples will be only able to detect *very* substantial changes or differences. The chart above shows the provincial representation of the sample at endline. District-level post-stratification weights at the school level were constructed to compensate for the disproportionate representation of learners from some school districts within provinces, to ensure that the sample is nationally representative. Weights were used in all analyses of oral reading fluency and mathematics assessment data to enable extrapolations from the sample onto the population of Rwandan school children in Primary 1, 2, 3 and 4.

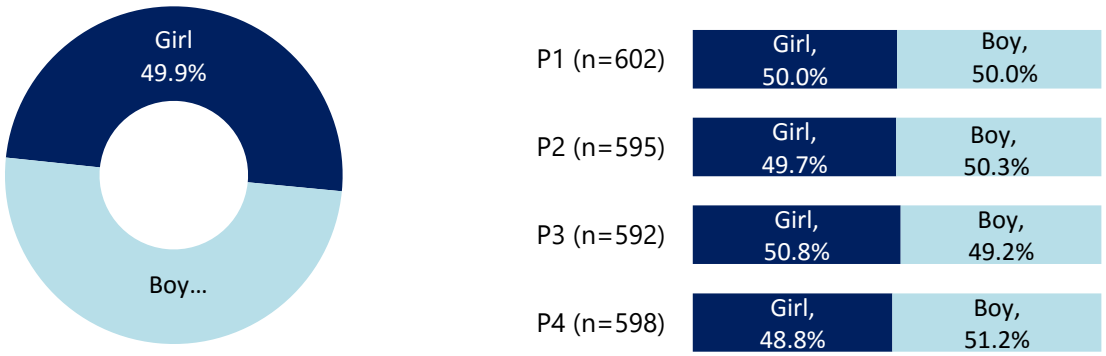
Age and Sex of Learners. Sampled learners at endline ranged in age from 5 to 21 years old. Similar to the baseline, the median age of Primary 1 learners was 7, for Primary 2 learners was 9, for Primary 3 was 10, and the median age for Primary 4 learners was 12. Figure 3 shows the age distribution of the tested learners. These graphs demonstrate the age diversity of primary grade classrooms.

FIGURE 3. LEARNER'S AGE BY GRADE



The sample was designed to select an identical number of boys and girls in each grade, in each school. The final distribution by sex was nearly perfect across cohort and grade. Since statistics for overall enrollment in primary grades in the sampled schools show gender parity, no gender weights were applied in the statistical analysis of the results.

FIGURE 4. BREAKDOWN OF SAMPLE, BY SEX (N=2,387)



For more details on the methodology of the L3 outcome evaluation, please refer to Appendix B, which includes a detailed description of methods and data collection tools. Appendix C and D provides information on data collection and the data collection tools. Appendix E includes detailed assessment results.

I. LEARNER CONTEXT INTERVIEW FINDINGS

It is widely recognized in the field of education that such contextual factors such as a home environment that supports learning, adequate nutrition, and early exposure to literacy play a prominent role in helping children succeed academically.[7] Additionally, such school factors such as teachers assigning homework or teachers reading to children have also been found to be associated with improved performance. To better understand which of these potential moderators seems to be particularly influential in explaining variance in learner performance in Rwanda, the L3 assessment team developed a learner interview questionnaire. The intent behind the questionnaire was to gather background information about the child's life and experiences that have direct relevance to his or her competencies in literacy and mathematics. The following questions were included in the interview:

Home Environment

1. What language do you speak at home?
2. At home, does someone read stories to you?
3. Who helps you to read at home?
4. Who listens to you when you read at home?
5. Do you see your mother (or main caregiver) reading books or newspapers?
6. How often do you miss school?
7. How often are you late for school?
   7a. Why are you missing school or late for school?
8. Have you or any of your siblings ever repeated a grade?
9. At home, which of the following do your parents expect you to do regularly? (Help with household chores, go to market, study, etc.)
10. Do your parents/caregivers want you to go to school every day?
11. Do your parents/caregivers check your homework?

[7] Park, H. (2008). Home literacy environments and children's reading performance: A comparative study of 25 countries. Educational Research and Evaluation, 14(6), 489–505. 2008. "Reading Achievement: International Perspectives from IEA's Progress in International Reading Literacy Studies (PIRLS)", Special Issue in Educational Research and Evaluation: An International Journal on Theory and Practice, Vol. 14, Issue 6, 2008. Fan, Xitao and Chen, Michael. 2001. "Parental Involvement and Learners' Academic Achievement: A Meta-Analysis" in Education Psychology Review. March 2001, Volume 13, Issue 1, pp 1-22. Bus, Adriana G., Van IJzendoorn, Marinus H. and Pellegrini, Anthony D. 1995. "Joint Book Reading Makes for Success in Learning to Read: A Meta-Analysis on Intergenerational Transmission of Literacy". Review of Educational Research, Spring 1995 vol. 65 no. 1 1-21.

School/Teacher

12. What do you like about school?
13. What do you NOT like about school?
14. Is this your first year in this grade?
15. Does your mathematics teacher check your work that you do in class?
16. Does your mathematics teacher check/mark your homework?
17. Does your Kinyarwanda teacher check your work that you do in class?
18. Does your Kinyarwanda teacher check/mark your homework?
19. Do you ask questions when you do not understand something?
20. At school, can you choose which stories to read?
21. Are you allowed to take books home from school?
22. Do you ever take books from school to read at home?
23. Do you usually go to borrow books to read?

Socio-Economic Factors

24. Did you have something to drink today, like water, tea, milk or juice?
25. Did you have something to eat today, like potatoes, rice, bread or beans?
26. Do you have radio or cell phone at home?
27. What light do you have at home? (Candles, electric lamp, solar panel lamp, etc.)
28. Does anyone at your house have a bicycle, a motorcycle or a car?

HOME ENVIRONMENT

The vast majority (99.8%) of learners reported that they speak Kinyarwanda at home. Only a few learners (1% or less) reported speaking other languages at home such as Urukiga, Kirundi, English or Kiswahili.

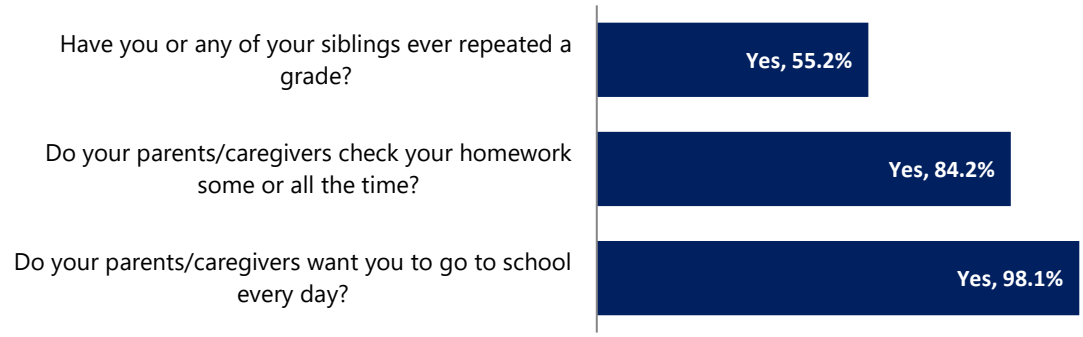
FIGURE 5. HOME ENVIRONMENT: READING (N=2,387, MULTIPLE RESPONSE)

Almost three quarters of learners said that a caregiver at home reads stories to them (73.7%) compared to roughly half (50.1%) at baseline. Results by grade showed that learners in higher grades were more likely to be read to at home—63.1% of P1 learners, 72.1% of P2, 78.0% of P3, and as many as 81.8% of P4 learners. In P2 and P3, slightly more girls reported being read to at home than boys, while for learners in grades P1 and P4, little difference was seen between boys and girls. It should be noted that the accuracy of this self-reported data could not be confirmed with parents since parent interviews were not part of the study. The majority of learners (83.9%) reported that someone at home helps and

listens to them read. Learners said that their mothers and siblings helped them read or listened to them read more often than their fathers did. About three quarters of learners reported that they see their mother (or other caregiver) reading books and newspapers around their home, which is a slight increase from baseline (69.8%).

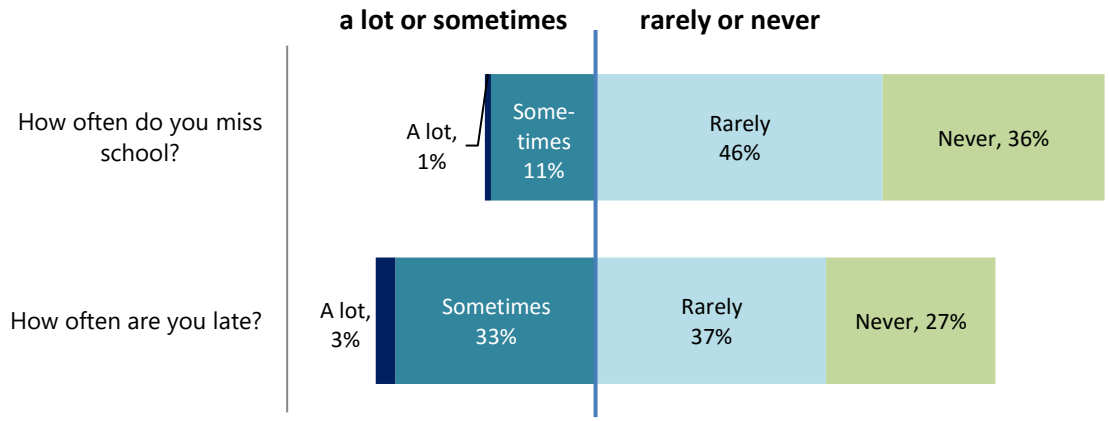
Just over half of learners reported that either themselves or a sibling had repeated a grade before. The vast majority said that their parents wanted them to attend school daily, and most (84.2%) had parents who checked their homework at least some of the time. There was negligible variation between girls and boys on these results.

FIGURE 6. HOME ENVIRONMENT: SCHOOL (N=2,387)



Learners' self-reported frequency of being late or absent was similar across sex. There was slight variation across grades, with P3 learners reporting slightly more lateness than the other grades, and P4 learners reporting slightly fewer absences than other grades. Results were consistent with findings from teacher surveys in which teachers indicated that roughly 9.1% of learners were absent on the day of data collection. Additionally, the majority of teachers (93.4%) said that only "a few" or "some" learners arrive to school late.

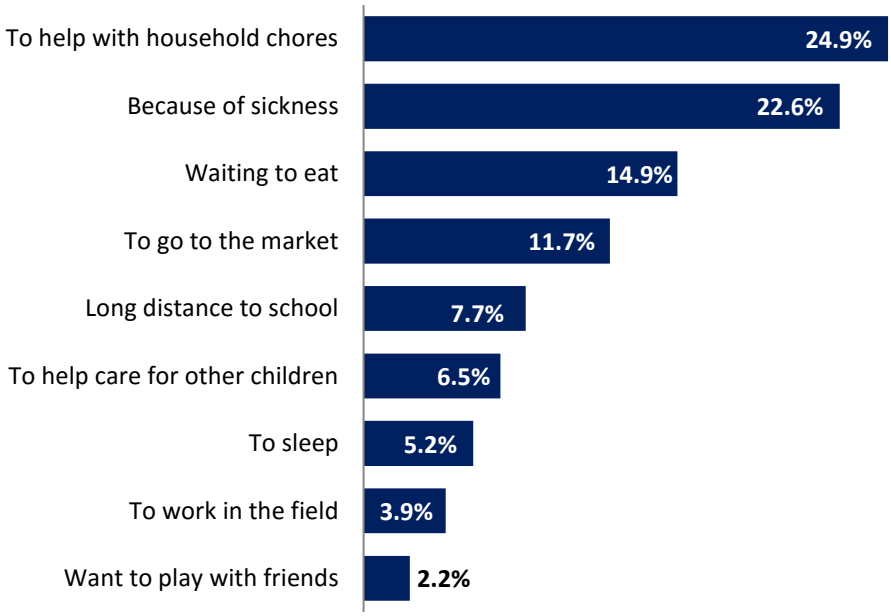
FIGURE 7. HOW OFTEN DO YOU MISS SCHOOL OR ARE LATE? (N=2,387)



For those learners who mentioned that they were late for school frequently, the most cited reasons for being late or absent were needing to do chores (24.9%) and being sick (22.6%). A few learners mentioned other reasons such as not going to school when their parents are not home, lacking materials for school, or needing to wash themselves or their uniform. Responses were similar for boys and girls, although slightly more girls than boys missed or were late to school due to needing to care for siblings.

The majority (87.0%) of learners reported that they were expected by their parents to help with household chores regularly. Less than half (42.5%) said that their parents expected them to study regularly. Several learners also mentioned that they were expected to go to the market, help with the other children, clean, collect firewood, fetch water, look after livestock and prepare food. Results were fairly consistent for both boys and girls with the exception of helping with the other children in the family in which significantly ($p<.001$) more girls were expected to do this than boys.

FIGURE 8. IF YOU ARE LATE/ABSENT A LOT OR SOMETIMES, WHY? (N=1,023, MULTIPLE RESPONSE)



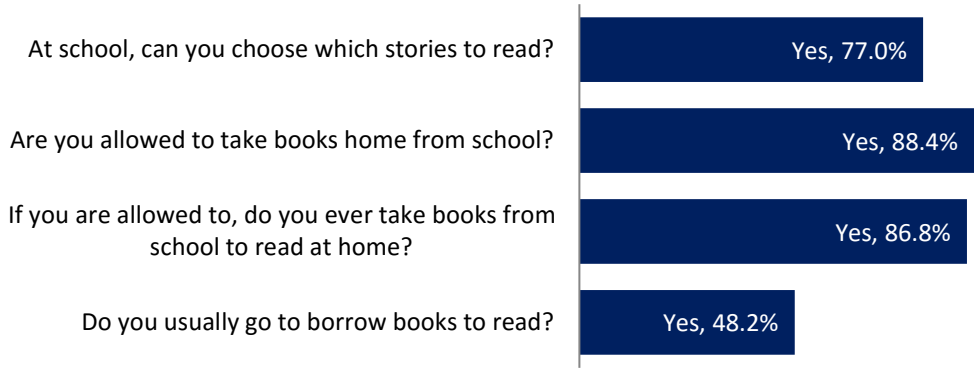
SCHOOL AND TEACHER

Learners overwhelmingly reported that mathematics and Kinyarwanda teachers check their homework and in-class work. The study did not collect data on the content of the work or what "checking homework" entails.

Overall, 76.5% of learners report that when they do not understand something, they ask a teacher; 19.7% ask a peer. Only 3.7% do not ask anyone for help. Over three quarters (77.0%) of learners are able to choose which stories to read at school. The majority (88.4%) of children are allowed to take books from school to read at home, and 86.8% of all respondents take the opportunity to do so. Roughly half (48.2%) of learners said that they usually go to borrow

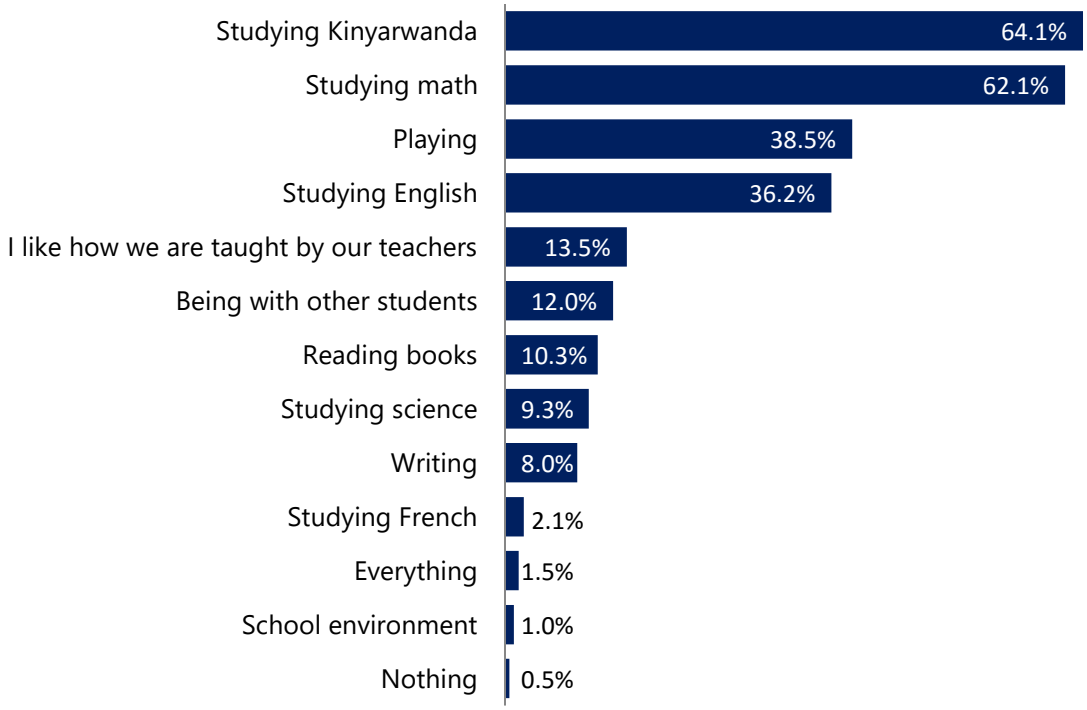
books to read, while 40.3% said they do not borrow books because they do not like to; only 11.5% of learners do not borrow books because they do not have a place to borrow from. Data was not collected on the type of books, the frequency or how many books the learners were able to take home.

FIGURE 9. SCHOOL/TEACHER FACTORS INTERVIEW RESULTS (N = 2,387)



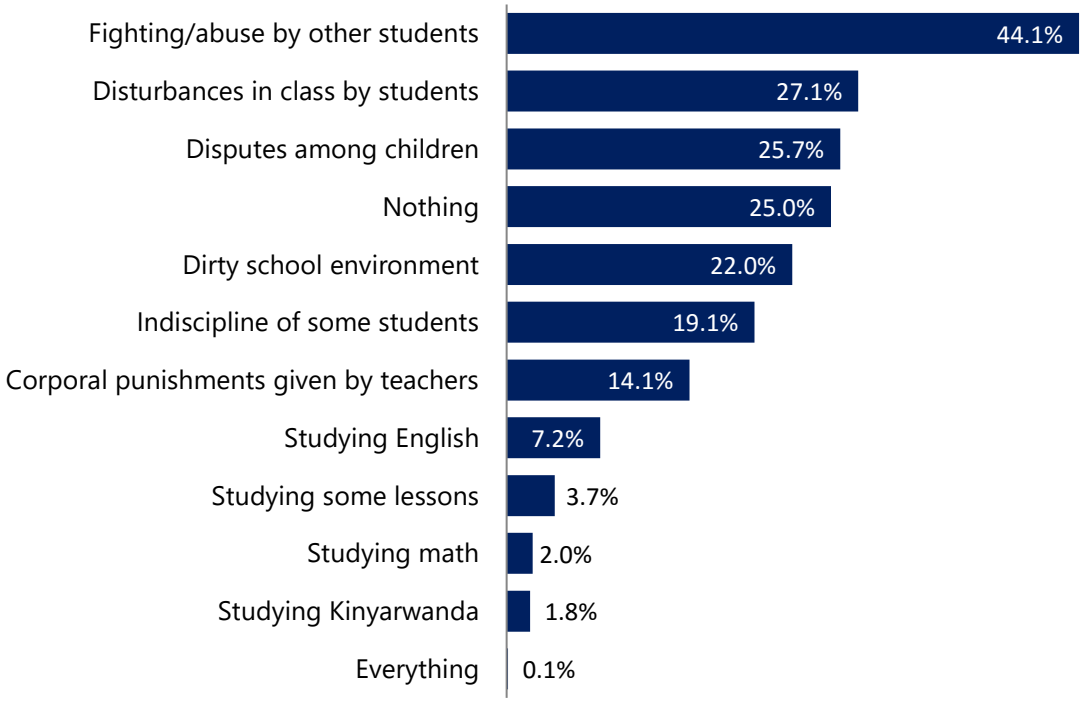
Learners were asked what they liked about school. The most common responses from learners was that they enjoyed studying Kinyarwanda, mathematics and English and playing. A few other responses included studying social studies, drawing, cleaning the school, and learning in general. Less than one percent of learners stated that they did not like anything about school.

FIGURE 10. WHAT DO YOU LIKE ABOUT SCHOOL? (N=2,387, MULTIPLE RESPONSE)



In terms of what learners did not like about school, the most common response was that they did not like fighting and abuse by other learners. A quarter of learners responded that there was not anything that they did not like about school. Other reasons that learners mentioned included, not liking to play (often because other learners might hurt them), not liking social studies, or not liking lateness, absenteeism, or dropping out.

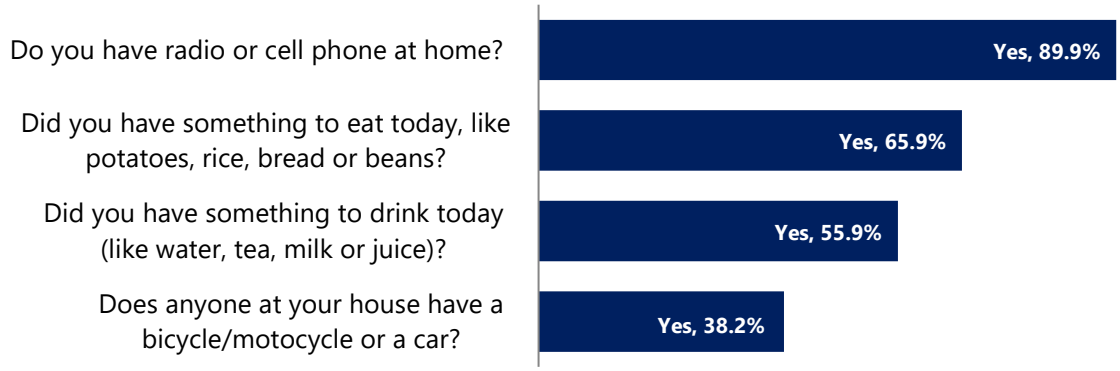
FIGURE 11. WHAT DO YOU NOT LIKE ABOUT SCHOOL? (N=2,387, MULTIPLE RESPONSE)



SOCIO-ECONOMIC STATUS

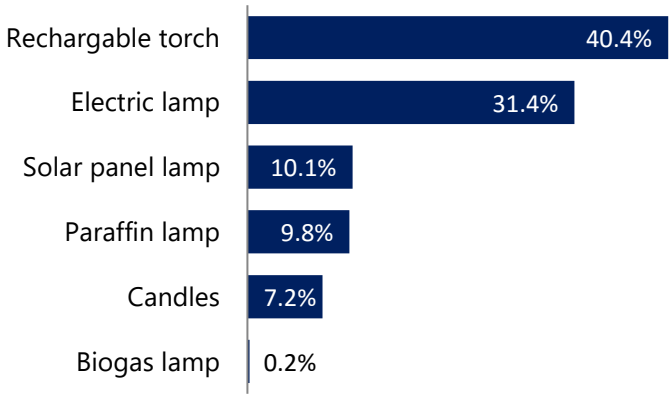
To better understand the socio-economic context of learners, we asked five simple questions that together serve as a proxy for a learners' family wealth. Most learners (89.9%) reported having a radio or cell phone at home. The majority of learners also reported having eaten before they came to school that day (65.9%) and more than half (55.9%) reported having something to drink, but of concern is that almost a third of learners came without having something to eat that day. Poor nutrition is one of the key factors impeding learning, as international research shows. Roughly a third (38.2%) of learners were also asked whether someone in their family owns a means of transportation such as a bike, a motorcycle or a car.

FIGURE 12. SOCIO-ECONOMIC STATUS INTERVIEW RESULTS (N = 2,387)



To better understand lighting conditions in learners' home that might impact their ability to do homework, learners were asked what type of light they used at home. The most common types of light used at home were rechargeable torches (40.4%) and electric lamps (31.4%). Few learners (7.2%) said they used candles at home, solar panel lamps (10.1%) or paraffin lamps (9.8%).

FIGURE 13. WHAT LIGHT DO YOU HAVE AT HOME? (N=2,387)



Composite[8] variables were created for each section of the learner questionnaire (home environment, school and teacher, and socio-economic status). Additionally, a composite variable was created for all the risk factors that could impact learning. These risk factors included the following: child reporting he/she does not see mother read; missing school often; late for school often; self or sibling repeating grade; parents not expecting child to go to school every day; parents not checking homework; disliking school; and not having anything to eat or drink before coming to school. The composite variables as well as specific measures from the context interview were included in bivariate analyses with FARS and MARS results in the relevant sections of this report to better understand variation in learner scores.

[8] "Composite" is a score created by adding data across multiple variables, when each of the variables is expressed in binary terms (e.g., "yes" = 1 and "no" = 0).

2. SCHOOL, TEACHER AND LEARNING ENVIRONMENT FINDINGS

The school's environment and management is critical to understanding the teaching and learning that is taking place in the school. Concurrently with the learner assessment, the data collection team gathered data on school context, grade-level resources and practices related to L3 activities. In all, 60 head teachers and 470 P1, P2, P3 and P4 teachers were surveyed. Data was collected to provide an overall picture of the school and learning environment; particularly data was collected on: 1) the school and learning environment, 2) school leadership, 3) L3 teaching and learning materials in the classroom, 4) teacher practices and beliefs, 5) support for literacy and numeracy instruction in schools, and 6) parent and community involvement. This contextual information is also used to explain variance in learner oral reading fluency and mathematics assessment results in subsequent sections.

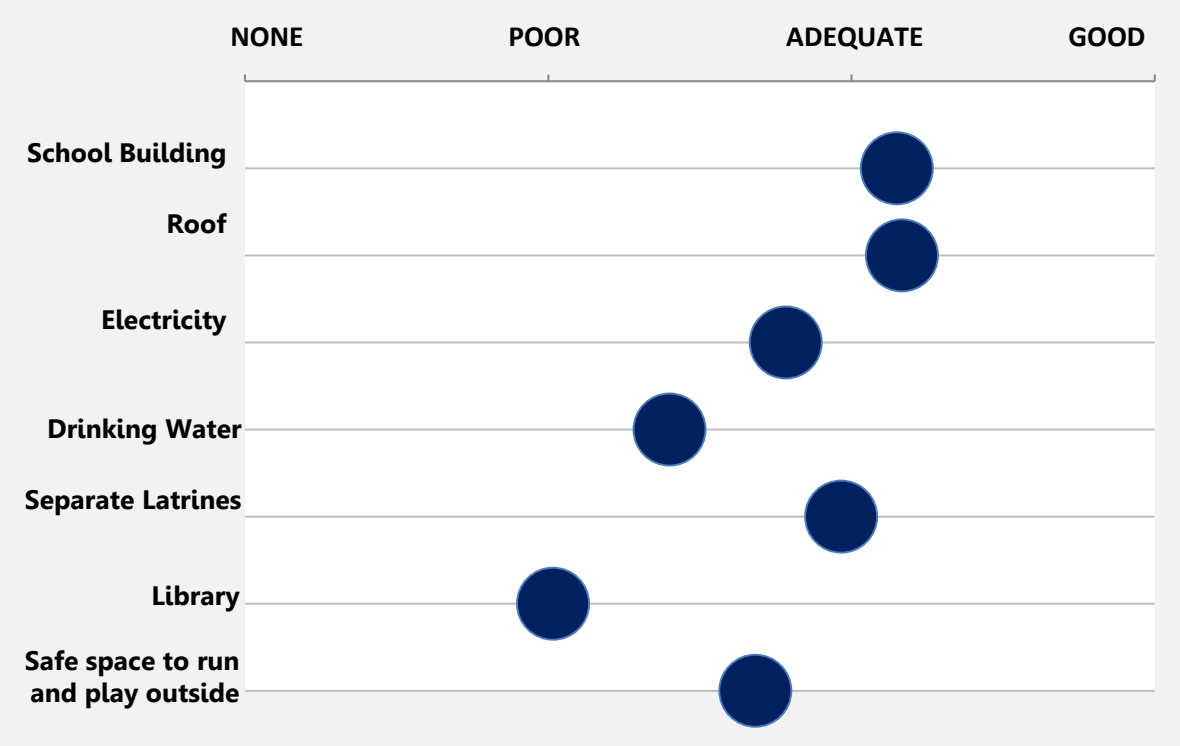
SCHOOL ENVIRONMENT

SCHOOL INFRASTRUCTURE

Data were collected on the school infrastructure of 60 sampled schools. Observations of sampled schools showed varying conditions in the school infrastructure and learning environment in these schools. Assessors scored the majority of schools as having "adequate" or "good" school buildings, roofs and separate latrines for boys and girls. Roughly two-thirds of schools had "adequate" or "good" electricity and a safe space for children to run and play outside. A quarter of observed schools did not have any electricity. Half of observed schools (46.7%) had "good" or "adequate" drinking water available for learners; however, roughly a quarter (28.3%) of schools did not have any drinking water available.

Libraries in good condition were uncommon. In fact, 50% of schools did not have a school library. This is consistent with head teacher survey results, in which, only half (45%) of surveyed head teachers reported that their school had a school library. The observed state of the school library varied from school to school, in which some schools had well-equipped and well-managed libraries; other school libraries were small and contained only a few books.

FIGURE 14. OBSERVED CONDITION OF SCHOOL INFRASTRUCTURE IN SAMPLED SCHOOLS (N=60)



ENROLLMENT, DROP-OUT AND GRADE REPETITION.

The table below shows the average number of learners enrolled by grade. On average, near gender parity can be seen in enrollment for all four grades, with roughly equal numbers of male and female learners enrolled. Further analysis by grade shows that the average number of enrolled learners decreases as they transition into higher grades. As can be seen in the table below, on average, P4 has nearly 36% fewer learners than P1. The decrease in enrolment is similar for both males and female learners.

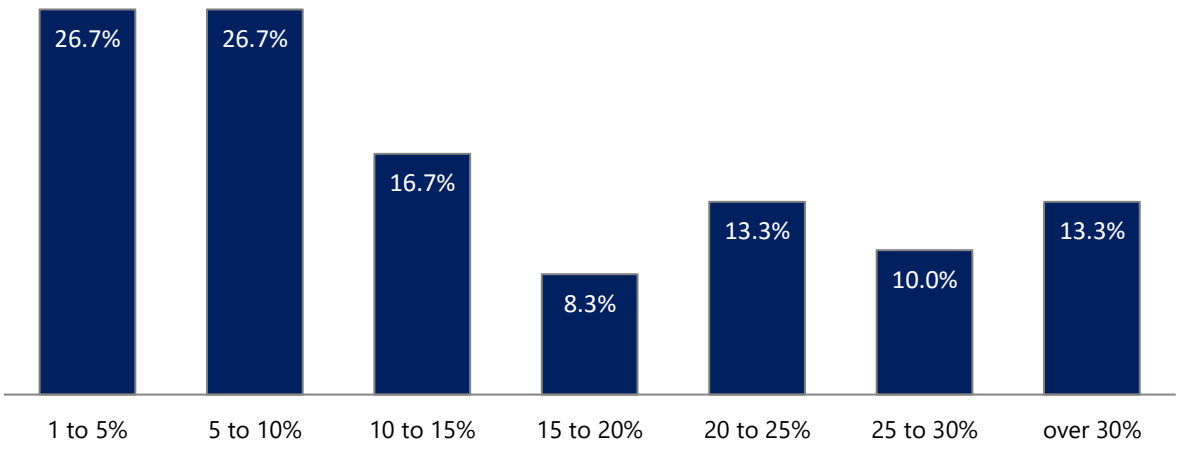
Sampled schools reported relatively low dropout rates during the 2016 school year. Overall, the majority of schools reported total dropout rates by grade ranging between zero and four percent. The table below shows the average reported dropout rate by grade. On average, boys had slightly higher dropout rates than girls across all grades (P1-P4).

TABLE 3. SCHOOL ENROLMENT AND DROPOUT STATISTICS, BY GRADE

Grade	№ of learners enrolled range	Avg. № Learners Enrolled			Avg. Dropout Rate[9]		
		Male	Female	TOTAL	Male	Female	TOTAL
P1	52-629	119	109	228	2.2%	1.7%	2.0%
P2	28-516	104	100	204	2.5%	2.2%	2.4%
P3	26-464	86	86	172	2.6%	2.5%	2.5%
P4	23-429	71	74	145	3.9%	3.5%	3.7%

On average, teachers reported that 14.1% of learners in their classrooms were repeaters or have repeated the same grade. The percentage of repeaters by grade was fairly consistent with the exception of P1, which had, on average, the largest reported percentage of repeaters per classroom – 22.7%. The average percent of learners repeating the grade across the first three primary grades was 17.5%. There was a significant variation across schools with regard to the proportion of learners repeating a grade, ranging from 1 - 47% percent on average across the first four primary grades. The figure below summarizes the differences in the percent of P1 through P4 learners who were repeating the same grade in the school year 2016.

FIGURE 15. PERCENT OF REPEATERS IN P1-P4, ON AVERAGE, IN THE STUDY SCHOOLS (N=60)



[9] The dropout rate was calculated by dividing the total number of learners by grade who dropout during the current school year by the total number of enrolled learners by grade.

LEARNING ENVIRONMENT

The majority of schools reported that they had between one to four P1 classrooms (although in some schools this number was reported as high as five and seven), and one to three P2, P3 and P4 classrooms (with some schools reporting up to six classrooms).

The majority of head teachers reported that their schools had between 2 and 6 teachers teaching P1, P2, P3, and P4 learners. On average, in the sampled schools, two-thirds (63%) of P1-P4 teachers are female. The most common subject taught by sampled male teachers was mathematics, while the most common subject for female teachers was Kinyarwanda.

Teaching experience (in years) of sampled teachers ranged vary significantly. The average number of years of teaching experience was 12.4 years; the median was 10 years. Overall, three-quarters of teachers (77.2%) had attended TTC in preparation for teaching; 13.4% had attended General Secondary School (GSS); 8.1% had done distance learning with Candidat Libre (KEI); and 1.3% reported having no professional preparation for teaching. Only 27.2% of teachers overall had received training on literacy or numeracy by an NGO.[10] Most teachers (86.8%) had been with the same classes since the beginning of the year.

An analysis of learner/teacher ratio showed that, on average, P1-P4 classrooms are over-crowded. In fact, a P1 classroom can be expected to have between 15 and 166 learners per one teacher; a P2 classroom can be expected to have between 9 and 129 learners enrolled per one teacher; a P3 classroom can be expected to have between 8 and 120 learners per one teacher; a P4 classroom can be expected to have between 7 and 83 learners per one teacher, with respective averages of 64, 56, 50, and 43 learners per teacher.

TABLE 4. LEARNER/TEACHER RATIO STATISTICS, BY GRADE

Grade	№ of classes	№ of teachers	Learner/ Teacher ratio
P1	2.3	3.9	64 : 1
P2	2.3	3.8	56 : 1
P3	2.0	3.6	50 : 1
P4	1.7	3.3	43 : 1

> *"The ratio [of] teacher/pupils is high; so to follow all pupils is very difficult."*
>
> -Teacher in Western province

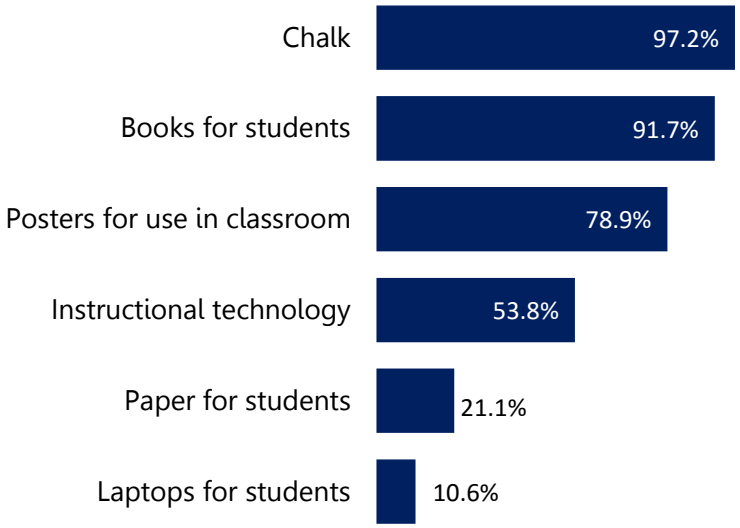
[10] L3 is a national literacy and numeracy program serving all government support primary schools. The purpose of this question was to establish if teachers were receiving additional literacy and numeracy training from other NGOs.

Head teachers were asked how many learners share one desk in the classroom by grade. On average, head teachers reported that in the majority of P1, P2, P3 and P4 classrooms between two to four learners share one desk; responses varied from two to six learners per desk.

Teachers reported large ranges in age of learners in their classes, in which learners could be up to 6 years older, on average, than the expected enrolment age for their grade.

Observed conditions in sampled classrooms showed that the majority of classrooms were in adequate or good condition with respect to blackboards, clean classroom space, good lighting, desks for learners, and reading and writing materials for learners. In nearly three-quarters (70.0%) of observed schools print materials (posters, signs, etc.) were observed on school or classroom walls. Almost all sampled teachers reported receiving chalk and books for learners from the school administration, and most received posters for the classroom. Around half of teachers reported receiving instructional technology.[11] Additional materials teachers mentioned receiving, included: notebooks, pens, registers, class diaries, geometric materials, and materials from other NGOs.

FIGURE 16. MATERIALS THE SCHOOL ADMINISTRATION PROVIDES TEACHERS WITH (N=470, MULTIPLE REPSONSE)



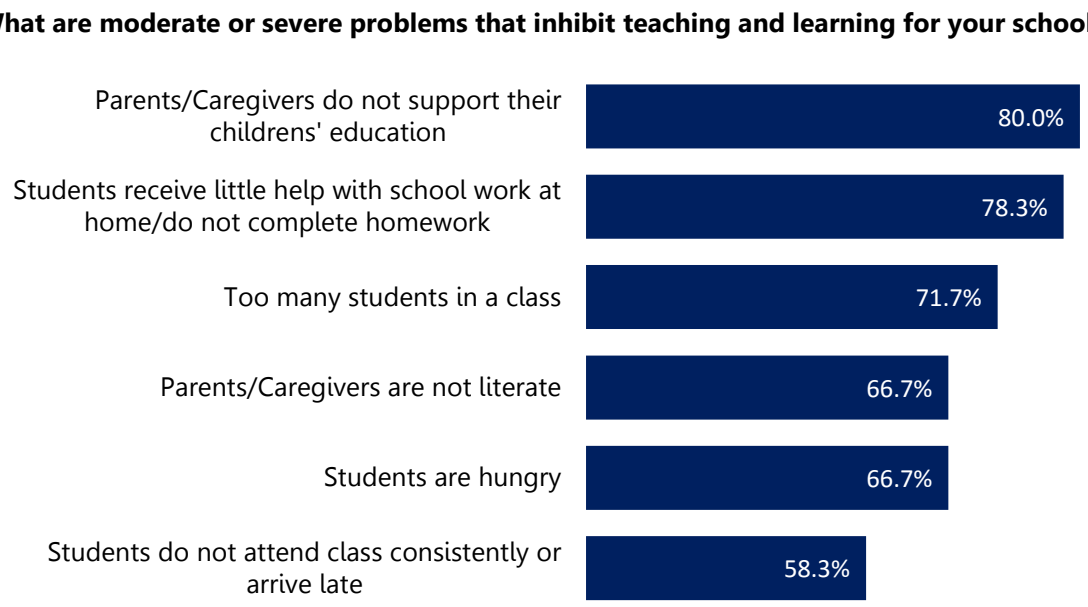
Teachers were asked about the reading abilities of their learners. In P1 and P4, teachers reported that the composition of readers in their classrooms varied tremendously. Roughly half of P1 Kinyarwanda and P4 English teachers reported that "most" or "many" of their learners were independent readers. The remaining P1 and P4 reading teachers reported a mix of non-readers, struggling readers and independent readers in their classrooms. In fact, 8.5% of P1

[11] L3 provides technology for teachers' use to all government supported primary schools, however, it is possible that this technology may not be assigned exclusively to individual teachers. Technology includes mobile phones with SD cards that contain the interactive audio instruction, speakers, and, where needed, solar panels for power.

teachers and 13.3% of P4 English teachers reported that "many" or "most" of their learners were non-readers. Similarly, in terms of struggling readers, P1 Kinyarwanda teachers and P4 English teachers reported the largest proportions of struggling readers in their classrooms in which 10.2% of P1 teachers and 10.0% of P4 English teachers reported that "many or most" of their learners were struggling readers. In P2 and P3, teacher reports of reading abilities of their learners were less varied. Nearly three-quarters of P2 and P3 Kinyarwanda teachers reported that "many" or "most" of their learners were independent readers. The majority of P2 and P3 teachers said that they only had "a few" struggling readers." In fact, only between 3-6% of sampled P2 and P3 teachers reported that "many" or "most" of their learners were struggling or non-readers.

Head teachers were asked about challenges they face in their schools that inhibit teaching and learning. The most common challenges reported were lack of support of parents/caregivers for their child's education; and lack of help at home for learners with their homework, which is interesting given that the majority of learners reported that someone at home read stories to them, helped and listened to them read and checked their homework. Additional reasons, head teachers cited included, overcrowding in classrooms; and low literacy levels of parents/caregivers. The figure below shows the percent of schools that identified the following challenges as moderate or severe problems in their school.

FIGURE 17. COMMON CHALLENGES TO TEACHING AND LEARNING IN SCHOOLS (N=60, MULTIPLE RESPONSE)



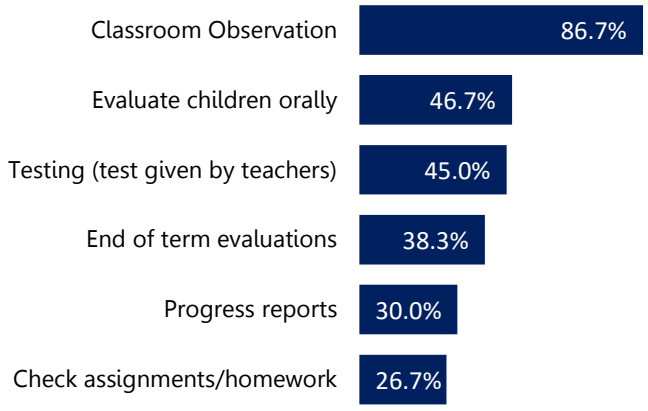
SCHOOL LEADERSHIP (POLICIES, PRACTICES, AND MONITORING)

Overall, the vast majority (90%) of head teachers reported being trained on school leadership. All sampled head teachers reported that their school has a system for tracking teacher attendance, in which the majority (98.3%) of head teachers collected teacher attendance data daily. Teacher attendance records showed that on average, on a given day, 6.1% of all P1, P2, P3, and P4 teachers were absent.[12] These results were largely consistent with self-reported absenteeism by teachers in which the majority of teachers (87.2%) reported they were not absent at all the previous week; 12.1% of teachers said they were absent one time; 0.6% were absent more than once.

All head teachers reported that they observe teachers teaching in the classroom. Nearly two-thirds (61.7%) of head teachers said that they observe teachers on a weekly basis, while 35.0% observed teachers monthly, and 3.3% observe teachers once a term. Surveyed teachers corroborated these responses, in which all surveyed teachers reported that school administration observed them teaching in the classroom. About half (50.2%) of surveyed teachers indicated that they are observed once a week; while more than a third (41.9%) reported being observed once a month. The frequency in which teachers reported being observed teaching was largely consistent across subject (Kinyarwanda, English and mathematics) as well as by the number of years teaching.

Schools reported holding school assemblies frequently. Of the sampled schools, 43.3% indicated that they held daily school assemblies. Roughly a third (33.3%) held assemblies at least once a week. A few schools indicated that they held assemblies less frequently: 10.0% said they held assemblies once a month; 11.7% said they held assemblies once a term).

FIGURE 18. METHODS USED BY HEAD TEACHERS TO MONITOR THE READING PROGRESS OF LEARNERS (N=60; MULTIPLE RESPONSE)



All sampled head teachers also reported that they monitor reading progress of learners. Various methods of monitoring progress were reported; the most common methods being classroom observation, monitoring learners' results on tests given by teachers and evaluating children orally.

[12] Teacher attendance records were reviewed. Data was collected for teacher absences on the day of the data collection and the day before. The average percent of absent teachers was calculated by averaging the daily teacher absenteeism rate for the two data points.

On average, teachers reported that 10.6% of their learners in their class have learning barriers. Interviews with head teachers showed that slightly more than three-quarters (76.7%) of head teachers tracked children with learning barriers; the remaining quarter did not record this information. Of those head teachers who did track learners with learning barriers, all head teachers reported having some remedial measures to support children with learning barriers.

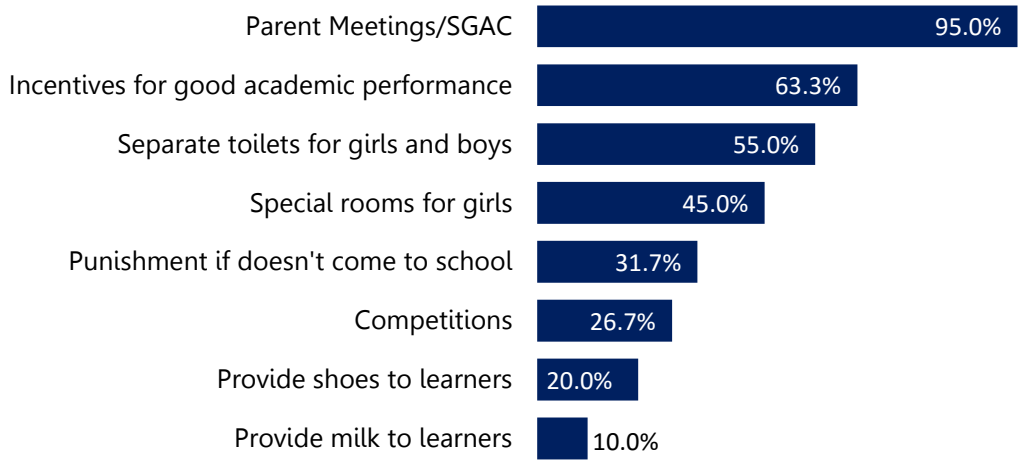
Almost every teacher (98.7%) takes attendance daily and uses a daily attendance register (98.9%). Teachers reported moderately high absenteeism of their learners: teachers reported that 9.1% of their learners in their classroom were absent on the day of data collection. This was consistent across grade.

Learners who are late are tasked with helping to clean in 88.9% of schools; 3.7% of schools send learners to detention; 1.9% of schools reported using corporal punishment to discipline learners who were late to school.

According to teachers, the majority of their learners arrive to school on time. In fact, the majority (72.8%) of teachers responded that "many" or "most of all" of their learners come to school on time; similarly, the majority (80.0%) of teachers said that only "a few" learners arrive to school late. Nearly all schools in the sample (90.0%) have discipline measures for children who come late to school. The most common form of discipline is tasking the learner with helping to clean (88.9%). Several schools reported using other forms of discipline (13.0%) for those late to school including, talking to the learner and/or the parents. Similarly, the majority (80.0%) of schools also have discipline measures for learners who miss school.

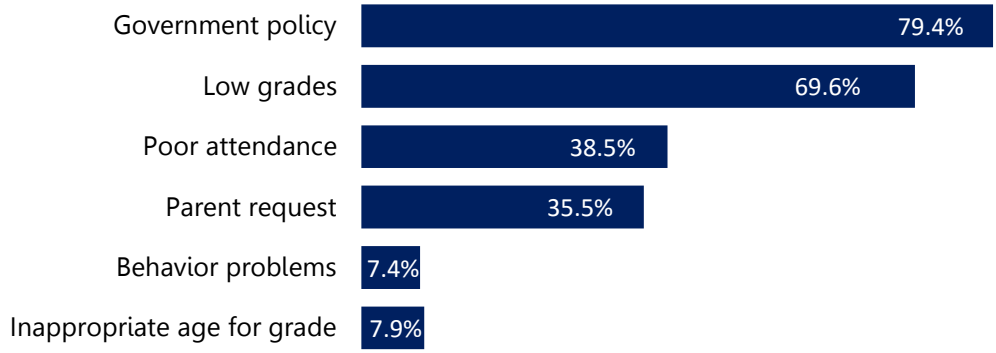
Head teachers were also asked about their methods of encouraging learners to come to school. The most prevalent methods of encouraging learners to attend school were parent meetings/PTA/SGAC, provision of incentives for good academic performance, ensuring separate toilets for girls and boys and by providing special rooms for girls. The figure below shows the distribution of head teachers' responses.

FIGURE 19. METHODS TO ENCOURAGE LEARNERS TO ATTEND SCHOOL (N=60; MULTIPLE RESPONSE)



Head teachers and teachers were also asked how they decide when to hold a learner back a year. The majority of teachers said that schools hold learners back according to the government guidelines on class promotion, repetition and dropout (79.4%)[13], or as a result of low grades (69.6%). Poor attendance is also taken into account by 38.5% of sampled teachers and slightly more than a third (35.5%) of teachers would hold back a learner because a parent requested it. Less than 8% of teachers reported that they would hold a learner back due to behavioral problems or because the learner was an inappropriate age for the grade. Head teachers similarly reported that low grades were the most important factor for holding a learner back a year; however, head teachers reported that poor attendance was a more important factor to holding children back than parent requests.

FIGURE 20. TEACHERS' REASONS THAT A LEARNER CAN BE HELD BACK A YEAR (N=470)



L3 MATERIALS AND TECHNOLOGY

Head teachers were asked the number of materials they received from L3 over the last three school terms. Table 6 shows the average number of materials received for P1, P2, P3 and P4.

TABLE 6. AVERAGE NUMBER OF L3 MATERIALS SCHOOLS RECEIVED, BY GRADE

L3 Materials	P1	P2	P3	P4
Kinyarwanda guide	1-3	1-2	0-3	---
Kinyarwanda read-aloud	1-2	1-2	2-3	---
Mathematics guide	1-2	0-2	2-3	2-3
Kinyarwanda reader term 1	262	192	122*	---
Kinyarwanda reader term 2	271	199	---	---
Kinyarwanda reader term 3	260	185	---	---
English guide	1-2	1-2	2-3	2-3
English reader	260	194	125	---
English read-aloud**	---	---	8-9	2-3
English Pupil's book***	---	---	---	125

*P3 received a comprehensive Kinyarwanda Daily reader instead of Kinyarwanda readers by term.
**Only P3 and P4 classrooms received English read-alouds
***Only P4 classrooms received English Pupil's Books

[13] The Rwandan Educucation Ministry issued guidelines/policy in 2001 on class promotion, repetition and dropout.

L3-provided printed teachers' guides were observed in sampled schools. Primarily they were observed in use by teachers; however, in nearly a quarter of schools (23.3%), they were found in the library. L3-provided learner books were also observed in schools. In the majority (73.3%) of observed schools, learner books were observed in use by learners or were found on the classroom shelves. In a few schools, learner books were found in the library. In nearly all schools, learner books looked like they had been used.

Head teachers were also asked the quantity of technological equipment received from L3, such as speakers, cell phones, SD cards, and solar panels. All but one sampled schools reported receiving at least one speaker, cell phone or SD card. On average schools received around six speakers and cell phones and five SD cards from L3. Nearly half of the schools (46.7%) in the sample received a solar panel from L3. School observations, found that L3 technology (speakers, cell phones, and SD cards) were largely found to be located in classrooms or stored in the head teacher's office for use by teachers.[14] In nearly all schools where L3 technology was observed, the technology appeared to have been used.

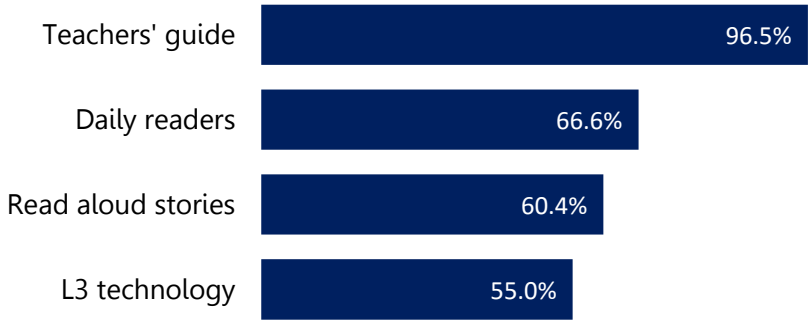
TABLE 5. AVERAGE NUMBER OF TECHNOLOGY MATERIALS RECEIVED FROM L3, N=60

Type of Materials	Range of number received*	Avg. Number received
Speakers	0 to 16	6
Cell phones	0 to 16	6
SD cards	0 to 13	5

*The number received was based on the number of teachers in the school teaching primary grades.

The majority (86.0%) of sampled teachers reported that they use L3 materials. Out of the teachers who reported using L3 materials, the most common L3 material used by teachers were teachers' guides, in which almost all surveyed teachers (96.5%) reported using teachers' guides. More than half of teachers use daily readers (66.6%) and read aloud stories (60.4%). Slightly more than half (55.0%) reported using L3 technology.

FIGURE 20. WHICH L3 MATERIALS TEACHERS USE (N=404, MULTIPLE RESPONSE)



[14] In several schools, L3 technology was observed in the head teacher's office since observations coincided with examinations and L3 technology were not needed by teachers in the classroom.

In all, 14.0% of teachers said they do not use L3 materials. The most frequent reason (45.5%) was because they were not trained on how to use them. A number of teachers (21.2%) said it was because they did not receive enough materials, some (16.7%) said it was because their school received other materials that they now use instead, and others (12.1%) said it is because their materials were damaged.

> *"**L3 materials are rich on content and [are] needed to help teachers and learners.**"*
>
> -Teacher in Southern province

Teachers reported receiving cell phones, speakers, and SD cards at almost equal rates. Out of the teachers who received L3 technology, teachers report using the technology often. In fact, almost three-quarters (71.6%) use L3 technology at least once a week; of which, half reported using technology two to four times a week. Results were generally consistent across grade and subject. Most of the teachers who never use L3 technology in the classroom said this was a result of damage to the technology. A few teachers said they did not use L3 technology or materials because they had received new curriculum or books, and a few said it was due to insufficient materials.

FIGURE 21. PERCENT OF TEACHERS WHO RECEIVED TECHNOLOGY FROM L3, BY GRADE (N=470)

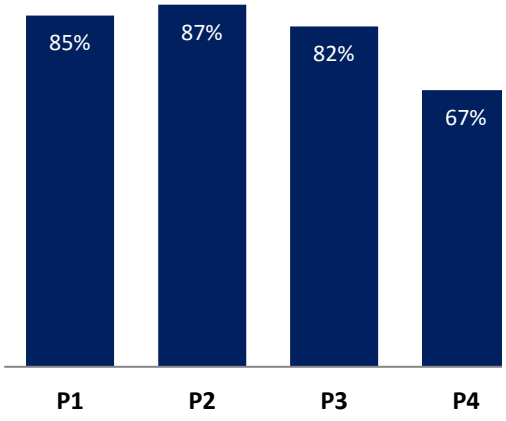
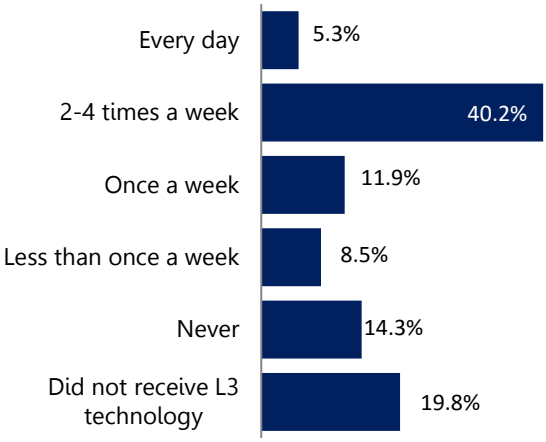


FIGURE 22. HOW OFTEN DO YOU USE IT TO TEACH LEARNERS THIS SUBJECT? (N=470)



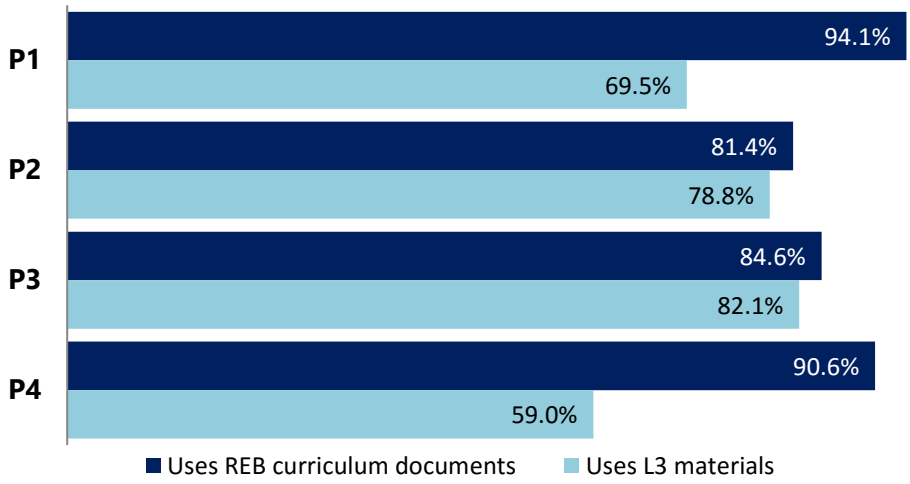
TEACHING PRACTICES AND BELIEFS

When preparing for lessons, overall, about three-quarters (72.3%) of sampled teachers report that they use L3 teachers' guides. Curriculum documents and schemes of work provided by REB are used by most (87.7%) teachers when developing lesson plans. When asked what other materials they used, some teachers responded that they use items like beans, coins, stones, plants, and other local materials.

The use of curriculum documents and L3 guides varied by grade, with only 59.0% of P4 teachers using L3 materials, while slightly higher proportions of P1-P3 teachers use them

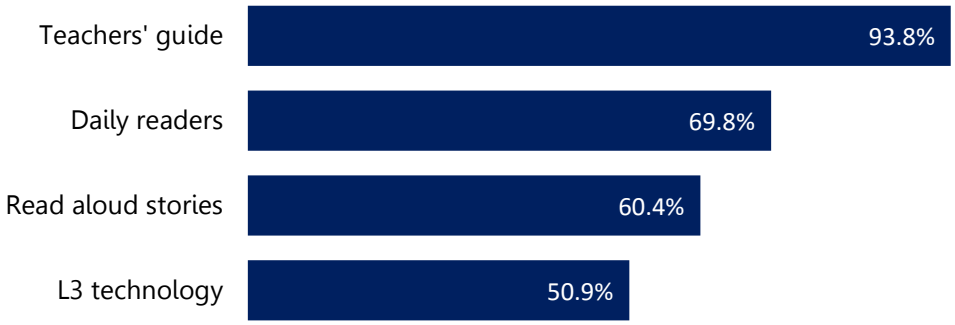
(69.5%, 78.8%, and 82.1%, respectively). The use of curriculum documents from the REB was consistent across grades.

FIGURE 23. WHAT DOCUMENTS DO YOU USE WHEN PREPARING YOUR LESSON PLANS? (N=470)



Teachers were also asked what L3 materials they find helpful to use when teaching. They found L3 teachers' guides the most useful by a wide margin, followed by daily readers, read-alouds, and L3 technology.

FIGURE 24. WHICH L3 MATERIALS TEACHERS FIND USEFUL (N=470, MULTIPLE RESPONSE)



Surveyed reading teachers were asked whether they allowed their learners to take books home. The majority (96.6%) said learners were allowed to take books home. Data was not collected on the types of books learners were allowed to bring home. Of those teachers who reported allowing learners to take books home, most allowed learners to do so frequently – every day (86.6%); once a week (3.5%).

Reading teachers in P1-P4 were asked about their beliefs about teaching reading. Overall, teachers reported that teaching reading had its challenges. Roughly two-thirds (67.5%) of Kinyarwanda and English teachers said that it was "sometimes not easy" to teach reading. Conversely, only a fifth (21.9%) felt that teaching reading was "mostly easy" or "very easy."

Although, overall, only 10.5% felt that teaching reading was "not easy at all," looking at P1 teachers, almost a fifth (18.6%) believed teaching reading was "not at all" easy.

For teachers that reported that teaching reading was easy, teachers largely cited having enough books as a key resource that made teaching reading easier. Others cite their training or the methodology they were given as reasons that teaching reading was easy.

Common reasons for reading being a difficult subject to teach included:

CHALLENGES TO TEACHING READING IN PRIMARY GRADES:

- Overcrowded classrooms
- Not enough learning materials
- Children did not attend nursery school
- Family issues, including lack of parental involvement in learning
- Pupil absences
- Children come to school hungry
- Disability, including hearing problems
- Poverty
- Children do not understand the language (English or Kinyarwanda)
- Children are different ages or read at varying levels
- Some children are promoted to the next grade when they should not have been

When asked whether it was easier to teach boys or girls how to read, the majority (87.0%) said that there was no difference. A few teachers (8.8%) said it was easier to teach girls than boys, and even fewer (4.2%) said boys were easier to teach. Slightly more male teachers than female believed boys and girls were equally easy to teach; 11.9% of female teachers thought girls were easier to teach, and only 2.5% of male teachers believed so.

> "***Each child is able to learn reading and writing regardless [of] the[ir] sex.***"
>
> -Teacher in Southern province

When asked to elaborate their beliefs about teaching boys and girls to read, the majority of teachers said that they believed that boys and girls are all "at the same level," have the same capacity," and that "all are able." A few teachers revealed gender biases. For instance, a few teachers remarked that boys had more distractions and in general do not like to study; some said that girls were smarter, more attentive, more confident, and more likely to bring their materials with them to school. On the other hand, some teachers said that girls were "shy" and boys were "confident in responding." Additional responses from teachers indicated that some learners faced gender barriers to reading, not in the classroom, but at home; in which several teachers remarked that boys would drop-out to

work for money and that some girls would miss school or could not complete homework because they were needed to help out at home.

LITERACY AND NUMERACY INSTRUCTION SUPPORT IN SCHOOLS

The amount and type of support to teachers and head teachers in the form of provision of literacy and numeracy information and support, as well as training and professional development varied from school to school.

Three-quarters (76.5%) of head teachers reported receiving information on literacy and numeracy from the District Continuous Professional Development Committee. The majority (67.4%) of head teachers reported receiving information once a term; 21.7% report receiving information once a month. Very few (10.9%) head teachers received information as frequently as once a week. Discussions with Sector or District Education Officers was reported to be much more common. Nearly all head teachers (96.7%) discuss information on literacy and numeracy with the District or Sector Education Officers. In fact, 43.3% of head teachers discuss information on literacy and numeracy with District Education or Sector Education Officers once monthly; 38.3% once a term; 15% once a week; and only 3.3% never.

Head teachers were also asked whether they received support from other organizations/NGOs. About a third (35.0%) of schools indicated that they received support from other organizations, largely in the form of teacher training (71.4%); and the provision of teaching and learning materials (47.6%). Other types of support included payment of learners' school fees, uniforms, school materials, as well as construction.

The majority of head teachers reported that their schools have a school-based mentor (95.0%), of which 84.2% said that the mentor had provided training for teachers and head teachers on the use of L3 materials. Around a third (35.1%) of the schools with school-based mentors have a weekly plan detailing the school-based mentor's activities. Despite the fact that the majority of schools reported receiving support from school-based mentors, satisfaction of head teachers with the amount of support (training, mentoring, and coaching) provided by their school-based mentor varied substantially across the sample. Only a quarter of head teachers reported that they were "very" or "extremely" satisfied with the amount of support provided by the school-based mentor (22.9%). Another quarter (26.3%) were "moderately" satisfied. However, roughly half of sampled teachers were less satisfied with the support of school-based mentors, in which 26.3% reported only being "slightly satisfied," and 23.3% were "not at all" satisfied. Several teachers remarked that their school-based mentor did not have sufficient amount of time to train and support teachers since they had their own lessons. Some teachers also commented that

> "***School-based mentors do not have [a sufficient amount of] time to help us because they have many lessons***."
>
> -Teacher in Northern province

school-based mentors could use additional training in order to better support them in literacy and numeracy instruction.

Teachers reported that 86.0% use L3 teaching and learning materials (TLMs) with their learners, and over three-quarters (78.1%) reported attending training by their school-based mentor, on L3 materials. Teacher satisfaction of the support received from school-based mentors in terms of training, mentoring and coaching varied. Only a fifth (17.2%) were "very" or "extremely satisfied." Roughly a third (36.5%) were" moderately" or "slightly" satisfied. However, almost half (46.3%) were "not satisfied at all" with the amount of support they had received.

Teachers were also asked whether they had any comments on L3 materials, training, or school-based mentors. The most common comments/suggestions from surveyed teachers include:

- Additional trainings are needed for teachers on L3 program, materials and technologies. Teachers voiced a need for trainings more than anything else.
- School-based mentors' timetables are too full and they do not have enough time to train teachers.
- An increased number of L3 materials are needed.
- Damaged technology needs to be replaced.
- Teachers who did not have school-based mentors wished they had had one.
- Additional phones and speakers are required so that teachers do not have to share.
- Children cannot keep up with the pace of the lessons on the phones.

PARENTAL AND COMMUNITY INVOLVEMENT

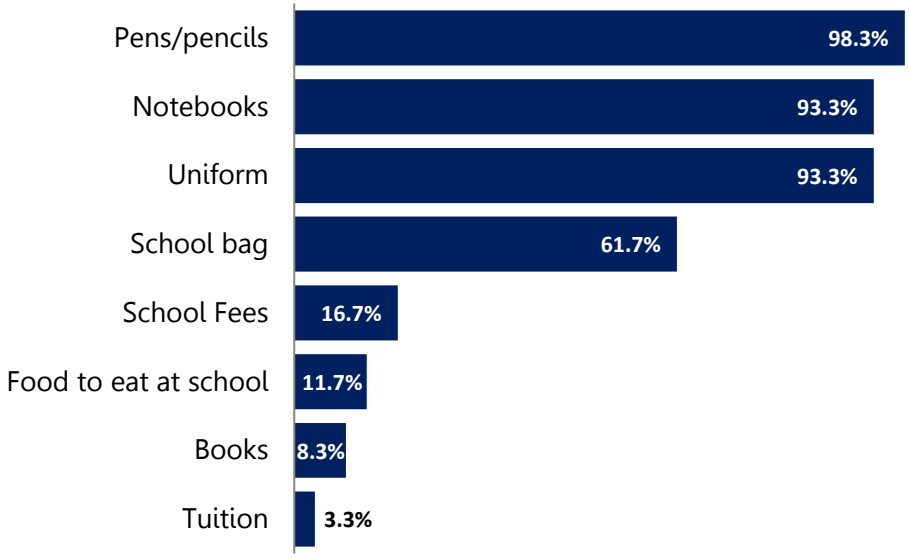
On average, head teachers reported inviting parents/caregivers to the school around three times a year. When asked how many parent or caregivers come to the school when invited, head teachers resoundingly reported high participation of parents/caregivers. In fact, over half (58.3%) of surveyed head teachers indicated that "a moderate amount" of parents/caregivers come to the school when they are invited; another 31.7% reported that "most" parents/caregivers come. Only six of the sampled schools reported that a "few" parents/caregivers attend. Similarly, over half (53.9%) of surveyed teachers reported that learners' parents or caregivers usually came to talk to them at least once per term. Over a third (35.7%) of parents, however, never came to talk to their child's teacher.

> "***The culture of reading is not encouraged among our students [by their family].***"
>
> -Teacher in Western province

The majority of schools indicated that parents were required to purchase various school supplies for their child to attend school, primarily pens/pencils, notebooks, uniforms and school bags. Only a quarter of surveyed schools said that parents were required to pay school fees, purchase books or pay for food for their child in order for their child to attend school. Head teachers also indicated that paying for these items was somewhat difficult for many

parents. Of the sampled schools, 73.3% reported that families in their school found it "somewhat difficult" to pay for these school supplies; 10.0% reported that it was "extremely difficult" for families to afford these school supplies. Only about one in five schools (16.7%) felt that it was "easy" or "somewhat easy" for parents to afford the required school supplies/items.

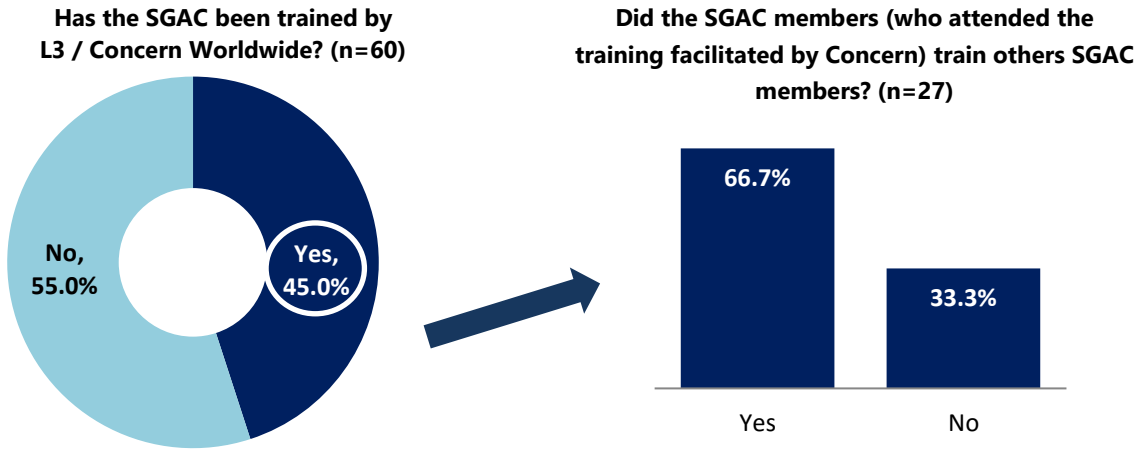
FIGURE 25. WHICH ITEMS MUST PARENTS PURCHASE FOR A LEARNER TO ATTEND SCHOOL? (N=60)



Lack of availability of reading materials and resources in the community was reported. Only 8.3% of surveyed head teachers stated that learners had access to a community library or similar place in the community to borrow books to read in their communities.

All schools in the sample had a School General Assembly Committee (SGAC) previously called PTA. Roughly half (45.0%) of sampled schools reported that L3's implementing partner, Concern Worldwide, had trained members from the SGAC. About two thirds (66.7%) of SGAC members who had received training trained other SGAC members.

FIGURE 26. SGAC MEMBERS TRAINED BY CONCERN WORLDWIDE



Eighty-five percent of schools reported that their SGAC had an action plan at endline, compared to nearly three-quarters (73.3%) of schools at midline, and roughly half (51.7%) of schools at baseline. Over half of schools (56.7%) reported that SGACs have undertaken initiatives to support teacher motivation in their schools. The major ways SGACs support teacher motivation include:

- Providing lunch and tea break for teachers at school,
- Providing financial incentives, bonuses, and awards to best performing teachers,
- Meeting, discussing, and collaborating with teachers on how to promote education.

Nearly two-thirds of SGACs (63.3%) have undertaken initiatives to support literacy and equity in education in their schools. Examples of initiatives include:

- Reading or writing competitions and rewards for learners;
- Creating reading clubs to assist children in reading;
- Allowing learners to take books home to read;
- Encouraging learners to read and borrow books from the library;
- Promoting parent literacy;
- Mobilizing parents to read with their children at home;
- Buying newspapers and magazines for learners;
- Giving a separate room for girls with all necessary materials;
- Providing school materials to children (boys and girls).

3. ORAL READING FLUENCY ASSESSMENT OF RWANDAN SCHOOLS (FARS)

IMPROVEMENT IN FARS ORAL READING FLUENCY RESULTS

An assessment of oral reading fluency was conducted in Kinyarwanda in Primary 1, 2, 3 and 4 using grade-level texts of appropriate length and complexity (see Methodology in Appendix B for details). Primary 4 learners were assessed in both Kinyarwanda and in English, using grade-appropriate texts in both languages. Learners were asked to read the reading passage, followed by five comprehension questions about the text's meaning. The reading part of the assessment was timed at 60 seconds; the comprehension questions part of the assessment was not timed. During the midline testing in 2015, an untimed reading subtest was introduced in which the data collectors administered the reading comprehension questions in two rounds: one with a timed and one with an untimed reading of the same passage. This was introduced in response to REB's queries on timed and untimed testing and growing interest in this area internationally,

SUMMARY RESULTS

KINYARWANDA. Kinyarwanda FARS results from baseline to endline showed that after two years of the L3 intervention, P1 - P3 learners are performing significantly ($p<.001$) better than learners performed prior to the intervention, at baseline. As seen in the table below, Primary 1, 2 and 3 showed statistically significant gains ($p<.001$) in both FARS subtests in Kinyarwanda from baseline to endline: oral reading fluency (ORF), and reading comprehension (timed).[15] Learners in P1 and P2 showed substantial improvements in oral passage reading, or the ability to read a grade-level text, in which learners were able to read 10.1% and 11.8% more of the reading passage at endline, respectively. In terms of oral reading fluency, which is the ability to read quickly and accurately with proper expression, the largest improvement in the number of words read correctly per minute were seen in P2 and P3. P1 showed an average increase in ORF of 2.9 wcpm (± 1.0 wcpm). P2 demonstrated gains from baseline to endline with an average increase of 5.7 wcpm (±2.1 wcpm). P3 showed average gains of 3.4 wcpm (± 1.8 wcpm) from baseline to endline.

For P4, Kinyarwanda FARS results remained largely unchanged from baseline (SY 2015) to endline (SY 2016), which may be due to the fact that the language of instruction switches from

[15] Administration of the FARS Untimed Reading comprehension subtest was introduced in 2015. As a result, for P1-P3, gains in untimed reading cannot be assessed from baseline (SY 2014) to endline (SY 2016).

Kinyarwanda to English in P4. As seen in the table below, analysis showed that there was not a significant difference in FARS results for P4 learners. Given that P4 data was not collected at baseline in 2014, results can only be compared from 2015 to 2016.

TABLE 6. AVERAGE KINYARWANDA GAINS (BASELINE-ENDLINE) ON FARS, BY GRADE

Grade	FARS Subtests	BASELINE (mean)	ENDLINE (mean)	GAIN (mean)	EFFECT SIZE (Cohen's d)
P1	Oral Passage Reading (pct)	17.2%	27.3%	10.1% (±3.5%)	0.32
	Words Correct per Minute (wcpm)	4.76	7.7	2.9 (± 1.0)	0.32
	Reading Comprehension: timed (pct)[16]	13.9%	21.9%	8.0% (±3.3)	0.27
	Reading Comprehension: untimed (pct)	---	35.3%	---	---
P2	Oral Passage Reading (pct)	43.1%	55.0%	11.8% (±4.4%)	0.30
	Words Correct per Minute (wcpm)	19.2	24.8	5.7 (±2.1)	0.30
	Reading Comprehension: timed (pct)	44.5%	51.0%	6.5% (±4.5%)	0.17
	Reading Comprehension: untimed (pct)	---	63.3%	---	---
P3	Oral Passage Reading (pct)	37.5%	43.7%	6.2% (±2.9%)	0.24
	Words Correct per Minute (wcpm)	22.1	25.5	3.4 (± 1.8)	0.22
	Reading Comprehension: timed (pct)	33.9%	40.1%	6.2% (±3.0%)	0.24
	Reading Comprehension: untimed (pct)	---	54.9%	---	---
P4*	Oral Passage Reading (pct)	60.5%	59.5%	-1.0% (±3.3%)	-0.03
	Words Correct per Minute (wcpm)	40.6	40.1	-0.5 (± 2.3)	-0.02
	Reading Comprehension: timed (pct)	56.5%	59.1%	2.6% (±3.9%)	0.08
	Reading Comprehension: untimed (pct)	84.5%	84.8%	0.3% (±3.4%)	0.01

*Baseline data for P4 was collected in 2015; endline data was collected in 2016 along with P1-P3

Effect size[17] was calculated between Kinyarwanda FARS scores at baseline and at endline. Effect size calculations showed small to medium effect size differences from baseline to endline in nearly all Kinyarwanda FARS subtests for P1-P3 learners, with the exception of reading comprehension for P2. The largest effect size difference was seen in oral passage reading and oral reading fluency in P1 (d=0.32). The effect size calculations are reported in Table 8. Detailed results of P1-P4 Kinyarwanda FARS can be found in subsequent sections as well as in the Appendix E.

[16] Reading comprehension: timed (pct) and untimed (pct) represents the average (mean) percent of reading comprehension questions learners answered correctly.

[17] Effect size is a statistical measure that is used to estimate the magnitude of difference between two measures. Effect sizes are largely resistant to sample size influence, and thus provide a truer measure of the magnitude of effect. Effect size was computed by dividing the differences between the means of the two groups by the pooled standard deviation. Effect sizes are interpreted as follows, according to Cohen (1998): "small, d = .2," "medium, d = .5," and "large, d = .8". (reference: Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Earlbaum Associates.)

ENGLISH. Given that the language of instruction changes from Kinyarwanda to English in P4, an English FARS assessment was conducted with a sample of P4 learners during midline data collection in 2015, as well as during endline data collection in October 2016. The P4 English assessment was not administered at baseline (SY 2014). As a result, the report provides results for data that was collected in 2015 (English baseline) and 2016 (endline).

Analysis of the P4 English FARS data showed statistically significant improvements ($p<.01$) in all FARS reading subtests in English from baseline (SY 2015) to endline (SY 2016). P4 learners showed substantial improvements in oral passage reading, in which learners were able to read 11.4% (±4.1%) more of the English reading passage at endline compared to baseline ($p<.001$), which suggests improvements in English word recognition skills. Similarly, improvements were seen in English oral reading fluency, in which learners were able to read, on average, 9.0 wcpm (±3.0) more words correct per minute at endline ($p<.001$). Significant gains (6.1%) were also seen in English reading comprehension ($p<.01$). The table below summarizes P4 English FARS results.

TABLE 7. AVERAGE ENGLISH P4 GAINS (BASELINE-ENDLINE) GAINS ON FARS

Grade	FARS Subtests	BASELINE (mean)	ENDLINE (mean)	GAIN (mean)	EFFECT SIZE (Cohen's d)
P4*	Oral Passage Reading (pct)	41.9%	53.3%	11.4% (±4.1%)	0.31
	Words Correct per Minute (wcpm)	26.0	35.0	9.0 (±3.0)	0.33
	Reading Comprehension: timed (pct)[18]	19.6%	25.6%	6.1% (±3.7%)	0.19
	Reading Comprehension: untimed (pct)	27.9%	35.1%	7.2% (±4.1%)	0.20

*Baseline data for P4 was collected in 2015; endline data was collected in 2016 along with P1-P3

Effect size difference calculations, as seen in Table 9 above, corroborate these findings. Small to medium effect sizes were found for all English FARS subtests, with the largest effect size difference between baseline and endline for P4 English oral reading fluency ($d=.33$).

ZERO SCORES

Overall, the results of the endline assessment found statistically significant reductions for all grades (P1-P4) in zero scores on nearly all Kinyarwanda FARS subtests– oral reading fluency and reading comprehension - from baseline to endline. The only exception was found in P4, in which the proportion of learners who were unable to answer a single reading comprehension question remained largely unchanged from baseline to endline. Further, results showed that, in P4, significant reductions were also seen in the percentage of learners who were unable to read a single word in an English passage or answer at least one reading comprehension question.

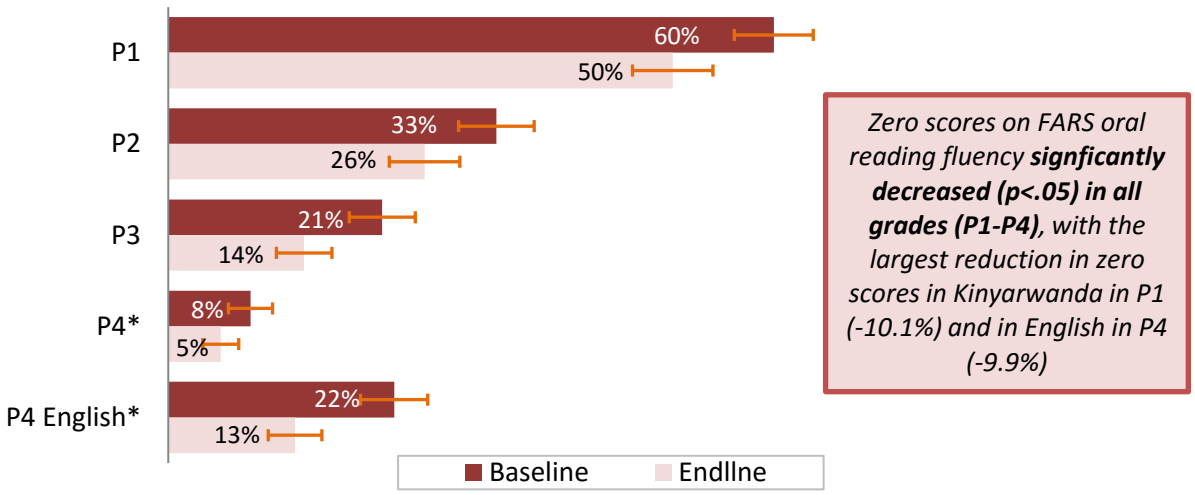
[18] Reading comprehension: timed (pct) and untimed (pct) represents the average (mean) percent of reading comprehension questions learners answered correctly.

ORAL READING FLUENCY. As seen in the figure below, in all grades assessed (P1-P4), analysis showed statistically significant ($p<.05$) reductions in the proportion of learners who could not read a single word in Kinyarwanda. P1 learners demonstrated the most dramatic drop of 10.1% (±5.6%). Similarly, reductions in zero scores in Kinyarwanda from baseline to endline were seen for P2 and P3 learners, in which scores dropped on average by 7.1% (±5.1%) and 7.8% (±4.3%), respectively. Effect size calculations showed small effect size differences in zero scores from baseline to endline (Cohen's *d* ranged from .16 to .21) for learners in P1-P3.

The percentage drop in the number of P4 learners who were unable to read a single word in Kinyarwanda showed the smallest reduction of 3.0% (±2.8%), however, this is not surprising given that very few P4 learners were found to not be able to read a single word in Kinyarwanda.

Analysis also showed statistically significant reductions ($p<.001$) in the number of P4 learners who could not read a single word in English. At endline, P4 English zero scores had reduced by 9.9% (±4.3%). Further analysis showed a small to medium effect size difference between the proportion of P4 learners with zero scores on English ORF at baseline and endline ($d=.26$). The figure below shows the reduction in zero scores from baseline to endline.

FIGURE 27. REDUCTION IN ORAL READING FLUENCY ZERO SCORES (BASELINE/ENDLINE), BY GRADE



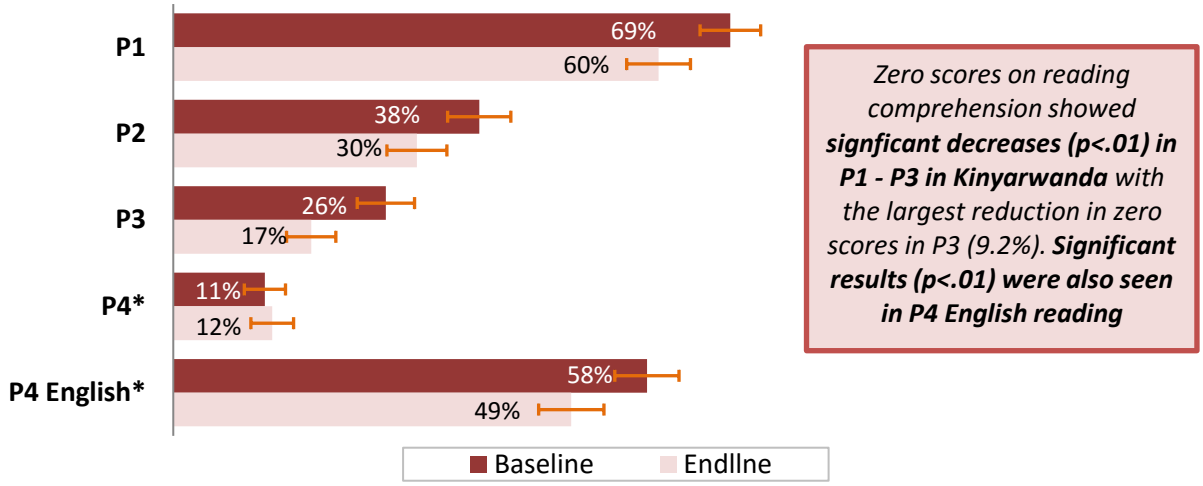
*Baseline data for P4 was collected in 2015; endline data was collected in 2016 along with P1-P3

READING COMPREHENSION. Similarly, results showed significant ($p<.01$) reductions in the percentage of P1-P3 learners who could not answer a single reading comprehension question after reading a grade-level text in Kinyarwanda from baseline to endline. At endline, zero scores in P1, P2 and P3 had reduced by 8.9% (±5.4%), 7.7% (±5.5%) and 9.2% (±4.7%), respectively. Effect size calculations indicated small reductions in zero scores from baseline to endline (Cohen's *d* ranged from .16 to .2) for learners in P1-P3.

The change in the proportion of P4 learners with zero scores in Kinyarwanda reading comprehension between baseline and endline was not statistically significant. However, on the English FARS, P4 learners showed significant ($p<.01$, $d=.19$) reductions in English zero scores

for reading comprehension, in which at endline zero scores on the FARS reading comprehension subtest had decreased by 9.4% (±5.6%) since baseline. The figure below shows the proportion of P1-P4 learners who were unable to answer a single reading comprehension question at baseline and endline.

FIGURE 28. REDUCTION IN READING COMPREHENSION ZERO SCORES (BASELINE/ENDLINE), BY GRADE



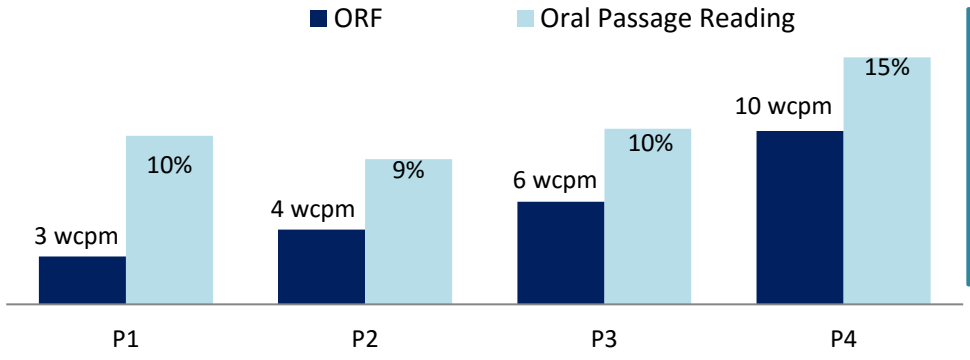
*Zero scores on reading comprehension showed **signficant decreases (p<.01) in P1 - P3 in Kinyarwanda** with the largest reduction in zero scores in P3 (9.2%). **Significant results (p<.01) were also seen in P4 English reading***

*Baseline data for P4 was collected in 2015; endline data was collected in 2016 along with P1-P3

RESULTS BY SEX

Data analysis found that girls, on average, continue to demonstrate far better FARS reading results than boys in both Kinyarwanda (P1-P4) and English (P4). Overall, the largest differences between boys and girls were seen in oral passage reading in both Kinyarwanda and English. The figure below shows the average gender gap in oral passage reading and oral reading fluency in Kinyarwanda by sex. As seen in the figure below, at endline, girls are outperforming boys by nine percentage points or more in all grades (P1-P4); in fact, in P4, girls were able to, on average, read 15% more of the reading passage than boys during the timed test. Results were similar in English; girls were able to read 9% more of the P4 English passage than boys.

FIGURE 29. AVERAGE GENDER GAP[19] ON KINYARWANDA FARS SUBTESTS AT ENDLINE, BY GRADE



*At endline, **girls continue to outperform boys** in oral reading fluency in Kinyarwanda and English.*

[19] The gender gap is calculated by subtracting average boys ORF and oral passage reading percent correct scores from average girls scores to calculate the average difference, gender gap, between boys and girls.

Detailed analysis of FARS subtest results at endline, by sex, showed a similar trend. Girls, on average, outperform boys by about four to fourteen percentage points in oral passage reading and reading comprehension. In terms of oral reading fluency, girls are able to read, on average, between two to eleven words more words per minute than boys at endline. The difference in FARS reading performance between boys and girls is statistically significant at the $p<.05$ level for nearly all Kinyarwanda and English FARS subtests, with the exception of P2 and P3 reading comprehension.

TABLE 8. FARS SUBTEST RESULTS AT ENDLINE, BY SEX AND GRADE

GRADE	FARS SUBTESTS	GIRLS	BOYS	GENDER GAP	EFFECT SIZE (Cohen's d)
P1	Oral Passage Reading (pct)	32.3	22.4	9.9% (±5.5%)	0.29
	Words Correct per Minute (wcpm)	9.1	6.3	2.8 (±1.6)	0.28
	Reading Comprehension: timed (pct)	25.7	18.0	7.6% (±5.2%)	0.23
P2	Oral Passage Reading (pct)	59.2	50.7	8.5% (±6.4%)	0.21
	Words Correct per Minute (wcpm)	27.0	22.7	4.4 (±3.1)	0.23
	Reading Comprehension: timed (pct)	53.8	48.3	5.5% (±6.4%)	0.14
P3	Oral Passage Reading (pct)	48.8	38.5	10.3% (±3.9%)	0.43
	Words Correct per Minute (wcpm)	28.5	22.4	6.0 (±2.4)	0.41
	Reading Comprehension: timed (pct)	42.1	38.0	4.2% (±4.3%)	0.16
P4 KR	Oral Passage Reading (pct)	66.9	52.4	14.5% (±4.4%)	0.53
	Words Correct per Minute (wcpm)	45.3	35.1	10.2 (±3.1)	0.52
	Reading Comprehension: timed (pct)	65.3	53.1	12.2% (±5.6%)	0.34
P4 Eng	Oral Passage Reading (pct)	58.0	48.8	9.2% (±5.8%)	0.25
	Words Correct per Minute (wcpm)	38.9	31.2	7.7 (±4.5)	0.28
	Reading Comprehension: timed (pct)	29.0	22.4	6.6% (±5.6%)	0.19

To explore the magnitude of difference between boys and girls' reading performance on FARS reading subtests, effect sizes were calculated. Results showed that, overall, the largest differences in reading performance in both Kinyarwanda and English were in oral passage reading and oral reading fluency; differences in reading comprehension were less pronounced, meaning that boys and girls performed relatively similarly in reading comprehension. Results also suggested that the gender gap in oral passage reading and oral reading fluency may be worsening as learners progress in primary school. Analysis showed that in P3 and P4, medium effect size differences between boys and girls in oral passage reading were detected ranging between $d=.43$ and $d=.53$. Compared to much smaller effect size differences in grades P1 and P2 (*Cohen's d* ranged between .21 and .29).

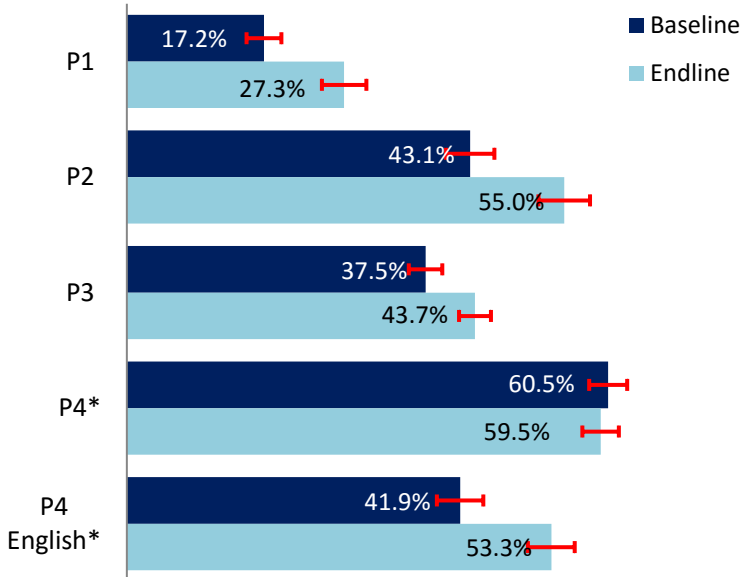
Given that results show that girls continue to outperform boys at endline, an important facet to explore is whether the difference in girls' and boys' FARS reading performance is getting smaller over time or in fact widening. Analysis of Kinyarwanda and English FARS subtest results show that the gender gap has worsened slightly from baseline to endline in grades P1, P3 and P4. In these grades, girls are improving at a particularly faster rate than boys and as a result, boys are falling even further behind girls. This is confirmed by larger effect size differences between boys and girls at endline compared to baseline. One exception to this trend is in Primary 2; although boys, on average, perform worse than girls on P2 FARS subtests, P2 results show that boys show larger gains than girls on Kinyarwanda FARS subtests from baseline to endline. This suggests that the gender gap in oral reading fluency in Primary 2 is slowly closing.

ORAL READING FLUENCY

To measure oral reading fluency, the ability to read quickly and accurately with proper expression,[20] and reading comprehension, P1-P4 learners were asked to read aloud a grade-level text in Kinyarwanda and to answer five reading comprehension questions. Additionally, in P4, to assess oral reading fluency and reading comprehension in English, P4 learners were also asked to read an English passage and answer five comprehension questions.

ORAL PASSAGE READING PERCENT CORRECT. An examination of the accuracy of learners to read a grade-level text was conducted in which the average percent[21] of a grade-level text that a learner could read within an allotted minute was analyzed. Accuracy is an important skill in reading since it requires word recognition and decoding skills and is closely linked to oral reading fluency (rate). In the early stages of learning to read, readers may be accurate but slow and inefficient at recognizing words. Analysis of endline results showed that the average percent of a grade-level text in Kinyarwanda that P1-P3 learners who were able to read within an allocated minute showed a

FIGURE 30. AVERAGE PERCENT CORRECT ON FARS, BY GRADE



* Baseline data for P4 were collected in 2015; endline was

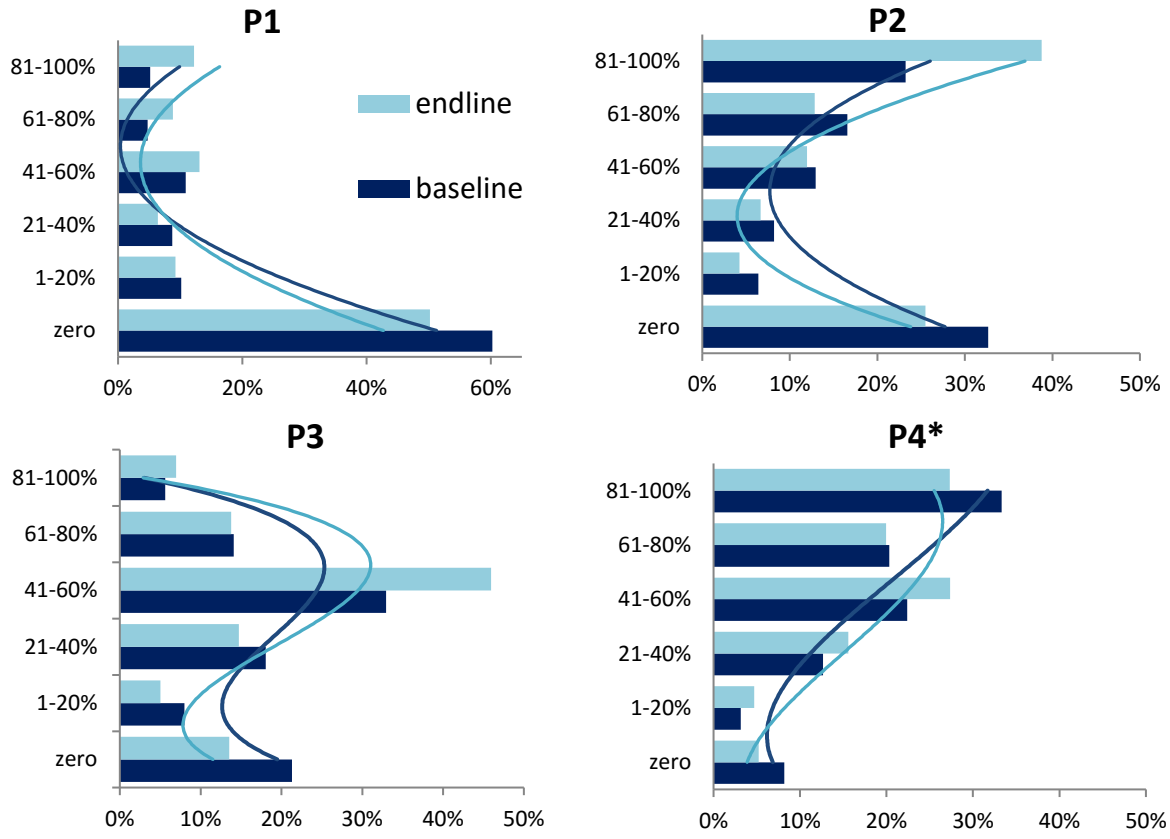
[20] Early Grade Reading Assessment Toolkit, Second Edition. 2015. p 25.

[21] FARS Oral Passage Reading Percent Correct is calculated by dividing the number of words read correctly in the passage by the total number of words in the passage. Error bars show 95% confidence interval of means.

movement toward better results at endline. Significant gains ($p<.001$) were seen from baseline to endline in the proportion of a grade-level text in Kinyarwanda that P1-P3 learners were able to read accurately. In measuring improvements in the percent of the grade-level text that the learners were able to read accurately in 60 seconds, P2 showed the largest gains from baseline to endline with an average increase of 11.8% (±4.4%). P1 and P3 also demonstrated significant gains from baseline to endline with an average increase of 10.1% (±3.6%) and 6.2% (±2.9%), respectively. Although in Kinyarwanda, P4 results remained largely unchanged from baseline to endline, in English, P4 learners were able to read 11.4% more words in the grade-level text ($p<.001$) from baseline to endline.

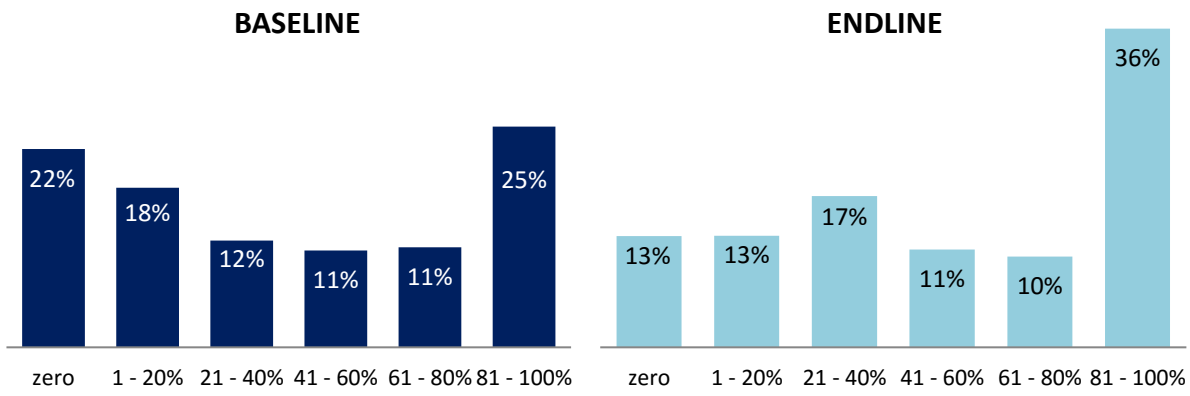
To better understand the distribution of readers in classrooms, further analysis of the percentage of a grade-level passage that learners were able to read by grade was conducted. Results showed that the heavily negatively skewed distribution (large numbers of learners who cannot read a single word) in P1 and the U-shaped pattern, with a high proportion of learners either reading the entire text or not reading a single word, in P2 persist at endline. P3 assessment results showed 13.5% of learners with zero scores, with the remaining results normally distributed. P4, results were largely unchanged from baseline to endline, with roughly three-quarters of learners who could read 40% or more of the Kinyarwanda text. Figure 32 presents these results, with a polynomial line emphasizing the shape of the distribution in each grade.

FIGURE 31. KINYARWANDA - PERCENT OF WORDS READ CORRECTLY, GROUPED BY GRADE



Analysis of English results showed improvements in the percent of an English passage P4 learners were able to read in an allotted minute. At baseline, results showed a slight U-shaped pattern, with a substantial proportion of learners either reading the majority of the text or not reading a single word. However, at endline, results were largely skewed to the left, with nearly half (46%) of P4 learners who could read over 60% of the English text compared to only a third (36%) at baseline. Figure 33 below shows the distribution of English oral passage reading results at baseline and endline.

FIGURE 32. P4 ENGLISH FARS - PERCENT OF WORDS READ CORRECTLY

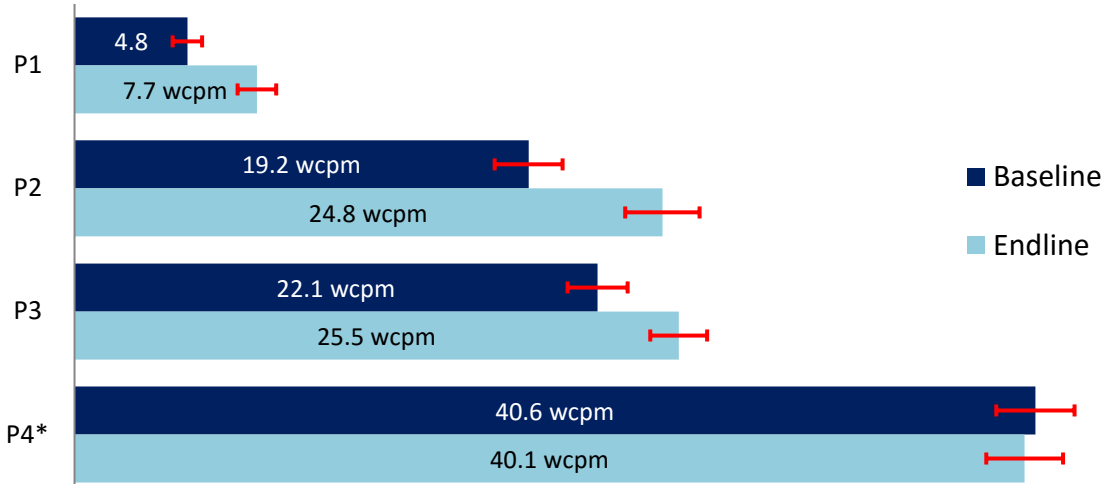


ORAL READING FLUENCY (WORDS CORRECTLY READ PER MINUTE). Fluency is often described as a bridge between word recognition and reading comprehension, in which readers must eventually advance decoding skills to the point that is not only accurate, but automatic and as a result, readers can focus their attention on what the text means – comprehension. P1-P4 learners were timed on reading grade-level texts, with the limit of 60 seconds. The number of words read correctly was divided by the seconds it took to read and then multiplied by 60 seconds to find the number of correct words per minute, which is the standard fluency measure used to measure USAID reading interventions.

After two years of L3 intervention, P1-P3 learners were able to read significantly faster ($p < .001$) than learners at baseline. Figure 34 shows the average oral reading fluency of P1-P3 learners in Kinyarwanda. In measuring improvements in the number of words read correctly per minute, P2 and P3 learners showed the most gains from baseline to endline. P1 showed an average increase in ORF of 2.9 wcpm (± 1.0 wcpm). P2 demonstrated gains from baseline to endline with an average increase of 5.7 wcpm (±2.1 wcpm). P3 showed average gains of 3.4 wcpm (± 1.8 wcpm).

For P4, Kinyarwanda FARS results remained largely unchanged. As seen in the figure below, analysis showed that there was not a significant difference in FARS results for P4 learners. Given that P4 data was not collected at baseline in 2014, results can only be compared from 2015 to 2016.

FIGURE 33. KINYARWANDA: AVERAGE NUMBER OF WORDS READ CORRECTLY IN A MINUTE, BY GRADE



* Baseline data for P4 were collected in 2015; endline was collected in 2016 along with P1-P3

In P4, learners were also asked to read aloud a grade-level English passage, timed at 60 seconds. Endline results showed significant improvements ($p<.001$) in oral reading fluency in English. At baseline (SY 2015), P4 learners were able to read 26.0 (±2.0) words correct per minute. However, by endline (SY 2016), learners were able to read 35.0 (±2.2) words correct per minute, on average, which is an improvement of 9.0 (±3.0) additional words in a minute.

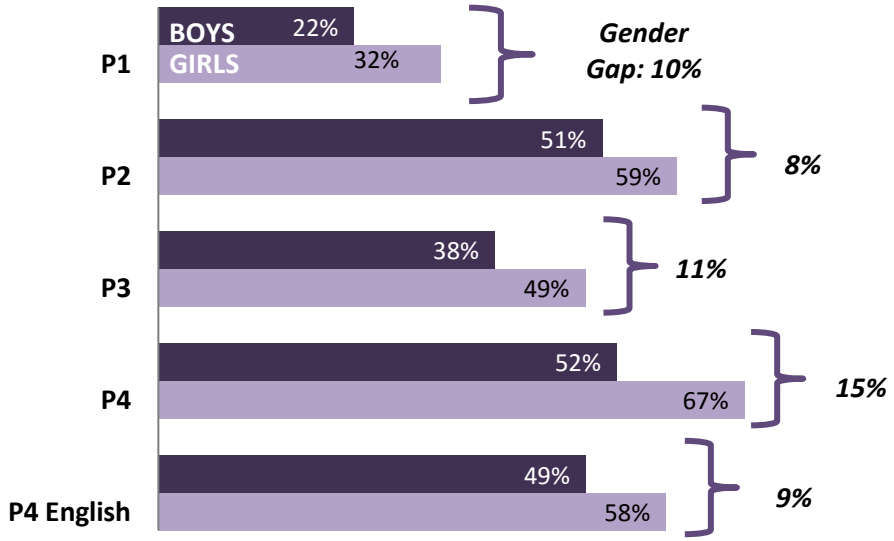
ORAL READING FLUENCY RESULTS BY SEX

At endline, girls were found to be reading faster than boys in all four tested grades.

Overall, an analysis of oral passage reading by sex showed that, on average, girls were able to read more of a grade-level text than boys. At baseline, the difference between boys and girls in Kinyarwanda oral passage reading (percent correct) was statistically significant among only P2-P4 learners, at $p<.05$; significant differences between boys and girls were not seen in Kinyarwanda in P1 or in English in P4. However, at endline, the difference between boys and girls is statistically significant ($p<.05$) in oral reading in Kinyarwanda in all four tested grades. Similarly, this trend was found in P4 English as well.

Figure 35 shows how much, on average, of the grade-level oral reading passage P1-P4 boys and girls were able to read within the allocated one minute at endline. The figure shows a persistent gender gap across all grades in which girls tend to read more of the text than boys. Results show that a substantial gender gap at endline in which girls can read between 8% to 15% more of a grade-level text compared to boys, on average. Further investigation is needed to establish the reasons why girls are learning to read better than boys.

FIGURE 34. PERCENT OF WORDS READ CORRECTLY AT ENDLINE, BY SEX AND GRADE



Similar results, were seen in oral reading fluency by sex. At baseline, girls in P2-P4 were able to, on average, read in Kinyarwanda faster than boys. No significant difference in ORF was seen in P1 nor in P4 in English. However, at endline, girls were able to read significantly ($p<.01$) faster than boys in Kinyarwanda in all grades (P1-P4) as well as in in English (P4). In fact, an analysis of learner ORF results by sex showed that girls both started higher and improved more than boys between the baseline and the endline. The only exception to this trend was in P2, in which boys showed larger gains than girls from baseline to endline. Despite this slight closing of the ORF gender gap in P2, boys still remained significantly behind girls in all grades at endline.

TABLE 9. BASELINE-ENDLINE GAINS IN ORAL READING FLUENCY, BY GRADE AND SEX

Girls: Oral Reading Fluency Averages				
Grade	BASELINE	ENDLINE	GAIN	EFFECT SIZE (Cohen's d)
P1	5.0	9.1	4.1 (± 1.6)	0.42
P2	22.2	27.0	4.9 (± 3.1)	0.25
P3	23.5	28.5	5.0 (± 2.4)	0.33
P4	43.0	45.3	2.3 (± 3.3)	0.12
P4 English	27.2	38.9	11.7 (± 4.3)	0.44
Boys: Oral Reading Fluency Averages				
Grade	BASELINE	ENDLINE	GAIN	EFFECT SIZE (Cohen's d)
P1	4.5	6.3	1.8 (± 1.3)	0.22
P2	16.1	22.7	6.6 (± 2.8)	0.37
P3	20.7	22.4	1.7 (± 2.5)	0.11
P4	38.2	35.1	-3.1 (± 3.1)	-0.15
P4 English	24.8	31.2	6.4 (± 4.1)	0.25

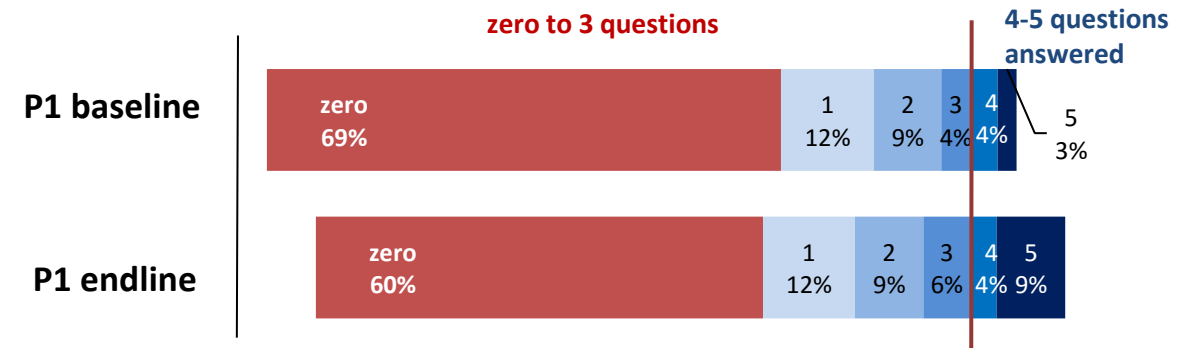
READING COMPREHENSION

Comprehension is the ultimate goal of reading. To measure comprehension, during the assessment, learners were asked five locator[22] questions about the text that they just read (see Methodology section in Appendix B for the description). Learners were not allowed to look back at the text to help them answer questions. The overall results are presented below in Figures 36 and 37.

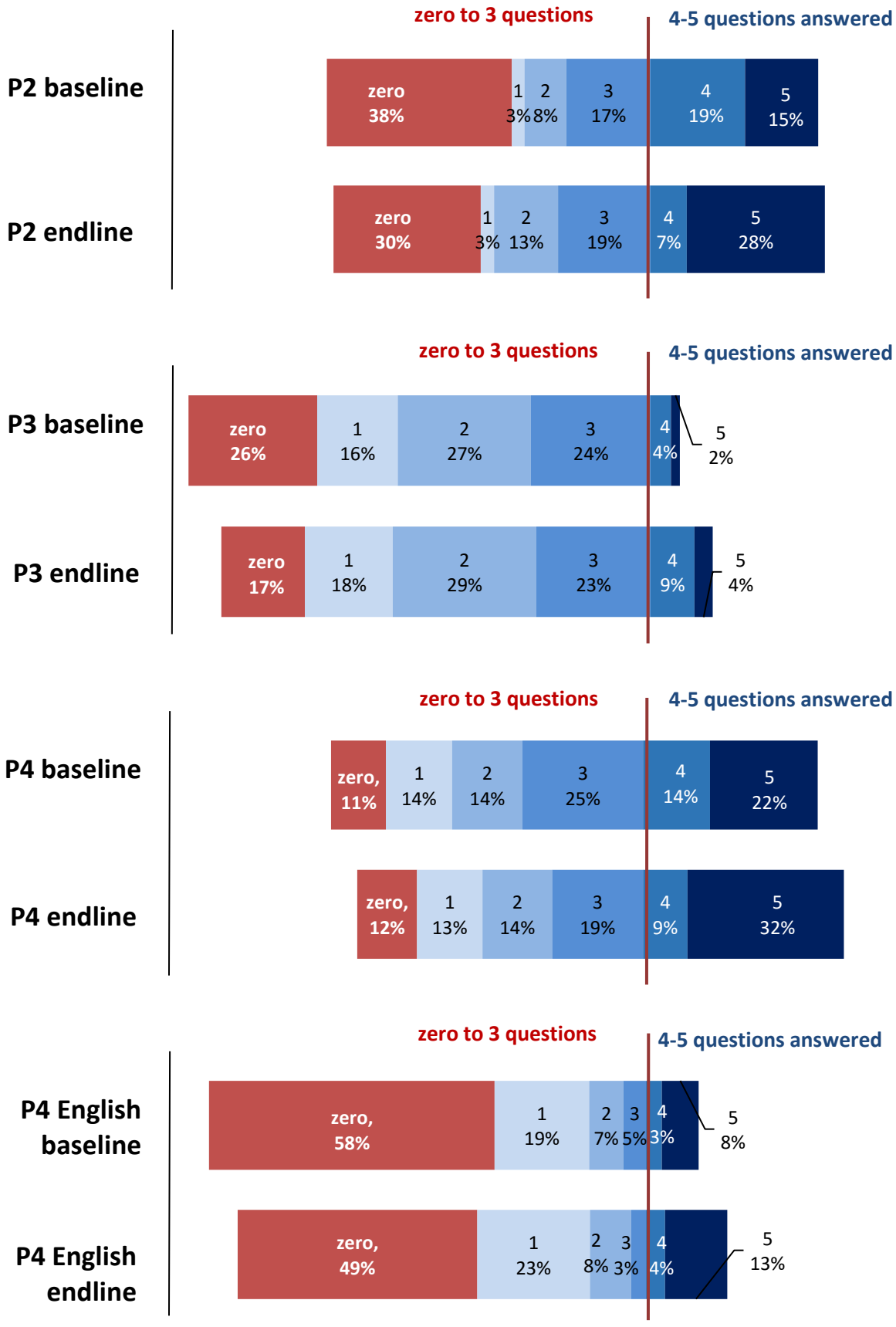
Similar to oral passage reading results, from baseline to endline, P1-P3 learners showed a significant ($p<.01$) increase in the number of reading comprehension questions they could answer correctly. In Primary 4, learners showed a significant improvement ($p<.001$) in the number of English reading comprehension questions they could answer correctly; P4 reading comprehension in Kinyarwanda did not show significant changes from baseline to endline.

A learner who "reads with comprehension" is defined as being able to answer at least 4 out of 5 (80 to 100%) reading comprehension questions. Figures below show that a large proportion of tested learners were not able to achieve this benchmark. In P1, the percent of learners answering 4 or 5 reading comprehension questions increased from 7% at baseline to 13% at endline. Additionally, zero scores decreased by 9% from baseline to endline. In Primary 2, the percent of learners reading with comprehension (4-5 questions correct) improved slightly from 34% to 35%. Although the percentage of P2 learners "reading with comprehension" only improved slightly, as seen in the figure below, the proportion of P2 learners who answered all five reading comprehension questions correctly improved substantially from 15% at baseline to 28% at endline. Additionally, a substantial reduction in zero scores (8% decrease) was noted in P2. The percent of P3 and P4 learners who were able to answer 4 or 5 reading comprehension questions increased by 7% and 5%, respectively, at endline. Similarly, P4 English results showed that 6% more learners were able to "read with comprehension" at endline.

FIGURE 35. FARS COMPREHENSION RESULTS, BY GRADE



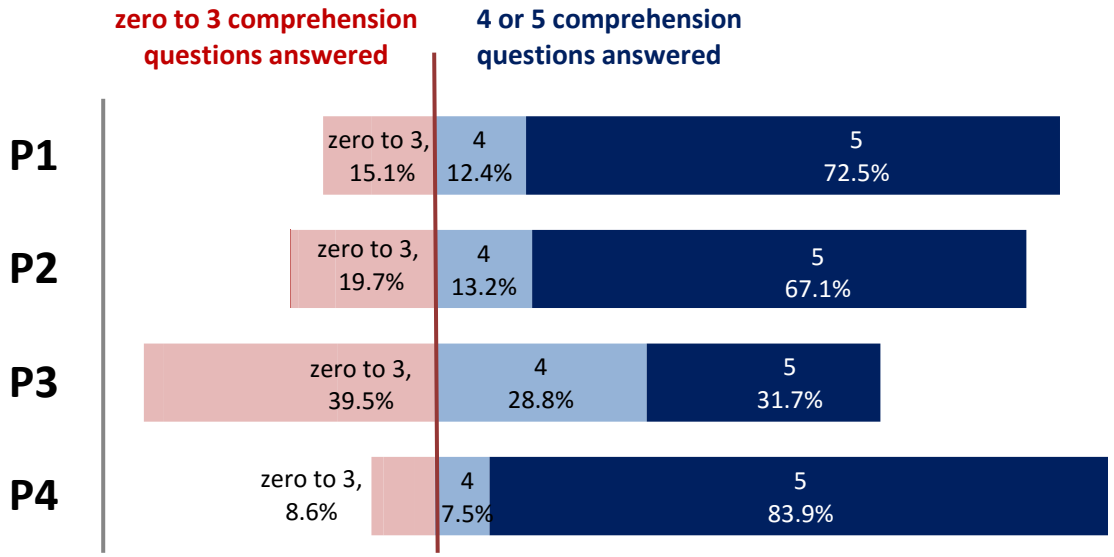
[22] A locator (also called "literal") question is a type of comprehension question about the passage that invokes a specific reference to the text and not implied meaning or an inference. For example, a question about a name of a character or a place in a story that is specifically mentioned is a locator question.


zero to 3 questions
4-5 questions answered
P2 baseline
zero 38%
1 3%
2 8%
3 17%
4 19%
5 15%
P2 endline
zero 30%
1 3%
2 13%
3 19%
4 7%
5 28%
zero to 3 questions
4-5 questions answered
P3 baseline
zero 26%
1 16%
2 27%
3 24%
4 4%
5 2%
P3 endline
zero 17%
1 18%
2 29%
3 23%
4 9%
5 4%
zero to 3 questions
4-5 questions answered
P4 baseline
zero, 11%
1 14%
2 14%
3 25%
4 14%
5 22%
P4 endline
zero, 12%
1 13%
2 14%
3 19%
4 9%
5 32%
zero to 3 questions
4-5 questions answered
P4 English baseline
zero, 58%
1 19%
2 7%
3 5%
4 3%
5 8%
P4 English endline
zero, 49%
1 23%
2 8%
3 3%
4 4%
5 13%

Since a true measure of comprehension can only be taken when a learner can read the text about which the questions are asked, an analysis of comprehension results among learners who read more than 80 percent of the text was conducted. The results showed that 84.9% of P1 learners, 80.3% of P2, 60.5% of P3 learners and 91.4% of P4 learners who actually read the text were able to answer four or five reading comprehension questions. All P3 and P4 learners who were able to read 80% of the text or more were able to answer at least one comprehension question. It should be noted that only a handful of P1 and P3 learners were able to read over 80% of the FARS text correctly.

The results showed that 84.9% of P1 learners, 80.3 percent of P2, 60.5% of P3 learners and 91.4% of P4 learners who demonstrated that they could read a grade-level text in Kinyarwanda were able to answer four or five reading comprehension questions.

FIGURE 36. ENDLINE COMPREHENSION RESULTS AMONG LEARNERS WHO READ 80-100% OF THE TEXT



The relationship between oral passage reading and reading comprehension as seen above for P1-P4 learners in Kinyarwanda was less pronounced in English. Of the P4 learners who were able to read 80 percent or more of the grade-level English text, only 41.7% were able to answer four or five reading comprehension questions correctly at endline. In fact, more than a third (38.4%) answered one or less reading comprehension questions correctly. These findings suggest that although Primary 4 learners have developed decoding and word recognition skills in English, the majority of learners have not progressed to understanding and interpreting what they have read, which is needed for English reading comprehension.

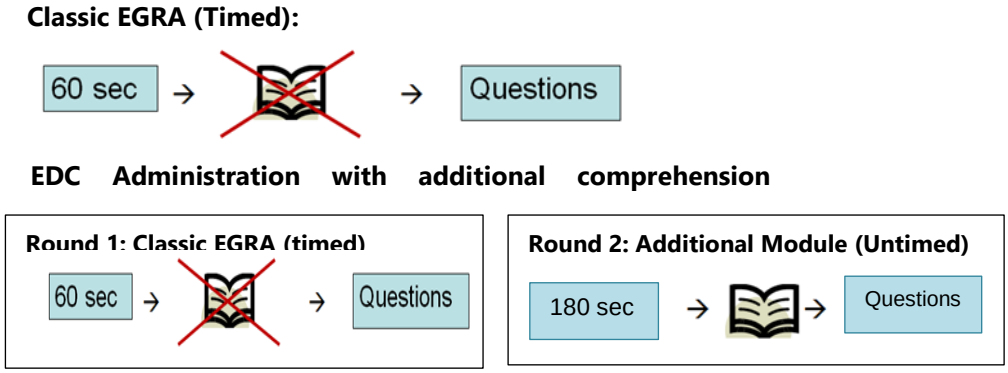
READING COMPREHENSION RESULTS BY SEX

Comparisons by sex showed significant differences in reading comprehension between boys and girls in P1 and P4. However, further analysis did not show significant differences between boys and girls who were able to read the majority of the grade-level text. Both boys and girls, who managed to read the test passage, were also able to answer comprehension questions, indicating appropriate vocabulary knowledge for their grade level. Since oral reading fluency is a statistically much more reliable measure than comprehension (due to the number of items included in the measurement), the results of the comprehension subtest should be interpreted with more caution than results of the fluency test.

UNTIMED READING RESULTS

In response to REB's queries on timed and untimed testing and growing interest in this area internationally, during the endline testing the data collectors administered the reading comprehension questions in two rounds: one with a timed and one with untimed reading. The first round the administration followed the standard EGRA administration procedures where tested learners had access to the test for 60 seconds and were supposed to answer comprehension questions without referencing the text. The second round immediately followed the first round. During the second round, assessors gave the same text back to the learners and allowed them to finish reading the passage[23] (if they hadn't done so already), and then asked them comprehension questions without taking the text away from the learners. The figure below compares the two rounds:

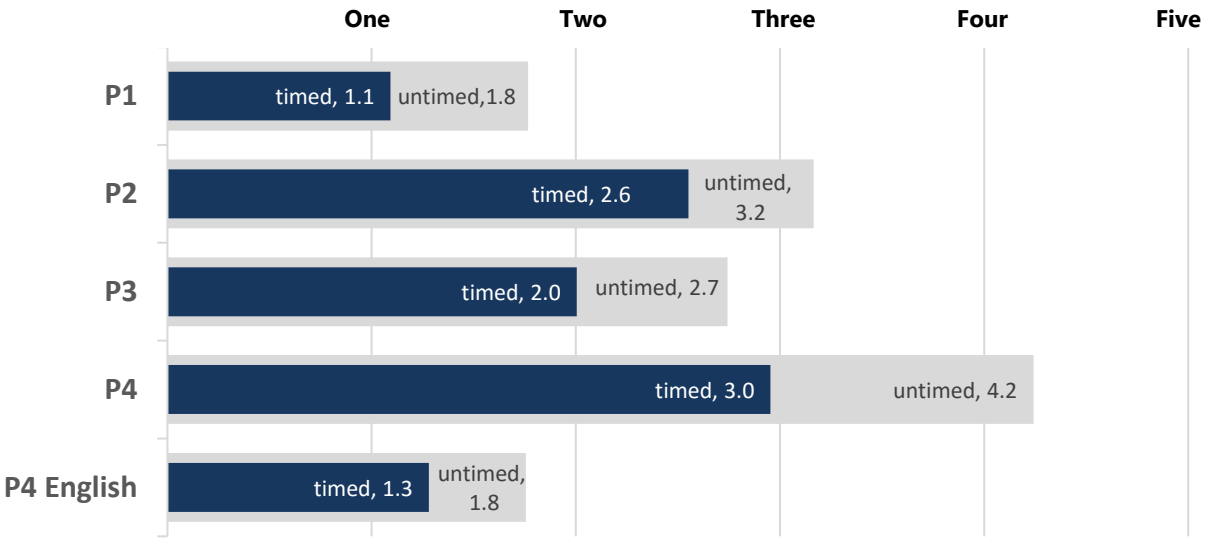
FIGURE 37. MEASURING READING COMPREHENSION



The results of the comparison between the two models of testing learners' comprehension skills are presented in the series of charts below. As seen from the next figure, the average reading comprehension results at endline significantly (p<.001) improved in all grades during untimed reading FARS administration.

[23] Learners who answered five comprehension questions during the first round were not asked to read the passage again nor answer reading comprehension questions again given that they demonstrated reading comprehension ability during the first round of administration.

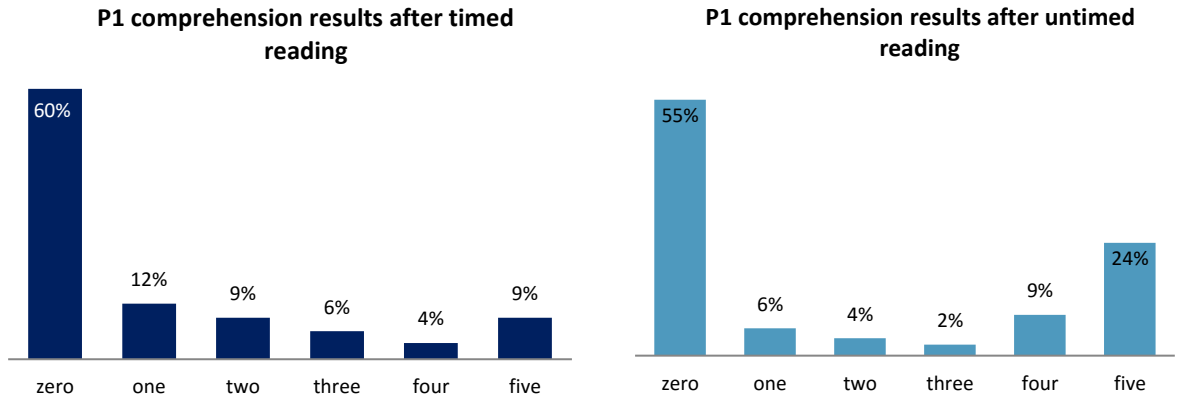
FIGURE 38. COMPARISON OF AVERAGE READING COMPREHENSION QUESTIONS ANSWERED CORRECTLY DURING TIMED AND UNTIMED READING AT ENDLINE, BY GRADE

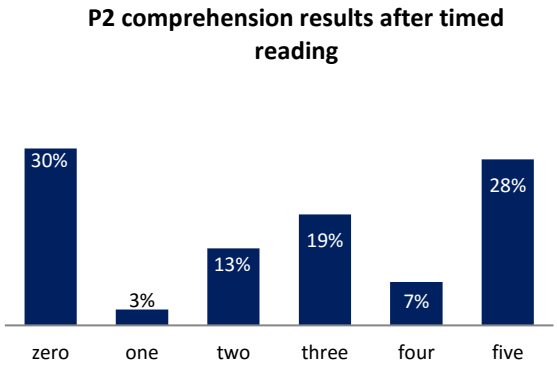


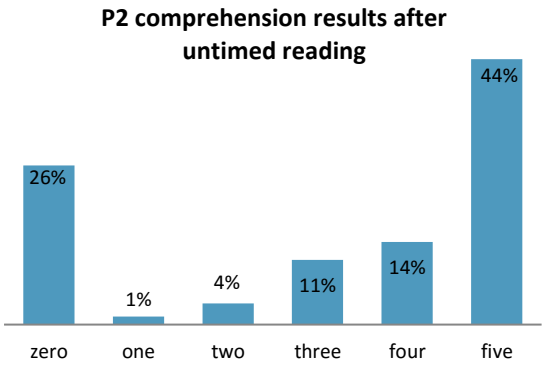
The following figures show the change in the number of comprehension questions answered when learners are allowed more time to finish reading the text and have access to the text when answering the questions. In all grades, the percent of learners who were able to meet comprehension proficiency benchmark of 80% in Kinyarwanda increased dramatically. In fact, the percentage of learners meeting comprehension benchmarks increased by at least 20 percentage points. The largest improvement in the proportion of learners meeting comprehension benchmarks during untimed reading were found in P4, in which the percentage of learners who were able to answer at least 4 comprehension questions increased from 41% to 82%.

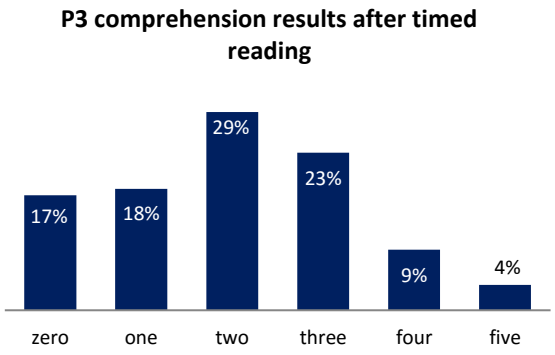
English results for P4 showed less substantial improvements in the proportion of learners meeting comprehension benchmarks after untimed reading (6 percentage point increase). However, results did show that allowing learners to complete reading and refer to the text when answering comprehension questions caused a drop in English comprehension zero scores from 49% to 37%.

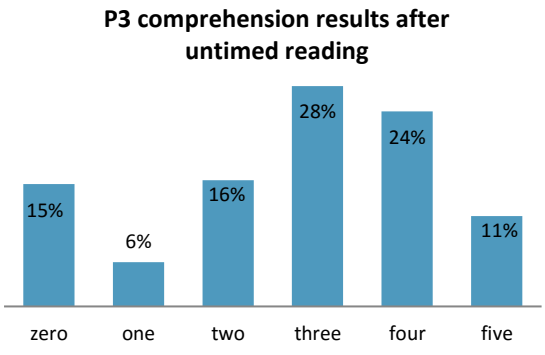
FIGURE 39. COMPARISON OF TIMED AND UNTIMED READING COMPREHENSION RESULTS

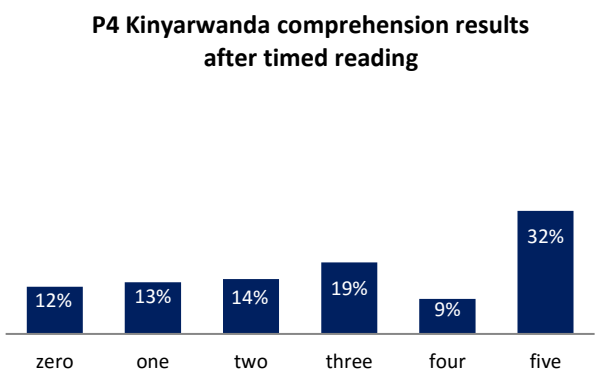


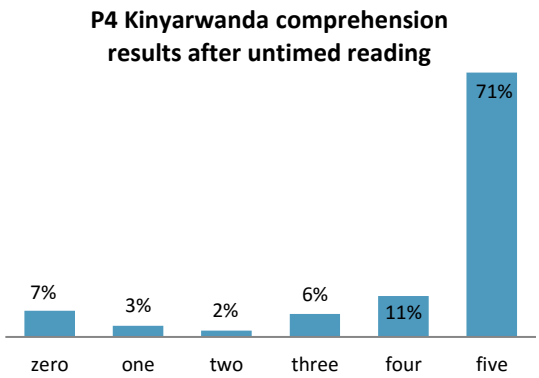


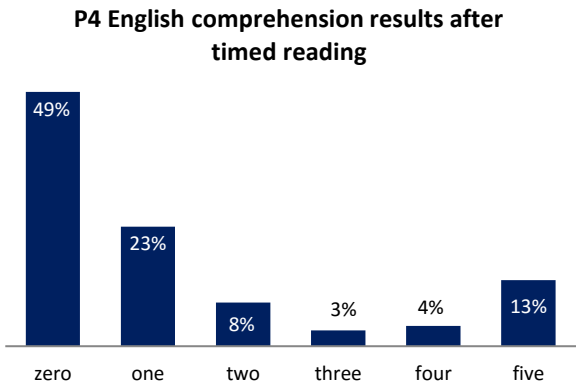


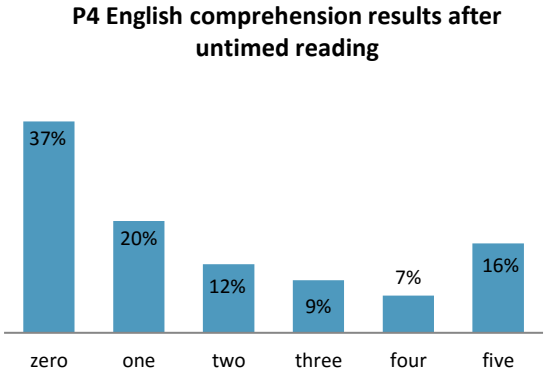












These findings suggest that reading comprehension results from timed and untimed reading assessments should be interpreted with caution. As seen above, results from timed and untimed administration, may be as much impacted by the process of administration as by the abilities of the tested learners.

PROFICIENCY AND PERFORMANCE BENCHMARKS

ORAL READING PROFICIENCY BENCHMARKS

One of the objectives of the assessment was to gather data on the percent of learners at different reading proficiency standards at the end of each grade. L3 and REB reading specialists proposed proficiency standards that are based on extensive research in literacy and a data-supported relationship between oral reading fluency and comprehension. According to the fluency standards,[24] the minimal oral reading fluency rate of a learner at the end of P2 should be at least 20 words read correctly in one minute. The minimal oral reading fluency rate of a learner at the end of P3 should be at least 33 words read correctly in one minute. While there are no fluency standards for P1, we use non-zero scores as a measure of fluency. Non-zero scores at the end of P1 could be construed as a positive result. Since P4 learners are expected to read in both Kinyarwanda and English, proficiency rates for both languages need to be established. Table 13 shows oral reading proficiency standards used to compute proficiency rates of primary grade learners in Rwandan schools.

TABLE 10. ORAL READING PROFICIENCY THRESHOLDS

Oral reading fluency proficiency	Speed in wcpm	Proficiency standard
Beginning to develop	**Under 20 wcpm**	
Developing reader	**20-32 wcpm**	**Primary 2**
Emerging fluent reader	**33-47 wcpm**	**Primary 3**

The table below summarizes the gains in the percentage of P1-P3 learners who meet oral reading fluency performance standards between the baseline and endline. Overall, the percentage of P1-P2 learners meeting oral reading fluency performance standards significantly improved ($p<.001$) from baseline to endline. Significant improvements were not seen in P3.

TABLE 11. BASELINE-ENDLINE GAINS IN LEARNERS MEETING ORAL READING FLUENCY BENCHMARKS, BY GRADE

GRADE	BASELINE	ENDLINE	GAIN	EFFECT SIZE
P1*	39.7%	49.8%	10.1% (± 5.6%)	0.20
P2**	49.9%	59.9%	10.0% (± 5.6%)	0.20
P3***	24.6%	27.7%	3.1% (± 5.0%)	0.07

* Reading 1+ words correct per minute

** Reading 20+ words correct per minute

*** Reading 33+ words correct per minute

[24] Since 2012, the REB and L3 worked closely to create national reading performance standards for primary grades 3 and 5. A national assessment of P3 and P5 to validate those standards was conducted at the end of the 2012 school year. P2 oral reading fluency standards were proposed by L3 to REB in 2015, based on baseline assessment findings. The P2 standards were approved in August, 2015. As of the writing of this report, P4 benchmarks for Kinyarwanda and English have not been established.

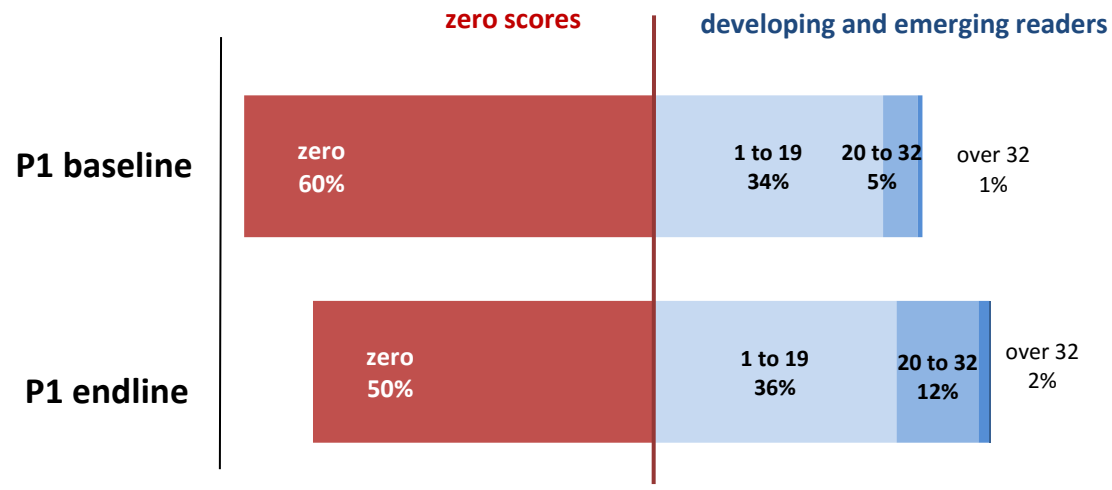
The following figures show a distribution of results for oral reading fluency according to the proficiency standards for P2 and P3. Since no proficiency standards for P1 have been established at the time of the preparation of this report, all non-zero score learners were assumed to be proficient for the purpose of reporting here. The percent of P3 learners who are proficient readers is smaller than the percent of P2 learners who are proficient because proficiency standards for P3 are higher.

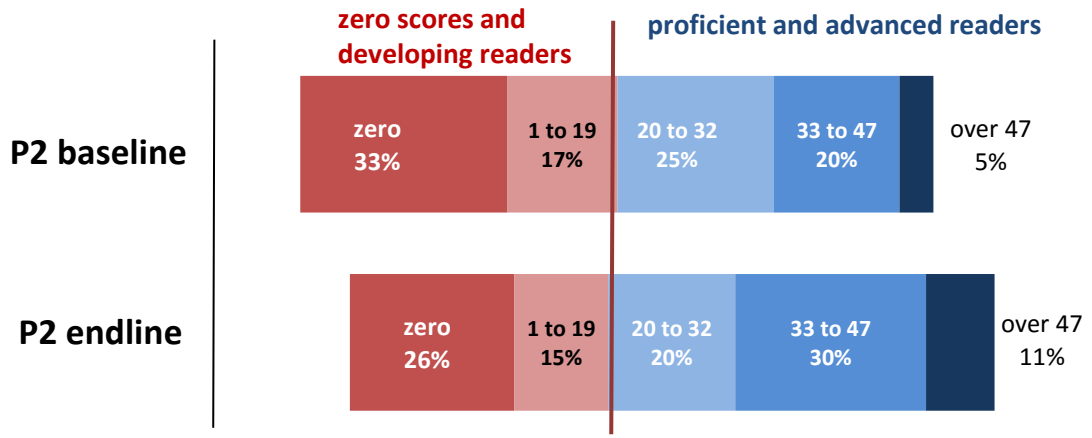
Overall, the assessment found that more P2 and P3 learners could read fluently compared to their peers from the same grades who were tested at baseline, according to the proficiency standards established by REB. In P1, the percent of learners with non-zero scores increased by 10%. In fact, the percent of P1 learners who could read 20 or more words correct per minute more than doubled between the baseline and the endline. The percent of P2 learners meeting performance standards and could read a grade level text with some oral reading fluency (over 20 words per minute) increased from 50% to 60%. In P3, 28% of learners met performance standards of 33 or more words correct per minute, compared to 25% at baseline.

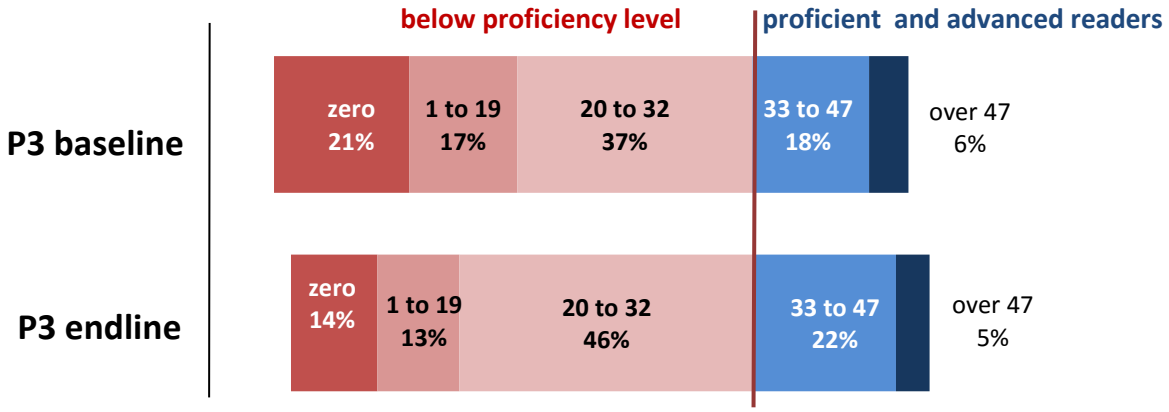
Average ***decrease*** in percent of children not able to read a single word

- **P1: 10.1%**
- **P2: 7.1%**
- **P3: 7.8%**

FIGURE 40. PERCENT OF LEARNERS READING AT GRADE LEVEL, BY GRADE



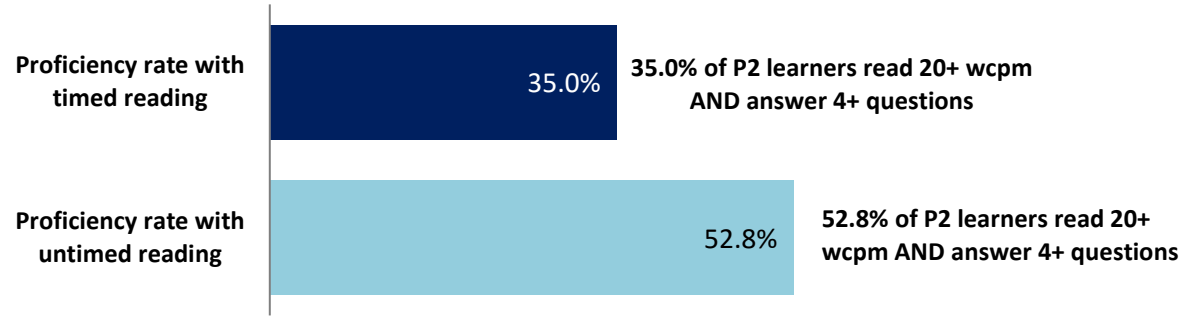




READING WITH FLUENCY AND COMPREHENSION

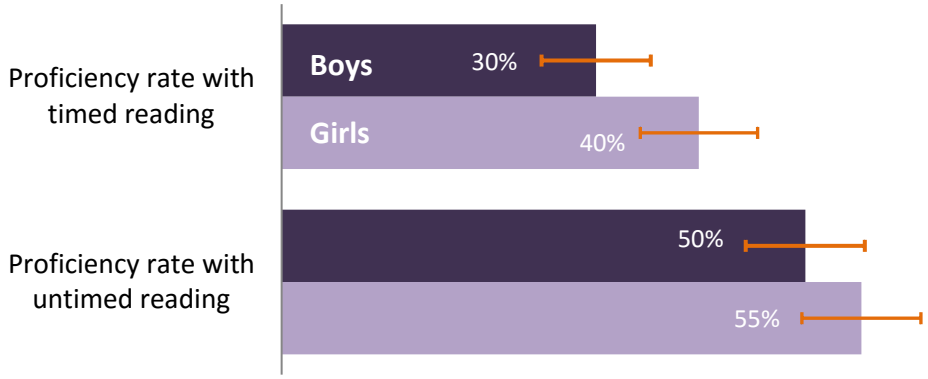
To compute the percent of learners who meet the USAID standard indicator "*percent of learners who, by the end of two years of schooling, can read and understand grade-level text,*" results of the fluency assessment and the comprehension subtest were combined. Analysis of endline results show that, after two years of L3 intervention, 35.0% (±3.8%) of P2 learners can read with fluency and comprehension. The graph below shows the percent of P2 learners who met both the Kinyarwanda fluency benchmark (20 or more wcpm) and reading comprehension benchmark of 80% reading comprehension for both timed and untimed comprehension administration. As the graph demonstrates, the percent increased to 52.8% (±4.0%) if measuring comprehension with the untimed reading. These findings demonstrate that removing time and memory barriers as well as giving students a second chance to read the text notably increases comprehension scores among all groups.

FIGURE 41. PERCENT OF P2 LEARNERS READING AND UNDERSTANDING GRADE LEVEL TEXT AT ENDLINE



Analysis by sex showed that more girls are meeting the fluency and comprehension benchmark than boys, in which 10% more girls were able to read and understand a grade-level text than boys, using timed reading comprehension results. This difference was statistically significant at the $p<.01$ level. Interesting, gender comparisons using untimed reading results, show a much smaller difference between boys and girls. In fact, untimed results show no statistically significant difference between the percent of girls and boys who can read and understand a grade-level text.

FIGURE 42. PERCENT OF P2 LEARNERS READING AND UNDERSTANDING GRADE LEVEL TEXT AT ENDLINE, BY SEX



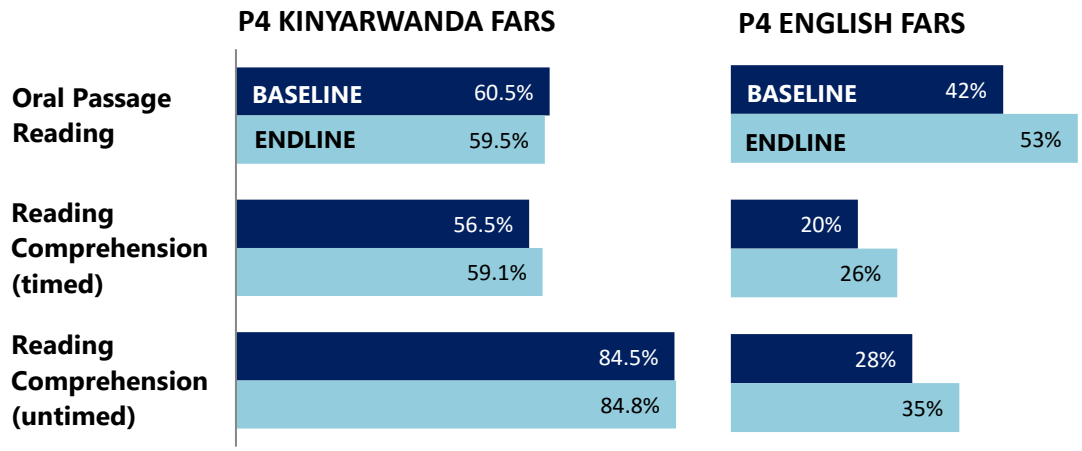
KINYARWANDA TO ENGLISH TRANSITION IN P4

Presently, in Primary 1, teachers use the MT language, Kinyarwanda, as the medium of instruction for all subjects; however, once learners reach Primary 4, teachers use English as the language of instruction (LOI) for all subjects. This section explores P4 learner performance in oral reading fluency and comprehension in Kinyarwanda and English.

SUMMARY RESULTS

Overall, results show that in Primary 4, learners performed significantly ($p<.001$) better on the Kinyarwanda FARS reading assessment compared to the English FARS assessment. This trend is consistent at baseline and endline. Kinyarwanda endline results suggest that, by the end of Primary 4, learners, on average, are able to read nearly two-thirds of a grade-level Kinyarwanda passage (59.5%) and are able to answer roughly 3.0 (60%) reading comprehension questions on a timed test. During the untimed administration, learners were able to answer on average 4.2 (84.8%) reading comprehension questions. Similarly, results showed that only around two-thirds (64.4%) of P4 learners meet the P3 performance standards of 33+ wcpm. These findings suggest that, on average, at the end of P4, learners are still "learning to read" in their mother-tongue, Kinyarwanda, and have not transitioned yet to "reading to learn." Analysis of English results showed that P4 learners performed worse on the English FARS assessment. Learners were able to read roughly half (53%) of the English passage; however, learners particularly struggled on reading comprehension subtests, in which P4 learners were only able to answer 1.3 (26%) timed and 1.8 (35%) untimed reading comprehension questions respectively. These findings suggest although Primary 4 learners have developed word recognition skills in English, the majority of learners have not progressed to reading with understanding the meaning of these words, which is needed for English comprehension. In all, Primary 4 English results suggest that learners may not be prepared for the transition to English as the LOI in Primary 4, given that learners struggle with oral passage reading and reading comprehension in English, even at the end Primary 4.

FIGURE 43. PRIMARY 4 FARS RESULTS IN KINYARWANDA AND ENGLISH



*Baseline P4 FARS data was collected in SY 2015; endline data was collected in SY 2016.

Bivariate statistical analysis found moderate to large correlations between P4 learner results in Kinyarwanda and English on FARS subtests—oral reading fluency and reading comprehension (timed).[25] All results were statistically significant at the $p<.001$ level. Small correlations were also found between untimed reading comprehension results in Kinyarwanda and English reading comprehension (timed and untimed). Correlation analysis results are shown in the table below.

TABLE 12. CORRELATION OF P4 KINYARWANDA AND ENGLISH FARS READING SUBTESTS RESULTS AT ENDLINE

P4 FARS Subtests		English FARS			
		Oral Passage Reading (pct)	ORF (wcpm)	Reading Comp (timed, pct)	Reading Comp (untimed, pct)
Kinyarwanda FARS	Oral Passage Reading (pct)	.703***	.682***	.491***	.530***
	ORF (wcpm)	.696***	.704***	.505***	.538***
	Reading Comprehension (timed) (pct)	.621***	.595***	.403***	.457***
	Reading Comprehension (untimed) (pct)	.485***	.437***	.287***	.331***

***Correlations are significant at the >0.001 level (2-tailed)

As seen in Table 14 above, these findings suggest a moderate to strong relationship between learner reading performance in Kinyarwanda and in English; in other words, learners who demonstrate strong reading skills in Kinyarwanda will also likely demonstrate strong reading skills in English; and vice versa. As such, these findings suggest that learners who develop the necessary reading skills in their mother-tongue, Kinyarwanda, may be able to transfer these skills to reading in the official language of instruction, English. Given P4 endline FARS results, which showed that at the end of P4, learners are still "learning to read" in Kinyarwanda and have not transitioned to "reading to learn," this suggests that learners may not be prepared for the transition from mother-tongue instruction to English in P4. Additional research is needed to better understand the relationship between reading acquisition in mother-tongue and English in the Rwandan context.

> *"Shifting from Kinyarwanda in P3 and mov[ing] to English [in P4] is not easy."*
>
> -P4 Teacher in Eastern province

[25] In social science research, correlations below .2 are not considered to be of high importance. Correlations between .2 and .4 are considered small, correlations between .4 and .6 are moderate, and above .6 they are large.

IMPACT OF CONTEXTUAL FACTORS ON READING

LEARNER CHARACTERISTICS AND FARS RESULTS

Various factors from the student context interview were examined for association with key FARS outcomes: Kinyarwanda and English fluency and comprehension. Bivariate statistical analysis found small, but statistically significant, correlations between learner results in Kinyarwanda and English oral reading fluency and comprehension, and several learner context interview questions. Correlational analysis results are shown in the tables below.

Analysis showed that the strongest relationships between learner characteristics and performance on the FARS was found with whether a parent/caregiver checked the learner's homework as well as with learner's age. As seen in the table below, a significant positive relationship was found between learners who reported that their parent or caregiver checked their homework and higher achievement on oral reading fluency and reading comprehension.

In terms of learner's age, both at baseline and at endline, learners' age was found to be negatively correlated with reading achievement. The older the tested learner was, the lower his/her reading results would be. This relationship between learner's age and his/her reading results is only significant in Primary 3 and Primary 4. Overage children are largely a result of not starting school at the correct age or due to grade repetition. As The Education Sector Strategic Plan[26] emphasizes, delaying starting school past the correct age has implications for both the learner and the school. Older learners are less likely to succeed academically and have higher grade repetition rates; these factors put a strain on school system resources.

The table below summarizes the findings of the correlation analysis between questions on the context interview[27] and the results of the FARS.

[26] Education Sector Strategic Plan 2013/14-2017/18.", Rwanda Ministry of Education, July 2013.

[27] Four questions from the learner context survey were found to not have much variance and were excluded from the correlational analysis. (Do you speak Kinyarwanda at home? Do your parents/caregivers want you to go to school every day? Does your Kinyarwanda teacher check your work that you do in class? Does your Kinyarwanda teacher check/mark your homework?)

TABLE 13. CORRELATIONS BETWEEN CONTEXT INTERVIEW COMPOSITES AND FARS RESULTS

	Primary 1		Primary 2		Primary 3		Primary 4 KR		Primary 4 English	
Student Context Interview Questions	**fluency**	**comp.**	**fluency**	**comp.**	**fluency**	**comp.**	**fluency**	**comp.**	**fluency**	**comp.**
Are you repeating this grade? (yes=1)			-.099*	-.081*		-.083*	-.081*	-.116**		
Learner's age					-.211**	-.150**	-.189**	-.153**	-.232**	-.097*
Mother literate (1=yes)	.111**	.109**	.123**	.089*						
At home, does someone read stories to you? (1=yes)			.162**	.132**	.153**	.109**	.128**	.111**	.121**	
How often do you miss school? (4=a lot, 3= sometimes, 2=rarely, 1=never)	-.085*		-.089*	-.091*				-.085*	-.096*	
How often are you late for school? (4=a lot, 3= sometimes, 2=rarely, 1=never)	-.130**						-.150**	-.100*	-.097*	
Have you or any of your siblings ever repeated a grade? (1=yes)		-.105**			-.088*		-.187**	-.198**	-.149**	-.128**
Do your parents/caregivers check your homework? (1=yes)	.142**	.134**	.113**	.122**	.141**	.210**	.132**		.193**	.256**
When not understanding a lesson, do you ask questions? (1=yes)	.176**	.143**	.101*	.119**		.121**	.135**	.162**	.104*	.083*
At school, can you choose which stories to read? (1=yes)					.103*					
Are you allowed to take books home from school? (1=yes)										
Do you ever take books from school to read at home? (1=yes)										
Did you have something to drink today (like water, tea, milk or juice)? (1=yes)	.102*	.087*	.110**	.135**	.149**	.096*				
Did you have something to eat today, like potatoes, rice, bread or beans? (1=yes)							-.119**	-.090*	-.113**	-.125**
Do you have radio or cell phone at home? (1=yes)										
Does anyone at your house have a bicycle/motorcycle or a car? (1=yes)			.083*				.119**	.121**	.166**	.197**
Do you have electricity at your home? (electric lamp, paraffin lamp or biogas lamp) (1=yes)	.167**	.155**					.104*	.102*	.205**	.192**

*Correlations are significant at the >0.05 level (2-tailed)
**Correlations are significant at the >0.01 level (2-tailed)
Blanks denote no statistically significant association between variables.

Bivariate statistical analysis found small, but statistically significant correlations between learner results in oral reading and on comprehension tests, and learner context interview composites[28], as shown in the table below. These results are consistent with the results of the baseline, which found similar correlations between home environment, school and teacher, and socio-economic status composite variables. The largest correlations were found between

[28] Details of the learner context interview and resulting composites are found in the last section of the report.

the home environment composite and FARS results, in which the composite was found to have a significant positive correlation with the home environment. This suggests that there is a relationship between better reading achievement and having parental involvement in their child's education, in which parents/caregivers are literate, read to their children, check their child's homework, and want their child to go to school every day.

The risk factor composite was also found to have small significant negative correlations with learner reading achievement in all grades, particularly in P4. This suggests that there is a relationship between learners who demonstrate various risk factors such as repeating a grade, missing or being late to school, and having parents who are not engaged in their education, and lower oral reading and comprehension results.

TABLE 14. BIVARIATE TABLE CORRELATIONS BETWEEN LEARNERS CONTEXT INTERVIEW COMPOSITES AND FARS RESULTS

	Primary 1		Primary 2		Primary 3		Primary 4 KR		Primary 4 English	
Context interview composite	**fluency**	**comp.**	**fluency**	**comp.**	**fluency**	**comp.**	**fluency**	**comp.**	**fluency**	**comp.**
Socio-economic	.093*	.085*	.102*					.082*	.135**	.135**
Home environment	.141**	.136**	.192**	.166**	.176**	.153**	.124**	.071	.149**	.114**
Risk factors	-.127**	-.125**	-.100*	-.100*	-.154**	-.138**	-.269**	-.239**	-.255**	-.202**
School and teacher	.152**	.147**	.116**	.140**		.081*				

*Correlations are significant at the >0.05 level (2-tailed)
**Correlations are significant at the >0.01 level (2-tailed)
Blanks denote no statistically significant association between variables.

Significant differences were found between learners who had zero scores in reading and those who had non-zero scores. Learners with zero scores had lower composite values on all three composites except the risk factors composite. The difference was statistically significant at $p<.05$ level, except for P3 and P4 with the socio-economic composite and P4 for the school environment composite.

Comparisons of the four composites by sex found interesting trends. The socioeconomic composite, which is a proxy for socio-economic status, was not found to have a significant relationship with girl's fluency and comprehension results, meaning that no relationship was found between a girl's economic status and her reading performance. However, for boys in Primary 1 and 2, a significant positive relationship was found, although small. Analysis of the home environment composite by sex showed that there was a significant relationship between a positive home environment and reading performance for boys in P1-P3; however, for girls, a correlation was only noted in P3 and P4. The risk factor composite was significantly correlated with boys reading results for all grades, while for girls, significant negative correlations were only seen in P3 and P4. Additionally, the relationship between demonstrating risk factors and lower reading performance was stronger across the board for boys, which suggests that there

is a stronger relationship between boys demonstrating risk factors and lower reading performance than there is for girls.

SCHOOL AND CLASSROOM CHARACTERISTICS

To help us better understand the variation in learner FARS scores, we looked at the differences in school characteristics, such as distance to Kigali and District Office, teacher absenteeism, and other factors. A variety of factors were found to be associated with learner performance on FARS. Results showed that such factors as availability of a school library, and the nursery attached to school were found to be weakly associated with better learner reading results. Additionally, better school leadership practices such as head teachers who were trained in school leadership and who monitor student progress through classroom observation and on performance on test given by teachers showed positive correlations with better FARS results in select grades.

Consistent with baseline results, distance between Kigali and the school was found to be negatively correlated with learner achievement in reading, in which learners closer to Kigali tended to do better than schools farther away.

In addition to exploring how distance to Kigali might affect school performance, at endline, head teacher interviews included a question about distance to the local District Office. The reported range was between zero and 80 kilometers, with an average of 19.4 kilometers. Distance to the District office was found to be an important predictor of how well learners performed on the oral reading fluency test, in which a significant relationship was found between schools that were farther from the District Office and lower FARS scores.

Teacher absenteeism had mixed results, in which in P2 it was found to be negatively associated with learner performance on FARS; however, in P4, the reverse was found. A few factors in the classroom environment, teacher professional preparation and use of L3 materials when teaching, were found to have statistically significant positive relationships with fluency and comprehension scores in select grades, albeit the relationships were very weak. The table below shows results from the correlational analysis between school and classroom environment factors and FARS results; statistically significant relationships are reported below.

TABLE 15. CORRELATIONS BETWEEN SCHOOL ENVIRONMENT AND FARS RESULTS, AT ENDLINE

	Primary 1		Primary 2		Primary 3		Primary 4 KR		Primary 4 English	
	fluency	comp.	fluency	comp.	fluency	comp.	fluency	comp.	fluency	comp.
Distance to Kigali	-.176**	-.169**	-.082*				-.133**	-.196**	-.155**	-.108**
Head teacher trained in school leadership	.092*	.088*				.115**				
Head teacher monitors student progress through classroom observation						.085*	.170**	.139**	.201**	.221**
Head teacher monitors student progress on tests	.121*	.108*					.099*			
School library	.094*		.118**	.106**			-.086*			
Nursery school attached	.164**	.128**	.113**	.143**	.086*					
Distance to District Office	-.108**	-.105*	-.204**	-.189**		-.100*	-.174**	-.170**	-.170**	-.092*
Teacher Absenteeism			-.104*				.100*			.106*
Teacher professional preparation (1=none, 2=Distance learning, 3=GSS, 4=TTC)			.100*	.102*	.124**	.206**	.099*			
Use of L3 materials while teaching reading (1=yes)			.086*	.083*	.089*					

*Correlations are significant at the >0.05 level (2-tailed)
**Correlations are significant at the >0.01 level (2-tailed)
Blanks denote no statistically significant association between variables.

4. MATHEMATICS ASSESSMENT OF RWANDAN SCHOOLS (MARS)

SUMMARY FINDINGS

The MARS mathematics assessment was developed by REB AND EDC mathematics experts based on the review of the Rwandan mathematics curriculum in early grades and on the international standards of mathematics instruction. The MARS is comprised of tasks that are designed to test ***grade-level*** procedural fluency in basic mathematical concepts. The mathematics test included three subtests with 10 items each for Primary 1 and 2, four subtests for P3 and five subtests for P4. The tasks were developed to reflect grade-level competencies (see Methodology section in Appendix A); hence tasks for each grade were more difficult than tasks for the previous grade. In all grades (P1-P4), learners are asked to complete addition and subtraction tasks; however, they varied in difficulty by grade. Similarly, additional subtests of ***increased difficulty*** **were** added to each grade, including multiplication (P2-P4), and division (P3-P4). All tasks were timed at 60 seconds for P1, P2 and P3, and P4. The table below shows MARS tasks by grade.

TABLE 16. MATHEMATICS COMPETENCIES INCLUDED IN MARS

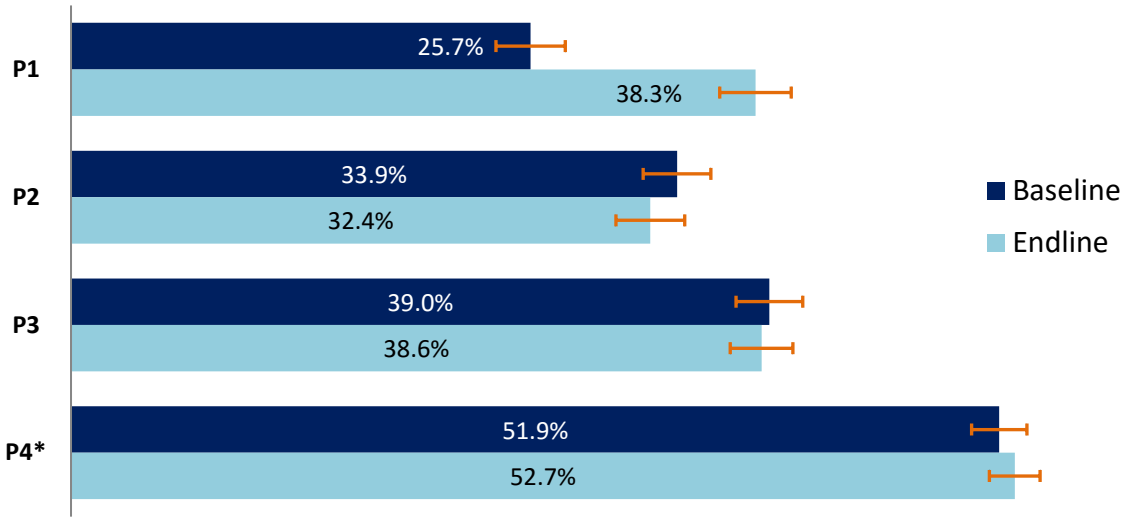
GRADE LEVEL	SUBTEST	TASK
Primary 1	Subtest 1	Adding numbers within 10
	Subtest 2	Subtracting numbers within 10
	Subtest 3	Comparing magnitude of numbers (up to 2 digits)
Primary 2	Subtest 1	Adding numbers within 100
	Subtest 2	Subtracting numbers within 20
	Subtest 3	Multiplying numbers within 10
Primary 3	Subtest 1	Multiplying numbers up to 10
	Subtest 2	Dividing numbers within 10
	Subtest 3	Adding numbers within 100
	Subtest 4	Subtracting numbers within 100
Primary 4	Subtest 1	Adding numbers within 200
	Subtest 2	Subtracting numbers within 100
	Subtest 3	Multiplying number within 20
	Subtest 4	Dividing numbers within 200
	Subtest 5	Comparing magnitude of numbers (fractions, decimals and 2 digit numbers)

The same tests were used for P1-P4 at both baseline and endline, so no equating of the results was necessary.

Analysis of average MARS results at baseline and endline found that learners in Primary 1 showed substantial gains from baseline to endline with an average increase of 12.6% (± 2.8%) in the average percent of MARS tasks solved correctly. Further analysis, showed that average

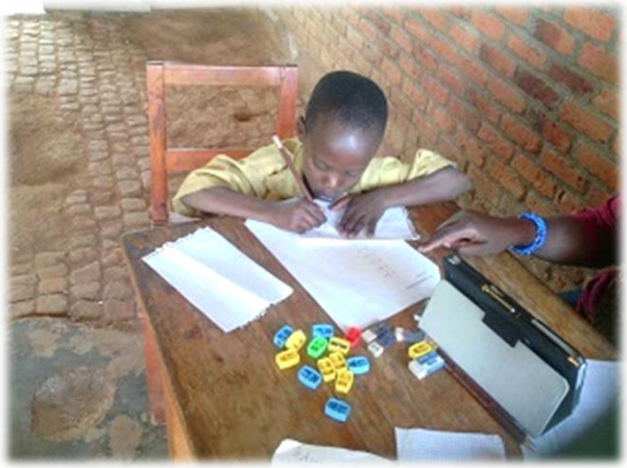
MARS results remained largely unchanged in P2-P4. Figure 45 shows the average percent of MARS tasks solved correctly at baseline and endline, by grade.

FIGURE 44. AVERAGE PERCENT CORRECT ON MARS SUBTESTS, BY GRADE[29]



* Baseline data for P4 was collected in 2015; endline data was collected along with P1-P3 in 2016.

Further analysis of performance of learners by MARS subtests showed that overall, analysis of endline results showed that P2-P4 learners performed the best in the most elementary and procedural of MARS subtests—addition and subtraction. In each grade (P1-P4), learners, on average, demonstrated the most knowledge and skills on either the Addition or Subtraction subtests. By contrast, the subtests in which learners particularly struggled were ones focused on more advanced mathematical operations—multiplication and division. Division subtests for Primary 3 and Primary 4 appeared to be particularly challenging for learners. In P1, learners struggled the most with subtraction, while in P2, learners struggled the most with multiplication. The same assessment instrument for each grade was used in baseline and endline assessment although, as described above, the assessment instruments varied from grade to grade, ensuring that they had tasks of appropriate difficulty for each grade. Complete results are found in Appendix E.



Detailed analysis of changes in MARS performance from baseline to endline by subtest showed varied results by subtest and grade. In Primary 1, significant gains ($p<.001$) from baseline to

[29] Average MARS Percent Correct is calculated by averaging the percent correct for each MARS subtest. Error bars show 95% confidence interval of means.

endline were seen on all MARS subtests, with the largest gains seen in Comparing Numbers and Subtraction. In Primary 2, results showed significant gains in only the Multiplication subtest; in fact, average Subtraction results showed a significant decrease ($p<.05$) of 5.2% from baseline to endline. In Primary 4, learners showed a substantial increase in average scores on the Comparing Numbers subtest ($p<.001$); however, significant decreases ($p<.05$) from baseline to endline in Multiplication and Division scores were noted. Primary 3 MARS results remained largely unchanged.

Effect sizes were also calculated to analyze the magnitude of change on the MARS assessment between baseline and endline. Overall, analysis showed small to moderate effect sizes ($d=0.32$ to 0.51) for P1 learners in Subtraction and Comparing Numbers, which suggests that, at endline, between 62 - 69% of P1 learners scored higher on the MARS assessment than at on average at baseline. Effect size differences for P2-P4 were very small, meaning that little difference was seen in MARS scores from baseline to endline. Notably, in P4, a moderate to large effect size (d=0.62) difference was seen in the Comparing Numbers subtest, meaning that, at endline, 73% of P4 learners scored higher on that subtest than on average at baseline. The table below shows the average MARS subtest scores at baseline and endline by grade.

TABLE 17. AVERAGE PERCENT CORRECT ON MARS SUBTESTS AT BASELINE AND ENDLINE, BY GRADE

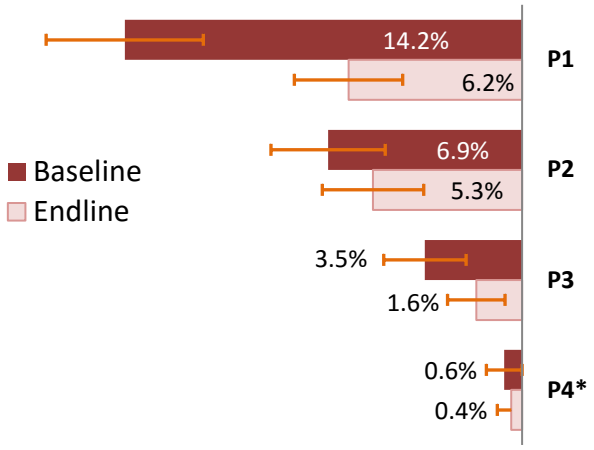
GRADE	SUBTEST	BASELINE (pct)[30]	ENDLINE (pct)	GAIN (pct)	EFFECT SIZE (Cohen's d)
P1	Addition	22.4% (± 2.2%)	31.3% (± 2.2%)	8.9% (± 3.1%)	0.32
	Subtraction	15.1% (± 1.9%)	28.2% (± 2.2%)	13.1% (± 2.9%)	0.51
	Comparing	39.6% (± 2.6%)	55.3% (± 2.4%)	15.7% (± 3.6%)	0.50
P2	Addition	31.5% (± 2.4%)	29.2% (± 2.3%)	-2.4% (± 3.3%)	-0.08
	Subtraction	45.3% (± 2.7%)	40.1% (± 2.7%)	-5.2% (± 3.8%)	-0.16
	Multiplication	24.8% (± 1.6%)	27.9% (± 1.7%)	3.1% (± 2.4%)	0.15
P3	Multiplication	45.5% (± 2.4%)	44.8% (± 2.4%)	-0.7% (± 3.4%)	-0.02
	Division	26.8% (± 2.3%)	25.9% (± 2.2%)	-0.9% (± 3.1%)	-0.03
	Addition	45.5% (± 2.1%)	45.4% (± 2%)	-0.1% (± 2.9%)	0.00
	Subtraction	38.3% (± 2.2%)	38.2% (± 2.1%)	-0.1% (± 3%)	0.00
P4[31]	Addition	77.0% (± 2.0%)	77.2% (± 2%)	0.2% (± 2.8%)	0.01
	Subtraction	62.9% (± 2.4%)	62.0% (± 2.2%)	-0.9% (± 3.3%)	-0.03
	Multiplication	51.8% (± 2.2%)	47.6% (± 1.9%)	-4.2% (± 2.9%)	-0.16
	Division	33.1% (± 2.4%)	29.6% (± 1.9%)	-3.5% (± 3.1%)	-0.13
	Comparing	34.7% (± 1.9%)	47.3% (± 1.3%)	12.7% (± 2.3%)	0.62

[30] Table shows the average percent correct by MARS subtest by grade. A 95% confidence interval is also reported, which indicates that the point estimate of average percent correct has a margin of error of 5.0%.
[31] P4 baseline date was collected in 2015. Endline data will be collected along with P1-P3 in 2016.

ZERO SCORES ON MARS SUBTESTS

Analysis of MARS assessment results showed that the percent of P1, P2, P3 and P4 learners with zero scores decreased from baseline to endline. About 14 percent of P1 learners, 7 percent of P2 learners and 4% of P3 learners could not solve a single mathematics problem at baseline. By endline, the percent of P1 learners with zero scores had decreased significantly ($p<.001$) to 6.2%. P3 also showed significant decreases in zero scores ($p<.05$) to 1.6%. P2 and P4 learners did not show statistically significant decreases in zero scores on the MARS assessment.

FIGURE 45. PERCENT OF LEARNERS WITH ZERO SCORES ON ALL MARS TASKS



* Baseline data for P4 was collected in 2015; endline data collected in 2016 along with P1-P3

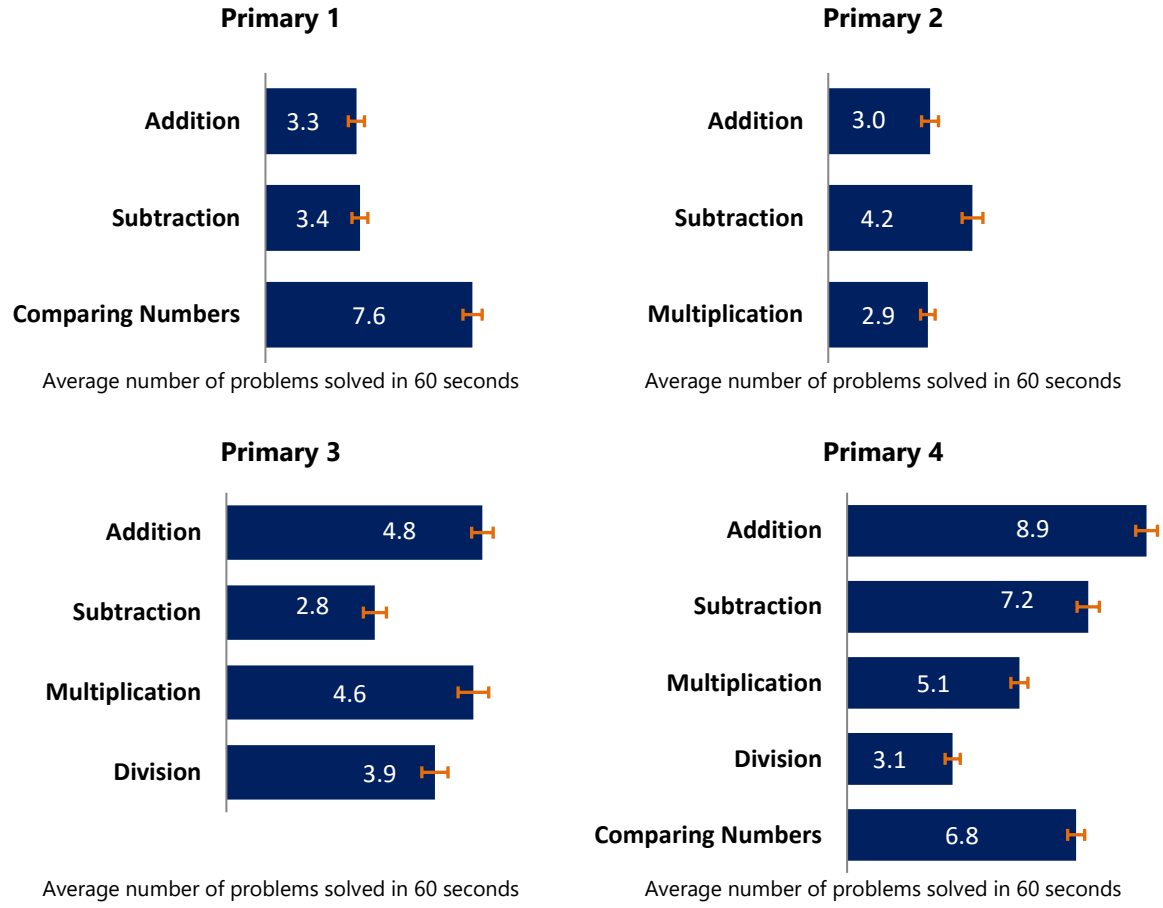
PROCEDURAL FLUENCY ON MATHEMATICS SUBTESTS

Research has shown that operational automaticity is essential for becoming efficient at mathematics and advancing to more conceptual and advanced mathematics.[32] Figure 47 shows the average automaticity/procedural fluency (speed of mathematics problem solving, measured in problems correct per minute) at endline, by grade level and type of problem.

In terms of automaticity/fluency, P1 learners performed the best on the comparing numbers subtest, on average, in terms of accuracy and speed, in which they were able to answer more questions correctly per minute than the other timed subtests. In fact, the average procedural fluency score for comparing numbers was significantly ($p<.001$) higher than for the other subtests. P2 learners were able to solve subtraction problems the quickest, in which they were able to, on average, solve one more subtraction problem correctly per minute than addition problem. P3 learners had the highest fluency measures in multiplication, and addition. P4 learners were able to correctly solve addition and subtraction problems the quickest. These results suggest that at endline the more basic, procedural mathematics tasks (number comparison, addition and subtraction) are more automatic for learners than more advanced tasks that require learners to solve more difficult operations such as division problems.

[32] RTI (2009). EGMA: A Conceptual Framework Based on Mathematics Skills Development in Children. 2-3.

FIGURE 46. AVERAGE AUTOMATICITY/ FLUENCY IN SOLVING MATHEMATICS PROBLEMS AT ENDLINE, BY GRADE



MATHEMATICS RESULTS BY SEX

Comparisons by sex did not show statistically significant differences in overall MARS performances at endline for grades P1, P3 and P4. However, significant differences were seen in P2, in which boys significantly ($p<.05$) outperformed girls on average MARS scores by an average of 4.4% (±3.8%). Of interest, is that the gender gap between boys and girls has decreased over time for P1, P3 and P4. In fact, in P1 and P4, girls have largely caught up to boys. However, it should be noted that in P2, results show that the gender gap between boys and girls may be widening, in that even though at baseline boys and girls performed similarly on the P2 MARS, at endline, boys are performing slightly better. Figure 48 below shows the average MARS percent correct at endline by sex.

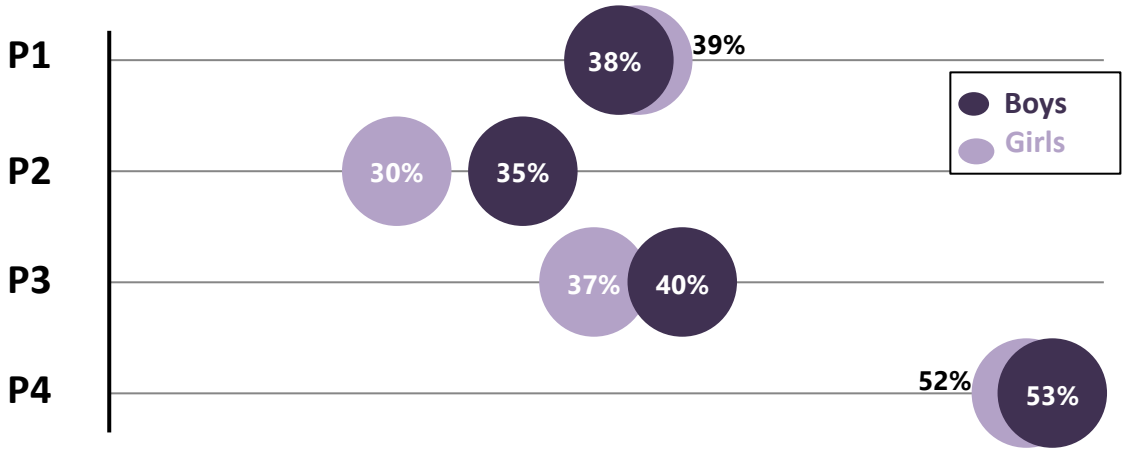
Improvements in decreasing the gender gap in mathematics for P1, P3 and P4 are largely due to the contribution of the L3 program in making the overall learning environment more gender-balanced and sensitive to how school environment and teaching practice impacts learning among girls and boys. The L3 Initiative recognizes that the teaching and learning materials that learners encounter every day have a powerful impact on how they learn to view themselves, each other, and the world, including gender roles and stereotypes. The L3

teaching and learning materials have been carefully constructed to reinforce positive messages regarding boys and girls gender roles, including but not limited to:

- Equal number of girls heard/portrayed.
- Equal number of boys heard/portrayed.
- Equal number of women heard/portrayed.
- Equal number of men heard/portrayed.
- Equal number of males/females featured in stories and exercises.
- Both female and male characters depicted as having equal intelligence (e.g. problem solving abilities)
- Both females and males show aptitude in language and mathematics
- Both female and males are portrayed as competent in what they do
- Both female and males express opinions
- Both female and males are both portrayed as confident and assertive
- Both female and males express emotions
- Both female and males have equal freedom of movement and activity
- Both female and males play the same games (e.g. football)
- Both female and males are both capable to perform the same tasks

While L3 materials did not specifically target mathematics in erasing harmful gender stereotypes and misconceptions, it appears that it has been largely successful in doing so.

FIGURE 47. AVERAGE PERCENT CORRECT ON MARS TASKS AT ENDLINE, BY GRADE AND SEX



As seen in Table 20, on average, girls in Primary 1 and Primary 4 showed larger gains than boys from baseline to endline on the MARS assessment. Girls in P1 demonstrated large gains between the baseline and endline, nearly doubling the percent of problems answered correctly (*d*=.70). Table 20 shows the average baseline and endline MARS results by sex and the effect size calculations.

TABLE 18. AVERAGE PERCENT CORRECT ON MARS ASSESSMENT, BY SEX

GRADE	SEX	BASELINE (pct)	ENDLINE (pct)	DIFFERENCE (pct)	EFFECT SIZE (Cohen's d)
P1	Boys	28.4% (±2.9%)	37.9% (±2.6%)	9.5% (±4.2%)	0.36
	Girls	22.8% (±2.5%)	38.6% (2.7%)	15.8% (±3.6%)	0.70
P2	Boys	34.4% (±2.8%)	34.6% (2.3%)	0.2% (± 3.9%)	0.01
	Girls	33.4% (±2.6%)	30.1% (2.62%)	-3.2% (±3.7%)	-0.14
P3	Boys	40.8% (±2.7%)	40.2% (2.73%)	-0.6% (±3.8%)	-0.03
	Girls	37.3% (±2.5%)	37.1% (2.32.8%)	-0.2% (±3.4%)	-0.01
P4[33]	Boys	53.4% (±2.1%)	53.2% (22.6%)	-0.2% (± 3.0%)	-0.01
	Girls	50.3% (±2.2%)	52.3% (32%)	2.0% (±3.0%)	0.11

DETAILED P1 MARS FINDINGS

The P1 MARS assessment tests learners' procedural fluency in key foundational mathematics skills: addition, subtraction and comparing numbers. Each subtest consists of 10 questions and is timed at 60 seconds. P1 learners demonstrated significant gains ($p<.001$) from baseline to endline. Analysis by sex showed that although boys performed significantly ($p<.001$) better than girls at baseline, by endline, there was no significant difference in performance on the P1 MARS test by sex. The figure below shows the average MARS percent correct for P1 learners as well as by sex.

FIGURE 48. OVERALL P1 MARS SCORES AT BASELINE AND ENDLINE

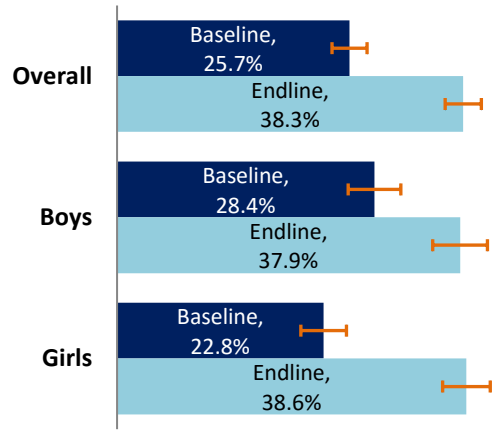
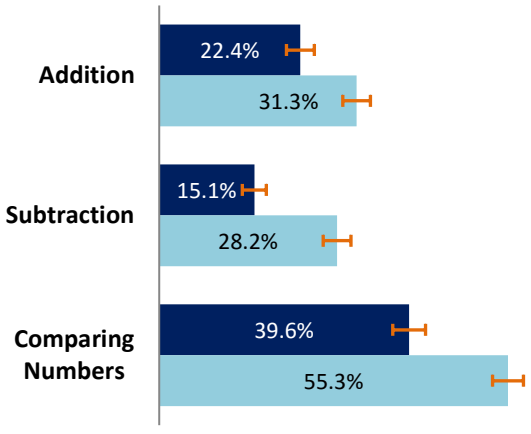


FIGURE 49. AVERAGE PERCENT CORRECT ON P1 MARS SUBTESTS AT BASELINE AND ENDLINE

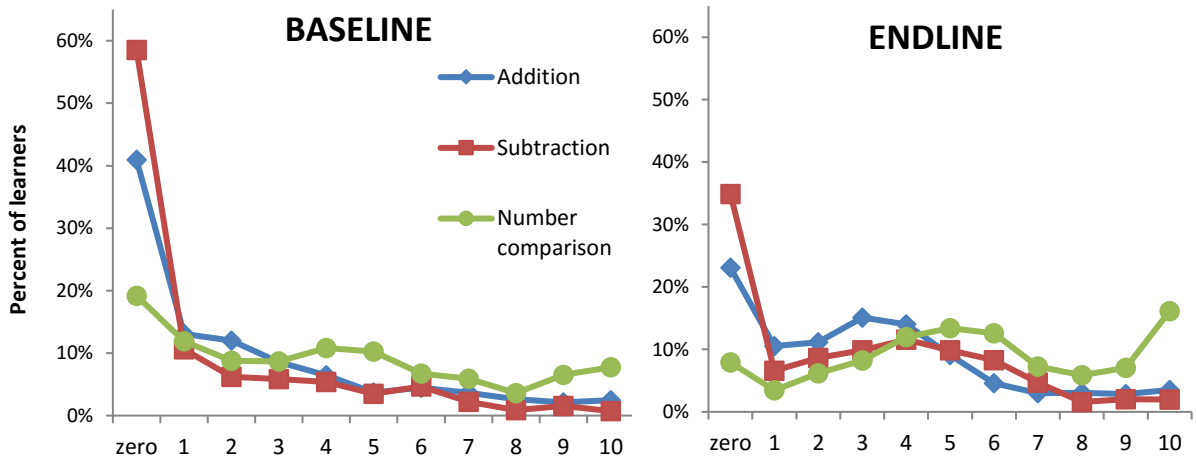


[33] P4 baseline date was collected in 2015; endline data was collected in 2016 along with P1-P3.

The analysis of data showed that at both baseline and endline P1 learners tended to perform best on the comparing numbers subtest in which at endline, learners on average answered 55.3% of questions correctly. P1 learners demonstrated significant gains ($p<.001$) from baseline to endline on all three MARS subtests: Addition, Subtraction and Comparing Numbers. Substantial gains were seen after two years of L3 intervention, in both the Subtraction subtest (13.1%, $d=0.51$) as well as in the Comparing Numbers subtest (15.7%, $d=0.50$).

Analysis of zero scores across the P1 MARS subtests showed that at endline the percent of learners who could not solve any mathematics problems had significantly ($p<.001$) decreased from baseline. Figure 51 shows the number of problems solved by P1 learners at baseline and endline. At baseline, a large proportion of P1 learners could not solve any subtraction problems (59%), any addition problems (41%) and any number comparison problems (19%). At endline, the percent of P1 learners with zero scores had dropped significantly ($p<.001$), in which, 23, 35 and 8% of learners could not solve any addition, subtraction and number comparison problems, respectively.

FIGURE 50. NUMBER OF PROBLEMS SOLVED ON P1 MARS SUBTESTS



DETAILED P2 MARS FINDINGS

The P2 MARS assesses learners' procedural fluency in three grade-level elementary mathematics skills: addition, subtraction and multiplication. Each subtest consists of 10 questions and is timed at 60 seconds. Overall, P2 learners' mathematics performance remained relatively unchanged from baseline to endline; this was consistent when results were disaggregated by sex. Further, analysis by sex showed that at baseline there was not a statistically significant difference between the performance of P2 girls and P2 boys; however, at endline, overall, boys were performing significantly ($p<.05$) better than girls.

The analysis of changes in baseline and endline P2 MARS results showed mixed results for the P2 MARS subtests (Figure 53). Generally, P2 learners tended to perform best on the subtraction subtest, followed by addition. Analysis of baseline and endline MARS results, showed that P2 learners performed significantly ($p<.05$) better on the Multiplication subtest at endline, in which learners scored 3.1% higher at endline compared to baseline results. Further analysis showed that Addition and Subtraction results were largely unchanged from baseline to endline.

FIGURE 51. OVERALL P2 MARS SCORES AT BASELINE AND ENDLINE

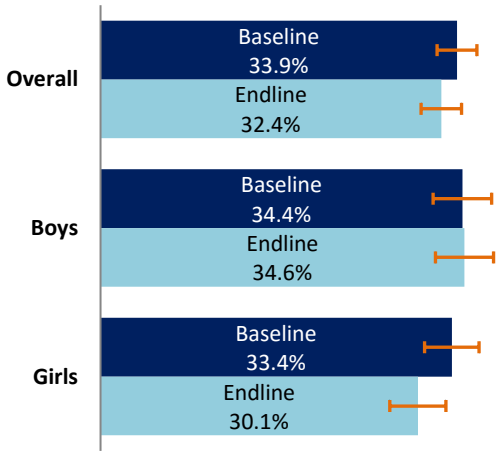
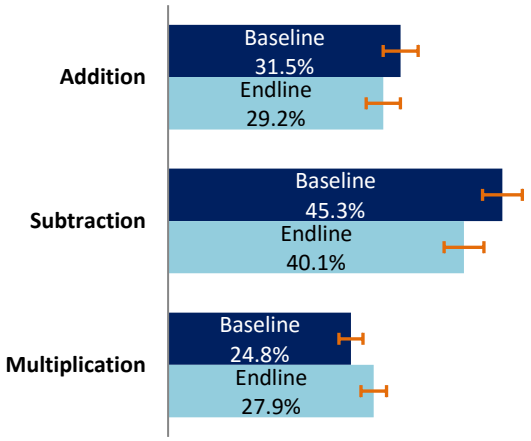


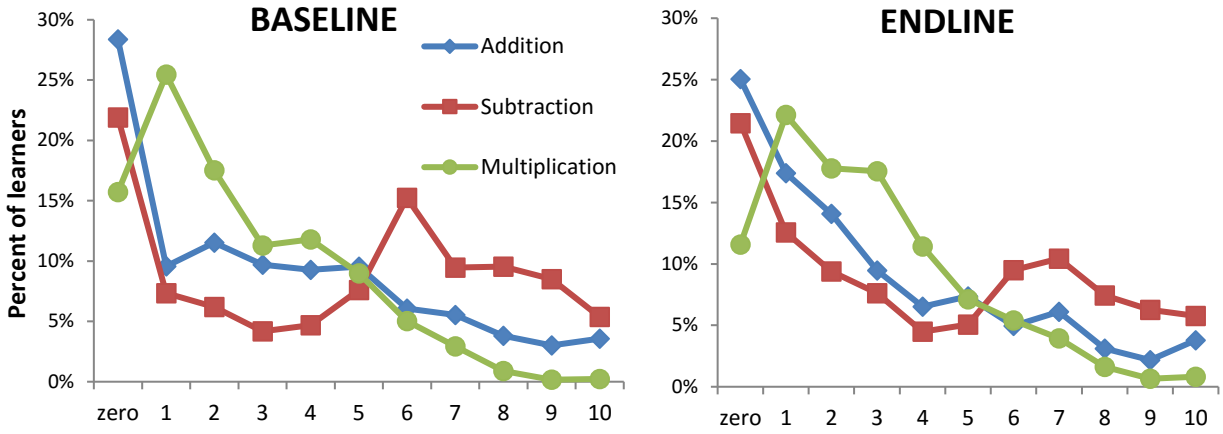
FIGURE 52. AVERAGE PERCENT CORRECT ON P2 MARS SUBTESTS AT BASELINE AND ENDLINE



The analysis of assessment results found that the addition and subtraction subtests had the largest percentage of learners with zero scores at endline – 25.0% and 21.5% respectively. As for the P2 Multiplication subtest, 11.6% of learners were unable to answer a single multiplication problem at endline. Reductions in the proportion of learners with zero scores on MARS subtests were noted from baseline to endline, however, the reduction was only statistically significant on the Multiplication subtest, in which zero scores dropped by 4.1% ($p<.05$, $d=.12$).

Figure 54 shows the number of problems solved by P2 learners at baseline and endline. At baseline, nearly a third (28%) of P2 learners could not solve any subtraction problems, roughly a quarter (22%) could not solve any addition problems and 16% could not solve any multiplication problems. At endline, the percent of P2 learners with zero scores had dropped slightly, in which, 25, 22 and 12% of learners could not solve any addition, subtraction or multiplication problems, respectively. Despite slight reductions in zero scores, at endline learners continue to struggle with the addition, subtraction and multiplication subtests. Very few learners are able to answer 8 or more problems correctly at endline.

FIGURE 53. NUMBER OF PROBLEMS SOLVED ON P2 MARS SUBTESTS



DETAILED P3 MARS FINDINGS

The P3 MARS assesses learners' procedural fluency in the four grade-level elementary mathematics skills: addition, subtraction, multiplication and division. Each subtest consists of 10 questions and is timed at 60 seconds. Overall P3 MARS scores showed that results were largely unchanged from baseline to endline with average MARS scores of 39.0% at baseline and 38.6% at endline. Analysis by sex showed that on average, as seen in other grades, boys tend to outperform girls on the P3 MARS assessment, as can be seen in Figure 55 below. This trend is consistent at both baseline and endline. However, further analysis showed that at baseline, boys performed significantly ($p<.01$) better than girls on two MARS subtests – Addition and Subtraction. At endline significant differences between male and female learners on the P3 MARS assessment were only seen on the Subtraction subtest. Results show that girls, on average, had caught up to boys in Addition at endline. Figure 55 below shows the average MARS percent correct for P3 learners as well as average performance disaggregated by sex of learner.

Analysis of performance on the four MARS subtests showed that P3 learners performed better on certain subtests than others. Overall, P3 learners tended to perform best on the Addition and Multiplication subtests in which learners were able to answer 44.8% and 45.4% of questions, respectively. P3 learners struggled the most with the Division subtest in which learners on average were only able to answer roughly a quarter (25.9%) of division problems at endline. Endline results on P3 MARS subtests remained consistent with baseline results on average. Figure 56 shows the average percent correct on P3 MARS subtests at baseline and endline.

FIGURE 54. OVERALL P3 MARS SCORES AT BASELINE AND ENDLINE

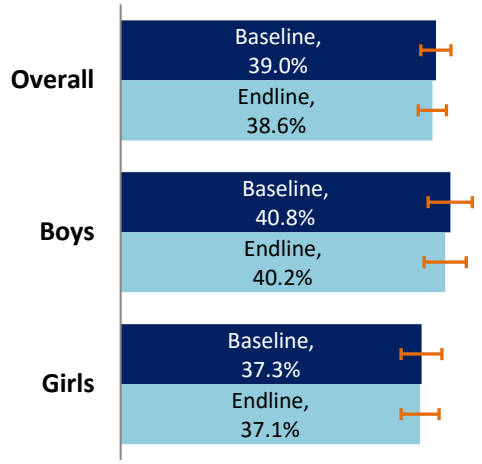
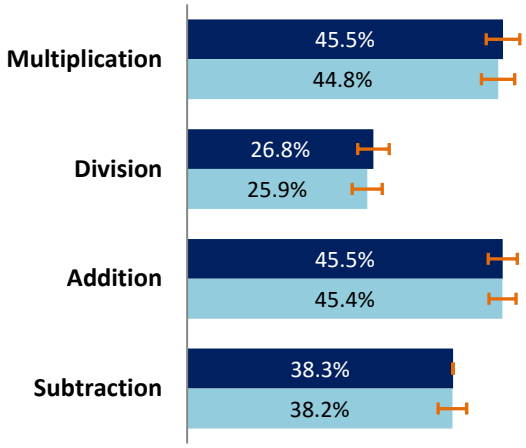
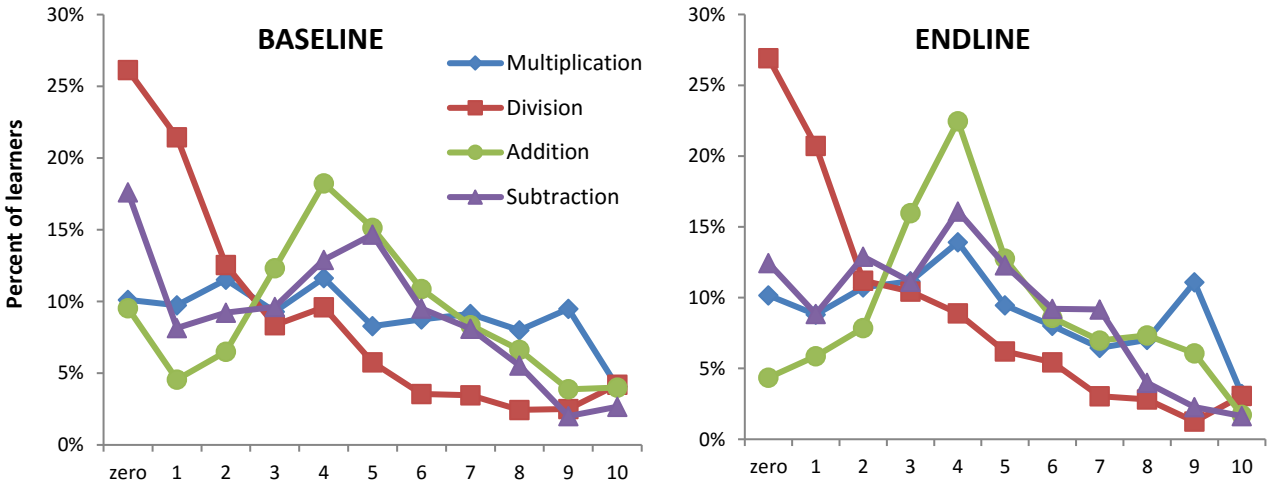


FIGURE 55. AVERAGE PERCENT CORRECT ON P3 MARS SUBTESTS AT BASELINE AND ENDLINE



For P3 learners, the hardest tasks at baseline were subtraction and division, with 18% and 26% of learners failing to solve a single problem on those subtests, respectively. About 10% of P3 learners had zero scores on addition and multiplication subtests at baseline. At endline, division remains the hardest task for P3 learners in which 69% of learners were unable to answer four or more questions correctly. P3 learners performed the best on multiplication and addition subtests. Roughly a quarter of P3 learners were able to answer 7 or more multiplication (28%) and addition (22%) questions correctly at endline. Figure 57 shows the number of problems solved by P2 learners at baseline and endline.

FIGURE 56. NUMBER OF PROBLEMS SOLVED ON P3 MARS SUBTESTS AT BASELINE AND ENDLINE



Analysis of zero scores showed significant decreases ($p<.05$) in the percent of P3 learners with zero scores on the subtraction and addition subtests, in which zero scores dropped by 5.1% on each subtask. The percent of learners who were unable to answer any multiplication and division questions changed little between baseline and endline.

DETAILED P4 MARS FINDINGS

Given that L3 did not roll out the P4 intervention until 2016, the P4 MARS baseline assessment was conducted in the end of 2015, at the same time as the midline assessment of P1, P2 and P3. Endline data was collected in October 2016 along with endline data for P1, P2 and P3. Figure 58 shows the average MARS scores for P4 learners at baseline (SY 2015) and endline (SY 2016). The P4 MARS assesses learners' procedural fluency in the four grade-level mathematics operations (addition, subtraction, multiplication and division) as well as their conceptual knowledge (comparing numbers with decimals and fractions). Each subtest consisted of 10 questions and was timed at 60 seconds. Overall, P4 MARS scores showed that results were slightly improved from baseline to endline with average MARS scores of 51.9% at baseline and 52.7% at endline; however, this improvement was not statistically significant. Analysis by sex showed that on average, at baseline, boys performed significantly ($p<.05$) better than girls on the MARS assessment, in which boys, on average scored 53.4% compared to 50.3% for females. At endline, no significant differences were found in overall MARS scores between boys and girls. In fact, analysis of the individual P4 MARS subtests by sex showed that the gender gap between boys and girls had decreased in all five subtasks from baseline to endline.

P4 learners demonstrated strong performance on the Addition and Subtraction subtests: learners, on average, were able to answer 77.2% of the addition problems and 62.0% of the subtraction problems at endline. Learners were able to, on average, answer 47.6% of the multiplication questions. As with P3 learners, the most challenging subtest for P4 learners was the division subtest, in which learners, on average, were only able to answer a third (29.6%) of division problems.

Figure 59 shows the average percent correct on P4 MARS subtests at baseline and endline. Overall, P4 scores on the addition and subtraction subtests remained unchanged from baseline to endline. Results showed significant decreases in average multiplication and division scores from baseline to endline ($p<.05$). However, analysis of the magnitude of difference (effect size) between baseline and endline scores in multiplication and division showed that the decrease was small ($d<.2$). One P4 MARS subtest showed substantial improvements ($p<.001$, $d=.62$) from baseline to endline – Comparing Numbers. At endline learners on average scored 12.7% higher on the Comparing Numbers subtest.

FIGURE 57. OVERALL P4 MARS SCORES AT BASELINE AND ENDLINE

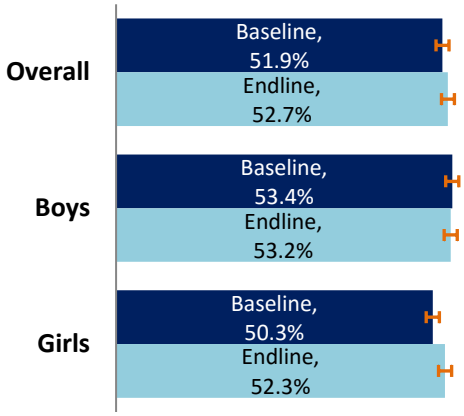


FIGURE 58. AVERAGE PERCENT CORRECT ON P4 MARS SUBTESTS AT BASELINE AND ENDLINE

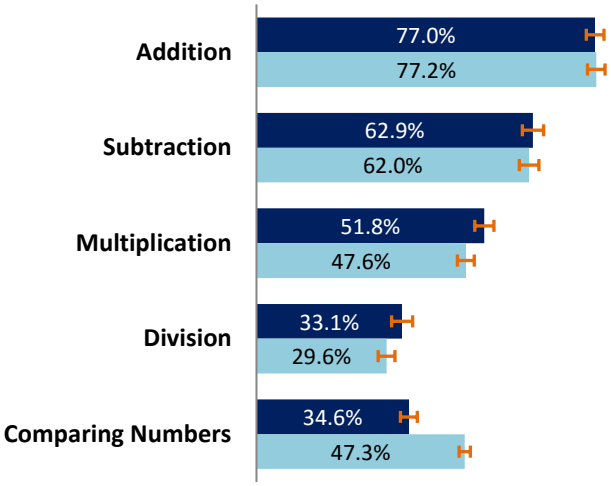
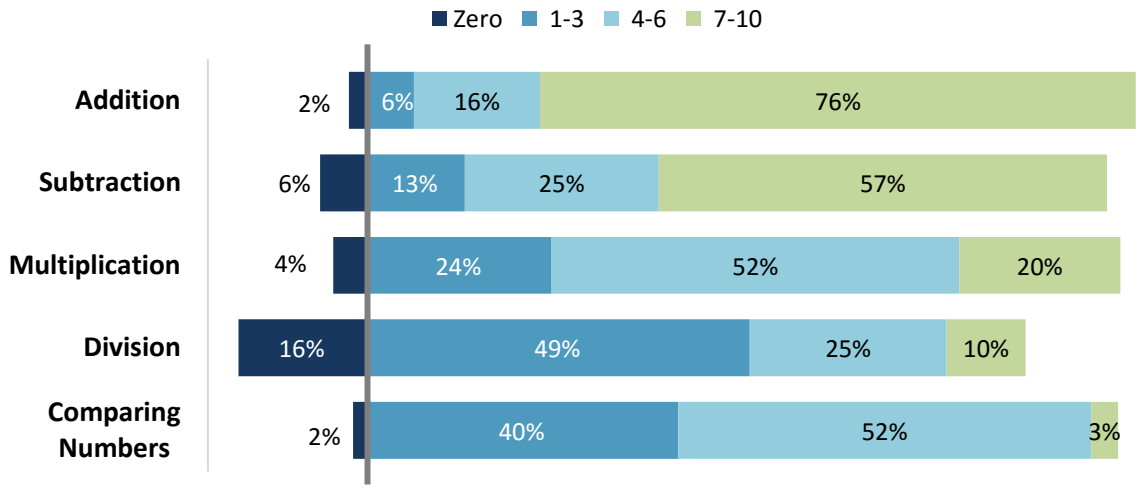


Figure 60 shows the number of problems P4 learners answered correctly at endline. As seen in the figure, the majority (76%) of P4 learners answered seven or more addition problems correctly at endline, which is a 3% increase from baseline. A substantial proportion of P4 learners were also able to answer seven or more subtraction problems. Learners struggled the most with the division subtest, in which a large proportion of P4 learners were unable to answer more than 3 problems correctly. In fact, 16% of P4 learners were unable to answer a single division problem correctly at endline.

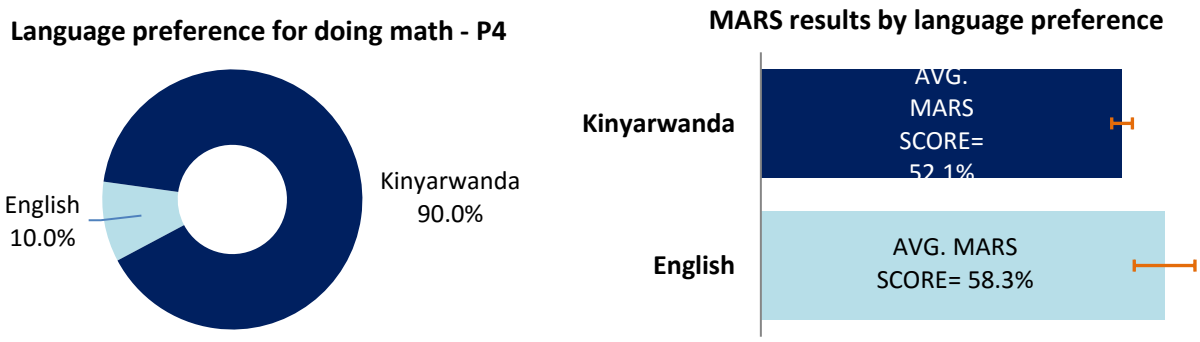
Analysis of zero scores showed substantial decreases ($p<.001$, $d=.74$) in the percent of P4 learners with zero scores on the comparing numbers subtest, in which zero scores dropped by 26% from baseline to endline. Decreases in the percent of learners who were unable to answer addition, subtraction, multiplication and division problems were seen from baseline to endline, however, decreases were small and were not found to be statistically significant.

FIGURE 59. NUMBER OF PROBLEMS SOLVED ON P4 MARS SUBTESTS AT ENDLINE



Since P4 is the first primary grade in which the language of instruction is English and not Kinyarwanda, the assessment attempted to find out to what extent learners feel comfortable performing mathematics operations in English. At the end of the assessment, P4 learners were asked, "Do you prefer to count and do mathematics problems in English or in Kinyarwanda?" The overwhelming majority (90%) said they preferred to count and do mathematics in Kinyarwanda. Learners who said they preferred to count and do mathematics in English scored significantly ($p<.05$) higher on MARS: the average MARS score among learners who indicated preference for English was 58.3%, compared to 52.1% among learners who said they preferred to do mathematics in Kinyarwanda. Analysis by subtest showed no significant difference in performance in Addition or Subtraction depending on language preference; however, on the more advanced mathematics operations — multiplication, division and comparing numbers — P4 learners who preferred to do mathematics in English performed significantly better than learners who preferred to do mathematics in Kinyarwanda.

FIGURE 60. P4 MARS RESULTS AND LANGUAGE PREFERENCE FOR DOING MATHEMATICS



These findings suggest that some learners might be falling behind in mathematics because they are not sufficiently fluent in the language of instruction.

IMPACT OF CONTEXTUAL FACTORS ON MATHEMATICS ACHIEVEMENT

LEARNER CHARACTERISTICS AND MARS RESULTS

Various factors from the student context interview examined for association with mathematic achievement on the MARS. Bivariate statistical analysis found small, but statistically significant, correlations between average MARS results for P1-P4, and several learner context interview questions. Correlation analysis results are shown in the table below.

TABLE 19. CORRELATIONS BETWEEN CONTEXT INTERVIEW COMPOSITES AND MARS RESULTS, AT ENDLINE

	Primary 1	Primary 2	Primary 3	Primary 4
Student Context Interview Questions	**Avg. MARS**	**Avg. MARS**	**Avg. MARS**	**Avg. MARS**
Are you repeating this grade? (yes=1)	.122**	-.107**		
Learner's age	.218**	.094*	-.125**	
Mother literate (1=yes)		.104*		
How often do you miss school? (4=a lot, 3= sometimes, 2=rarely, 1=never)	-.084*	-.149**	-.149**	-.112**
How often are you late for school? (4=a lot, 3= sometimes, 2=rarely, 1=never)	-.092*	-.126**		-.145**
Have you or any of your siblings ever repeated a grade? (1=yes)				-.110**
Do your parents/caregivers check your homework? (1=yes)				
When not understanding a lesson, do you ask questions? (1=yes)	.108**			
Did you have something to drink today (like water, tea, milk or juice)? (1=yes)				
Did you have something to eat today, like potatoes, rice, bread or beans? (1=yes)				.132**
Do you have radio or cell phone at home? (1=yes)				
Does anyone at your house have a bicycle/motorcycle or a car? (1=yes)				
Do you have electricity at your home? (electric lamp, paraffin lamp or biogas lamp) (1=yes)	.082*			.102*

Correlations are significant at the >0.05 level (2-tailed)

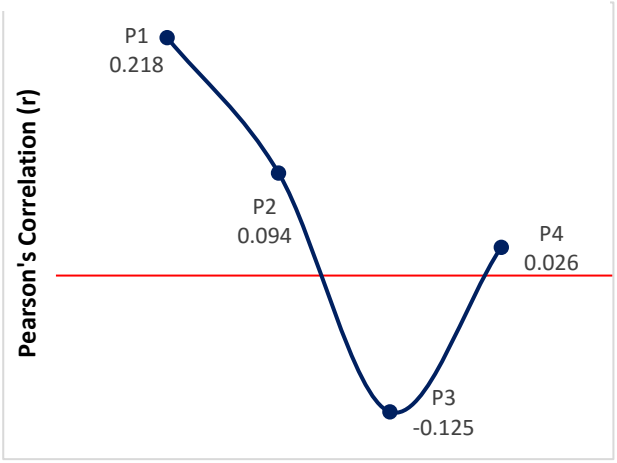
**Correlations are significant at the >0.01 level (2-tailed)

Blanks denote no statistically significant association between variables.

Correlational analysis showed that a relationship was found between repeating a grade and higher average mathematics scores in Primary 1. However, of interest, in Primary 2 the reverse was found; grade repeaters tended to have lower average MARS scores compared to non-repeaters. This is consistent with findings from the Repeater Study, which is detailed in Chapter 6 in which P1 repeaters significantly outperformed their non-repeating peers; while in P2 the reverse was true.

Similar to literacy findings, missing school and being late to school was found to be negatively correlated with mathematics performance in that there was a significant relationship between students who reported missing school or being late to school with lower mathematics scores.

FIGURE 61. CORRELATION BETWEEN LEARNER AGE AND MARS RESULTS



The impact of age with mathematics results was not as straightforward as with literacy: older learners in P1 tended to have better mathematics performance (Pearson's r=.218, p<.001 level), while in P3, younger learners performed better than older learners (Pearson's r=-.125, p<.01 level). The impact of age at P2 was smaller than at P1, and by P4 the age was not found to significantly impact results. This finding is likely due to the fact that P1 mathematics tasks were simple mathematics calculations that children are expected to perform using money when sent to the market for family needs. P1 learners who are older have the advantage of having practiced these tasks longer, so their performance on the test is higher. At P3 level, however, the tasks are much more complex, involving multiplication and division that are not practiced in everyday transactions; as a result, very few learners have had the benefit of more practice. Of interest, by P4, after two school years of being exposed to more complex mathematics operations, such as division and multiplication, the relationship between age and mathematics performance appears to not play a significant factor in mathematics performance.

Bivariate statistical analysis found statistically significant correlations between learner results in MARS and the home environment, school environment and risk factors composites, however, the relationships were weak. No significant relationship was found between MARS scores and the socio-economic composite. The relationship between the context interview composites and learner MARS results by sex were consistent among boys and girls.

	Primary 1	Primary 2	Primary 3	Primary 4
Context Interview Composite	**Avg. MARS**	**Avg. MARS**	**Avg. MARS**	**Avg. MARS**
Home environment		.111**	.130**	
School and teacher	.119**	.173**	.089*	
Socio-economic				
Risk Factors		-.109**	-.133**	-.176**

Correlations are significant at the >0.05 level (2-tailed)

**Correlations are significant at the >0.01 level (2-tailed)

Blanks denote no statistically significant association between variables.

Literacy-related questions, such as reading stories in the class and taking books home were not included in the correlation analysis with mathematics results. Additionally, questions that had no or very little variance were also not included in the analysis.[34]

SCHOOL CHARACTERISTICS

To help us better understand the variation in learner mathematics scores, we looked at the differences in school characteristics, such as distance to Kigali and District Office, teacher absenteeism, and other factors. A variety of factors were found to be associated with learner performance on MARS. Similar to the findings presented in the FARS section, distance to Kigali was found to be negatively associated with learner performance on the MARS. Teacher absenteeism was also found to be negatively correlated with learner mathematics results in P2. Such factors as having a nursery attached to school, a head teacher trained in school leadership, teacher professional preparation and whether the head teacher monitors student progress through classroom observation were found to be positively associated with learner results in select grades as seen in the FARS, yet similar to the FARS, the relationships were weak. The table below shows the various school and classroom factors that were found to be significantly correlated with average MARS results at endline.

TABLE 20. CORRELATIONS BETWEEN SCHOOL ENVIRONMENT AND MARS RESULTS, AT ENDLINE

	Primary 1	Primary 2	Primary 3	Primary 4
	Avg. MARS	Avg. MARS	Avg. MARS	Avg. MARS
Distance to Kigali		-.146**	-.165**	-.113**
Head teacher trained in school leadership	.102*			
Head teacher monitors student progress through classroom observation		.091*		.161**
Head teacher monitors student progress on tests				
Nursery school attached	.166**			
Distance to District Office				
Teacher Absenteeism		-.115**		
Student Teacher Ratio		-.107**		
Teacher professional preparation (1=none, 2=Distance learning, 3=GSS, 4=TTC)				.129**

Correlations are significant at the >0.05 level (2-tailed)

**Correlations are significant at the >0.01 level (2-tailed)

Blanks denote no statistically significant association between variables.

[34] Nearly all learners said yes to the following questions: Do your parents/caregivers want you to go to school every day? Does your mathematics teacher check your work that you do in class? Does your mathematics teacher check/mark your homework?, Additionally, nearly all learners said they speak Kinyarwanda at home. These questions were excluded from correlation analysis.

5. SCHOOL-LEVEL READING AND MATHEMATICS RESULTS

An analysis of school averages in grades P1-P3[35] showed an improvement of average Kinyarwanda FARS results across schools, in each grade on both tests. Figures 63 through 66 show scatterplots of average percent of words in a grade-level text read correctly by tested P1-P4 learners, by grade, in each tested school at endline and baseline. Each cross on the graph represents average results in a study school.

FIGURE 62. AVERAGE PERCENT CORRECT AT BASELINE (SY 2014) AND ENDLINE (SY 2016) AMONG TESTED P1 LEARNERS ON KINYARWANDA ORAL READING FLUENCY TEST IN STUDY SCHOOLS

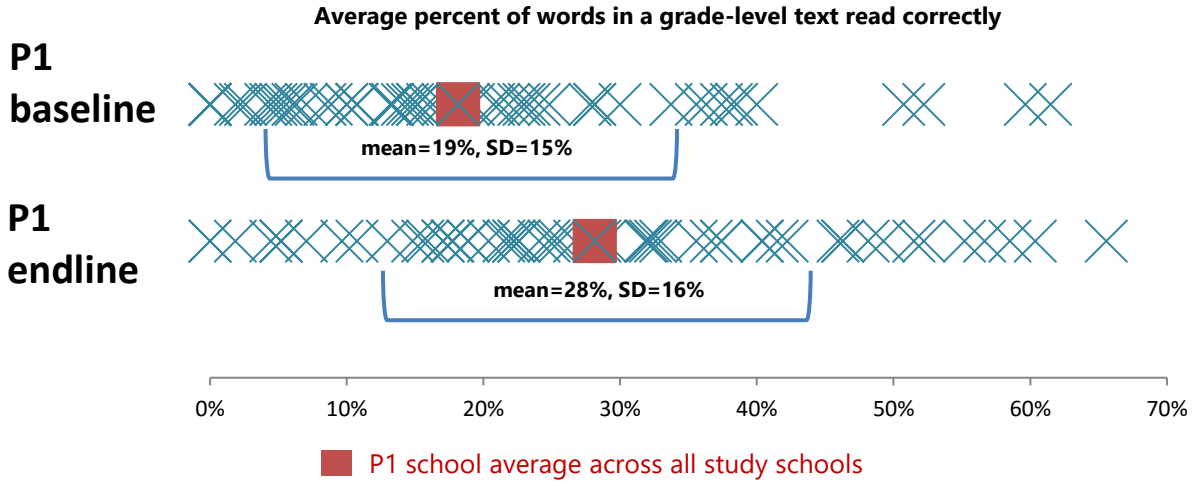
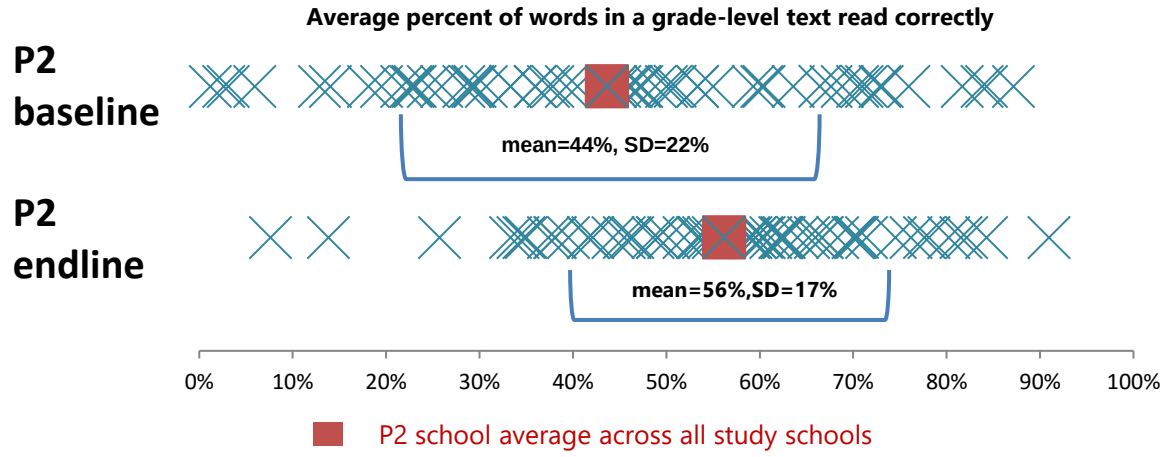


FIGURE 63. AVERAGE PERCENT CORRECT AT BASELINE (SY 2014) AND ENDLINE (SY 2016) AMONG TESTED P2 LEARNERS ON KINYARWANDA ORAL READING FLUENCY TEST IN STUDY SCHOOLS



[35] The averages were computed using unweighted percent correct read by sampled learners in each grade, for each school. The mean and standard deviation are calculated at the school-level.

FIGURE 64. AVERAGE PERCENT CORRECT AT BASELINE (SY 2014) AND ENDLINE (SY 2016) AMONG TESTED P3 LEARNERS ON KINYARWANDA ORAL READING FLUENCY TEST IN STUDY SCHOOLS

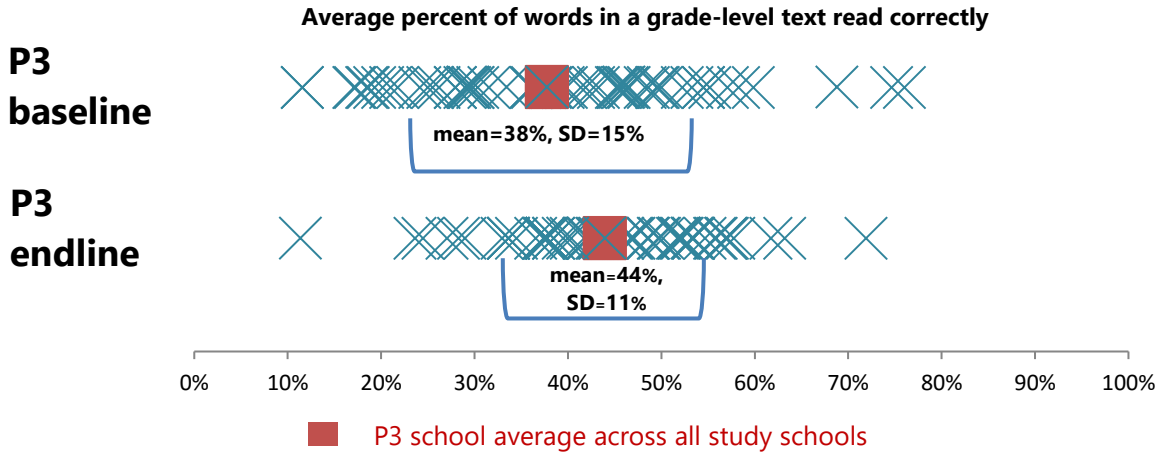
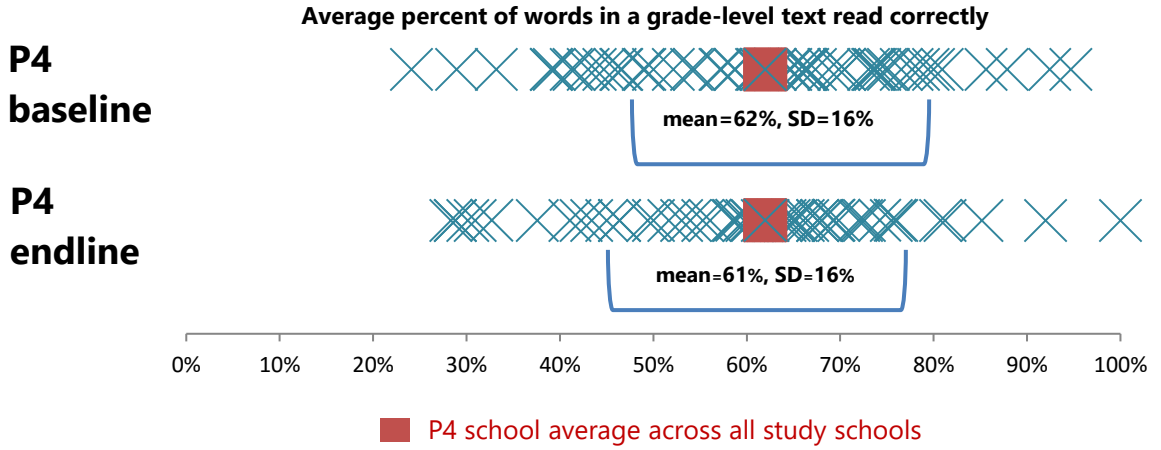


FIGURE 65. AVERAGE PERCENT CORRECT AT BASELINE (SY 2015) AND ENDLINE (SY 2016) AMONG TESTED P4 LEARNERS ON KINYARWANDA ORAL READING FLUENCY TEST IN STUDY SCHOOLS



As seen in the figures above, FARS P2 scores are the most dispersed at both baseline and endline. For each grade, groups of outlier schools are seen that have extreme FARS results: either performing substantially worse than other schools in the sample or performing substantially better. P2 had three schools whose learners could only read 30% or less of the grade-level text, on average, at endline; at the other extreme there are five schools whose learners could read, on average, 80% or more of the text.

Assessor interviews and observations indicated that schools on the lower end of achievement were observed tended to have worse school infrastructure and learning environments than those schools with higher performance. For instance, in the schools with the lowest achievement, all were observed to not have electricity in the schools. Similarly, several did not have an adequate roof or drinking water for learners. Additional analysis showed that lower performing schools also had higher rates of grade repetition and drop-out compared to high performing schools.

Similar analysis found an improvement in school averages in mathematics scores in P1 and P4 across all schools in the sample. Average school-level MARS results in P2 decreased slightly at endline, while for P3, results remained the same. Figures 67 through 70 show the average MARS results by school for each grade (P1-P4) at baseline and endline. Results show that average MARS results varied substantially from school to school. In fact, at endline, top performing schools scored between 38 percent to 50 percent higher than bottom performing schools, which is a substantial difference in performance. More research is needed to better understand why some schools outperform other schools so substantially in mathematics.

As seen in the figures, P1 MARS results are the most dispersed with average school-level P1 MARS scores ranging from 14% to 64%, however, the majority of schools had average scores between 21% and 50% at endline. At endline, very few cases of extreme outliers were identified. In fact, average MARS results, by grade, are less dispersed at endline compared to baseline, meaning that across sample schools, students are performing more similarly in mathematics. There are fewer outlier schools that are performing extremely better or worse than other schools. This suggests that the program has been effective in providing much needed support to those teachers and schools that needed it the most.

FIGURE 66. AVERAGE PERCENT CORRECT AT BASELINE (SY 2014) AND ENDLINE (SY 2016) AMONG TESTED P1 LEARNERS ON MARS IN STUDY SCHOOLS

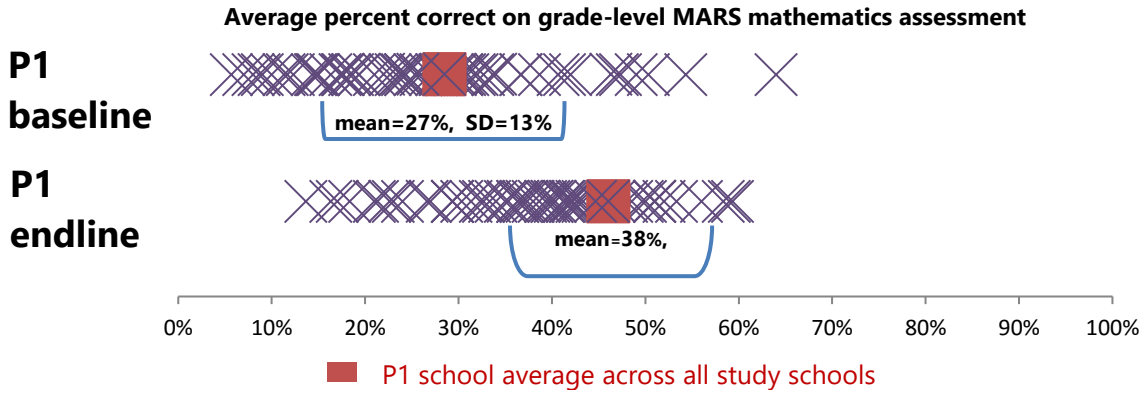


FIGURE 67. AVERAGE PERCENT CORRECT AT BASELINE (SY 2014) AND ENDLINE (SY 2016) AMONG TESTED P2 LEARNERS ON MARS IN STUDY SCHOOLS

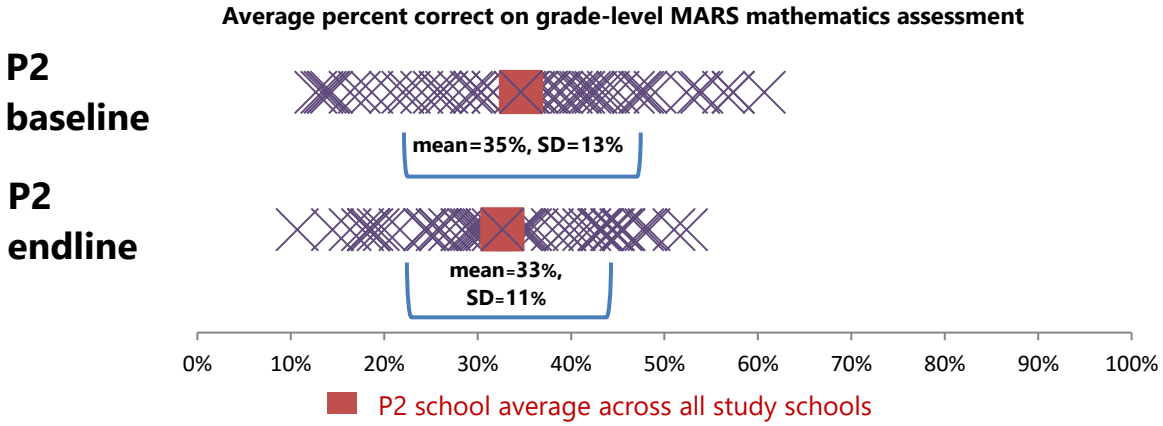


FIGURE 68. AVERAGE PERCENT CORRECT AT BASELINE (SY 2014) AND ENDLINE (SY 2016) AMONG TESTED P3 LEARNERS ON MARS IN STUDY SCHOOLS

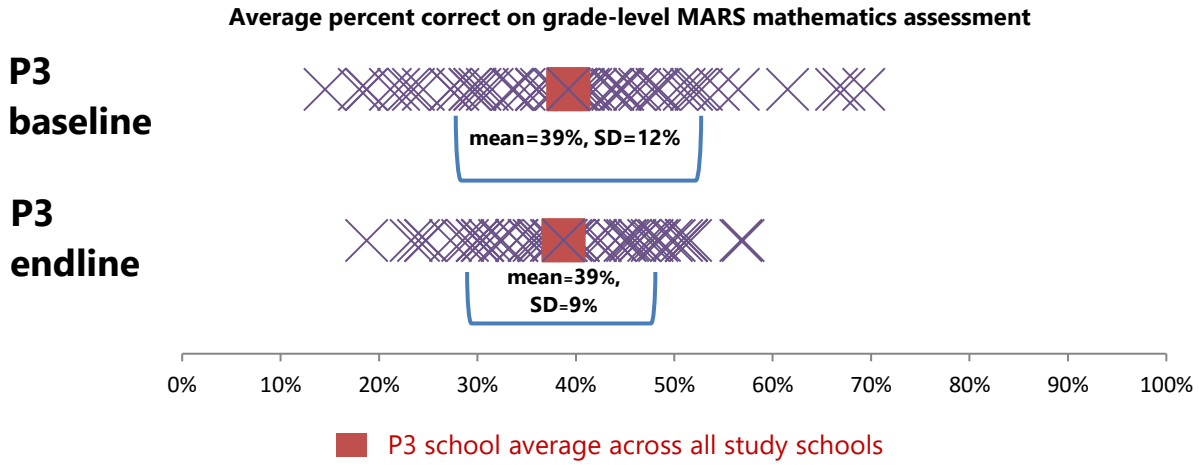
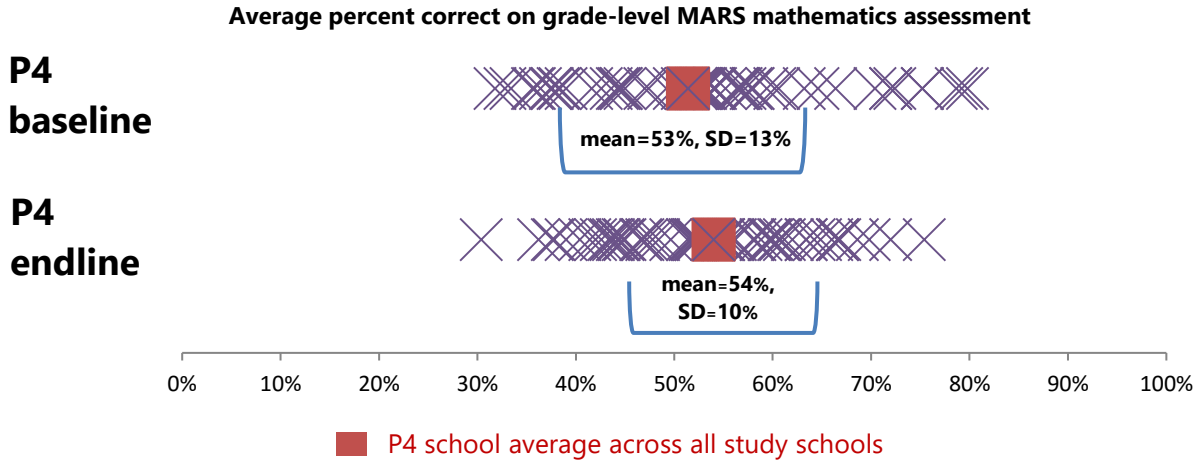


FIGURE 69. AVERAGE PERCENT CORRECT AT BASELINE (SY 2015) AND ENDLINE (SY 2016) AMONG TESTED P4 LEARNERS ON MARS IN STUDY SCHOOLS



Comparisons of school-level average results on oral reading fluency and mathematics assessment tasks found that, in several top and bottom performing schools, learners in the same schools do below average on both tests, or do above average on both tests. In other words, many of the same dozen schools showed low average results among their P1, P2, P3 and P4 learners in both oral reading fluency and mathematics assessment. On the other end of the spectrum, in a handful of schools all tested learners performed well above average. In the vast majority of schools, however, the average learner results varied greatly. This finding was consistent with bivariate correlation results which found a moderate to strong positive correlation between average school performance on MARS and average school performance on FARS (r=.65). This suggests that schools that have higher average FARS scores tend to have higher average MARS scores, and vice versa.

Analysis of background characteristics of top and bottom performing schools showed a notable difference in the distance to District offices in which top performing schools were on average 12.8 kilometers from District Offices compared to 31.3 kilometers in bottom performing schools. On average, top performing schools were slightly larger, had higher teacher to learner ratio, and were more likely to have a school library and nursery school attached. Results also showed that top performing schools were more likely to have a head teacher who had been trained in school leadership. This finding was corroborated with assessor interviews in which assessors noted that top performing schools were observed to have good school leadership. Given the small sample size (12 schools) no statistically significant differences were found between school characteristics of top and bottom performing schools, however, notable effect size differences between top and bottom performing schools were seen with select school characteristics. Results showed large effect size differences between top and bottom performing schools in the distance to District Offices (d=.92) and having a head teacher who was trained in school leadership (d=.91).

6. STUDY OF GRADE REPEATERS

DESCRIPTION OF THE STUDY

According to the Rwandan Ministry of Education, the official repetition and drop-out rate were roughly 18% and 6% respectively in primary school.[36] Identifying the actionable causes and outcomes of grade repetition and dropout is critical to crafting effective solutions and strategies to prevent students from repeating grades and dropping out of school.

In order to better understand grade repetition in Rwandan primary schools, a repeater study was conducted as part of L3's FARS/MARS national assessment in SY 2015 and SY 2016. The study aimed to examine key issues surrounding grade repetition and drop-out in Rwanda. In a nationally representative sample, primary students were tracked longitudinally over three years to examine key questions in repetition and drop-out in the context of Rwanda, including:

- Who are grade repeaters?
- What are the causes, factors and conditions at the individual, family and school-level that influence grade repetition and drop-out?
- To what extent does grade repetition impact learner achievement in reading and mathematics?
- Do learners who are retained "catch up" to their peers?

This section will present the findings of the study on grade repetition patterns and causes in Rwanda, the outcomes of grade retention on learner achievement.

METHODOLOGY. During the endline assessment (October 2016), the assessment team longitudinally tracked how many learners from the midline sample (SY 2014) of tested learners progressed to the next grade, and how many were retained in the previous year's grade. At endline, the assessment team was able to locate and test 1,270[37] learners who were tested at midline (52.6% of the midline sample). Of the tracked learners who were present on the day of endline testing, 208 learners (16.4% of the tracked midline sample) were found to be repeating the same grade they were in at midline testing a year previously.

[36] MINEDUC. (2016). *2015 Education Statistical Yearbook*. Kigali: Ministry of Education, Republic of Rwanda. Pg 24.
[37] At endline, the assessment team made all efforts to track and test *all* students from the P1-P3 midline sample. In total 1,233 learners (68.0% of the midline sample of P1-P3 learners) who were enrolled in P1-P3 at midline were tracked and tested. For learners in the P4 midline sample, only learners identified as repeaters (still enrolled in P4) were tracked and tested given that FARS/MARS data was only collected for grades P1-P4. As a result, learners who were in P4 at midline (SY 2015) and had been promoted to P5 in SY 2016 were not attempted to be found and tested. In total, 37 P4 learners were tracked as repeaters at endline.

Additionally, during endline data collection (October 2016) the assessment team longitudinally tracked how many learners that were identified as repeaters during midline data collection in 2015 (baseline repeaters) were still repeating the same grade at endline and how many learners had been promoted to the next grade. During midline data collection, 175 learners were identified as repeating the same grade where they were at baseline testing a year previously. At endline, the assessment team was able to track and test 75 (42.8%) of the baseline repeaters. Of these students, 12 (16%) learners were found to still be repeating the same grade; 63 (84%) learners were found to have been promoted to the next grade.

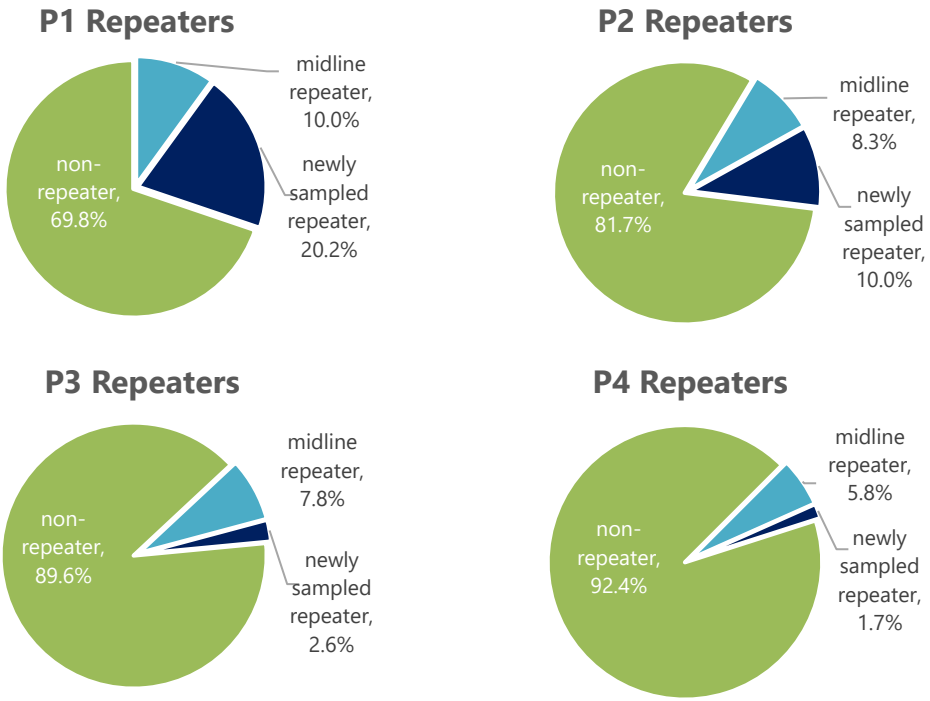
It is important to note that many repeating learners show poor attendance which, in part, is the reason why they are identified by the school to repeat the grade. Therefore, it is likely that among the original midline sample that the study team was not able to find on the day of endline testing, there were undoubtedly some repeaters that were absent. Given the study design, only repeaters who were present on the day of the endline assessment were able to be tested and surveyed; as a result, data on repeaters who were absent on the day of assessment was not collected.

This section presents detailed analysis of grade-level repeaters. The study design is intended only to provide a broader understanding of potential differentiating factors between repeaters and non-repeaters as well as to identify potential trends in learner achievement among grade repeaters; it is not intended to make valid inferences about grade repetition in Rwanda. Further, it should be noted that other factors that may contribute to improved learner achievement such as improved attendance, differentiated instruction, among others, were not collected and examined in the study. As such, learner achievement findings due to grade repetition should be interpreted with caution, since various other factors, not investigated in this study, could have contributed to changes in learner achievement.

DESCRIPTION OF GRADE REPEATERS

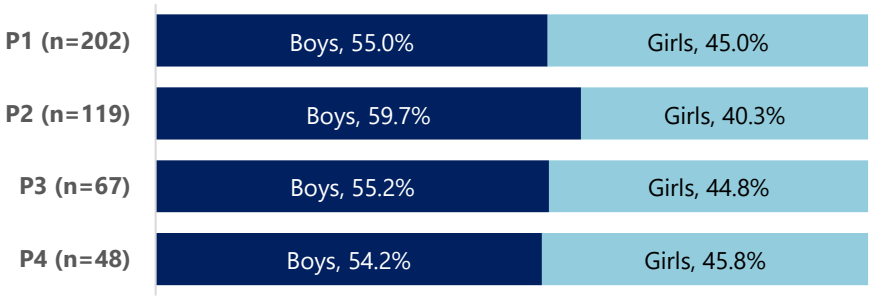
CHARACTERISTICS OF ALL REPEATERS. Most of the learners repeating the grade were found in P1. The figure below shows the grade distribution, both for the repeaters tracked from the midline, and for those newly sampled learners who were discovered to be repeating the grade. As seen from Figure 71, the percent of learners who repeat the grade decreases as they progress from grade to grade.

FIGURE 70. PERCENT OF REPEATERS AT ENDLINE, BY GRADE



Data analysis by sex showed that overall, more boys were more found to be repeating a grade than girls. The figure below shows the sex breakdown of repeaters by grade for all sampled repeaters (midline tracked repeaters and newly sampled repeaters). Boys comprised the largest proportion of repeaters in Primary 2. Because of the small sample size of the repeaters tracked from the midline, it is unknown to what extent the difference is due to a random sample error. The test of significance did not find the relationship between sex and grade repetition to be statistically significant in P1, P3 or P4; however, in Primary 2, significantly ($p<.05$) more boys were found to be repeaters than girls.

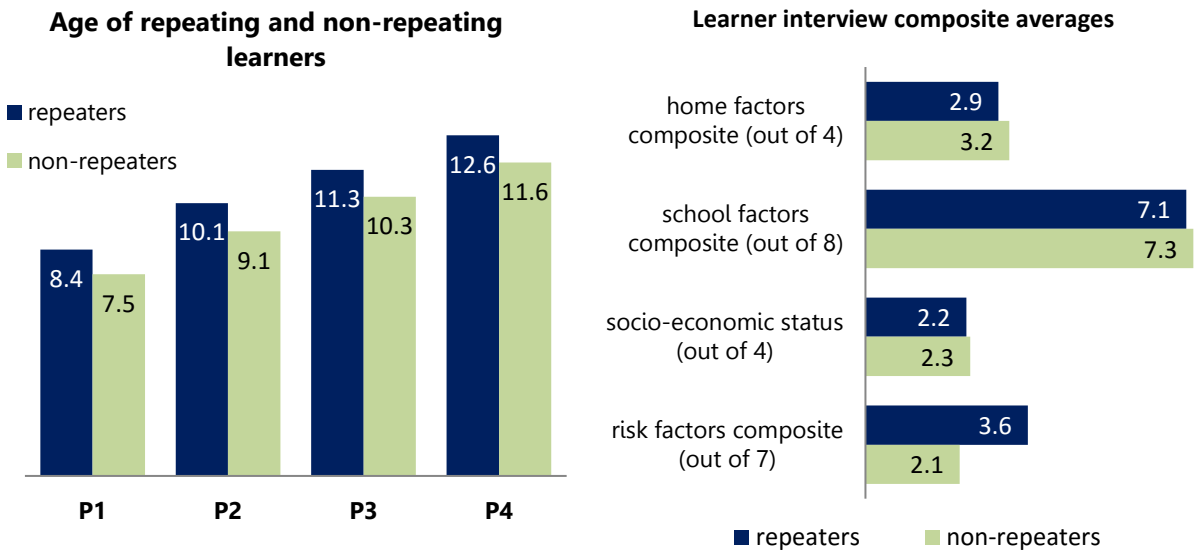
FIGURE 71. BREAKDOWN OF REPEATERS AT ENDLINE, BY SEX



Data showed that, on average, repeaters are older than their non-repeating peers, which is consistent with findings from the midline repeater study conducted in 2015. In fact, the difference in age between repeaters and non-repeaters was found to be statistically significant ($p<.001$) in all grades. Repeating learners had lower scores on home environment, school and teacher, and risk factors composites, compared to non-repeaters, which were found to be statistically significant at the $p<.01$ level. The difference on the socio-economic factors

composite was not found to be statistically significant. Results also found that repeaters were more likely to report missing school or being late for school more often than non-repeaters, however, the difference was small ($p<.01$, $d=.15$).

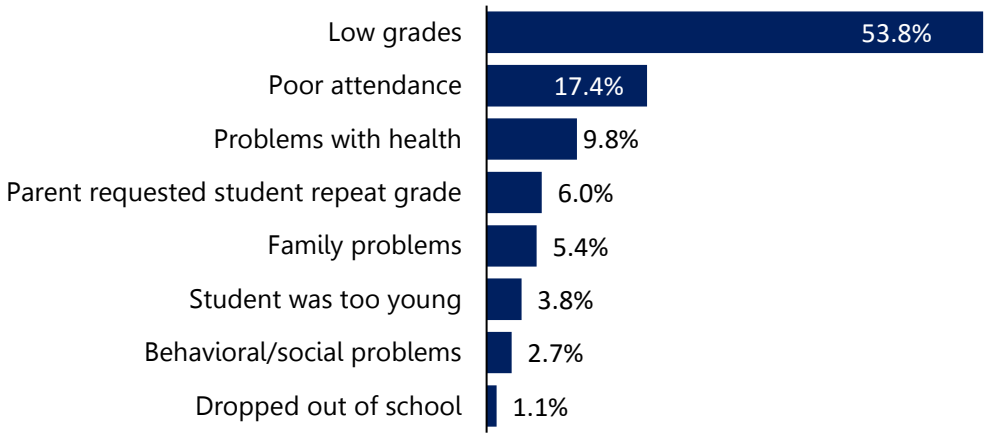
FIGURE 72. DEMOGRAPHIC CHARACTERISTICS OF REPEATERS COMPARED TO NON-REPEATERS



TEACHERS' REPORTS ABOUT REPEATERS

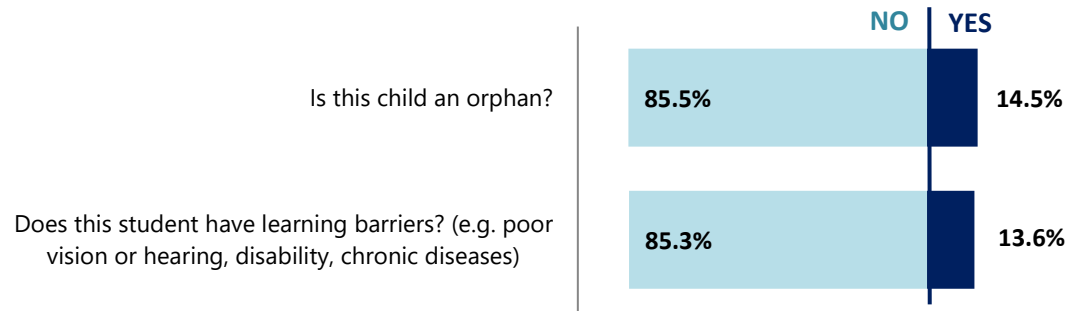
To better understand the reasons why learners are held back a year, the study team asked teachers familiar with repeating learners. The most common reason teachers cited that learners were retained in the current grade was low academic performance (53.8%) and poor attendance (17.4%). Reasons for grade repetition were consistent across grade. Analysis by sex showed that girls were more likely to be retained in the current grade due to low grades (61.3%) compared to boys (48.1%). A larger proportion of boys (22.2%) were retained due to poor attendance than girls (10.7%).

FIGURE 73. REASONS WHY LEARNER WAS RETAINED IN CURRENT GRADE (N=184)



The majority of repeaters were not orphans; in fact, only 14.5% were orphans. Of the midline repeaters, 13.6% were identified by teachers as having learning barriers such as poor vision, hearing, disabilities or chronic diseases.

FIGURE 74. BACKGROUND CHARACTERITICS OF REPEATERS (N=184)



Teachers reported that roughly three-quarters of repeaters attended school regularly during the year they repeated and that the majority (80.0%) had improved sufficiently to be promoted to the next grade next year. However, a fifth (20.0%) of repeaters were at risk for having to repeat the current grade again the following year. Primary 1 repeaters were the most at risk of not being promoted to the next grade the next year, with roughly a third at risk of being retained another year in Primary 1. Results by sex did not show significant differences between boys and girls.

Teachers remarked that common risk factors that might affect children's academic performance and attendance in school was poverty and problems in the household. Several teachers also mentioned lack of involvement of parents in their child's education was a risk factor citing several parents who were not involved in their child's education. Further, a few teachers mentioned that the learner's age (under-age or over-age) was a risk factor.

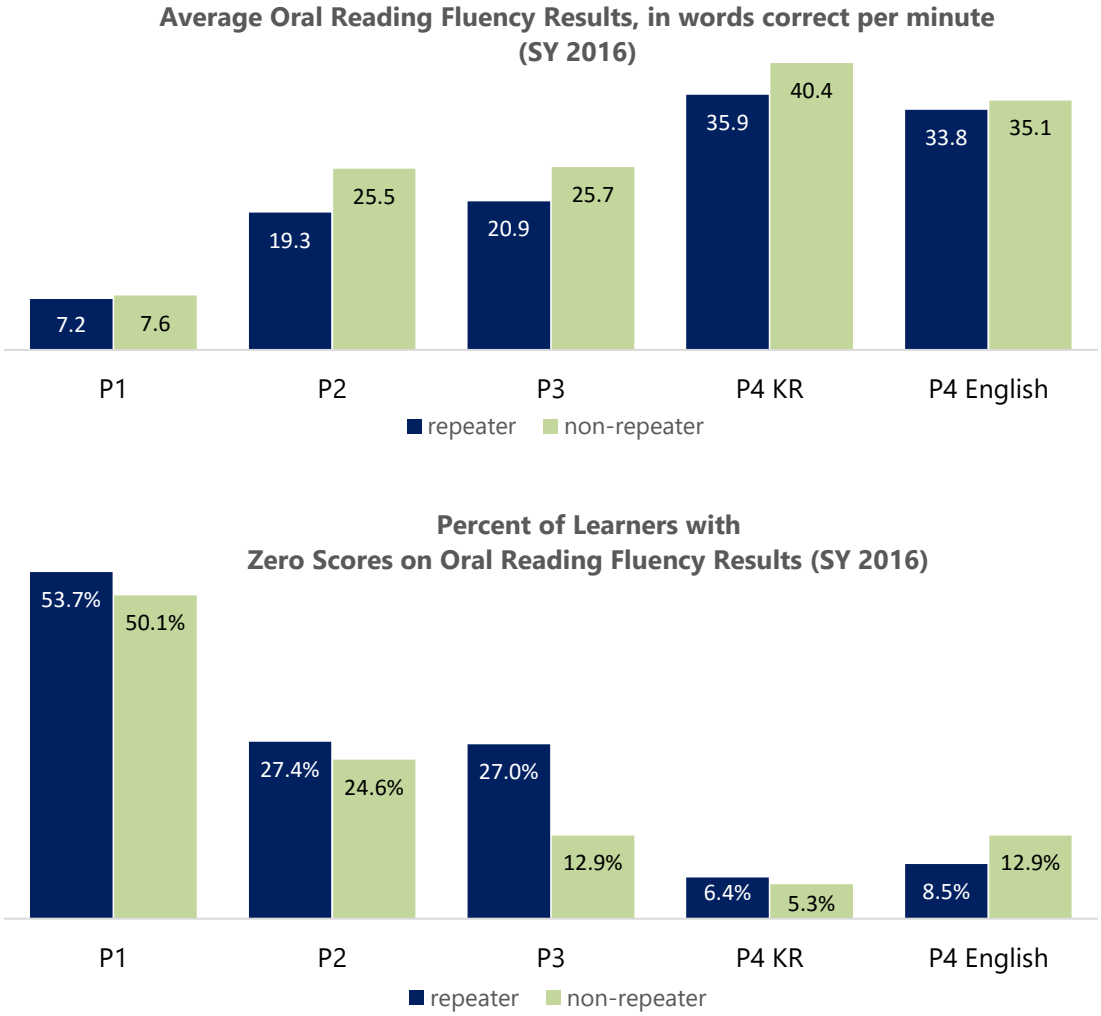
According to interviewed teachers, roughly one-fifth (14.7%) of repeaters from the midline sample are at risk of dropping out, which was consistent among boys and girls. A larger proportion of P4 repeaters (20.0%) were identified by their teachers as being at risk of dropping out; results were largely consistent among repeaters in P1, P2 and P3.

DO GRADE-LEVEL REPEATERS PERFORM SIMILARLY TO THEIR NON-REPEATING PEERS IN READING AND MATHEMATICS?

To better understand if differences in academic performance between repeaters and non-repeaters, reading and mathematics results of repeaters (those learners tracked from the midline who were found to be repeating the same grade, and those newly sampled learners who were discovered to be repeating the grade) and non-repeaters were compared. Analysis of learners who are repeating the grade and those who are attending the current grade for the first time revealed mixed results between the oral reading skills of repeaters and non-

repeaters. In P1, the average fluency rate and proportion of learners with zero scores on the reading passage among repeaters was not statistically different from those who were attending P1 for the first time. Similarly, there was no statistically significant difference in average P4 reading speed or zero scores in Kinyarwanda or English between repeaters and non-repeaters, indicating that repeaters were performing similarly to their non-repeating peers. In P2 and P3, by contrast, repeaters demonstrated slower average reading speed in Kinyarwanda ($p<.01$, $d=.32$). Additionally, in P3, substantially more repeaters were unable to read a single word of a grade-level text compared to non-repeaters ($p<.001$, $d=.40$). The figure below shows differences between these repeaters and non-repeaters in average fluency as well as in a percent of learners with zero scores on a grade-level reading test.

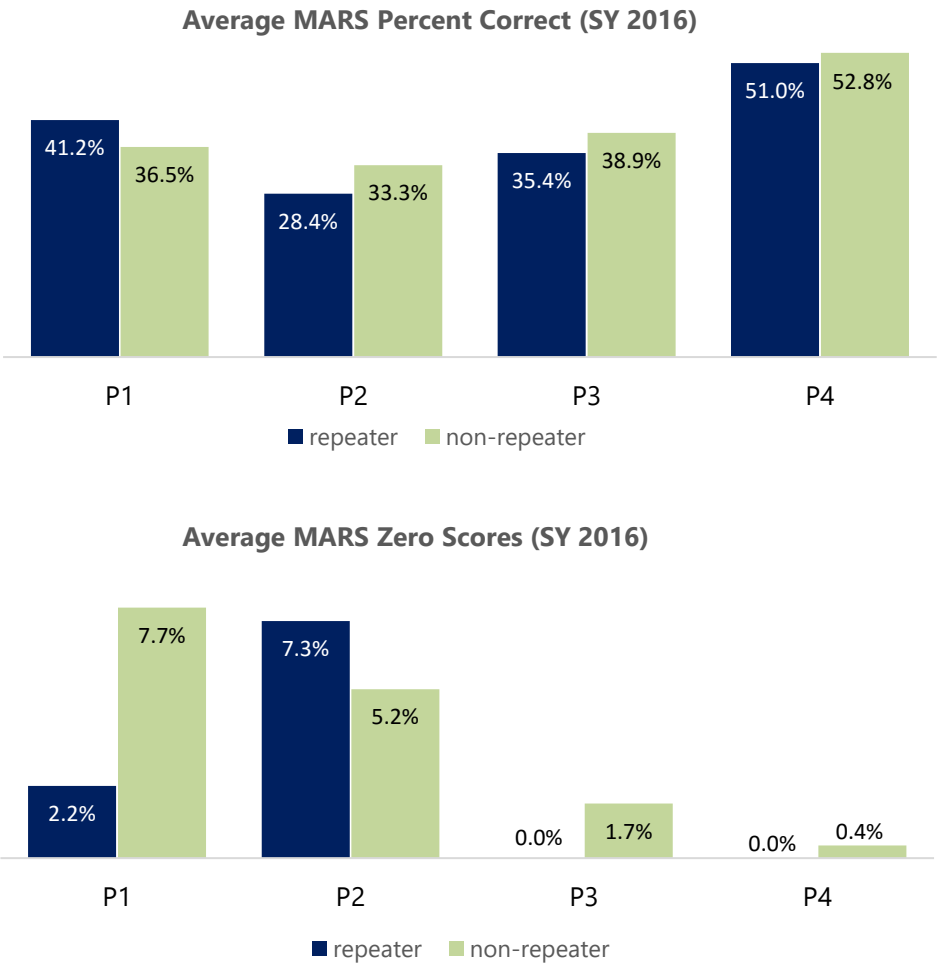
FIGURE 75. AVERAGE ORAL READING FLUENCY RESULTS AMONG REPEATERS AND NON-REPEATERS, AT ENDLINE



Comparisons of mathematics results showed that, in Primary 1, repeaters outperformed their non-repeating peers in mathematics ($p<.05$, $d=.19$) and had significantly fewer zero scores on average MARS results ($p<.01$). However, in Primary 2, the opposite was found, in which non-repeaters scored on average 5% higher on overall MARS scores than those students who were

repeating P2 ($p<.05$, $d=.20$); significant differences between repeaters and non-repeaters were not found in the percent of learners with zero scores. In P3 and P4, the difference between repeaters and non-repeaters was not found to be statistically significant, which suggests repeaters and non-repeaters perform similarly in mathematics in Primary 3 and Primary 4.

FIGURE 76. AVERAGE MARS PERCENT CORRECT AMONG REPEATERS AND NON-REPEATERS, AT ENDLINE



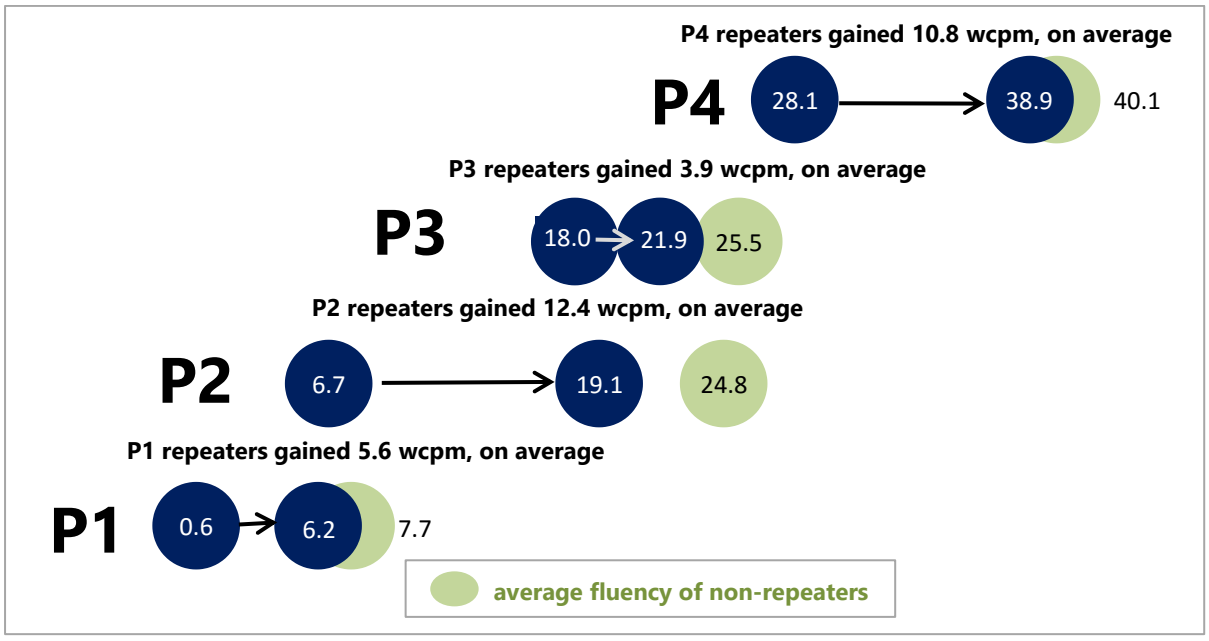
ARE THERE POSITIVE IMPACTS ON LEARNER ACHIEVEMENT IN READING AND MATHEMATICS, AFTER ONE YEAR OF GRADE REPETITION?

When learners are retained to repeat a grade, how much do they learn, on average, during the year they repeat? To answer this question, at endline, data was collected on sampled learners whom the study team identified as grade-level repeaters (learners who were still in the same grade as they found in at midline data collection in 2015). Learners were re-tested at endline and results were compared to midline results in order to determine changes in learner achievement after one year of grade repetition.

ORAL READING FLUENCY. The figure below shows changes in Kinyarwanda oral reading fluency of repeating learners who were tracked from midline. The figure demonstrates that over the course of one academic year repeating learners experienced gains in oral reading fluency. Overall, oral reading fluency gains, among repeaters, were found to be statistically significant ($p<.05$) in P1, P2 and P4; improvements in P3 were not statistically significant. Large effect size improvements were found in P1 and P2 ($d=.85$ and .92, respectively), indicating large improvements in average oral reading fluency results among P1 and P2 repeaters in one academic year. In Primary 3, a small effect size difference was noted ($d=.25$), in which learners were able to read 3.9 additional words correctly per minute, on average. Primary 4 results showed a moderate improvement ($d=.58$) in oral reading fluency in one academic year among P4 repeaters.

Oral reading fluency results of repeaters at endline were compared to non-repeater results. Analysis showed that P1 and P4 repeaters in the sample nearly caught up to their non-repeating peers, while P2 and P3 repeaters closed more than half of the gap between them and non-repeaters. Blue circles denote the average fluency of repeaters in SY 2015 and SY 2016; green circles denote the average fluency of non-repeaters in the sample.

FIGURE 77. CHANGES IN KINYARWANDA FLUENCY OVER THE COURSE OF 2016 ACADEMIC YEAR AMONG REPEATERS



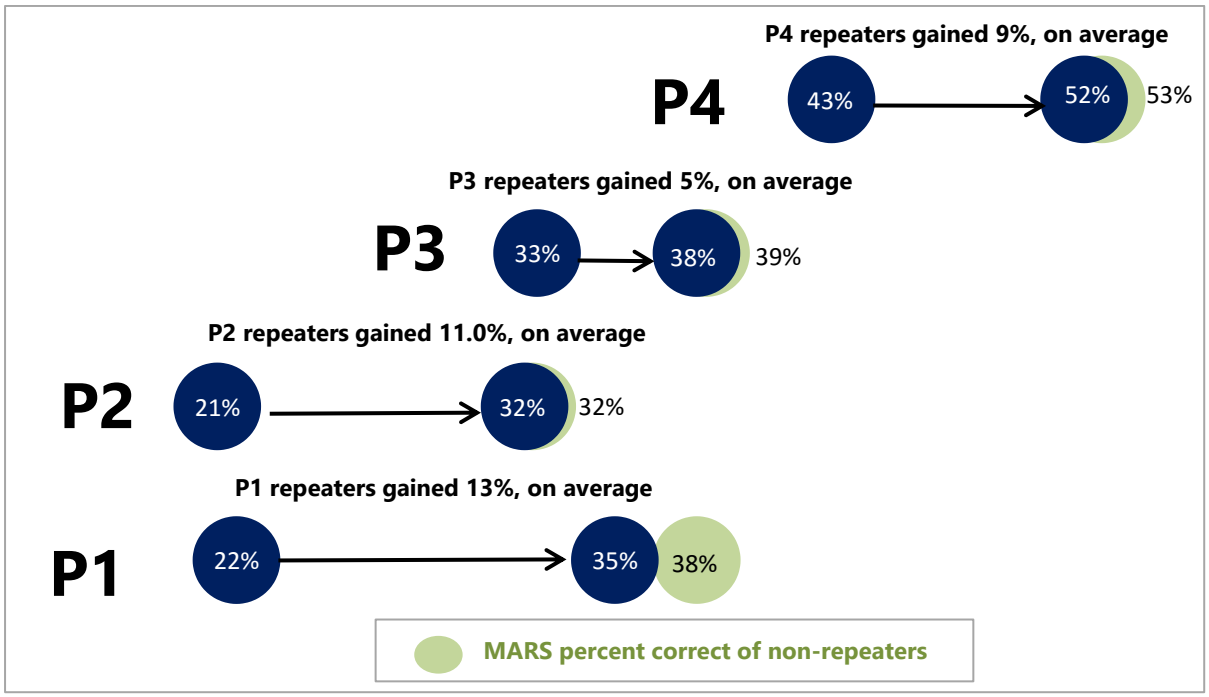
Similarly, analysis showed large ($p<.001$, $d=1.2$) improvements in oral reading fluency in English in Primary 4 among grade-level repeaters. At the end of the school year in 2015, P4 learners were able to read, on average, 12.8 words correct per minute in English. After one academic year of repeating P4, repeaters were able to read, on average, 36.9 words correct per minute, which is an improvement of 24.1 wcpm. In fact, P4 repeaters had similar oral reading fluency rates, on average, in English as their non-repeating peers. Results showed that

at endline, P4 repeaters were able to read 36.9 wcpm compared to 35.0 wcpm among non-repeaters.

MATHEMATICS. How much mathematics did repeaters learn in one year? The figure below shows changes in average percent correct across all MARS subtests of learners who repeated the grade, over the course of one academic year. The figure demonstrates that over the course of one academic year repeating learners experienced gains in procedural fluency and accuracy of solving foundational mathematics problems. In fact, study repeaters showed significant gains ($p<.05$) in P1, P2 and P4. Effect size calculations showed medium size improvements in average MARS scores over one academic year for repeaters in P1, P2 and P4 ($d=.51$-$.63$). Effect size difference calculations showed small to medium improvements in Primary 3 ($d=.3$).

Study repeaters by and large caught up to their non-repeating peers in mathematics in all tested grades. Blue circles denote the average MARS scores for grade-level repeaters in the sample, while green circles denote the average MARS scores of non-repeaters.

FIGURE 78. CHANGES IN MARS SCORES OVER THE COURSE OF 2016 ACADEMIC YEAR AMONG REPEATERS



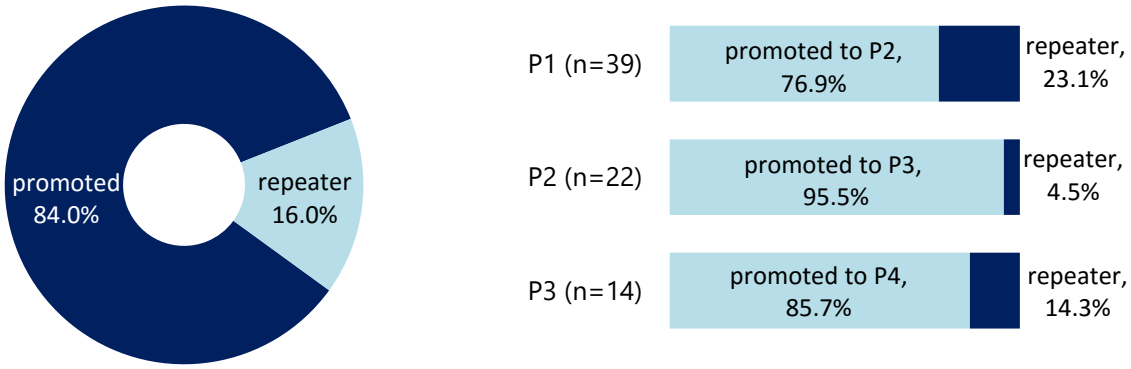
Overall, results show that grade-level repeaters showed improvements in oral reading fluency and mathematics in one academic year after repeating a grade. In fact, many repeaters had largely "caught up" to their non-repeating peers and had similar fluency and mathematics results. These findings were corroborated by teachers, in which surveyed teachers indicated that overall the majority (80%) of tracked repeaters had improved sufficiently in the year to be promoted to the next grade the following year. Despite these improvements, disaggregation by grade showed that P1 tracked repeaters were more at-risk of not being promoted to the next grade. Teachers reported that only two-thirds (66%) of P1 repeaters were ready to be

promoted to the next grade; the remaining third would likely need to repeat P1 again the next year. Conversely, in P2, P3 and P4, teachers reported that the large majority repeaters were likely to be promoted to the next grade, in fact, only 11%, 13% and 14% of repeaters, respectively, were at-risk of being retained in their current grade again the following year.

What Happens to Grade-level Repeaters After They Repeat a Grade?

During endline data collection, the assessment team longitudinally tracked learners that were identified as P1- P3 repeaters in SY 2015 to see what happens to learners after repeating a grade. Were learners still repeating the same grade the following year – SY 2016? Had learners been promoted to the next grade, and if so, how did they compare to their peers? Of the 175 learners that were identified as repeaters during data collection at the end of SY 2015, the assessment team was able to track and test 75 (42.8%) learners in SY 2016. The other 100 learners were either not enrolled at the same school or were absent on the day of testing. Of these students, 12 (16%) learners were found to still be repeating the same grade; 63 (84%) learners were found to have been promoted to the next grade. Learners in Primary 1 were found to have the largest percentage of learners who were still repeating the same grade a second year in a row.

FIGURE 79. STATUS IN SY 2016 OF SY 2015 PRIMARY 1- PRIMARY 3 REPEATERS (N=75)

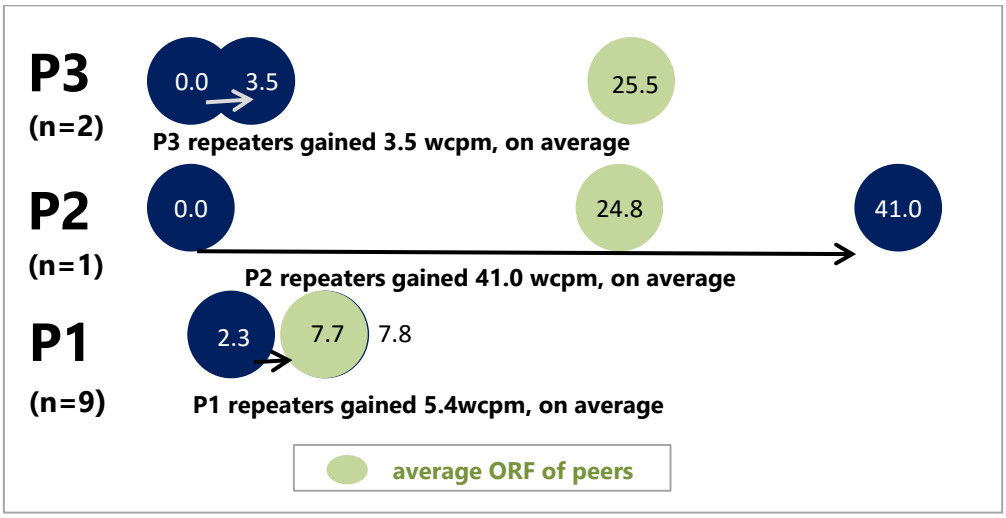


How Do Learners Who Are Retained In The Same Grade For multiple Years compare to their peers?

In total, the study tracked 12 learners (9 P1 learners, 1 P2 learners and 2 P3 learners) who were found to be repeating the same grade three years in a row (SY 2014, SY 2015 and SY 2016). The outcomes of repeating a grade multiple times were mixed. After two years of repeating the same grade, longitudinally tracked learners in Primary 1 had made slight improvements in Kinyarwanda ORF and had "caught up" to their peers. In Primary 2, the longitudinally tracked learner demonstrated a large improvement in ORF after repeating the same grade for two

years; in fact, the learner had surpassed the average ORF of his/her peers. In Primary 3, results showed small gains after two years of grade repetition for the two longitudinally tracked learners; however the learners had substantially lower ORF rates than their peers in Primary 3.

FIGURE 80. CHANGES IN KINYARWANDA FLUENCY AFTER REPEATING THE SAME GRADE FOR TWO YEARS (SY 2014 TO SY 2016) (N=12)



Analysis of mathematics results showed that tracked P1-P3 learners who were repeating a grade for the second year in a row demonstrated improvements in the overall mathematics performance after two years of grade repetition, however, tracked P1 and P3 learners had not caught up to their peers. In fact, repeaters in P1 and P3 were still performing on average 5.3% and 16.1% worse, respectively, than their peers on average.

Teachers were surveyed for seven out of 12 tracked repeaters (6 P1 teachers and 1 P2 teacher) at the end of the school year. In Primary 1 and Primary 2, surveyed teachers reported that learners had improved sufficiently to be promoted to the next grade the following year. Promotion data on the two longitudinally tracked P3 repeaters was not collected.

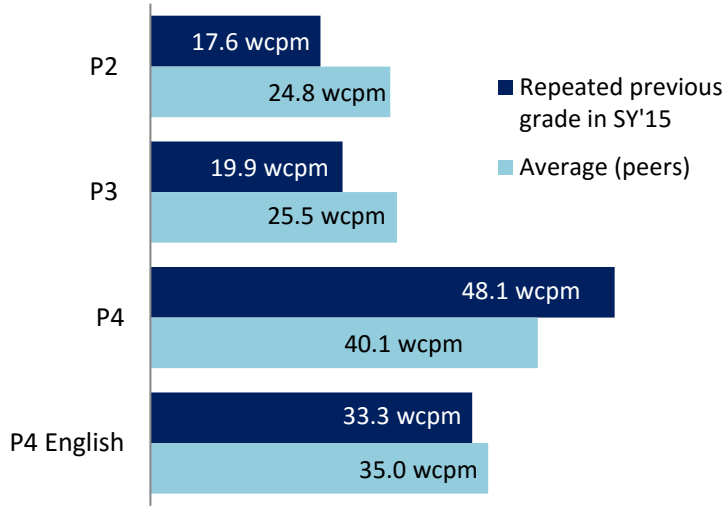
Overall, these findings suggest that although learners are making improvements in reading and mathematics performance as a result of grade repetition, the benefits of grade repetition multiple years in a row is not conclusive. The majority of the longitudinally tracked learners had "caught up" to their peers in oral reading fluency after two-years of grade repetition, however, in mathematics, several learners are still falling behind their peers. Additionally, analysis showed that in mathematics, for the majority of students, most of their improvement in mathematics performance occurred in the first year of grade repetition, results only improved slightly during the second year of grade repetition. Reading results were mixed; some students made larger gains in their first year repeating the grade, others made larger gains in their second year of grade repetition. It should be noted that these findings are based on only 12 learners that were longitudinally tracked repeating the same grade from 2014 to 2016 and as such, caution should be taken when drawing conclusions from these findings.

More research is needed to better understand the impact multiple years of grade repetition can have on student performance.

WHAT HAPPENS TO LEARNERS WHO HAVE REPEATED A GRADE AND THEN ARE PROMOTED TO THE NEXT GRADE?

Do repeaters perform similarly to their peers once they've been promoted or are they at risk of falling behind once again? To answer these questions, in SY 2016, we tested learners who previously repeated a grade in SY 2015, but had been promoted to the next grade in SY 2016. For those learners who were promoted, analysis was conducted to see how they compared to their peers. Figure 82 shows the average oral reading fluency scores of promoted repeaters compared to average oral reading scores of their peers at the end of the school year. As seen in the figure, in Primary 2 and Primary 3, learners who had previously repeated a grade, had lower oral reading fluency scores in Kinyarwanda than their peers, on average (*d*=.38). However, in Primary 4, interestingly, those learners who had previously repeated P3, were able to read 8 words correct per minute more than their P4 peers, on average (*d*=.40). In English, P4 learners who had previously repeated P3, were found to have similar oral reading fluency scores to their peers, on average, at the end of Primary 4.

FIGURE 81. ORAL READING FLUENCY SCORES IN SY 2016 OF PROMOTED REPEATERS COMPARED TO THEIR PEERS



Primary 2 and Primary 3 learners who had repeated the previous grade the year before were also found to have substantial numbers of zero scores on the FARS. In total, 36.7% of P2 and 19.0% of P3 baseline repeaters were unable to read a single word of the grade-level text in SY 2016, which suggests that they may have not been ready to be promoted to the next grade. Additional analysis showed that in Primary 2, 40% of learners who previously repeated a grade, were meeting proficiency standards (20+wcpm) compared to a grade-level average of 59.9% of learners. In Primary 3, not a single learner who had previously repeated Primary 2 was able to meet P3 proficiency standards of 33 or more words correct per minute.

Similar to reading results, analysis of average MARS scores showed that learners in Primary 2 and 3 who had repeated a grade the previous year, scored slightly worse (7.9% and 2.5%, respectively), on average, on the MARS assessment compared to their peers. Conversely, in Primary 4, longitudinally tracked learners who had repeated P3 the previous year and who had been promoted to P4 in 2016, slightly outperformed their peers on average MARS scores, in which they scored, on average, 3.8% higher overall (*d*=.21).

These findings suggest that for some learners who previously repeated a grade, they do not necessarily "catch up" to their peers once promoted, especially among those who repeated early grades – Primary 1 and Primary 2 — as seen in lower oral reading fluency and mathematics scores for these learners compared to their peers. However, as seen in P4, study learners who had previously repeated a grade not only "caught up" to their peers in both oral reading fluency and mathematics, in fact, learners were outperforming their peers. However, it is important to interpret these results with caution given the small sample size of longitudinally tracked repeaters. These results are only intended to suggest possible trends in grade repetition. More research is required to better understand the long-term outcomes of grade repetition on academic achievement as well as the outcomes associated with early or later grade retention.

EVIDENCE FROM OTHER STUDIES

The study of repeaters found that repeating a grade was academically beneficial for most of the learners that the study was able to track and test twice in 2015 and 2016. These trends are consistent with findings from the first phase of the L3 repeater study conducted in October 2015 in sample schools.

The long-term issues associated with grade repetition have been extensively studied in other countries. For example, a meta-analysis of 19 studies of grade retention in the USA[38] found that initial achievement gains may occur during the year the student is retained. However, the consistent trend across many research studies is that achievement gains decline within 2-3 years of retention, such that retained children either do not perform better or perform more poorly than similar groups of promoted children. This is consistent with the findings from the repeater study in which results showed that repeaters who are promoted to the next grade do not necessarily "catch up" to their peers, especially among those who repeated early grades – Primary 1 and Primary 2 — as seen in lower oral reading fluency and mathematics scores for these learners compared to their peers.

Another meta-study of 20 rigorous studies of long-term effects of grade repetition[39] found similar trends. Retention does not appear to have a positive impact on self-esteem or overall school adjustment; however, retention is associated with significant increases in behavior problems as measured by behavior rating scales completed by teachers and parents, with problems becoming more pronounced as the child reaches adolescence. Results indicate that grade retention had a negative impact on all areas of achievement (reading, mathematics and

[38] National Association of School Psychologists. (2011). Grade retention and social promotion (White Paper). Bethesda, MD. Accessed from https://www.nasponline.org/ in March, 2016.
[39] Jimmerson, S.R. (2001). Meta-analysis of Grade Retention Research: Implications for Practice in the 21st Century. *School Psychology Review*. 2001, Volume 30, No. 3, pp. 420-437.

language) and socio-emotional adjustment (peer relationships, self-esteem, problem behaviors, and attendance).

The effects of grade repetition in Rwandan schools would warrant a separate study. Bearing in mind that large class sizes are one of the causes of poor academic results overall, the fact that many of the pupils are over age might be a contributing factor to poor academic performance of all learners. Schools need to provide support through remedial strategies for learners who fall behind to help advance them together with their age cohort. Additional research is also needed on the socioemotional, behavioral as well as long-term academic outcomes of grade repetition in the Rwandan context. If Rwanda wants pupils to be workforce-ready, retaining learners above the average age in early primary grades may not be an effective policy in the long run.

7. RECOMMENDATIONS

The review, revision and sensitization of system-level policies can have a positive impact on overall learner achievement. The results of such a review could impact the process of instruction, bilingual transitional programming, learner repetition and class promotion, assessment of learners and continuous professional development. Specifically, the L3 Initiative recommends the review/revision of policies relating to the following issues:

- **SENSITIZE SCHOOL STAFF REGARDING POLICIES ON CLASS PROMOTION, REPETITION, AND DROPOUT.** The endline results show that large numbers of learners are repeating grades, resulting in heavily populated classrooms, with most of the repeaters found in P1. A majority of teachers said that schools hold learners back to comply with government policies or as a result of low grades. L3 recommends that policies be put in place to counteract this trend and to reinforce ongoing teacher sensitisation on the policies. Specifically, school staff should be sensitized on the correct application of the promotion and repetition policy. The policy should be reviewed and revised to ensure school staff are accountable for their learners' progress.

- **CONSIDER BILINGUAL LATE-EXIT TRANSITIONAL PROGRAMMING.** Analysis of Kinyarwanda FARS from baseline to endline shows that learners in P1 - P4 are still in the process of learning to read. Similarly, P4 English FARS results revealed that most learners have not acquired the necessary comprehension skills to understand and interpret a grade level text. Implementation of the language policy is facing some challenges in early primary. Teachers reported that many children do not understand the English language and this can cause difficulties for teaching reading in the primary grades and using English as the language of instruction from P4. Considering these findings, a bilingual late-exit transitional programming for primary school with English as the language of instruction in P6 or later is recommended. Studies have demonstrated that "late-exit" transitional programs, i.e. those that develop their mother tongue language skills for four to five years (as opposed to only three years), have much better results in terms of student performance.

- **ESTABLISH EXPLICIT LITERACY AND NUMERACY STANDARDS.** The period spanning nursery through P3 is the most critical for the development of reading and writing competencies. During that time, learners acquire the foundational skills needed for later academic, social, and economic success, and explicit literacy and numeracy standards are crucial for benchmarking the skills students should acquire. The L3 Initiative has developed a program where, by the time they reach P3, learners should be able to read fluently, independently and enthusiastically, and be able to write with confidence and competence in Kinyarwanda. Therefore, the L3 Initiative recommends

that a heavy emphasis be given to developing specific standards and benchmarks for P1 through to P3 based on key literacy competencies. Developing learner performance standards will provide all stakeholders with a common understanding of the skills and competencies that learners need to become proficient readers and writers. These standards and benchmarks need to be reflected in all literacy and numeracy instructional materials so that teachers teach according to them.

- **PROVIDE SCRIPTED TEACHER GUIDES.** Almost all surveyed teachers reported that the L3 teacher guides were among the most useful to their teaching effectiveness. The scripted teacher guides developed by L3 ensured that teachers were guided every step of the way in the delivering of literacy and numeracy instruction. Teachers need resources that help them implement best practices in literacy and numeracy practices. REB should consider investing in the development of scripted teacher guides to ensure that teachers have the needed guidance and knowledge in the implementation of the new competence based curriculum and teachers teach according to the requirements of the curriculum.

- **PROVIDE ASSESSMENT TOOLS THAT SCHOOL STAFF CAN USE TO MONITOR PROGRESS.** All sampled head teachers reported that they monitor reading progress of learners. The L3 Initiative recommends developing assessment tools that head teachers can utilize to measure and report student literacy and numeracy progress as well as teacher performance. The measurement tools should be based on set literacy standards and, when utilized, should provide teachers and school management with useful feedback to guide their instructional planning. Annual criterion-referenced assessments would provide consistent information on learner performance on key indicators, such as grade-level reading and procedural mathematics fluency. Data gathered on learner achievement, class size, repetition, teacher performance and other central issues in education can be used to inform policy.

- **PROVIDE REGULAR CONTINUOUS PROFESSIONAL DEVELOPMENT (CPD).** The amount and type of support to teachers and head teachers in the form of provision of literacy and numeracy instruction as well as training and professional development varied from school to school. Teachers and school leaders need a comprehensive, sustained professional development effort to build their knowledge about reading and writing and to develop a commitment to evidence-based practice. The L3 Initiative recommends that District Continuous Professional Development Committees coordinate and monitor regular CPD on early grade literacy and numeracy practices. Dedicated time for CPD should be integrated into the weekly school calendar. Teachers need regular access to coaches and mentors who understand and have experience with

new instructional approaches and a peer network of teachers who work together to enhance their practices.

- **PROVIDE SUPPLEMENTARY READING MATERIALS.** Teachers reported that lack of books was a challenge in teaching children how to read. School libraries were uncommon. Frequent, guided and independent opportunities to read interesting and challenging texts are essential for literacy learning. Therefore, the L3 Initiative recommends that school management be encouraged and supported to develop and maintain school libraries, where learners may take books home to read to a parent and or sibling.

- **ENCOURAGE COMMUNITY AND FAMILY SUPPORT.** Research has also demonstrated the positive contributions that family and community play in preparing and supporting children to be successful readers. Schools reported that the most common challenges that inhibited learning was the lack of support of parents/caregivers for their child's education and lack of help at home for learners with their homework, even though the majority of learners reported that someone at home read stories to them, helped and listened to them read and checked their homework. Head teachers and SGACs should receive guidance and training on how to provide direct and structured on-going communications between the classroom, the family and the community to ensure success in reading.

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APPENDIX A. L3 INITIATIVE OVERVIEW

The Literacy, Language and Learning (L3) Initiative's strategic objective is to strengthen teaching and learning so that children leave primary school with solid literacy and numeracy skills. L3 works with Rwanda's Ministry of Education (MINEDUC) to improve students' reading and mathematical skills in grades one to four, as well as their English language proficiency. Working in collaboration with the MINEDUC, USAID and technical partners, the L3 initiative works with pre-service and in-service facilitators to introduce proven reading and mathematics teaching strategies, and with community volunteers to support learning. The initiative also aims to improve the availability and use of innovative reading and mathematics instructional materials. Teachers' and students' reading, mathematics and English language skills is reinforced through interactive audio instruction programs.

The L3 initiative has five intermediate results that support the strategic objective, and ultimately contribute to USAID's goal of improved reading skills for 100 million children in primary grades by 2015. These results and key activities include:

IR 1: Improved Quality of Teaching

1. Development of a shared vision of effective literacy/numeracy instruction and tools to measure progress with respect to that
2. Implementation of a School-based Mentoring Program to support enhanced literacy, numeracy and ESL instruction
3. Support to TTCs to become Centers of Excellence for Literacy and Numeracy Instruction
4. Pilot initiatives to improve teachers' motivation and working conditions

IR 2: Improved Availability of Teaching and Learning Materials

1. Develop a complete package of instructional materials to support early grade reading
2. Hold Math Camps for teachers and story writing competitions and Writer's Workshops to produce locally developed reading materials
3. Distribute over one million supplementary books
4. Introduce "traveling libraries" in low income, rural communities
5. Distribute sustainable technologies to support enhanced literacy/numeracy instructional program
6. Hold local campaigns and activities to promote a culture of reading

IR 3: Support for English

1. Develop interactive audio programs for, P1 to P4
2. Develop an instrument to evaluate teachers' English language proficiency
3. Support the revision of the existing English as a Second Language (ESL) curriculum

IR 4: Strengthened Ministry Capacity

1. Embed L3 literacy/numeracy specialists in the central MINEDUC and the 13 TTCs to provide day-to-day support in literacy/numeracy and teacher training reforms
2. Develop a criteria-based classroom observation form to monitor changes in teachers' literacy/numeracy instructional practices over time
3. Provide short-term technical support to the Examinations division to strengthen student literacy/numeracy assessment programs

IR 5: Improved Equity in Education

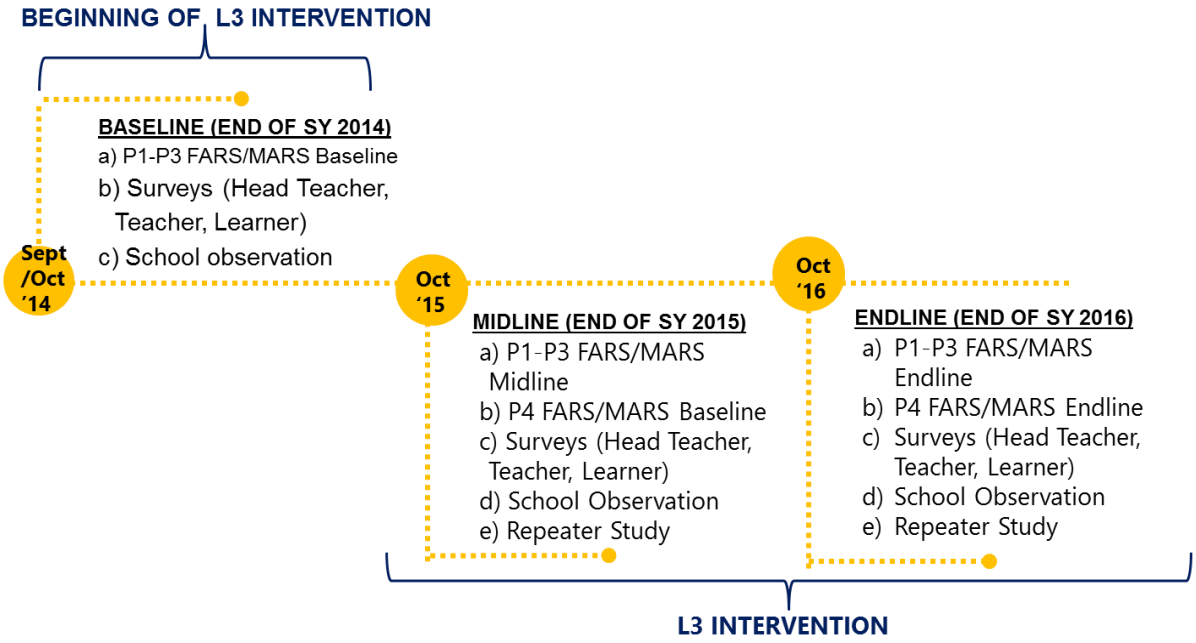
1. Include new instructional materials with positive images of girls and other marginalized groups
2. Provide additional supports and inputs to students in low-income and rural areas

APPENDIX B. METHODOLOGY

METHODOLOGY

The purpose of this evaluation study is to: 1) measure changes in P1-P3 learner achievement in reading and mathematics; 2) explore the relationship between P4 learner performance in oral reading fluency in Kinyarwanda and English; 3) collect data on the school and learning context, 4) explore whether variance in learner achievement is explained by contextual factors; and 5) explore to what extent repeating a grade impacts learner achievement.

The evaluation followed a quasi-experimental, cross-sectional design in which the same sample of schools and to the extent possible the same cohorts of learners were tracked over the life of the project. In order to document changes in P1-P4 learner achievement in reading and math over the course of the L3 Initiative, our evaluation was designed to collect learner, teacher and school data at three time periods (baseline, midline and endline). In 2014, before the full L3 intervention began, a comparison cohort of P1-P3 learners in a nationally representative sample of schools in Rwanda was assessed in reading (Kinyarwanda) and mathematics at the end of the school year. Each subsequent year, in 2015 and 2016, P1-P4 learners were assessed in reading and math to compare to baseline scores before the full L3 intervention rolled-out.[40] The figure below shows the timeline of evaluation activities for data presented in this report.



[40] In 2015 and 2016, assessment of P4 learners in English, Kinyarwanda and mathematics was added to data collection activities.

To measures learner's competencies in reading and math, grade-level oral reading and mathematics assessments were conducted in sample schools. Assessments were conducted in the language of instruction, which is Kinyarwanda in grades P1 through P3, and English in P4. The following tests are included in the assessment:

- **Oral Reading Fluency Assessment of Rwandan Schools (FARS)** includes a grade-level passage and five comprehension questions. This test measures oral reading fluency (speed and accuracy of reading) and comprehension of a grade-level text.
- **Mathematics Assessment of Rwandan Schools (MARS)** includes grade-level problems designed to measure grade-level procedural fluency.

The assessments were developed by a team of experts from REB and L3 and are based on a) international standards for testing and measuring learners' oral reading fluency in the early grades, b) on Rwandan[41] grade level standards in literacy and mathematics and c) Rwanda's Competence-based Curriculum.

Rwanda's Competence-based Curriculum

The FARS and MARS assessment instruments were developed to complement Rwanda's competence-based curriculum. In lower primary, the importance of oral reading fluency and reading comprehension skills are emphasized in the competence-based curriculum:

- At the end of P1, the child should be able to read capital and lower-case letters, words, and sentences or small paragraphs. (p 14)
- At the end of P2, the child should be able to read typed and handwritten words, sentences, and small paragraphs consisting of letters they have learned, plus common combinations of letters. (p 44)
- At the end of P3, the child should be able to read typed and handwritten words, sentences, medium-sized paragraphs, and simple stories in Kinyarwanda. (p 72)

The Rwandan 2016 Competence-based Curriculum identifies literacy and numeracy as basic competencies (important foundational skills that influence academic success across the school curriculum). The curriculum framework provides descriptors that detail the learning outcomes expected for literacy and numeracy competences. These include reading a variety of texts fast and accurately and computing accurately using the four mathematical operations. The FARS and MARS assessment instruments were developed to complement the curriculum and provide useful information on these learning outcomes as well as overall achievement levels in Rwanda. As part of the development process, REB officials and curriculum experts examined the FARS and MARS tools and made judgments about the appropriateness of each subtest for measuring the early reading and numeracy skills of Rwandan learners, as specified in the curriculum framework and standards and guidelines for

[41] Since 2012, the REB and L3 worked closely to create national reading performance standards for primary grades 3 and 5. A national assessment of P3 and P5 to validate those standards was conducted at the end of the 2012 school year. In 2014, this work continued with proposing reading standards for Primary 2 (P2) and validating them through national sample-based testing, which were approved in August 2015.

learning expectations. Similarly, the tests were reviewed and modified to reflect locally and culturally appropriate words and concepts. The assessments were extensively piloted through a number of pilot activities. Pilot testing helped ensure that the content included in the assessments were suitable for the target audience, culturally and age appropriate, clearly worded and aligned to the curriculum. The box above provides further information on Rwanda's Competence-based Curriculum.

To gather information on learner achievement, as well as to support the Rwandan Education Board (REB) in establishing a system of regular national assessments, L3 conducted annual assessments of learner achievement in literacy and mathematics during the project rollout stage (2014-2016) with a random sample of learners drawn from a nationally representative sample of schools. The assessment had the following main objectives:

1. Evaluate the outcomes of the L3 initiative[42]:
    a. Document changes in P1 – P3 learner achievement in oral reading fluency in Kinyarwanda against established benchmarks, and in mathematics on grade-level procedural fluency tasks after two years of national implementation of the L3 intervention.
    b. Given that the language of instruction changes from Mother-tongue (MT) to English in P4, document changes in and the relationship between P4 learner performance in oral reading fluency in Kinyarwanda and English.
2. Investigate factors impacting learner achievement:
    a. Analyze variance in learner achievement using school-level data, such as active SGACs, and classroom-level data such as teacher background characteristics, using instructional technology, teaching experience, etc.
    b. Analyze variance in learner achievement using learner background characteristics, such as parental literacy, support with homework at home, etc.
3. Analyze learner achievement among learners who repeated the same grade to establish to what extent repeating a grade impacts learner achievement.
4. Develop recommendations for L3 and REB with regard to support systems needed to accelerate improvements in learner achievement.

In addition to these L3-related objectives, the assessment also provides an opportunity to begin conversations about how nation-wide periodic assessments based on international standards can inform Education Sector Planning.

[42] The outcome evaluation is designed based on the principles of the impact attribution articulated in USAID Evaluation Policy (2011), and recommendations in the Technical Notes of the Education Strategy (2012, 2015). The comparison group, or counterfactual, for the project outcome is captured through the baseline conducted with the nationally representative sample of primary schools in October of 2014.

DATA COLLECTION TOOLS

The assessments were developed by a team of experts from the REB and L3 and are based on a) international standards for testing and measuring learners' oral reading fluency in the early grades, and b) on existing grade level standards in literacy and mathematics. The assessments were extensively piloted through a number of pilot activities. The first pilot activity took place in March of 2014 with a sample of 1,237 learners randomly selected from 62 schools from all districts in Rwanda. The results were documented in a detailed report[43]; after the initial pilot the assessment team made appropriate adjustments and revised tools, which were piloted again in July of 2014. All revisions were made in close collaboration with REB literacy and mathematics experts. The finalized assessment tools were used in the baseline assessment that took place in October of 2014 and again at endline in October 2016. Assessment items for P4 were piloted in 2015 with a sample of 240 learners randomly drawn from four schools. Given that the same FARS and MARS tests were used at baseline and endline, no equating of the results was necessary.

FLUENCY ASSESSMENT OF RWANDAN SCHOOLS (FARS) TOOLS

The REB and L3 experts worked collaboratively to develop reading tests for P1, P2, P3 and P4 reading assessment. The developed tests reflected emerging national standards for reading in the first three primary grades, since the testing was taking place at the end of the school year and was aligned with Rwanda's Competence-based Curriculum (see box below). The criteria used for the test development included the text genre, text structure, vocabulary, sentence structure, letter-sound combinations, length, content, and the type of comprehension questions. The development process involved three stages:

1. Convening of the expert group to develop three passages appropriate for the end of the Primary 1, Primary 2 and Primary 3 with 5 comprehension questions each (July 2014)
2. Pilot test the three passages with a sample of learners (July-August 2014)
3. Based on the results of the pilot test, select the final text (August 2014).

Summary of the text development criteria is provided in Table 23, and the full sets of criteria can be found in Table 28 at the end of the Methodology section. The end of Primary 1 was considered to correspond to Level 4, and the end of Primary 2 was considered to correspond to Level 9. Criteria for these levels were used to develop the reading tests.

[43] National Fluency and Mathematics Assessment Report, September 2014. Prepared by EDC for USAID.

TABLE 21. CRITERIA FOR DEVELOPING TEXTS IN KINYARWANDA

Criteria	P1 (Level 4)	P2 (Level 9)
Genre	Very simple narrative, familiar single theme; simple topic	Simple narrative; familiar themes; single idea or simple topic
Vocabulary	Familiar words	Familiar vocabulary; 1-3 syllables; nearly all high frequency words
Sentence structure	Simple sentence structure, short sentences, present tense.	Simple sentence structure; short and long sentences; present tense
Length (target)	15 words	35 words
Content	Simple structure; literal information	Simple structure; literal information
Comprehension questions	5 questions; literal questions, i.e., who, what, when, where, why	5 questions; literal questions, i.e., who, what, when, where, why

The timed portion of the FARS was timed at 60 seconds for the reading portion, which was followed by five comprehension questions. This was followed by the extended FARS, which was capped at 3 minutes (180 seconds). Data was collected electronically using tablets and processed using SurveyToGo software.

MATHEMATICS ASSESSMENT OF RWANDA SCHOOLS (MARS) TOOLS

MARS was developed and pilot-tested by L3 staff with the technical support from REB and EDC mathematics experts prior to the national baseline conducted in 2014. The tests were based on the results of an analysis of the Rwanda curriculum framework, mathematics teacher guides, and learning materials for the primary grades, to determine which mathematical concepts were pivotal for each grade. Selected concepts were then cross-referenced with the research-based international standards of teaching mathematics in early grades.

Each subtest included 10 tasks; each subtest was timed at 60 seconds at P1, P2, P3, and P4, for the entire MARS not to exceed 10 minutes in administration, per child, including introduction and conclusion. All MARS subtests included only numerical mathematics operations; students were not required to read to answer the mathematics problems. Data was collected electronically using tablets and processed using SurveyToGo software.

A reliability analysis of the MARS showed a strong reliability for all four MARS subtests. The subtest with the lowest item-total correlation was P4 Subtest 5 ("Comparing Numbers") which had the correlation coefficient of .282. These results show that students who are proficient in adding, subtracting, dividing and multiplying do not have the same level of proficiency when it comes to comparing fractions and decimal numbers, which is a competency they are supposed to acquire in Primary 4. However, other P4 MARS subtests as well as subtests in other grades relate strongly to each other.

TABLE 22. MARS RELIABILITY ANALYSIS

Subtests	MARS P1		MARS P2	
	Item-Total Correlation	Alpha if Item is Deleted	Item-Total Correlation	Alpha if Item is Deleted
Subtest 1	.759	.746	.719	.616
Subtest 2	.763	.743	.717	.632
Subtest 3	.634	.872	.522	.831
Cronbach's alpha	.847		.790	
Subtests	MARS P3		MARS P4	
	Item-Total Correlation	Alpha if Item is Deleted	Item-Total Correlation	Alpha if Item is Deleted
Subtest 1	.626	.813	.648	.742
Subtest 2	.617	.812	.702	723
Subtest 3	.734	.764	.667	.736
Subtest 4	.699	.776	.624	.751
Subtest 5*	Not included		.282	.835
Cronbach's alpha	.835		.801	

** Grades P1 and P2 MARS test included only three subtests; MARS P3 test included four and P4 included five subtests.*

Table 25 summarizes the subtests and how they are presented in the report.

TABLE 23. FARS AND MARS SUBTESTS

#	Description (Instrument)	P1 TEST TASKS Tasks	Max. Pts.	Timed
	FARS			
1A	Oral Reading Fluency	27-word passage	27	Yes (60 sec.)
1B	Reading Comprehension	5 questions	5	No (without text)
1C	Reading Comprehension	5 questions	5	No (with text, after extended time reading)
	MARS			
1	Adding Numbers	10 equations	10	Yes (60 sec.)
2	Subtracting Numbers	10 equations	10	Yes (60 sec.)
3	Comparing Numbers	10 equations	10	Yes (60 sec.)
#	**Description (Instrument)**	**P2 TEST TASKS Tasks**	**Max. Pts.**	**Timed**
	FARS			
1A	Oral Reading Fluency	42-word passage	42	Yes (60 sec.)
1B	Reading Comprehension	5 questions	5	No (without text)
1C	Reading Comprehension	5 questions	5	No (with text, after extended time reading)
	MARS			
1	Adding Numbers	10 equations	10	Yes (60 sec.)
2	Subtracting Numbers	10 equations	10	Yes (60 sec.)
3	Multiplying Numbers	10 equations	10	Yes (60 sec.)

P3 TEST TASKS				
#	Description (Instrument)	Tasks	Max. Pts.	Timed
		FARS		
1A	Oral Reading Fluency	58-word passage	58	Yes (60 sec.)
1B	Reading Comprehension	5 questions	6	No (without text)
1C	Reading Comprehension	5 questions	5	No (with text, after extended time reading)
		MARS		
1	Multiplying Numbers	10 equations	10	Yes (60 sec.)
2	Dividing Numbers	10 equations	10	Yes (60 sec.)
3	Adding Numbers	10 equations	10	Yes (60 sec.)
4	Subtracting Numbers	10 equations	10	Yes (60 sec.)

P4 TEST TASKS				
#	Description (Instrument)	Tasks	Max. Pts.	Timed
		FARS Kinyarwanda		
1A	Oral Reading Fluency	66-word passage	66	Yes (60 sec.)
1B	Reading Comprehension	5 questions	5	No (without text)
1C	Reading Comprehension	5 questions	5	No (with text, after extended time reading)
		FARS English		
1A	Oral Reading Fluency	56-word passage	56	Yes (60 sec.)
1B	Reading Comprehension	5 questions	5	No (without text)
1C	Reading Comprehension	5 questions	5	No (with text, after extended time reading)
		MARS		
1	Adding Numbers	10 equations	10	Yes (60 sec.)
2	Subtracting Numbers	10 equations	10	Yes (60 sec.)
3	Multiplying Numbers	10 equations	10	Yes (60 sec.)
4	Dividing Numbers	10 equations	10	Yes (60 sec.)
5	Comparing Numbers	10 numbers	10	Yes (60 sec.)

STUDENT CONTEXT INTERVIEW

In order to collect basic demographic data as well as information about a pupil's educational background and opportunities for reading, a student context interview was administered prior to administration of the FARS/MARS. The interview protocol included questions in the following subject areas: language(s) spoken at home and at school; household items; school absenteeism and lateness, availability of reading support at home from a parent or other adult or family member; and opportunities for reading in school. The student context interview provides potentially useful information. However, the information obtained must be

considered with care as it is based on self-reports of young children. Data were collected electronically using tablets and was processed using SurveyToGo software.

SCHOOL MONITORING FORM

The school's environment and management is critical to understanding the teaching and learning that is taking place in the school. The School Monitoring Form was designed to capture information on: 1) availability of L3 materials in schools, 2) the teaching and learning demographic, 3) the head teacher's background and characteristics, 4) school policies, practices, and monitoring, 5) the school environment, and 6) parent and community involvement. The survey was administered with 60 head teachers in sample schools at the time of data collection in October 2016. The survey data was collected on paper and processed in the SurveyToGo system.

SCHOOL OBSERVATION FORM

The school observation form captures data on the condition of school infrastructure (building infrastructure, classroom environment, availability of reading and writing materials, school library, safe spaces for children to play, etc.) in sample schools. School observations were conducted in all 60 sample schools on tablets and were processed using SurveyToGo software.

GRADE MONITORING FORM

The Grade Monitoring Form is a brief survey that is administered to P1-P3 Kinyarwanda teachers and P4 English teachers, as well as, P1-P4 mathematics teachers in sample schools. The survey captures data on teachers' use of L3 materials and technology, student attendance and repeaters, teacher's beliefs about teaching reading as well as satisfaction of teachers with school leadership and parental support. The survey was conducted in October 2016 with 470 P1, P2, P3 and P4 teachers in sample schools on paper and processed using the SurveyToGo system.

SAMPLING PARAMETERS

The sampling approach followed random clustered sampling method to obtain a nationally representative sample of non-private schools (public or government-aided schools only). The sample was determined based on the following assumptions:

- Type of analysis: logistic regression
- Alpha (probability of Type I error): .05/2 = .025. Alpha is divided by two because two separate measures are used by the test (fluency and comprehension)
- Power (probability of Type II error): 0.9, or 90 percent
- Expected effect size: 0.3 (moderate)
- Expected inter-class correlation (ICC, or roh): 0.1

Using Optimal Design cluster sampling software, the following sample size was computed:

- Number of clusters (schools) = 60
- Cluster size (number of students in a school, per each grade, per each gender) = 5 randomly selected boys and 5 randomly selected girls, 10 students in each grade, 40 students in each school.

Total sample size for each grade: 600 students. Total number of students: 2,400 in four grades.

SAMPLING PROCESS

The list of all government schools in Rwanda ("sampling frame") was obtained by L3 from REB in 2012. Early in 2014, the decision was made in collaboration with REB and USAID that the sample would be stratified by school district. Therefore, the key parameter used in drawing the sample was the school district as the stratification variable. To compensate for the difference in the number of schools in each district, weights were applied during the data analysis. The sampling of schools was conducted randomly (not targeted) and is fully representative of the universe of Rwandan schools. Sampling was conducted by the L3 M&E advisor in July of 2014 using the following inputs:

1. Sampling frame: list of all government schools in Rwanda. The list was obtained from REB by L3 staff in Excel format and was imported by the L3 M&E advisor into SPSS.
2. Sampling stratification: school district. Two schools per district were sample.

The sample was drawn by software without any human interference using the sampling frame provided by REB. The sample was drawn using the Complex Samples module of Statistical Package for the Social Sciences (SPSS). The selection of schools was conducted by the software from the sampling frame, based on the specified criteria (stratification levels). The L3 assessment team did not know the condition of the schools that were randomly selected by the software, nor were any technical staff involved in the selection process. The sampling approach followed random clustered sampling method to obtain a nationally representative sample of public or government-aided schools. The clustered sampling process involved randomly selecting 2 schools from each of the 30 districts in five provinces, with the total of 60 schools randomly selected. The same schools participated in the baseline, midline and endline assessments. Because there are a different number of districts in each province, the number of schools in a sample is also different in each province. To compensate for the fact that school districts are different in size, the results of the assessment were weighted during the data analysis. Applying post-stratification weights to the sample ensures that some provinces or school districts are not over or under-represented in the nation-wide estimates. Data on the population of total number of schools by district was used to construct the post-stratification weights at the school-level for the study sample. Distributions of schools across strata (district) were used to adjust the study sample to conform to the population's parameters using post-stratification weights.

For the learner sample, at baseline, P1-P3 learners were randomly selected to participate in the FARS/MARS assessment. Learners were tracked longitudinally to the extent possible. Longitudinally tracked P2, P3 and P4 learners who were absent on the day of midline and endline testing, dropped out or were found to be repeating the same grade were replaced with randomly selected learners of the same sex and grade as the missing ones. All P1 learners for the midline and endline assessments were randomly selected.

The tables below detail the sample of learners used in the report at baseline, midline and endline, as well as, provides detail on the sample by province and district at endline.

TABLE 24. LEARNER SAMPLE

Cohort	Number of schools	P1	P2	P3	P4	TOTAL
Baseline (SY'14)	60	599	600	600	---	**1799**
Midline (SY'15)	60	604	602	606	601*	**2413**
Endline (SY'16)	60	602	595	592	598	**2387**

*Baseline data for P4 was collected in 2015; endline data was collected in 2016 along with P1-P3

TABLE 25. NUMBER OF SAMPLED LEARNERS BY DISTRICT (2 SCHOOLS PER DISTRICT) AT ENDLINE

Province	District	Learners				
		P1	P2	P3	P4	TOTAL
Eastern	Bugesera	20	20	20	20	**80**
	Gatsibo	20	20	20	20	**80**
	Kayonza	20	20	20	20	**80**
	Kirehe	20	20	20	20	**80**
	Ngoma	20	20	20	20	**80**
	Nyagatare	19	20	20	20	**79**
	Rwamagana	20	20	20	20	**80**
Kigali City	Gasabo	20	20	20	20	**80**
	Kicukiro	20	20	20	20	**80**
	Nyarugenge	20	19	20	20	**79**
Northern	Burera	21	20	20	20	**81**
	Gakenke	21	21	20	21	**83**
	Gicumbi	20	20	20	21	**81**
	Musanze	20	20	20	20	**80**
	Rulindo	20	20	20	21	**81**
Southern	Gisagara	20	20	19	20	**79**
	Huye	20	20	20	20	**80**
	Kamonyi	20	20	19	19	**78**
	Muhanga	20	20	20	19	**79**
	Nyamagabe	20	19	19	20	**78**
	Nyanza	20	20	20	20	**80**

	Nyaruguru	20	17	18	20	**75**
	Ruhango	20	20	18	17	**75**
	Karongi	20	20	20	21	**81**
	Ngororero	20	19	20	20	**79**
	Nyabihu	21	20	20	20	**81**
Western	Nyamasheke	20	20	19	20	**79**
	Rubavu	20	20	20	20	**80**
	Rusizi	20	20	20	19	**79**
	Rutsiro	20	20	20	20	**80**
TOTAL		**602**	**595**	**592**	**598**	**2387**

In each visited school, the Head Teacher was asked to complete the School Survey Form to collect contextual information that could help explain variation in learner results across schools. In addition to that, 470 teachers selected from P1, P2, P3 and P4 classrooms completed a Grade Monitoring Form.

DATA ANALYSIS

Collecting FARS/MARS data electronically eliminated the need for data entry. L3 M&E staff cleaned the data sets and analyzed using standard statistical techniques such as univariate and bivariate statistics as needed for different analytical purposes. The results were disaggregated by sex, and grade, as appropriate. Univariate and multivariate statistical analyses for were conducted. Central tendency analysis (e.g. mean, median) were conducted for continuous demographic variables. Comparison of means statistical tests (independent samples t-test) were conducted to estimate differences between groups such as cohort and sex, where appropriate. Additionally, effect size (Cohen's d) calculations were calculated to assess magnitude of difference between cohort (baseline and endline) and sex.

For the analysis of the FARS data, we used the words correct per minute (wcpm) score as the main fluency measure, which was calculated as follows:

WCPM = (Words Read Correctly / Number of Seconds Used) x 60

For instance, if a student read 10 words correctly from the text and used 30 out of the 60 seconds, their rate would be 20 correct words per minute: WCPM = (10 / 30) x 60 = 20. MARS data analysis is presented both by section and by total scores across the sections.

Results from the student context survey and the demographics section were used for the bivariate analysis of student-level results. Composite variables were constructed for each of the three sections of the context survey and used in the bivariate analysis.

LIMITATIONS OF DESIGN

The assessment had some limitations. In cross-sectional designs, major threats to validity[44] involve selection-history (when other events occur between cohorts that may impact one group but not the other), selection-instrumentation (when the test used with cohorts is slightly different), and selection-mortality (when there is a different rate of dropout in different tested cohorts, for whatever reason). While it is possible to control for the selection-instrumentation bias by extensive pilot testing, other two threats relate to the passage of time and external events outside of control or knowledge of the study team. It is therefore unknown to what extent external factors may impact different cohorts.

Other limitations originate from the assessment's sampling strategy. First, the sample size was designed to provide national estimates of literacy and mathematics achievement of P1, P2 and P3 students. While the sample was stratified by district to ensure adequate representation of students from all regions of the country, the province-level or district-level sub-samples are not large enough to be treated as separate samples. A much larger sample size would be required to enable such analyses.

Finally, a limitation was the timing of the assessment. While the baseline assessment was conducted in September of 2014, the endline assessment was conducted in October, almost a full month later. It is likely that the results are slightly skewed toward higher scores due to this difference.

[44] W. Trochim, Research Methods Knowledge Base. Cornell University, 2006.

TABLE 26. CRITERIA FOR FARS DEVELOPMENT: CHARACTERISTICS OF TEXTS ACCORDING TO THE LEVEL OF DIFFICULTY

Level	Presentation of the text	Illustrations	Length	Choice of words	Syntax	Style
0	• Simple presentation • Writing is separate from illustration • Text on 1 page, illustration on the other • Text is always in the same place on the page	• Direct link between the text and the illustration • Each idea is illustrated • There is more space for the illustration than for the text	• 1 to 3 words per line • 1 line per page • 16 to 24 words • About 8 pages	• Only familiar and frequent words • Simple vocabulary that is frequently used orally	• Word or group of words	• Predictable structure • Repetitive structure (pattern book) • A single idea is presented • Lists of things or actions
1	• Simple presentation • Writing is separate from illustration • Text is always in the same place on the page	• Direct link between the text and the illustration • Each idea is illustrated • About 8 pages	• 2 to 5 words per line • 1 to 2 lines per page • 21 to 40 words • About 8 pages	• Only familiar and frequent words • Simple vocabulary that is frequently used orally	• Declarative sentences • Simple sentences (S-V-C) • Verbs are in the simple present tense	• Predictable structure • Repetitive structure (pattern book) • A single idea is presented
2	• Simple presentation • Writing and illustrations are sometimes on the same page • Text is always in the same place on the page	• Direct link between the text and the illustration • Each idea is illustrated • There is more space for the illustration than for the text	• 3 to 8 words per line • 1 to 2 lines per page • 30 to 55 words • About 8 pages	• Only familiar and frequent words • Simple vocabulary that is frequently used orally	• Declarative and/or exclamatory sentences • Simple sentences (S-V-C) • Verbs are in the simple present tense of the indicative or the imperative	• Predictable structure • Repetitive structure (pattern book) • Story structure (beginning, middle and end) • Narrative or informative text • Some dialogues
3	• Simple presentation • Writing and illustrations are sometimes on the same page • Text is always in the same place on the page	• Direct link between the text and the illustration • Each idea is illustrated • There is more space for the illustration than for the text	• 5 to 8 words per sentence • 1 to 2 lines per page • 50 to 80 words • About 8 pages	• Only familiar and frequent words • Simple vocabulary that is frequently used orally	• Declarative and/or exclamatory sentences • There can be some interrogative and negative sentences • Simple sentences (S-V-C) • Verbs are in the simple present tense of the indicative or the imperative	• Predictable structure • Repetitive structure (pattern book) • Story structure (beginning, middle and end) • Narrative or informative text • Dialogues
4	• Simple presentation • Writing and illustrations are sometimes on the same page • Text location may vary • Sentences continue one more than one line • Each new sentence begins on a new line	• Direct link between the text and the illustration • More than one idea or action is contained in the illustration • There is more space for the illustration than for the text	• 5 to 8 words per sentence • 2 to 3 lines per page • 75to 100 words • About 8 to12 pages	• Mostly familiar and frequent words • Simple vocabulary • Text includes 1 to 3 new words not present in child's oral vocabulary	• Declarative and/or exclamatory sentences • There can be some interrogative and negative sentences • Simple sentences (S-V-C) • Verbs are in the simple present tense of the indicative or the imperative	• Story structure (beginning, middle and end) • Only one theme is presented • Narrative or informative text • Dialogues

Level	Presentation of the text	Illustrations	Length	Choice of words	Syntax	Style
					• There may be verbs on the present continuous	
5	• Simple presentation • Writing may be presented in "talking bubbles" • Text is separate from illustrations (except for "talking bubbles") • Text location may vary • Sentences continue one more than one line • Each new sentence begins on a new line	• Direct link between the text and the illustration • More than one idea or action is contained in the illustration • There is more space for the illustration than for the text	• 5 to 11 words per sentence • 2 to 5 lines per page • 75to 130 words • About 8 to12 pages	• Mostly familiar and frequent words • Simple vocabulary • Text includes some new words not present in child's oral vocabulary	• Declarative and/or exclamatory sentences • There can be some interrogative and negative sentences • Simple sentences (S-V-C) • Verbs are in the simple present or continuous present tense of the indicative or the imperative • There can be verbs in the past or the future tense	• Story structure (beginning, middle and end) • Only one theme is presented with several events • Narrative or informative text • Dialogues
6	• Simple presentation • Writing may be presented in "talking bubbles" • Text is separate from illustrations (except for "talking bubbles") • Text location may vary • Font reduced and easy to see • Sentences continue one more than one line • Each new sentence begins on a new line	• The illustration supports the text • The illustration takes up several ideas in the text • The meaning of the story is more in the text than in the illustration	• 2 to 12 words per sentence • 3 to 5 lines per page • 130 to 180 words • About 8 to16 pages	• Mostly familiar and frequent words • Simple vocabulary • Text includes some new words not present in child's oral vocabulary	• Declarative and/or exclamatory sentences • There can be some interrogative and negative sentences • Simple sentences (S-V-C) • Verbs are in the simple present, present continuous, past and/or future tense of the indicative or present of the imperative •	• Story structure (beginning, middle and end) • Only one theme is presented with several events • Narrative or informative text • Dialogues
7	• Simple presentation • Writing may be presented in "talking bubbles" • Text is separate from illustrations (except for "talking bubbles") • Text location may vary • Font reduced and easy to see • Sentences continue one more than one line • Each new sentence begins on a new line	• The illustration supports the text • The illustration takes up several ideas in the text • The meaning of the story is more in the text than in the illustration	• 4 to 12 words per sentence • 3 to 8 lines per page • 120 to 200 words • About 8 to16 pages	• Mostly familiar and frequent words • Simple vocabulary • Text includes some new words not present in child's oral vocabulary	• Declarative and/or exclamatory sentences • There can be some interrogative and negative sentences • Simple sentences (S-V-C) • Verbs are in the present, present continuous, past and/or future tense of the indicative or present of the imperative •	• Story structure (beginning, middle and end) • Only one theme is presented with several events • Narrative or informative text • Dialogues
8	• Simple presentation • Writing may be presented in "talking bubbles"	• The illustration supports the text but only in part • The illustration takes up several ideas in the text	• Average 7to 8 words per sentence	• Some familiar and frequent words • Some vocabulary is a little more complex	• Declarative and/or exclamatory sentences	• Story structure (beginning, middle and end)

Level	Presentation of the text	Illustrations	Length	Choice of words	Syntax	Style
	• Text is separate from illustrations (except for "talking bubbles") • Text location may vary • Font reduced and easy to see • Sentences continue one more than one line • Each new sentence begins on a new line	• The meaning of the story is more in the text than in the illustration	• 4 to 9 lines per page • 180 to 270 words • About 8 to16 pages	• Text includes some new words not present in child's oral vocabulary	• There can be some interrogative and negative sentences • Simple sentences (S-V-C) • Verbs are in the present, present continuous, past and/or future tense of the indicative or present of the imperative •	• Only one theme is presented with several events • Narrative or informative text • Dialogues
9	• Simple presentation • Writing may be presented in "talking bubbles" • Text is separate from illustrations (except for "talking bubbles") • Text location may vary • Font reduced and easy to see • Sentences continue one more than one line • Each new sentence begins on a new line • There are some pages that contain only text	• The illustration offers a weak to moderate support to the text • The illustration takes up several ideas in the text • The illustration lengthens the text by adding detail • The illustration promotes an interpretation of the story • The meaning of the story is more in the text than in the illustration	• Average 9 words per sentence • 4 to 10 lines per page • 250 to 320 words • About 8 to16 pages	• Some familiar and frequent words • Some vocabulary is a little more complex • New specific vocabulary linked to the context • Text includes some new words not present in child's oral vocabulary	• Declarative and/or exclamatory sentences • There can be some interrogative and negative sentences • Simple sentences (S-V-C) • Verbs are in the present, present continuous, past and/or future tense of the indicative or present of the imperative •	• Story structure (beginning, middle and end) • Only one theme is presented with several events • Narrative or informative text • Dialogues
10	• Simple presentation • Writing may be presented in "talking bubbles" • Text is separate from illustrations (except for "talking bubbles") • Text location may vary • Font reduced and easy to see • Sentences continue one more than one line • Each new sentence begins on a new line • There are short paragraphs	• The illustration offers a weak to moderate support to the text • The illustration takes up several ideas in the text • The illustration lengthens the text by adding detail • The illustration promotes an interpretation of the story • The meaning of the story is more in the text than in the illustration	• Average 9 words per sentence • 4 to 12 lines per page • 300 to 400 words • About 14 to16 pages	• Some familiar and frequent words • Some vocabulary is a little more complex • New specific vocabulary linked to the context • Text includes some new words not present in child's oral vocabulary	• Declarative and/or exclamatory sentences • There can be some interrogative and negative sentences • Simple sentences (S-V-C) • Verbs are in the present, present continuous, past and/or future tense of the indicative or present of the imperative •	• Story structure (beginning, middle and end) • Story with multiple episodes links to a single plot line • Narrative or informative text • Dialogues
11	• Simple presentation • Writing may be presented in "talking bubbles"	• The illustration offers a weak to moderate support to the text	• Average 8 to 10 words per sentence	• Some familiar and frequent words	• Declarative and/or exclamatory sentences	• Story structure (beginning, middle and end)

Level	Presentation of the text	Illustrations	Length	Choice of words	Syntax	Style
	• Text is separate from illustrations (except for "talking bubbles") • Text location may vary • Font reduced and easy to see • Sentences continue one more than one line • Each new sentence begins on a new line • There are short paragraphs	• The illustration summarizes the main idea of the text • The illustration promotes an interpretation of the story • The meaning of the story is more in the text than in the illustration	• 4 to 14 lines per page • 350 to 460 words • About 14 to16 pages	• Some vocabulary is a little more complex • New specific vocabulary linked to the context • Text includes some new words not present in child's oral vocabulary	• There can be some interrogative and negative sentences • Simple sentences (S-V-C) • Verbs are in the present, present continuous, past and/or future tense of the indicative or present of the imperative	• Story with multiple episodes links to a single plot line • Narrative or informative text • Dialogues
12	• Simple presentation • Writing may be presented in "talking bubbles" • Text is separate from illustrations (except for "talking bubbles") • Text location may vary • Font reduced and easy to see • Sentences continue one more than one line • Each new sentence begins on a new line • There are short paragraphs	• The illustration offers a weak to moderate support to the text • The illustration summarizes the main idea of the text • The illustration promotes an interpretation of the story • The meaning of the story is more in the text than in the illustration	• 4 to 14 lines per page • 420 to 600 words • About 16 to 20 pages	• Some familiar and frequent words • Some vocabulary is a little more complex • New specific vocabulary linked to the context • Text includes some new words not present in child's oral vocabulary	• Declarative and/or exclamatory sentences • There can be some interrogative and negative sentences • Simple sentences (S-V-C) • Verbs are in the present, present continuous, past and/or future tense of the indicative or present of the imperative	• Story structure (beginning, middle and end) • Story with multiple episodes links to a single plot line • Narrative or informative text • Dialogues • Longer text with simple sentence structures to facilitate extended reading

APPENDIX C. DATA COLLECTION

Teams of REB staff and trained external data collectors with support from L3 M&E specialists administered the FARS/MARS to the sample of students. Data collectors were identified by REB and trained by L3 staff in October of 2016 in Kigali. The training was designed to standardize the administration of the tools and increase the reliability of the assessment. It began with orienting the data collectors to the study and reviewing the fluency and mathematics instruments. Because the data were collected electronically, data collectors were trained how to use tablets. A significant portion of the training time was devoted to practice using the tools, both in the training environment and in schools.

To measure how well individual administrators graded the sub-tests similarly, inter-rater reliability (IRR) exercises were conducted during the training. All administrators took part in IRR exercises. During the group role play, administrators scored the mock child respondent and the trainer noted the variances in the scores for each of the subtests. The mean ICC score was .970, with a median of .991, which is very strong reliability. Administrators with consistent discrepancies were given additional training, monitoring and support. Items with larger discrepancies were furthered reviewed with the larger group during practice sessions. In addition, during the practice testing with actual children, two administrators were paired together to score the same child respondent. Each administrator scored the respondent separately. At the end of the testing, the administrators compared scoring data and discussed discrepancies with the oversight of the trainers. Overall, average IRR calculations with actual children showed very strong reliability among data collectors of .997 and a median of .999.

During actual data collection, teams of five L3-trained data collectors traveled to five provinces; each team was supervised by an experienced team leader who supervised data collection. Since the data capture was done electronically, daily data checks were conducted by the L3 M&E Advisor to ensure high quality of data. Data checks included timer data, duration of administration, time of start and time of finish of each assessment. Completeness of the data and the accuracy of timers were ensured by the software used for the assessment.

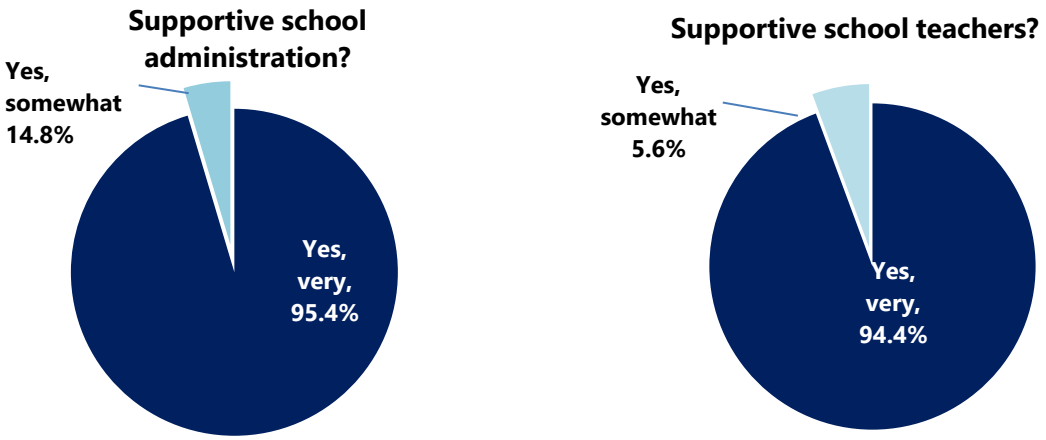
Data were then collected from the same 60 sampled schools

that participated in the baseline. Teams of data collectors collected data at the same time, between October 10 and October 31 of 2016. All FARS/MARS data were collected electronically, using tablets with SurveyToGo software in which FARS and MARS were programmed. All timed tasks were implemented automatically to reduce the possibility of an error.

All testing was implemented in Kinyarwanda in P1-P3, and in Kinyarwanda and English in P4. The entire assessment took between 4 and 40 minutes, with the average time of 15 minutes per child.

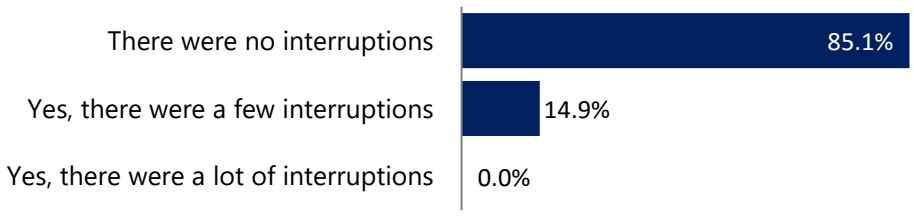
Assessors were asked whether schools and teachers were supportive of data collection. The majority of assessors reported that the school administration and teachers were very supportive of data collection. When asked about school administration specifically, 95% of assessors reported that administrators were very supportive, with 5% indicating administrators were somewhat supportive. School teachers were rated as very supportive of data collection by 94% of assessors, with 6% saying that teachers were somewhat supportive. No assessors reported that school administrators or teachers were not supportive.

FIGURE 82. SCHOOL/TEACHER ARE SUPPORTIVE OF DATA COLLECTION (N=195)



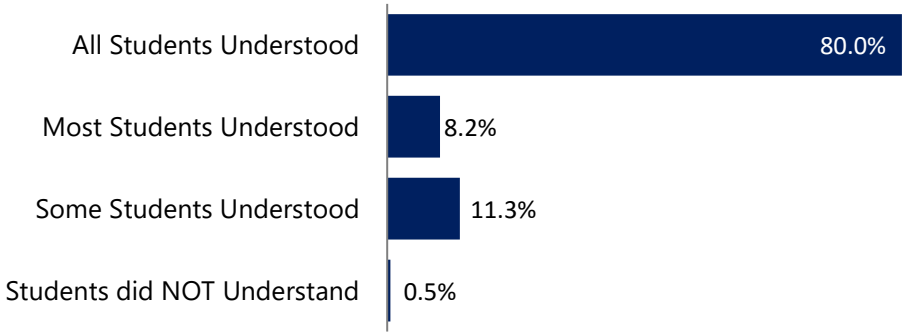
The majority of assessors reported that they were able to conduct interviews without interruptions by teachers or other learners walking into the room where the assessment was being conducted. While 85.1% indicated experiencing no interruptions, 14.9% experienced a few interruptions.

FIGURE 83. ASSESSMENTS WERE CONDUCTED WITH FEW INTERRUPTIONS (N=195)



Assessors were asked whether the students they assessed were able to understand the language that they were speaking. While 80% of assessors said that all or most of the students were able to understand the language they were speaking, 8% indicated that only some students were able to understand the language, and 11% stated that the students were not able to understand the language in which they were speaking.

FIGURE 84: PERCENT OF STUDENTS WHO UNDERSTOOD THE LANGUAGE THE ASSESSOR USED (N=195)



Assessors were also asked whether they experienced problems during data collection. The majority of assessors reported that they did not experience any problems during data collection at the sample schools. The most common problems assessors faced disruptions during assessments by other students, delays due to the rain or examinations being given in schools, and the absence of key teachers or administrators.

APPENDIX D. DATA COLLECTION TOOLS

STUDENT CONTEXT SURVEY

1. Is this your first year in this grade? Ni ubwa mbere wiga muri uyu mwaka?	a. Yes/Yego b. No, I am repeating this grade/ Oya, nasibiye muri uyu mwaka c. No response/Nta gisubizo
2. What language(s) do you speak at home? (select all that apply) Mu rugo iwanyu muvuga uruhe rurimi?	a. Kinyarwanda b. Kirundi c. Urukiga d. Amashi e. French f. English g. Swahili h. Arabic i. Other
3. At home, does someone read a story to you? Mu rugo bajya bagusomera inkuru cyangwa bagucira umugani?	a. Yes/Yego b. No/Oya c. Don't know/Simbizi
4. Who helps you to read at home? Ninde ugufasha gusoma mu rugo?	a. Father / Papa b. Mother/ Mama c. Brother/sister / Mukuru cyangwa mushiki d. Nobody/ Ntawe
5. Who listens to you when you read at home? Ninde ukumva/ ugutega amatwi iyo urimo usoma mu rugo?	a. Father / Papa b. Mother/ Mama c. Brother/sister / Mukuru cyangwa mushiki d. Nobody/ Ntawe
6. Do you see your mother (or main caregiver) reading books or newspapers? Ujya ubona mama wawe cyangwa undi ukurera asoma igitabo cyngwa ikinyamakuru?	a. Yes/yego b. No/oya c. My mother does not know how to read (Mama wanjye/undera ntazi gusoma) d. No response/Nta gisubizo
7. How often do you miss school? Ni kangahe ujya usiba ishuli?	a. A lot (Kenshi) b. Sometimes (Rimwe na rimwe) c. Rarely (Gacye) d. Never (Ntanarimwe)
8. How often are you late for school?	a. A lot (Kenshi)

Ni kangahe ukererwa ishuli?	b. Sometimes (Rimwe na rimwe) c. Rarely (Gacye) d. Never (Ntanarimwe)
9. Why are you missing school or late for school? (select all that apply) Vuga impamvu usiba/ucyererwa ishuli?	a. Need to do chores (Gukora imirimo yo mu rugo) b. Go to market (Kuntuma ku isoko) c. Go work in the field (gukora mu murima) d. Waiting to eat (Gutegereza kurya) e. Long distance to school (Urugendo rurerure kugera ku ishuli) f. Want to play with my friends (Mba nkina n'inshuti zanjye) g. Help care for other children (Kurera barumuna banjye) h. Sick/not feeling well (Ntabwo meze neza. Ndarwaye) i. Sleep (kuryama) j. Other (Ikindi) k. No response (Nta gisubizo)
10. Have you or any of your siblings ever repeated a grade? Wowe se cyangwa muri bakuru bawe hari uwigeze asibira mu mwaka?	a. Yes/yego b. No/oya c. I don't know/Simbizi d. No response/Nta gisubizo
11. At home, which of the following do your parents expect you to do regularly? (tick all that apply) Mu rugo iwanyu, ni iki muri ibi bikurikira ababyebi bawe bagusaba gukora kenshi? (Hitamo igisubizo/ibisubizo)	a. Help with household chores/Gufasha mu mirimo yo mu rugo b. Go to market/Kuntuma ku isoko c. Go work in the field/Gukora mu murima d. Study/Kwiga e. Help with other children in the family/Kurera barumuna banjye f. Other/Ikindi g. No response/Nta gisubizo
12. Do your parents/caregivers want you to go to school every day? Ese ababyeyi bawe/abakurera bifuza ko ujya ku ishuli buri munsi?	a. Yes/yego b. No/oya c. No response/Nta gisubizo
13. Do your parents/caregivers check your homework? Ababyeyi bawe/abakurera bajya bagenzura umukoro wawe?	a. Yes, every time/ Yego, buri gihe b. Yes, sometimes/ Yego rimwe na rimwe c. No, they do not check/ Oya, ntabwo bawugenzura
14. What do you like about school? (ask without reading the list) (tick all that apply) Ni iki ukunda kigendanye n'ishuli?	a. Being with other students/Kuba hamwe nabandi banyeshuri b. I like how we are taught by our teachers/Nkunda uko abarimu batwigisha

	c. Playing/Gukina d. Studying Kinyarwanda/Isomo ry'ikinyarwanda e. Studying Math/Isomo ry'imibare f. Studying English/Isomo ry' icyongereza g. Studying French/Isomo ry'igifaransa h. Studying science/Isomo ry'ubumenyi i. Reading books/Gusoma ibitabo j. Writing/Kwandika k. School environment/Imiterere y'ishuli l. Other/Ikindi m. Everything n. Nothing o. No response/Nta gisubizo
15. What do you NOT like about school? (select all that apply) Ni iki udakunda ku bigendanye n'ishuli?	a. Dirty school environment/Umwanda ku ishuli b. Disputes among children/Impaka/guharira kw'abandi bana c. Disturbances in class by students/Gusakuza kw'abanyeshuri d. Corporal punishments given by teachers/Ibihano mpabwa n'abarimu e. Fighting and abuse by other students/Abana barwana f. Do not like studying Math/Kwiga imibare g. Do not like studying English/Kwiga icyongereza h. Do not like studying Kinyarwanda/Kwiga ikinyarwanda i. Do not like studying some lessons/Kwiga amasomo amwe namwe j. Indiscipline of some students/Abana bagira ikinyabupfura gicye k. Other/ikindi l. Everything m. Nothing n. No response/Nta gisubizo
16. Does your math teacher check your work that you do in class? Mwarimu w'imibare ajya areba imyitozo ukorera mu ishuli?	a. Yes/yego b. No/oya c. No response/Nta gisubizo
17. Does your math teacher check/mark your homework? Mwarimu w'imibare ajya areba/akosora umukoro wawe?	a. Yes/yego b. No/oya c. No response/Nta gisubizo

18. Does your Kinyarwanda teacher check your work that you do in class? Mwarimu w'ikinyarwanda ajya areba imyitozo ukorera mu ishuli?	a. Yes/yego b. No/oya c. No response/Nta gisubizo
19. Does your Kinyarwanda teacher check/mark your homework? Mwarimu w'icyinyarwanda ajya areba/akosora umukoro wawe?	a. Yes/yego b. No/oya c. No response/Nta gisubizo
20. Do you ask questions when you don't understand something? Ese mu ishuli iyo hari ibyo utumvise, urabaza?	a. Yes, I ask the teacher/ Yego mbaza mwalimu b. Yes, I ask other students/ Yego, mbaza abandi banyeshuli c. No, I don't ask/ Oya, ntabwo mbaza d. No response/Nta gisubizo
21. At school, can you choose which stories to read? Ese ujya uhabwa amahirwe yo kwihitiramo inkuru usoma uri mu ishuli?	a. Yes/yego b. No/oya c. No response/Nta gisubizo
22. Are you allowed to take books home from school? se gutahana ibitabo mu rugo uvanye ku ishuli?	a. Yes/yego b. No/oya c. No response/Nta gisubizo
23. Do you ever take books from school to read at home? Ujya utahana ibitabo ubivanye ku ishuli byo gusomera mu rugo?	a. Yes/yego b. No/oya c. No response/Nta gisubizo
24. Do you usually go to borrow books to read? Ujya ujya gutira ibitabo byo gusoma	a. Yes/Yego b. No, I don't like to borrow books/ Oya. Ntabwo nkunda gutira ibitabo c. No, I don't have somewhere to borrow books/ Oya, Nta hantu nabona ntira ibitabo
25. Did you have something to drink today (like water, tea, milk or juice)? Waje ku ishuli hari icyo unyweye?	a. Yes/yego b. No/oya c. No response/Nta gisubizo
26. Did you have something to eat today, like potatoes, rice, bread or beans? Waje ku ishuli hari icyo uriye?	a. Yes/yego b. No/oya c. No response/Nta gisubizo
27. In your family, does anyone have a radio or cell phone at home?	a. Yes/Yego b. No/Oya c. Don't know/Simbizi

Mu rugo iwanyu mufite iradiyo cyangwa terefoni?	
28. What light do you have at home? Mu rugo iwanyu mucana iki?	a. Candles/buji b. Electric lamp/Amashanyarazi c. Paraffin lamp/Itara rya peterore d. Solar panel lamp/Ingufu z'izuba e. Biogas lamp/biyogaze f. Rechargeable torch/ Itoroshi g. Other/Ikindi
29. Does anyone at your house have a bicycle/motocycle or a car? Ese mu rugo iwanyu hari uwaba atunze igare/ipikipiki/imodoka?	a. Yes/Yego b. No/Oya c. Don't know/Simbizi

P1 ASSESSMENT

ASSESSMENT INFORMATION SHEET

A. Assessor's Name	
B. Date of Assessment	
C. Province:	
D. School District:	
E. School Name:	
F. Student's Name:	Family name_____ Other names_____
G. Student's Oldest Sibling's First Name[45]:	
H. Student's Age:	[number of full years]
I. Student's Gender	○ Boy ○ Girl
J. Consent	○ Yes ○ No
K. Student's Class	○ P1 ○ P2 ○ P3 ○ P4
Please enter this student's teachers' names:	Kinyarwanda teacher's name: _____ Math teacher's name: _____

[45] If the student IS the oldest child in the family, write down "self".

FARS Task 1a: Oral Reading Fluency	**TEXT A** 60 seconds

🗣Ngiye kugusaba gusoma inkuru. Ugerageze gusoma cyane.

Uriteguye dutangire?

Ngaho tangira

Mahoro na Kagabo

Mahoro yagiye ku isoko guhaha ariko arayoba. Nuko asubira mu rugo arira. Yahuye na Kagabo amusaba kumuyobora. Kagabo aramuherekeza amugeza ku isoko. Nuko Mahoro ataha anezerewe cyane.

Task 1b: Reading Comprehension

🗣Noneho ngiye kukubaza ibibazo kur'iyi nkuru umaze gusoma

Questions ***(Correct Answer)***	Correct	Incorrect	No answer	Not Attempted
1. Mahoro yari agiye he? (Ku isoko)				
2. Ni iki cyarijije Mahoro? (Nuko yayobye)				
3. Mahoro yahuye na nde ubwo yari amaze kuyoba? (Yahuye na Kagabo)				
4. Kagabo yafashije iki Mahoro? (Yaramuherekeje amugeza ku isoko)				
5. Mahoro yatashye ameze ate? (Yishimye/anezerewe cyane)				
			Number of correct answers	

FARS Task 1c: SECOND READING - Oral Reading Fluency	**TEXT A**	180 seconds (3 MIN)

🗣Ngiye kugusaba gusoma inkuru. Ugerageze gusoma cyane.

Uriteguye dutangire?

Ngaho tangira

Mahoro na Kagabo

Mahoro yagiye ku isoko guhaha ariko arayoba. Nuko asubira mu rugo arira. Yahuye na Kagabo amusaba kumuyobora. Kagabo aramuherekeza amugeza ku isoko. Nuko Mahoro ataha anezerewe cyane.

Task 1d: SECOND READING- Reading Comprehension

🗣Noneho ngiye kukubaza ibibazo kur'iyi nkuru umaze gusoma

Questions ***(Correct Answer)***	Correct	Incorrect	No answer	Not Attempted
1. Mahoro yari agiye he? (Ku isoko)				
2. Ni iki cyarijije Mahoro? (Nuko yayobye)				
3. Mahoro yahuye na nde ubwo yari amaze kuyoba? (Yahuye na Kagabo)				
4. Kagabo yafashije iki Mahoro? (Yaramuherekeje amugeza ku isoko)				
5. Mahoro yatashye ameze ate? (Yishimye/anezerewe cyane)				
			Number of correct answers	

MARS Task 1: Adding Numbers	**Sheet A**	60 seconds

Dore indi myitozo yoguteranya turibukore [glide hand from left to right].

Ngiye kwifashisha iyisaha ibara. Ngaho kora imibare myinshi uko ushoboye.

Niba utazi igisubizo, jya kukibazo gikurikiyeho. Uriteguye? . . .

- Tangirira aha [point to first problem].

Write: **1 = Correct.**
0 = Incorrect or no response
[ ] After last problem attempted

1.	2 + 7 =	(9)
2.	1 + 3 =	(4)
3.	3 + 2 =	(5)
4.	4 + 5 =	(9)
5.	2 + 4 =	(6)
6.	1 + 2 =	(3)
7.	3 + 4 =	(7)
8.	7 + 3 =	(10)
9.	1 + 6 =	(7)
10.	6 + 4 =	(10)

Total correct: _____/10

Task 2: Subtracting Numbers	**Sheet B**	60 seconds

Dore indi myitozo yo guteranya turi bukore [glide hand from left to right].

Ngiye kwifashisha iyi saha ibara. Ngaho kora imibare myinshi uko ushoboye.

Niba utazi igisubizo, jya ku kibazo gikurikiyeho. Uriteguye? . . .

- Tangirira aha [point to first problem].

Write: **1 = Correct.**
0 = Incorrect or no response
[ ] After last problem attempted

1.	7 - 4 = (3)	
2.	9 - 5 = (4)	
3.	5 - 2 = (3)	
4.	3 - 2 = (1)	
5.	8 - 4 = (4)	
6.	6 - 5 = (1)	
7.	9 - 7 = (2)	
8.	10 - 3 = (7)	
9.	8 - 3 = (5)	
10.	9 - 4 = (5)	

Total correct: _____/10

Task 3: Comparing numbers	**Sheet C**	60 seconds

Reba kuri buri tsinda ry' imibare ikurikira. Muri buri tsinda, umubare munini ni uwuhe?

Ngiye kwifashisha iyisaha ibara. Ngaho kora imibare myinshi uko ushoboye.

Niba utazi igisubizo, jya kukibazo gikurikiyeho. Uriteguye? . . .

- Tangirira aha [point to first problem].

Circle: **1 = Correct.**

0 = Incorrect or no response

[ ] After last problem attempted

6	**8**	
10	**18**	
53	44	
82	**91**	
79	**80**	
63	56	
25	16	
54	**62**	
61	59	
24	13	

Total correct: _____/10

P2 ASSESSMENT

ASSESSMENT INFORMATION SHEET

A. Assessor's Name:	
B. Date of Assessment :	
C. Province:	
D. School District:	
E. School Name:	
F. Student's Name:	Family name_____ Other names_____
G. Student's Oldest Sibling's First Name[46]:	
H. Student's Age:	[number of full years]
I. Student's Gender	○ Boy ○ Girl
J. Consent	○ Yes ○ No
K. Student's Class	○ P1 ○ P2 ○ P3 ○ P4
Please enter this student's teachers' names:	Kinyarwanda teacher's name: _____ Math teacher's name: _____

[46] If the student IS the oldest child in the family, write down "self".

FARS Task 1a: Oral Reading Fluency	**TEXT A** 60 seconds

🗣Ngiye kugusaba gusoma inkuru. Ugerageze gusoma cyane.

Uriteguye dutangire?

Ngaho tangira

Kanyange yamenye gusoma
Kanyange yiga mu mwaka wa kabiri. Akunda gusoma no kwandika. Yamenye gusoma inyuguti, amagambo n'interuro. Yamenye gusoma no kwandika udukuru. Kanyange afata ibikoresho by'ishuri neza kandi akabigirira isuku. Buri munsi atahana igitabo cyo gusomera mu rugo. Buri mugoroba, akora umukoro mwarimu yamuhaye.

Task 1b: Reading Comprehension

🗣Noneho ngiye kukubaza ibibazo kur'iyi nkuru umaze gusoma

Questions	Correct	Incorrect	No answer	Not Attempted
1. Ni nde uvugwa mu mwandiko? (Kanyange)				
2. Kanyange yiga mu mwaka wa kangahe? (Umwaka wa kabiri)				
3. Ni ibiki Kanyange akunda? (Gusoma/kwandika)				
4. Ni iki Kanyange akora buri mugoroba? (Akora umukoro mwarimu yamuhaye)				
5. Ni iki uyu mwandiko ukwigishije? **(**Gukunda gusoma or kwandika/gukora umukoro/gufata neza ibikoresho by'ishuri)				

Number of correct answers

FARS Task 1c: SECOND READING - Oral Reading Fluency	**TEXT A**	🕐 180 seconds (3 MIN)

🗣Ngiye kugusaba gusoma inkuru. Ugerageze gusoma cyane.

Uriteguye dutangire?

Ngaho tangira

Kanyange yamenye gusoma
Kanyange yiga mu mwaka wa kabiri. Akunda gusoma no kwandika. Yamenye gusoma inyuguti, amagambo n'interuro. Yamenye gusoma no kwandika udukuru. Kanyange afata ibikoresho by'ishuri neza kandi akabigirira isuku. Buri munsi atahana igitabo cyo gusomera mu rugo. Buri mugoroba, akora umukoro mwarimu yamuhaye.

Task 1d: SECOND READING - Reading Comprehension

🗣Noneho ngiye kukubaza ibibazo kur'iyi nkuru umaze gusoma

Questions	Correct	Incorrect	No answer	Not Attempted
1. Ni nde uvugwa mu mwandiko? (Kanyange)				
2. Kanyange yiga mu mwaka wa kangahe? (Umwaka wa kabiri)				
3. Ni ibiki Kanyange akunda? (Gusoma/kwandika)				
4. Ni iki Kanyange akora buri mugoroba? (Akora umukoro mwarimu yamuhaye)				
5. Ni iki uyu mwandiko ukwigishije? **(**Gukunda gusoma or kwandika/gukora umukoro/gufata neza ibikoresho by'ishuri)				
			Number of correct answers	

MARS Task 1: Adding Numbers	**Sheet A**	60 seconds

Dore indi myitozo yoguteranya turibukore [glide hand from left to right].

Ngiye kwifashisha iyi saha ibara. Ngaho kora imibare myinshi uko ushoboye.

Niba utazi igisubizo, jya kukibazo gikurikiyeho. Uriteguye? . . .

- Tangirira aha [point to first problem].

Write: **1 = Correct.**
0 = Incorrect or no response
[ ] After last problem attempted

1.	13 + 3 = (16)	
2.	16 + 4 = (20)	
3.	45 + 5 = (50)	
4.	11 + 7 = (18)	
5.	15 + 4 = (19)	
6.	13 + 10 = (23)	
7.	63 + 2 = (65)	
8.	7 + 13 = (20)	
9.	21 + 6 = (27)	
10.	13 + 7 = (20)	

Total correct: _____/10

MARS Task 2: Subtracting Numbers	**Sheet B**	60 seconds

Dore indi myitozo yo gukuramo turibukore [glide hand from left to right].

Ngiye kwifashisha iyi saha ibara. Ngaho kora imibare myinshi uko ushoboye.

Niba utazi igisubizo, jya kukibazo gikurikiyeho. Uriteguye? . . .

- Tangirira aha [point to first problem].

Write: **1 = Correct.**
0 = Incorrect or no response
[ ] After last problem attempted

11. 12 - 4 =	(8)	
12. 6 - 3 =	(3)	
13. 10 - 5 =	(5)	
14. 13 – 1 =	(12)	
15. 10 – 1 =	(9)	
16. 20 – 10 =	(10)	
17. 15 – 5 =	(10)	
18. 17 – 6 =	(11)	
19. 15 – 10 =	(5)	
20. 20 – 17 =	(3)	

Total correct: _____/10

Task 3: Multiplying numbers	**Sheet C**	60 seconds

Dore indi myitozo yo gukuba tugiye gukora [glide hand from left to right].

Ngiye kwifashisha iyi saha ibara. Ngaho kora ibibazo byinshi bishoboka.

Niba utazi igisubizo, jya ku kibazo gikurikiyeho. Uriteguye? . . .

- Tangirira aha [point to first problem].

Circle: **1 = Correct.**
0 = Incorrect or no response
[ ] After last problem attempted

1.	2 x 2 = (4)	
2.	3 x 5 = (15)	
3.	4 x 5 = (20)	
4.	2 x 6 = (12)	
5.	6 x 3 = (18)	
6.	7 x 4 = (28)	
7.	9 x 1 = (9)	
8.	5 x 6 = (30)	
9.	7 x 7 = (49)	
10.	8 x 9 = (72)	

Total correct: _____/10

P3 ASSESSMENT

ASSESSMENT INFORMATION SHEET

A. Assessor's Name:	
B. Date of Assessment :	
C. Province:	
D. School District:	
E. School Name:	
F. Student's Name:	Family name_____ Other names_____
G. Student's Oldest Sibling's First Name[47]:	
H. Student's Age:	[number of full years]
I. Student's Gender	○ Boy ○ Girl
J. Consent	○ Yes ○ No
K. Student's Class	○ P1 ○ P2 ○ P3 ○ P4
Please enter this student's teachers' names:	Kinyarwanda teacher's name: _____ Math teacher's name: _____

[47] If the student IS the oldest child in the family, write down "self".

FARS Task 1a: Oral Reading Fluency	**TEXT A**	60 seconds

🗣Ngiye kugusaba gusoma inkuru. Ugerageze gusoma cyane.

Uriteguye dutangire?

Ngaho tangira

Nkunda igihugu cyanjye

Nitwa Mugisha. Igihugu cyanjye cyitwa u Rwanda. Abagituye bitwa Abanyarwanda. Nshimishwa n'ibiganiro n'inyigisho binyuzwa kuri Radiyo Rwanda yumvwa na benshi. Sinshobora guhombywa izi nyigisho n'abantu bigize intyoza, banshuka gukurikirana inyigisho zimpyinagaza aho kunteza imbere. Nk'umwana muto, nkwiye guhora ndi maso, nirinda kuryarywa n'abashaka kundoha mu ngeso mbi. Niyemeje kwiga neza kuko nkunda igihugu cyanjye. Ndifuza gukorera igihugu cyambyaye.

Task 1b: Reading Comprehension

🗣Noneho ngiye kukubaza ibibazo kur'iyi nkuru umaze gusoma

Questions	Correct	Incorrect	No answer	Not Attempted
1. Ni nde wivuga muri uyu mwandiko? (Mugisha)				
2. Igihugu cye cyitwa ngo iki? (u Rwanda)				
3. Ni iki kimushimisha? (Ashimishwa na gahunda zinyuzwa kuri Radiyo Rwanda)				
4. Ni iki Mugisha yiyemeje? (Kwiga neza)				
5. Uyu mwandiko urakwigisha iki? (Gukunda (gukorera) igihugu cyanjye/Kwirinda abanshuka/Guhora ndi maso/nibindi)				

Number of correct answers

FARS Task 1c: SECOND READING - Oral Reading Fluency	**TEXT A**	180 seconds (3 MINS)

🗣Ngiye kugusaba gusoma inkuru. Ugerageze gusoma cyane.

Uriteguye dutangire?

Ngaho tangira

Nkunda igihugu cyanjye
Nitwa Mugisha. Igihugu cyanjye cyitwa u Rwanda. Abagituye bitwa Abanyarwanda. Nshimishwa n'ibiganiro n'inyigisho binyuzwa kuri Radiyo Rwanda yumvwa na benshi. Sinshobora guhombywa izi nyigisho n'abantu bigize intyoza, banshuka gukurikirana inyigisho zimpyinagaza aho kunteza imbere. Nk'umwana muto, nkwiye guhora ndi maso, nirinda kuryarywa n'abashaka kundoha mu ngeso mbi. Niyemeje kwiga neza kuko nkunda igihugu cyanjye. Ndifuza gukorera igihugu cyambyaye.

Task 1d: SECOND READING - Reading Comprehension

🗣Noneho ngiye kukubaza ibibazo kur'iyi nkuru umaze gusoma

Questions	Correct	Incorrect	No answer	Not Attempted
1. Ni nde wivuga muri uyu mwandiko? (Mugisha)				
2. Igihugu cye cyitwa ngo iki? (u Rwanda)				
3. Ni iki kimushimisha? (Ashimishwa na gahunda zinyuzwa kuri Radiyo Rwanda)				
4. Ni iki Mugisha yiyemeje? (Kwiga neza)				
5. Uyu mwandiko urakwigisha iki? (Gukunda (gukorera) igihugu cyanjye/Kwirinda abanshuka/Guhora ndi maso/nibindi)				

Number of correct answers

Task 1: Multiplying Numbers	**Sheet A**	60 seconds

Dore indi myitozo yo gukuba tugiye gukora [glide hand from left to right].

Ngiye kwifashisha iyi saha ibara. Ngaho kora ibibazo byinshi bishoboka.

Niba utazi igisubizo, jya ku kibazo gikurikiyeho. Uriteguye? . . .

- Tangirira aha [point to first problem].

Circle: 1 = Correct.
0 = Incorrect or no response
[ ] After last problem attempted

1.	2 x 3 =	(6)	
2.	3 x 4 =	(12)	
3.	4 x 2 =	(8)	
4.	10 x 2 =	(20)	
5.	3 x 6 =	(18)	
6.	6 x 2 =	(12)	
7.	5 x 5 =	(25)	
8.	2 x 8 =	(16)	
9.	5 x 4 =	(20)	
10	5 x 40 =	(200)	

Total correct: _____/10

Task 2: Dividing Numbers	**Sheet B**	60 seconds

Dore indi myitozo yo gukuba tugiye gukora [glide hand from left to right].

Ngiye kwifashisha iyi saha ibara. Ngaho kora ibibazo byinshi bishoboka.

Niba utazi igisubizo, jya ku kibazo gikurikiyeho. Uriteguye? . . .

- Tangirira aha [point to first problem].

Circle: **1 = Correct.**
0 = Incorrect or no response
[ ] After last problem attempted

4 : 2 = (2)	
6 : 3 = (2)	
8 : 2 = (4)	
6 : 2 = (3)	
10 : 5 = (2)	
8 : 4 = (2)	
10 : 2 = (5)	
2 : 2 = (1)	
9 : 3 = (3)	
12 : 6 = (2)	

Total correct: _____/10

Task 3: Adding Numbers	**Sheet C**	60 seconds

Dore indi myitozo yoguteranya turibukore [glide hand from left to right].

Ngiye kwifashisha iyisaha ibara. Ngaho kora imibare myinshi uko ushoboye.

Niba utazi igisubizo, jya kukibazo gikurikiyeho. Uriteguye? . . .

- Tangirira aha [point to first problem].

Circle: **1 = Correct.**
0 = Incorrect or no response
[ ] After last problem attempted

1.	7 + 2 =	(9)	
2.	13 + 3 =	(16)	
3.	16 + 4 =	(20)	
4.	45 + 5 =	(50)	
5.	11 + 17 =	(28)	
6.	15 + 40 =	(55)	
7.	13 + 23 =	(36)	
8.	17 + 13 =	(30)	
9.	21 + 6 =	(27)	
10.	130 + 12 =	(142)	

Total correct: _____/10

Task 4: Subtracting Numbers	**Sheet D**	60 seconds

Dore indi myitozo yo gukuramo turibukore [glide hand from left to right].

Ngiye kwifashisha iyisaha ibara. Ngaho kora imibare myinshi uko ushoboye.

Niba utazi igisubizo, jya kukibazo gikurikiyeho. Uriteguye? . . .

- Tangirira aha [point to first problem].

Circle: **1 = Correct.**
0 = Incorrect or no response
[ ] After last problem attempted

21. 7 - 4 = (3)	
22. 13 - 3 = (10)	
23. 18 - 1 = (17)	
24. 23 – 3 = (20)	
25. 17 – 5 = (12)	
26. 40 – 15 = (25)	
27. 100 – 50 = (50)	
28. 38 – 6 = (32)	
29. 25 – 9 = (16)	
30. 40 – 37 = (3)	

Total correct: _____/10

P4 ASSESSMENT

ASSESSMENT INFORMATION SHEET

A. Assessor's Name:	
B. Date of Assessment:	
C. Province:	
D. School District:	
E. School Name:	
F. Student's Name:	Family name_____ Other names_____
G. Student's Oldest Sibling's First Name[48]:	
H. Student's Age:	[number of full years]
I. Student's Gender	○ Boy ○ Girl
J. Consent	○ Yes ○ No
K. Student's Class	○ P1 ○ P2 ○ P3 ○ P4
Please enter this student's teachers' names:	Kinyarwanda teacher's name: _____ English teacher's name: _____ Math teacher's name: _____

[48] If the student IS the oldest child in the family, write down "self".

FARS Kinyarwanda Task 1a. Oral Reading Fluency	**TEXT A** 60 seconds

🗣Ngiye kugusaba gusoma inkuru. Ugerageze gusoma cyane.

Uriteguye dutangire?

Ngaho tangira usome

Umunsi umwe, impyisi yagiye gutembera irayoba. Igerageza gusoma ibyapa biyobora abagenzi yabonaga birayinanira. Ikomeza kugenda iyobagurika. Mu nzira ihura n'imbwa irayiyoboza. Imbwa yo yari intyoza, irayibaza iti: "Ese uzi gusoma ibyapa biyobora abagenzi?" Impyisi iti:"Ashwi da! " Imbwa irayiyobora, ariko iyishishikariza kujya kwiga gusoma no kwandika. Impyisi iribwira iti: "Ni byo koko, kutamenya gusoma ni ikibazo gikomeye." Nyuma y'iminsi mike, impyisi ijya kwiga gusoma no kwandika

Kinyarwanda Text 1b: Reading Comprehension

🗣Noneho ngiye kukubaza ibibazo kur'iyi nkuru umaze gusoma

Remove the text from the child before asking comprehension questions.

Questions	Correct	Incorrect	No answer	Not Attempted
1. Ni izihe nyamaswa zivugwa muri iyi nkuru? (Impyisi n'imbwa.)				
2. Ni ukubera iki impyisi yayobye? (Yayobye kubera kutamenya gusoma ibyapa biyobora abagenzi.)				
3. Ni iki imbwa yabajije impyisi? (Yayibajije niba izi gusoma ibyapa biyobora abagenzi.)				
4. Ni iyihe nama imbwa yagiriye impyisi? (Yayishishikarije kujya kwiga gusoma no kwandika.)				
5. Impyisi yafashe uwuhe mwanzuro? (Yafashe umwanzuro wo jujya kwiga gusoma no kwandika.)				
Number of correct answers				

FARS Kinyarwanda Task 1C. Oral Reading Fluency – SECOND READING	**TEXT A**	🕐 180 seconds (3 MIN)

🗣Ngiye kugusaba gusoma inkuru. Ugerageze gusoma cyane.

Uriteguye dutangire?

Ngaho tangira usome

Umunsi umwe, impyisi yagiye gutembera irayoba. Igerageza gusoma ibyapa biyobora abagenzi yabonaga birayinanira. Ikomeza kugenda iyobagurika. Mu nzira ihura n'imbwa irayiyoboza. Imbwa yo yari intyoza, irayibaza iti: "Ese uzi gusoma ibyapa biyobora abagenzi?" Impyisi iti:"Ashwi da! " Imbwa irayiyobora, ariko iyishishikariza kujya kwiga gusoma no kwandika. Impyisi iribwira iti: "Ni byo koko, kutamenya gusoma ni ikibazo gikomeye." Nyuma y'iminsi mike, impyisi ijya kwiga gusoma no kwandika

Kinyarwanda Text 1D: Reading Comprehension

🗣Noneho ngiye kukubaza ibibazo kur'iyi nkuru umaze gusoma

Leave the text in front of the student.

Questions	Correct	Incorrect	No answer	Not Attempted
6. Ni izihe nyamaswa zivugwa muri iyi nkuru? (Impyisi n'imbwa.)				
7. Ni ukubera iki impyisi yayobye? (Yayobye kubera kutamenya gusoma ibyapa biyobora abagenzi.)				
8. Ni iki imbwa yabajije impyisi? (Yayibajije niba izi gusoma ibyapa biyobora abagenzi.)				
9. Ni iyihe nama imbwa yagiriye impyisi? (Yayishishikarije kujya kwiga gusoma no kwandika.)				
10. Impyisi yafashe uwuhe mwanzuro? (Yafashe umwanzuro wo jujya kwiga gusoma no kwandika.)				
			Number of correct answers	

FARS English Task 1a: Oral Reading Fluency	**TEXT B** 🕐 60 seconds

🗣Ngiye kugusaba gusoma inkuru. Ugerageze gusoma cyane.

Uriteguye dutangire?

Ngaho tangira usome

My name is Kalisa. I like to take care of my body. I drink clean water and eat healthy food. I like to eat fresh fruit and vegetables. It is important to wash your hands before you eat. I like to play games and read books. Sleeping is good for you. It helps your body rest.

English Task 1b. Reading Comprehension

🗣Noneho ngiye kukubaza ibibazo kur'iyi nkuru umaze gusoma

Remove the text from the child before asking comprehension questions.

Questions	Correct	Incorrect	No answer	Not Attempted
1. Who is talking in the story? (Kalisa)				
2. What does Kalisa do to take care of his body? (Drinks clean water and eats healthy food)				
3. According to Kalisa, what should you do before eating? (Wash your hands)				
4. What does Kalisa like to do? (Play games and read books)				
5. Why is sleeping good? (It helps you rest)				

Number of correct answers ____

FARS English Task 1C: Oral Reading Fluency: SECOND READING	**TEXT B**	🕐 180 seconds (3 MIN)

🗣Ngiye kugusaba gusoma inkuru. Ugerageze gusoma cyane.

Uriteguye dutangire?

Ngaho tangira usome

My name is Kalisa. I like to take care of my body. I drink clean water and eat healthy food. I like to eat fresh fruit and vegetables. It is important to wash your hands before you eat. I like to play games and read books. Sleeping is good for you. It helps your body rest.

English Task 1D. Reading Comprehension

🗣Noneho ngiye kukubaza ibibazo kur'iyi nkuru umaze gusoma

Leave the text in front of the student.

Questions ***(Correct Answer)***	Correct	Incorrect	No answer	Not Attempted
6. Who is talking in the story? (Kalisa)				
7. What does Kalisa do to take care of his body? (Drinks clean water and eats healthy food)				
8. According to Kalisa, what should you do before eating? (Wash your hands)				
9. What does Kalisa like to do? (Play games and read books)				
10. Why is sleeping good? (It helps you rest)				

Number of correct answers

Task 1: Addition	**Sheet A**	60 seconds

Dore indi myitozo yoguteranya turibukore [glide hand from left to right].

Ngiye kwifashisha iyisaha ibara. Ngaho kora imibare myinshi uko ushoboye.

Niba utazi igisubizo, jya kukibazo gikurikiyeho. Uriteguye? . . .

- Tangirira aha [point to first problem].

Circle: **1 = Correct.**
0 = Incorrect or no response
[ ] After last problem attempted

1. 4 + 5 = (9)	
2. 3 + 9 = (12)	
3. 7 + 2 = (9)	
4. 5 + 15 = (20)	
5. 20 + 20 = (40)	
6. 5 + 6 = (11)	
7. 32 + 3 = (35)	
8. 25 + 25 = (50)	
9. 19 + 6 = (25)	
10. 300 + 200 = (500)	

Total correct: _____Total time: _____

Task 2: Subtraction	**Sheet B**	60 seconds

Dore indi myitozo yo gukuramo turibukore [glide hand from left to right].

Ngiye kwifashisha iyisaha ibara. Ngaho kora imibare myinshi uko ushoboye.

Niba utazi igisubizo, jya kukibazo gikurikiyeho. Uriteguye? . . .

- Tangirira aha [point to first problem].

Circle: **1 = Correct.**
0 = Incorrect or no response
[ ] After last problem attempted

1. 7 - 2 = (5)	
2. 10 - 6 = (4)	
3. 25 - 5 = (20)	
4. 18 – 2 = (16)	
5. 50 – 10 = (40)	
6. 16 – 4 = (12)	
7. 9 – 5 = (4)	
8. 200 – 100 = (100)	
9. 50 - 60 = (-10)	
10. 100 – 100 = (0)	

Total correct: _____Total time: _____

Task 3: Multiplication	**Sheet C**	60 seconds

Dore indi myitozo yo gukuba tugiye gukora [glide hand from left to right].

Ngiye kwifashisha iyi saha ibara. Ngaho kora ibibazo byinshi bishoboka.

Niba utazi igisubizo, jya ku kibazo gikurikiyeho. Uriteguye? . . .

- Tangirira aha [point to first problem].

Circle: **1 = Correct.**
0 = Incorrect or no response
[ ] After last problem attempted

1.	2 x 4 = (8)	
2.	3 x 3 = (9)	
3.	5 x 2 = (10)	
4.	5 x 10 = (50)	
5.	7 x 3 = (21)	
6.	4 x 6 = (24)	
7.	15 x 2 = (30)	
8.	20 x 10 = (200)	
9.	6 x 5 = (30)	
10	12 x 10 = (120)	

Total correct: _____Total time: _____

Task 4: Division	**Sheet D**	60 seconds

Dore indi myitozo yo gukuba tugiye gukora [glide hand from left to right].

Ngiye kwifashisha iyi saha ibara. Ngaho kora ibibazo byinshi bishoboka.

Niba utazi igisubizo, jya ku kibazo gikurikiyeho. Uriteguye? . . .

- Tangirira aha [point to first problem].

Circle: 1 = Correct.
0 = Incorrect or no response
[ ] After last problem attempted

1.	9 ÷ 3 = (3)	
2.	4 ÷ 2 = (2)	
3.	24 ÷ 6 = (4)	
4.	10 ÷ 2 = (5)	
5.	15 ÷ 3 = (5)	
6.	50 ÷ 10 = (5)	
7.	20 ÷ 5 = (4)	
8.	55 ÷ 11 = (5)	
9.	70 ÷ 1 = (70)	
10.	200 ÷ 2 = (100)	

Total correct: _____Total time: _____

Task 5: Number comparison	**Sheet E**	60 seconds

Reba kuri buri tsinda ry' imibare ikurikira. Muri buri tsinda, umubare munini ni uwuhe?

Ngiye kwifashisha iyisaha ibara. Ngaho kora imibare myinshi uko ushoboye.

Niba utazi igisubizo, jya kukibazo gikurikiyeho. Uriteguye? . . .

- Tangirira aha [point to first problem].

Circle: 1 = Correct. (Bolded and underlined number is the correct answer)
0 = Incorrect or no response
[ ] After last problem attempted

1.	**2/4**	or	2/6	
2.	0.01	or	**0.1**	
3.	**55**	or	-60	
4.	4/2	or	**3**	
5.	3.7	or	**3.77**	
6.	-2	or	**0.5**	
7.	**4/5**	or	1/2	
8.	7.5	or	**70**	
9.	**-20**	or	-25	
10.	1/4	or	**4/2**	

Total correct: _____Total time: _____

SCHOOL MONITORING FORM

A. L3 Observer/Izina ry'Umukozi wa L3:	
B. Date of visit/Itariki y'isuzuma:	
C. Province/ Intara:	
D. School District/ Akarere:	
E. School Name/ Izina ry'ishuli:	
F. School status/ Imiterere y'ishuli:	☐ Only primary section/ Ishuli ribanza gusa ☐ 9 Years Basic Education / Ishuli ry'imyaka icyenda ☐ 12Years Basic Education/ Ishuli ry'imyaka cumi n'ibiri
Name of Head-teacher/ Amazina y'umuyobozi w'ishuli:	_____
Phone Number: / Numero ya telefoni	_____
Head teachers' level of education/ Amashuli yize	☐ A2- ☐ A1- Diploma ☐ A0- Bachelor;' Degree ☐ Master' s Degree
Years of experience as head teacher/ Imyaka y'uburambe nk'umuyobozi w'ishuli:	_____
Sex of head techers/ Igitsina	☐ Male/ Gabo ☐ Female/ Kobwa
Age / Imyaka:	_____

1. **Materials checklist:** Did the school receive from L3 the following (indicate quantity of each) **Ishuri muyobora ryabonye ibitabo bivuye muri L3 (Andika umubare)**:

MATERIAL CHECK					
Item	**Quantity/umubare**	**Item**	**Quantity/umubare**		
			T1	**T2**	**T3**
P1 Kinyarwanda guide/ *Imfashanyigisho Kinyarwanda P1*		P1 Kinyarwanda reader/ *Igitabo cy'umunyeshuri P1 Kinyarwanda*			
P1 Kinyarwanda Read aloud/ *Igitabo cy'inkuru P1 Kinyarwanda*		P2 Kinyarwanda reader/ *Igitabo cy'umunyeshuri P2 Kinyarwanda*			
P2 Kinyarwanda guide/		P1 English reader/ *Igitabo cy'umunyeshuri P1 Icyongereza*			

MATERIAL CHECK					
Item	**Quantity/umubare**	**Item**	**Quantity/umubare**		
			T1	**T2**	**T3**
Imfashanyigisho Kinyarwanda P2					
P2 Kinyarwanda Read aloud/ *Igitabo cy'inkuru P2 Kinya*		P2 English reader/ *Igitabo cy'umunyeshuri P2 Icyongereza*			
P3 Kinyarwanda guide/ *Imfashanyigisho Kinyarwanda P3*		P2 Math guide/ *Imfashanyigisho P2 Imibare*			
P3 Kinyarwanda Read aloud/ *Igitabo cy'inkuru P3 Kinya*		P3 English guide/ *Imfashanyigisho P3 Icyongereza*			
P1 English guide/ *Imfashanyigisho P1 Icyongereza*		P3 Kinyarwanda reader/ *Igitabo cy'umunyeshuri P3 Kinyarwanda*			
P2 English guide/ *Imfashanyigisho P2 Icyongereza*		P3 English reader/ *Igitabo cy'umunyeshuri P3 Icyongereza*			
P3 English guide/ *Imfashanyigisho P3 Icyongereza*		Solar Panel/*Icyuma gitanga amashanyarazi*			
P3 English Read aloud/*Igitabo cy'inkuru P3 Kinyarwanda*		Cellphones/*telefone*			
P1 Math guide/ *Imfashanyigisho P1 Imibare*		Speakers/*indangururamajwi*			
P3 Math guide/ *Imfashanyigisho P3 Imibare*		SD cards/*memori kadi*			
P4 English guides/*Imfashanyigisho P4 Icyongereza*		P4 Math guides/*Imfashanyigisho P4 Imibare*			
P4 English Read Aloud collections /*Igitabo cy'inkuru P4*		P4 English Pupil's book/ *Igitabo cy'umunyeshuli P4 icyongereza*			
L3 New competence based materials received					
P1 Kinyarwanda guide/ *Imfashanyigisho Kinyarwanda P1*		P1 Kinyarwanda reader/ *Igitabo cy'umunyeshuri P1 Kinyarwanda*			
P1 Kinyarwanda Read aloud/ *Igitabo cy'inkuru P1 Kinyarwanda*		P2 Kinyarwanda reader/ *Igitabo cy'umunyeshuri P2 Kinyarwanda*			

MATERIAL CHECK					
Item	**Quantity/umubare**	**Item**	**Quantity/umubare**		
			T1	**T2**	**T3**
P2 Kinyarwanda guide/ *Imfashanyigisho Kinyarwanda P2*		P1 English reader/ *Igitabo cy'umunyeshuri P1 Icyongereza*			
P2 Kinyarwanda Read aloud/ *Igitabo cy'inkuru P2 Kinya*		P2 English reader/ *Igitabo cy'umunyeshuri P2 Icyongereza*			
P2 Math guide/ *Imfashanyigisho P2 Imibare*					

2. PTA/PTC information	**Answers**
2.1 Does the school have a functioning School General Assembly Committees (SGACS) / *Mwabamugira* School General Assembly Committees (SGACS) *ikora*?	☐ Yes /*yego* ☐ No/*oya*
If you answered yes in Q2.1 answers questions 2.2 – 2.9, if not, skip to question 3.1. / ***Niba wasubije yego ku kibazo cya 2.1 subiza ibibazo kuva kuri 2.2 kugera kuri 2.9; niba wasubije oya simbuka ujye ku kibazo cya 3.1***	
2.2. Has the School General Assembly Committees (SGACS) been trained by Concern Worldwide? /*Niba ihari yaba yarahuguwe na Concern Worldwide?*	☐ Yes/*yego* ☐ No/*oya*
2.3 Did the School General Assembly Committees (SGAC) members (who attended the training facilitated by Concern) train other School General Assembly Committee (SGAC) members?/ *Abitabiriye amahugurwa (yateguwe na ConcernWoldwide) bahuguye abandi bagize* School General Assembly Committees (SGACS)	☐ Yes/yego ☐ No/oya
2.4 Does the School General Assembly Committees (SGACS) have an action plan? / School General Assembly Committees (SGACS) *ifite iteganyabikorwa?*	☐ Yes/yego ☐ No/oya
2.5 Has the School General Assembly Committees (SGACS) undertaken initiatives to support teacher motivation? School General Assembly Committees (SGACS) *yaba yaratangije gahunda zafasha mwarimu gukora umurimo we awishimiye?*	☐ Yes/yego ☐ No/oya
2.6 (if YES specify how)/Niba zihari ,zivuge?	
2.7 Has the School General Assembly Committees (SGACS) undertaken initiatives to support literacy and equity in education/ School General Assembly Committees (SGACS) *yaba yaratangije gahunda ziteza imbere umuco wo gusoma, ubudasumbana no guha abana bose amahirwe angina?*	☐ Yes/yego ☐ No/oya

2.8 (if YES specify how) Niba zihari, zivuge? - -	
3. School-Based Mentors	**Answers/ibisubizo**
3.1 Does the School have a Mentor? /*Mufite mentor?*	☐ Yes/yego ☐ No/oya
If you answered yes to Q 3.1, please answer questions 3.2 - 3.5; if you answered no, skip to Q4./ *Niba wasubije yego ku kibazo cya 3.1 subiza ibibazo kuva ku kibazo cya 3.2 kugera kuri 3.5; niba wasubije oya simbuka usubize ikibazo cya 4*	
3.2. Does the Mentor train the teachers/head teachers on the use of L3 materials/*?/Mentor ajya ahugura abarimu/Umuyobozi?*	☐ Yes/yego ☐ No/oya
3.3 If yes, how many math, English and Kinyarwanda teachers trained this month by the school-based mentor? /*Ni abarimu bangahe bigisha imibare, ikinyarwanda,icyongereza bo muri bahuguwe na Mentor muri uku kwezi?*	_____(number of male teachers) *Umubare w' Abagabo* _____(number of female teachers) *Umubare w' Abagore*
3.4. Are you satisfied with the amount of support (training, mentoring, coaching) given by your School Based mentor?/ *Waba wishimiye ubufasha n'amahugurwa uhabwa na School Based Mentor?*	☐ Not at all satisfied / Ntabwo bihagije ☐ Slightly satisfied / Birahagije gake ☐ Moderately satisfied /Birahagije mu rugero ☐ Very satisfied/ Birahagije ☐ Extremely satisfied /Birahagije cyane
3.5 Is there a weekly plan detailing school based mentor's activities in the school?/ *Haba hari gahunda igaragaza ibikorwa bya buri cyumweru bya School Based Mentor?*	☐ Yes/yego ☐ No/oya

4. Enrollment (Indicate the total number of students enrolled, not just those present during the visit)/*Vuga umubare w'abanyeshuri bose banditse:*

	Students/ abanyeshuri		**Repeaters/Abasibire**		**Drop out students in this year /Abaretse ishuri**		**No of classrooms Umubare w'ibyumba by'amashuri**	**Shift/Isimburana 1: Single 2: Double**
	Male/ Gabo	**Female/ Gore**	**Male/ Gabo**	**Female/ Gore**	**Male/ Gabo**	**Female/ Gore**		
P1								
P2								
P3								
P4								

5. Number of Teachers/Umubare w'abarimu

GRADE	Subject/isomo	Number of Teachers	
		Male/Gabo	Female/Gore
P1	Kinya P1		
	Math P1		
	English P1		
	Total actual number of P1 teachers*:/ Umubare w'abarimu bigisha P1		
P2	Kinya P2		
	Math P2		
	English P2		
	Total actual number of P2 teachers: / Umubare w'abarimu bigisha muri P2		
P3	Kinya P3		
	Math P3		
	English P3		
	Total number of P3 teachers: Umubare w'abarimu bigisha muri P3		
P4	Kinya P4		
	Math P4		
	English P4		
	Total number of P4 teachers:/ Umubare w'abarimu bigisha muri P4		
	TOTAL actual NUMBER OF P1-P4** teachers Igiteranyo cya P1 –P4		
Name (s) of P1 teacher(s)			
Name (s) of P2 teacher (s)			
Name (s) of P3 teacher (s)			
Name (s) of P4 teacher (s)			

*In some schools a teacher may team more than one subject. Please indicate here the total number of teachers in this grade.

/Hari amwe mumashuri afite umuwarimu wigisha amasomo arenze rimwe. Vuga umubare w'abarimu bigisha muri uyu mwaka.

** In some schools a teacher may team more than one grade. Please indicate here the actual total number of teachers teaching P1, P2, P3 and P4 in this grade.

6. School leadership	Answers/ibisubizo
6.1. As a head teacher have you ever been trained on school leadership? / *Nk'umuyobozi w'ishuli mwaba mwarahuguwe ku miyoborere y'ishuli?*	☐ Yes ☐ No
6.2 Does your school have a system for tracking teacher attendance? *If yes, ask head teacher to show you their teacher attendance records / Ese ishuli ryanyu ryaba rifite uburyo bwo kugenzura ubwitabire bw'abarimu? Niba ari yego, saba Umuuyobozi w'ishuli akwereke aho bandika ubwitabire bw'abarimu*	☐ Yes, Attendance records completed daily/ Yego, twandika ubwitabile buri munsi ☐ Yes, Attendance records completed weekly/Yego, twandika ubwitabire rimwe mu cyumweru ☐ Yes, Attendance records completed bi-weekly/ Yego, twandika ubwitabire rimwe mu byumweru bibiri ☐ Yes, Attendance records completed monthly/ Yego, twandika ubwitabire rimwe mu kwezi ☐ No/ Oya
6.3. How many teachers who teach P1, P2, P3 or P4 were absent yesterday? /*Ni abarimu bangahe bigisha P1, P2, P3, p4 basibye ejo*?	_____ teachers out of _____ teachers
6.4. How many teachers who teach P1, P2, P3 or P4 are absent today? / *Ni abarimu bangahe bigisha P1, P2, P3, P4 basibye none?*	_____ teachers out of _____ teachers
6.5. How often do you observe teachers teaching in their classrooms? /*Ni kangahe ugenzura imyigishirize y'abarimu mu mashuri?*	☐ At least once a week/Nibura rimwe mu cyumweru ☐ At least once a month/Nibura rimwe mu kwezi ☐ At least once a term/Nibura rimwe mu gihembwe ☐ At least once a year/Nibura rimwe mu mwaka ☐ Not at all/Nta narimwe
6.6.Do you monitor the reading progress of students in the school?/ *Ujya ugenzura imitsindire y'abana mu gusoma?*	☐ Yes/yego ☐ No/oya
6.7 If yes, how do you monitor the reading progress of students in the school? (Select all that apply) / *Niba ari yego, ni gute ugenzura imitsindire y'abana mu gusoma? (Hitamo ibisubizo byose bishoboka)*	☐ Classroom Observation/*Igenzura mu ishuli* ☐ Monitor students' results on tests given by the teacher/ *Kugenzura amanota y'abanyeshuli mu ibazwa riyatanzwe na mwalimu* ☐ Evaluate children orally myself/ *Njyewe ubwanjye, nkoresha abana isuzuma ryo gusoma* ☐ Review students' assignments or homework/ *Ngenzura imikoro y'abanyeshuli* ☐ Teachers provide me progress reports/ *Abarimu batanga raporo ku mitsindire y'abanyeshuli* ☐ End of term evaluations/*kugenzura amanota y'igihembwe*

6.8 Are there records of children with learning barriers? / *Hari imibare igaragaza abana bafite inzitizi mu myigire biga kuri iri shuli?*	☐ Yes/yego ☐ No/oya
6.9 If yes, are there some remedial measures to support children with learning barriers? / *Haba hari ingamba zifatwa mu gufasha by'umwihariko abana bafite inzitizi mu myigire?*	☐ Yes/yego ☐ No/oya
6.10 What do you do to encourage students to come to school? (Select all that apply) */Ni iki ukora ngo ushishikarize abanyeshuri kuza kwiga? (Hitamo ibisubizo byose bishoboka)*	☐ Parent meetings/PTA/Inama z'ababyeyi ☐ Provide milk to students/Kubaha amata yo kunywa ☐ Provide shoes to students/Kubaha inkweto zo kwambara ☐ Playground for students to enjoy/Kubategurira ibibuga byo gukiniraho ☐ Separate toilets for boys and girls/Ubwiherero butandukanye kubahungu n'abakibwa ☐ Special rooms for girls/Imyumba byihariye byisuku by'abakobwa ☐ Incentives for good academic performance/Ibihembo kubanyeshuli batsinda kurusha abandi ☐ Punishment if not come/Ibihano kubasiba ☐ Competitions/Amarushanwa atandukanye ☐ Other/Ikindi_____ ☐ Nothing/Ntacyo
6.11 Are there discipline measures for children who come late to school?/ *Hari ibihano bihabwa bana baza bakererewe?*	☐ Yes /Yego ☐ No/Oya ☐ Depends on a teacher, it's up to them/Biva k'umwarimu
6.12 If yes, what are they? (Select All that Apply) / *Niba Bihari, bivuge (Hitamo ibisubizo byose bishoboka)*	☐ Corporal punishment/Ibihanobibabaza (gukubita, gupfukama, etc) ☐ Student who is late is not admitted to class/Uwacyererewe ntiyemererwa kwinjira mu ishuli ☐ Student who is late is sent for detention/Uwacyererewe arafungwa ☐ Student who is late helps with cleaning, other tasks/Uwakererewe akora isuku nindi mirimo ☐ Other forms of disciplining/Ibindi_____
6.13 Are there discipline measures for children who miss school?/ *Hari ibihano bihabwa abana basiba ishuli?*	☐ Yes /Yego ☐ No/Oya ☐ Depends on a teacher, it's up to them/Biva k'umwarimu

7. Parent Involvement	**Answers/ibisubizo**
7.1 How often does this school have school assemblies? /Inteko y'abanyeshuri iba kangahe?	☐ Every Day/Buri munsi ☐ At least once a week/Nibura rimwe mu cyumweru ☐ At least once a month/Nibura rimwe mu kwezi ☐ At least once a term/Nibura rimwe mu gihembwe ☐ At least once a year/Nibura rimwe mu mwaka ☐ Never/Nta narimwe
7.2 How many times are parents/caregivers invited to come to the school each year? / Inama y'ababyeyi iba kangahe mu mwaka?	Number/Umubare : _____
7.3 (if the answer to # 7.2 is greater than 0) When invited to come to the school, how many parents/caregivers come ?/(Niba igisubizo ku kibazo cya 9.2 ari hejuru ya kabiri) Iyo bayumiwe mu nama, Haza abangana iki?	☐ All/Bose ☐ Most /Hafi ya bose ☐ A Moderate Amount/Abagereranyije ☐ Few/Bacye
8. School environment	**Answers/ibisubizo**
8.1 Does the School have a library? / *Ishuri ryanyu rifite Isomero? (If yes, ask to see the library)*	☐ Yes/yego ☐ No/oya Observation:
8.2 Is there a nursery school attached to the school?/ *Haba hari ishuli ry'inshuke rishamikiye kuri iri shuli?*	☐ Yes/yego ☐ No/oya Observation:
8.3 Does your school get support from other organization/ NGO (s)? *(Ishuri ryanyu rihabwa inkunga nindi Miryango)* (other than L3)	☐Yes/Yego☐No/Oya
8.4 If yes, specify/ *(Inkunga mu biki*?):	☐Teaching and learning materials ☐Teacher training ☐Other……
9. Literacy resources in the community	**Answers/ibisubizo**
9.1 Is there a community library or place in the community where students can borrow books to read? / *Haba hari isomero rusange hafi y'ishuli aho abana bashobora gutira ibitabo byo gusoma?*	☐ Yes/yego ☐ No/oya
10. Other School Features	**Answers/ibisubizo**
10.1 How far is the school located from the District's Office? *Ugereranije , hari ibirometero bingahe kuba ku biro by'Akarere kugera kuri iri shuli?*	_____kms
10.2. How often do you receive information on literacy and numeracy from the District Continuous Professional Development Committee?/ *Ni kangahe mwakira amabwiriza/ amakuru aturutse kuri Komite y'Akarere ishinzwe amahugurwa y'abarimu?*	☐ Once a week/ Rimwe mu cyumweru ☐ Once monthly /Rimwe mu kwezi ☐ Once a term/Rimwe mu gihembwe ☐ Never/ Nta narimwe

10.3. How often do you discuss information on literacy and numeracy from Sector Education Officers/ District Education Officers? / *Ni kangahe mujya muganira n'abashinzwe uburezi ku karere cyangwa k'umurenge ku ngamba zigamuje guteza imbere kwigisha gusoma n'imibare?*	☐ Once a week/ Rimwe mu cyumweru ☐ Once monthly /Rimwe mu kwezi ☐ Once a term/Rimwe mu gihembwe ☐ Never/ Nta narimwe

11 Challenges: To what extent are the following inhibit teaching and learning in your school)? /*Ni kuruhe rugero ibi bikurikira bibangamire imyigishirije n'imyijyire kuri iri shuli?*				
Challenge/Imbogamizi	1=Not a problem at all/Si ikibazo namba	2=Hardly a problem/Ni ikibazo gito	3=A moderate problem/Ni ikibazo kiringaniye	4=A severe problem/Ni ikibazo gikomeye
11.1 Too many students in a class/ Abanyeshuri benshi mu ishuli rimwe				
11.2 Students are over age/under age for a particular class/ Abanyeshuri barengeje imyaka/abatagejeje imyaka mu mashuli amwe				
11.3 Students are hungry/ Abanyeshuli bashonje				
11.4 Students are tired/ Abanyeshuri bananiwe				
11.5 Students are sick/ Abanyeshuri barwaye				
11.6 Students misbehave/ Abanyeshuri bitwara nabi				
11.7 Students do not attend class consistently or arrive late/ Abanyeshuri basiba cyane cyangwa bacyererwa kuza kwiga				
11.8 Students receive little help with school work at home/do not complete their homework/ Abanyeshuri babona ubufasha bucye mu gukora imikoro/ntibarangize imikoro				
11.9 Parents/Caregivers are not literate/ Ababyeyi batazi gusoma no kwandika				
11.10 Parents/Caregivers do not support their children's education/ Ababyeyi batagira uruhari muburezi bw'abana babo				
11.11 Students have to walk far to school/ Abanyeshuli bakora urugendo rurerure ngo bagere ku ishuli				

11 Challenges: To what extent are the following inhibit teaching and learning in your school)? *INi kuruhe rugero ibi bikurikira bibangamire imyigishirije n'imyijyire kuri iri shuli?*				
Challenge/Imbogamizi	1=Not a problem at all/Si ikibazo namba	2=Hardly a problem/Ni ikibazo gito	3=A moderate problem/Ni ikibazo kiringaniye	4=A severe problem/Ni ikibazo gikomeye
11.12 Large number of students drop out/ Umubare munini w'abanyeshuri bata ishuli				
11.13 Other/Ikindi_____				

12 Learning Environment	
11.1 In P1, how many students share one desk ?/Mu mwaka wa mbere, itebe yicaraho abanyeshuri bangahe?	_____ students/abanyeshuri ☐ No desk/Nta ntebe zihari
11.2 In P2, how many students share one desk ?/ Mu mwaka wa kabiri, itebe yicaraho abanyeshuri bangahe?	_____ students/abanyeshuri ☐ No desk/Nta ntebe zihari
11.3 In P3, how many students share one desk ?/ Mu mwaka wa gatatu, itebe yicaraho abanyeshuri bangahe?	_____ students/abanyeshuri ☐ No desk/Nta ntebe zihari
11.4 In P4, how many students share one desk? / Mu mwaka wa kane, itebe yicaraho abanyeshuri bangahe?	_____ students/abanyeshuri ☐ No desk/Nta ntebe zihari
11.5 Which items must parents purchase for a student to attend school? (Select all that apply) /Ni ibihe bikoresho ababyeyi basabwa kugurira abanyeshuri?	☐ Books/Ibitabo ☐ Pens/pencils/Amakaramu ☐ Notebooks/Amakayi ☐ Uniform/Imyambaro y'ishuli ☐ School Fees/Kwishura asabwa n'ishuli ☐ Tuition/Amafaranga y'ishuli ☐ School bag/Udukapu ☐ Food to eat at school/Ibiryo barira ku ishuli ☐ Other/Ikindi : _____ ☐ None of the above/Ntanakimwe mubiri hejuru
11.6 How easily can MOST of the families whose children attend this school pay for these	☐ Very easily/Biraborohera cyane ☐ Somewhat easily/Biraborohera ☐ With some difficulty/Bahura n'imbogamizi

items?/Ababyeyi boroherewe gute mu kugura ibi bikoresho?	☐ With extreme difficulty/Bahura n'imbogamizi nyinshi
11.7 Does the school/ SGAC provide meal (tea break or lunch) to teachers?/ Ese ishuli cyangwa Komite y'ababyeyi yaba itanga ifuro ku barium?	☐ Yes ☐ No

13 Rank the following items as to their importance in your decision to hold a student back (where 4=most important and 1=least important). / ***Erekana ikigero uha impamvu zikurikira mu gusibiza umunyeshuri? (4= ngombwa cyane naho 1= si ngombwa nabusa)***				
Reason/Impamvu	1=Not important/Si ngombwa	2=Hardly important/ Ni ngombwa gacye cyane	3=Somewhat important/Ni ngombwa	4=Very important/Ni ngombwa cyane
13.1 Poor attendance/Gusiba ishuli cyane				
13.2 Low grades/Amanota macye				
13.3 Behavioral problems/Ibibazo by'imyitwarire				
13.4 Student is an inappropriate age for the grade/Umunyeshuri ufite imyaka irenze ishuli yigamo				
13.5 Parent requests that the student be held back/Bisabwe n'ababyeyi b'umunyeshuli				

Thank you/ Murakoze!

GRADE MONITORING FORM

A. Assessor Name/ Izina ry'umukozi wa L3	
B. Date of the visit / Itariki	
C. Province/ Intara:	
D. School District/ Akarere:	
E. School Name/ Izina ry'ishuli:	
F. Grade	☐P1 ☐P2 ☐P3 ☐P4
G. Subject	☐Kinyarwanda ☐Math ☐English

INSTRUCTIONS:

With this questionnaire REB/ L3 would like to get some information and your ideas about the actual early grade teaching practices in primary schools.

When completing this survey, answer these questions for <u>the grade and subject</u> specified above. Please try to respond to all questions and give accurate answers. Follow the instructions provided, and do not hesitate to ask L3 staff present at your school for clarification.

Hifashishijwe iri suzuma, REB/L3 yifuza kubona amakuru agendanye n'imyigishirize yo gusoma mu mashuli abanza.

Mu gihe musubiza ibi bibazo, mutange amakuru agendanye n'umwaka ndetse n'isomo mwigishamo nk'uko mwabyanditse hejuru habanza. Mugerageze musubize ibibazo byose kandi mutange ibisubizo by'ukuri.

Igihe mwakenera ibindi bisobanuro, ntimushidikanye kubaza umukozi wa L3 uri ku ishuli ryanyu

1. What is your name? Amazina yawe ni ayahe?	Family name/Izina ry'umuryango_____ Other names/ Andi mazina _____
2. Sex of teacher/Igitsina	☐Male/Gabo ☐Female/Gore
3. Professional preparation in teaching/ Wize ubwarimu?	From TTC / Normale Primaire ☐ General Secondary education ☐ Through Distance learning with Candidat libre (KIE) ☐ None ☐

4. Years of teaching experience/Uburambe kukazi?	_____years/imyaka
5. Have you ever been trained on how to teach reading and/or mathematics? / Waba warigeze uhugurirwa kwigisha gusoma no kubara na ONG?	Yes/yego ☐ No/Oya ☐
6. Have you been teaching these students since they entered this grade?/ Ni wowe wigishije aba banyeshuru kuva umwaka watangira?	Yes/Yego ☐ No/Oya ☐
7. What documents do you use when preparing your lessons plans?/ (Ukoresha izihe mfashanyigisho iyo utegura amasomo?)	☐ Curriculum documents from REB/ Integanyanyigisho zatwanze na REB ☐ L3 materials (teachers' guides, read aloud stories, L3 technology, daily readers) / Ibikoresho bya L3 ☐ None/ Ntabyo ☐ Other /Ibindi bivuge_____
8. Do you use L3 Teaching Learning Materials (TLMs) while teaching this subject with this grade?/ Waba ujya wifashisha imfashanyigisho za L3 mu kwigisha iri somo?	☐Yes/Yego ☐No/Oya (skip to Q13) (if no skip to question 13/ komeza ku kibazo cya 13 niba ukoresha izindi mfashanyigisho zitari iza L3)

If you selected yes in Q8, answer questions 9 – 12. If you selected no in Q8, skip to question 13., Niba wahisemo yego ku kibazo cya 8, subiza ibibazo kuva kuri 9 kugera kuri 12, niba wahisemo oya, komeza ujye ku kibazo cya 13.		
If Yes, Q8 answer Q9-Q12/ Niba ari yego subiza Q9-12	9. If yes (Q8), what materials do you use? (*Please tick all which apply*)/Niba ari yego (Q8), ni ibihe bikoresho ukoresha/ (*Hitamo ibisubizo byose bishoboka)*	☐ Teachers 'guide, /igitabo cy'umwalimu ☐ Read aloud stories, /Igitabo cy'inkuru zisomerwa abana ☐ Daily readers,/ Igitabo cy'umunyeshuli cyo gusoma ☐ L3 technology (Phones & SD cards and speakers)/Ibikoresho bya L3 by;ikorana buhanga
	10. If yes, in (Q8), Which term? (Ni ikihe gihembwe ugezeho wigisha?)	☐Term 1 ☐Term 2 ☐Term 3
	11. Which week/Unit? (Ni icyumweru cyakangahe ugezeho wigisha)	_____(week #)/ Unit (icyumweru cya)
	12. Which lesson?(Ni isomo rya kangahe ugezeho wigisha?)	_____(lesson #)(isomo rya)
If No in Q8, answer only Q13/ Niba aro oya Q8, jya kuri 13	13. If no, (Q8) why don't you use L3 materials?/ Niba ari oya, ni ukubera iki?	□ I am not trained on how to use L3 materials/ Ntabwo nahuguwe ku gukoresha ibikoresho bya L3 □ Insufficient L3 materials/ Ibikoresho bya L3 ntibihagije □ Our school received other materials that we are now using / Ishuli ryacu ryakiriye ibindi bikoresho nibyo dukoresha □ Other reasons/ Izindi mpamvu_____
14. How many children are enrolled in your class? / Ni abanyeshuli bangahe biga muri iri shuli/iki cyiciro?		Number/Umubare_____

<table>
<tr><td>15. How many children are absent today? /
Muri aba banyeshuri, ni bangahe basibye uyu munsi?</td><td>Number_/Umubare_____</td></tr>
<tr><td>16. How many children in your class have learning barriers? /
Ni abanyeshuri bangahe muri iri shuli bafite inzitizi mu myigire?</td><td>Number/Umubare _____</td></tr>
<tr><td>17. What is the age range of the pupils in your class?/Tubwire ikigero cy’imyaka y’abana wigisha (umwana muto n’umukuru mu ishuli)</td><td>Between/Hagati ya _____ and/na_____</td></tr>
<tr><td>18. Do you take attendance every day? /Urahamagara se buri munsi?</td><td>☐ Yes/Yego
☐ No/ Oya</td></tr>
<tr><td>19. Do you have a list of attendance of the pupils you teach? (If yes, ask teacher to show it to you)/ Waba ufite ikaye uhamagariramo abanyeshuli?</td><td>☐ Register not available to be examined /Ntayo
☐ Register available to be examined /Irahari</td></tr>
<tr><td>20. How many children in this class are repeaters? /
(Ni bangahe basibiye muri iri shuli?)</td><td>Number/Umubare _____</td></tr>
<tr><td>21. How many of the pupils in your class arrive to school …/Tanga ikigero abana wigisha bazira ku ishuli

a) On time/ Ku gihe
b) Late/ Bakererewe</td><td>(Select the teacher’s response for each category (On time and late)/ Hitamo ukurikije ikigero (Abaza kare, abaza ku gihe n’abakererwa)
<table>
<tr><td>a) On time/ Bahagera se ku gihe</td><td>A few/ bake</td><td>Some/ Baringaniye</td><td>Many/ Benshi</td><td>Most of all/ Hafi yabose</td></tr>
<tr><td>b) Late/ Bakererewe</td><td>A few/ Bake</td><td>Some/ /Baringaniye</td><td>Many/ Benshi</td><td>Most of all/ Hafi yabose</td></tr>
</table></td></tr>
</table>

22. Are there discipline measures for children who come late to school? / Hari ibihano bihabwa abana baza ku ishuli bakererewe?	☐Yes/Yego ☐No/Oya

ONLY KINYARWANDA OR ENGLISH TEACHERS. For Questions 23 – 29 only answer if you teach Kinyarwanda or English. If you teach Mathematics proceed to Q30. /

Ibibazo bikurikira bireba gusa abarimu bigisha Kinyarwanda cyangwa icyongereza. Niba wigisha imibare, komeza ku kibazo cya 30

23. How many of your students in your class are the following? *Select the teacher's response for each category* / Hitamo ukurikije ikigero muri buri cyiciro cy'abanyeshuri

23.1 How many ***non-readers*** do you have in your class?/ Ni bangahe mu banyeshuli wigisha muri iri shuli badashobora gusoma n'ijambo na rimwe?	A few /bake	Some/ Baringaniye	Many/ Benshi	Most of all/ Hafi yabose
23.2 How many ***struggling readers*** do you have in your class?/ Ni bangahe mu banyeshuli wigisha muri iri shuli bafite imbogamizi nyinshi mu gusoma?	A few/ bake	Some/ Baringaniye	Many/ Benshi	Most of all/ Hafi yabose
23.3 How many ***independent readers*** do you have in your class?/ Ni bangahe mu banyeshuli wigisha muri iri shuli babasha gusoma neza	A few /bake	Some/ Baringaniye	Many/ Benshi	Most of all/ Hafi yabose

24. Do you find it easy to teach reading? / Ubona byoroshye kwigisha gusoma?
    - ☐ Not easy at all/ Ntabwo byoroshye na gato
    - ☐ Sometimes not easy/ Rimwe na rimwe ntabwo biba byoroshye
    - ☐ Mostly easy/ Akenshi biba byoroshye
    - ☐ Very easy/ Biroroshye cyane

25. Why? / Kubera iki?

26. Do you allow your students to take books home? / Waba wemerera abana ibitabo bajya gusomera mu rugo?
    - ☐ Yes/Yego
    - ☐ No/Oya

27. If yes, how often?/ Niba ari yego, ni nkk'inshuro zingahe?

- ☐ Every day/ Buri munsi
- ☐ Two to three times a week/ Kabiri cyangwa gatatu mu cyumweru
- ☐ Once a week/ Rimwe mu cyumweru
- ☐ Once a month / Rimwe mu kwezi
- ☐ Once a term/ Rimwe mu gihemwe

28. Do you find it easier to teach boys or girls how to read? / Ubona byoroshye kwigisha gusoma abahungu cyangwa abakobwa?

- ☐ Boys/ Abahungu
- ☐ Girls/ Abakobwa
- ☐ There is no difference/ Nta tandukaniro ririmo

29. Why? /Kubera iki?

ALL TEACHERS ANSWER QUESTIONS 30-41
Ibibazo bikurikira byuzuzwa n'abarimu bigisha I Kinyarwanda, Icyongereza n'imibare

30. Have you attended L3 training?/ (Wigeze ujya mu mahugurwa ya L3)	☐Yes/Yego ☐No/Oya
31. Have you attended a training by your school-based mentor on L3 materials? (Wigeze uhugurwa na school based mentor w'ikigo cy'amashuri cyawe?)	☐ Yes/Yego ☐ No/Oya (Skip to 33) ☐ Our school does not have mentor (Skip to 33)/ (ikigo cy'amashuri cyacu nta school based mentor kigira)
32. Are you satisfied with the amount of support (training, mentoring, coaching) given by your School Based mentor?/ Waba wishimiye ubufasha n'amahugurwa uhabwa na mentor?	☐ Not at all satisfied / Ntabwo bihagije ☐ Slightly satisfied / Birahagije gake ☐ Moderately satisfied /Birahagije mu rugero ☐ Very satisfied/ Birahagije ☐ Extremely satisfied /Birahagije cyane
33. Did you receive technology from L3? (TICK ALL THAT APPLY) / (Ni ibihe ibikoresha by'ikoranabuhanga bya L3 mwakiriye/ Tanga	☐Yes, cell phone/Yego twakiriye telephone ☐Yes, speakers/Yego, indangururamajwi ☐Yes, SD card/Yego twakiriye memory card ☐ No/Oya

ibisubizo bishoboka byose (Hitamo ibisubizo byose bishoboka)	
34. If you said yes in the previous question, how often do you use this technology in teaching pupils this subject (s) in your classroom? (Niba warakiriye ibikoresho by'ikoranabuhanga, ni inshuro zingahe ujya ubikoresha iyo wigisha abanyeshuri iri somo?)	☐ Every day (buri munsi) ☐ 2-4 times a week(kabiri-kane mu cyumweru) ☐ Once a week(rimwe mu cyumweru) ☐ More rarely than once a week(Gacye munsi ya rimwe mu cyumweru) ☐ Never(Nta na rimwe) a. If never, why? Niba nta narimwe ni kubera iki?

35. Which L3 materials do you find helpful to use in teaching? (TICK ALL THAT APPLY) / Ni ibihe bikoresho bya L3 ubona bigufasha cyane mu kwigisha? (Hitamo ibisubizo byose bishoboka)
    - ☐ Teachers guide/ Ibitabo bya mwalimu
    - ☐ Read aloud stories/ Ibitabo by'inkuru
    - ☐ Daily reads/ Ibitabo byo gusoma by'abana
    - ☐ L3 technologies / Ibikoresho by'ikoranabuhanga

36. Do you have additional comments on L3 materials, training and/or School based mentoring programme? (Haba hari igitekerezo cyangwa icyivuzo watanga ku bikoresho bya L3, ku mahugurwa cyangwa kuri gahunda y'aba school based mentor?)

37. Last week, how many days were you absent? /(Icyumweru gishize, wasibye iminsi ingahe?)
    - ☐ None/Nta numwe
    - ☐ 1
    - ☐ 2
    - ☐ 3
    - ☐ 4
    - ☐ All/Yose

38. How often does the school administration observe you teaching? / (Ni kangahe abayobozi b'ikigo bakugenzura wigisha?)
    - ☐ At least once a week/Nibura rimwe mu cyumweru
    - ☐ At least once a month/Nibura rimwe mu kwezi
    - ☐ At least once a semester/Nibura rimwe mu gihembwe
    - ☐ At least once a year/Nibura rimwe mu kwezi
    - ☐ Not at all/Nta narimwe

39. Does the school administration provide you with the following materials? *(TICK ALL THAT APPLY)/ Ubuyobozi bw'ikigo bwaba bubaha ibikoresho bikurikira? (HITAMO MURI IBI BIKURIKIRA)*
    - ☐ Paper for students/Impapuro z'abanyeshuri
    - ☐ Chalk/Ingwa
    - ☐ Posters for use in classroom/Impapuro nini zo mu ishuli
    - ☐ Books for students/Ibitabo by'abanyeshuri
    - ☐ Instructional technology (e.g., cell phones with speakers)/Ibikoresho by'ikoranabuhanga (terefoni n'indangururamajwi)
    - ☐ Laptops for students/Mudasobwa z'abanyeshuri
    - ☐ None of the above/Nta nakimwe muri ibi
    - ☐ Other/ikindi: _____

40. How often do parents/caregivers of your students come to school to talk with teachers? / (Ni inshuro zingahe ababyeyi b'abana wigisha baza ku ishuli kukureba?)
    - ☐ At least once a week/Rimwe mu cyumweru
    - ☐ At least once a month/Rimwe mu kwezi
    - ☐ At least once a semester/Rimwe mu gihembwe
    - ☐ At least once a year/Rimwe mu mwaka
    - ☐ Never/Nta narimwe

41. How do you decide when to hold a student back a year? (CHECK ALL THAT APPLY) / (Ugendera kuki mu gusibiza umunyeshuri? Hitamo ibisubizo byose bishoboka)

Reason/Impamvu	YES/Yego	NO/Oya
41.1 Poor attendance//Gusiba ishuli cyane		
41.2 Low grades/amanota macye		
41.3 Behavioral problems/Ibibazo by'imyitwarire		
41.4 Student is an inappropriate age for the grade/ Umunyeshuri ufite imyaka irenze ishuli yigamo		
41.5 Parent requests that the student be held back/ Bisabwe n'ababyeyi b'umunyeshuli		
41.6. Government policy/ Amabwiriza ya Leta		

Thank you/Murakoze!

SCHOOL OBSERVATION FORM

A. Assessor Name/ Izina ry'umukozi wa L3	
B. Date of the visit /Itariki	
C. Province/Intara:	
D. School District/Akarere:	
E. School Name/Izina ry'ishuli:	

Infrastructure/Imyubakire

Please note availability and condition of the following/Garagaza niba ibi bikurikira bihari ndetse nuko bimeze

	None/ Ntibihari	**Poor condition/ availability/Bimeze nabi cyane/Nibicye cyane**	**Adequate condition/ availability/Bimeze neza mu rugero/Birahari mu rugero**	**Good condition/ availability/Bimeze neza cyane/Birahari bihagije**
1. School building/Amazu				
2. Roof/Ibisenge				
3. Electricity/solar panels/Umuriro				
4. Drinking water/Amazi meza				
5. Separate latrines for boys and girls/Ubwiherero bw'amahungu n'abakobwa				
6. Blackboards in classrooms/Ibibaho byo mumashuli				
7. Clean, ventilated classroom space/Amashuli asukuye, yisanzuye				
8. Good lighting in classrooms/urumuri ruhagije mu mashuli				

	None/ Ntibihari	Poor condition/ availability/Bimeze nabi cyane/Nibicye cyane	Adequate condition/ availability/Bimeze neza mu rugero/Birahari mu rugero	Good condition/ availability/Bimeze neza cyane/Birahari bihagije
9. Desks for students/Intebe z'abanyeshuri				
10. Reading materials for students/Ibikoresho byo gusoma by'abanyeshuri				
11. Writing materials for students (e.g, paper, slate boards)/Ibikoresho byo kwandikaho by'abanyeshuri (impapuro, nibindi				
12. Library/resource center/Isomero				
13. Safe space for students to run and play outside/Imbuga yo hanze itekanye yo gukiniramo				

14. Are there print materials (posters, signs, etc) on school or classroom walls?/Haba hari imfashanyigisho (posters, signs, nibindi) bimanitse ku bikuta mu mashuli?
    - ☐ Yes, print materials in classrooms/Yego, mu mashuli
    - ☐ Yes, print materials in hallways/Yego, hanze mu kigo
    - ☐ No print materials displayed/Ntabigaragara

15. Where are L3-provided printed teacher guides observed?/Ni hehe wabonye ibitabo by'abarimu bya L3?
    - ☐ In teachers' hands/Nabibonanye abarimu
    - ☐ In the library/Nabibonye mu isomero
    - ☐ In the headmaster office/Nabibonye mu biro by'umuyobozi w'ikigo
    - ☐ In boxes in which they were delivered/Mu makarito byatangiwem

16. Where are the majority of L3-provided student books observed?/Ni hehe wabonye ibitabo by'abanyeshuri bya L3? (Only tick one response)
    - ☐ In student hands/Nabibonanye abanyeshuri
    - ☐ In classrooms on shelves/Mu tubati mu mashuri
    - ☐ In teachers' hands/Nabibonanye abarimu
    - ☐ In the library/Mu Isomero
    - ☐ In the headmaster office/Mu biro by'umuyobozi w'ikigo
    - ☐ In boxes in which they were delivered/Mu makarito byatangiwemo
    - ☐ None observed/Ntabyo nabonye

17. Do student books look used?/Ibitabo by'abanyeshuri bya L3 byaba bisa nibikoreshwa?
    - ☐ Yes, all look used/Yego, byose bisa nibikoreshwa
    - ☐ Yes, some look used/Yego, bimwe nibyo bisa nibikoreshwa
    - ☐ No/Oya

18. Where are L3 technologies (telephones, speakers and SD cards) observed?/Ni ibihe bikoresho by'ikoranabuganga wabonye mu ishuli?
    - ☐ In classroom /Nabibonye mu ishuli
    - ☐ In the library/Nabibonye mu isomero
    - ☐ In the headmaster office/Nabibonye mu biro by'umuyobozi w'ikigo
    - ☐ In boxes in which they were delivered/Mu makarito byatangiwemo
    - ☐ Not observed / Ntabyo nabonye

19. Do L3 technologies look like they have been used?/ Ibikoresho by'ikoranabuhanga byatanze n'umushinga L3 bya L3 byaba bisa nibikoreshwa?
    - ☐ Yes, all look used/Yego, byose bisa nibikoreshwa
    - ☐ Yes, some look used/Yego, bimwe nibyo bisa nibikoreshwa
    - ☐ No/Oya

20. Comments/Andika ibindi waba wabonye:_____

21. Please take ONE photo of a classroom with students OR a student
    Preview the photo. Make sure the photo looks good and is in sharp focus before proceeding. If the photo does not look good, please delete it and try again

22. Please take ONE photo of the school building
    Preview the photo. Make sure the photo looks good and is in sharp focus before proceeding. If the photo does not look good, please delete it and try again

TEACHER QUESTIONNAIRE ABOUT REPEATERS IN THE STUDY

INSTRUCTIONS: This survey is intended to allow L3/REB to get more information on repeaters. For each student that was tested last year in 2015 who is identified as a repeater, the Kinyarwanda or English teacher should be asked to fill out this form. For P1, P2, and P3, this questionnaire should be filled out by the student's Kinyarwanda teacher. For P4, the questionnaire should be filled out by the student's English teacher/ ***Amabwiriza: Iri suzuma rigamije gufasha REB/L3 mu kubona amakuru ku bana basibiye mu ishuliMu ishuli rigaragaramo umwana wabajijwe mu mwaka ushize wa 2015, akaba yaragaragaye nk'umusibire Mwarimu we w'I Kinyarwanda cyangwe se uw'icyongereza nobo barasubiza ibi bibazo. Kuva mu mwaka wa mbere kugera mu wa gatatu ni mwalimu w'I Kinyarwanda naho mu wa kane ni mwalimu w'icyongereza usubiza ibi bibazo***	
A. Assessor Name/ Izina ry'umukozi wa L3	
B. Date of the visit /Itariki	
C. Province/Intara:	
D. School District/ Akarere:	
E. School Name/Izina ry'ishuli:	
F. Student Name/ Izina ry'umunyeshuri	First Name/Izina ry'idini_____ Family Name/Izina ry'umuryango_____
G. Grade	☐P1 ☐P2 ☐P3 ☐P4

1. Do you know why this student was retained to repeat this grade? /Ni iyihe mpamvu yatumwe uyu mwana asibira?
   - ☐ Poor attendance/Gusiba ishuli cyane
   - ☐ Low grades/Amanota macye
   - ☐ Problems with behavior/Ibibazo by'imyitwarire
   - ☐ Problems with health/Ibibazo by'uburwayi/ubuzima
   - ☐ Student was too young/Uyu mwana yari mutoya cyane
   - ☐ Parent requested student repeat the grade/Byasabwe n'ababyeyi be
   - ☐ Other___

2. Did the student attend school regularly this year?/Uyu mwana yaba yitabira ishuli buri gihe muri uyu mwaka?

- ☐ Yes/Yego
- ☐ No/Oya
- ☐ Don't know

3. Does this student have learning barriers? (e.g., poor vision or hearing, disability, chronic diseases)/Uyu mwana afite inzitize mu myigire ye (e.g. Kutareba neza cg kutumva, ubumuga, indwara idakira)?
   - ☐ yes, a lot/Yego, cyane
   - ☐ yes, some/Yego, gacye
   - ☐ no/Oya
   - ☐ Don't know

4. Is this child an orphan?/Uyu mwana ni imfubyi?
   - ☐ Yes/Yego
   - ☐ No/Oya
   - ☐ Don't know

5. Did you teach the child last year?/ Waba warigishije uyu mwana umwaka ushize?
   - ☐ Yes/Yego
   - ☐ No/Oya

6. Did the student improve this year sufficiently to be promoted to the next grade next year?/Ukurikije imyigire ye uyu mwaka, urabona azimuka noneho?
   - ☐ Yes/Yego
   - ☐ No/Oya
   - ☐ Don't know

7. Do you think this student might be at risk of dropping out?/Waba utekereza ko uyu mwana ashobora guta ishuli?
   - ☐ Yes/Yego
   - ☐ No/Oya
   - ☐ Don't know

8. Please share what you know about this student and his/her family that might impact student's attendance and performance at school? /Mwatubwira ibyo muzi kuri uyu mwana n'umuryango bigira ingaruka ku myigire ye?

Thank you/Murakoze

APPENDIX E. DETAILED RESULTS OF FARS AND MARS ENDLINE RESULTS

DETAILED RESULTS FOR FARS SUBTESTS

Descriptive Statistics for P1 FARS subtests					
Subtest	**Baseline (SY 2014)**	**Midline (SY 2015)**	**Endline (SY 2016)**	**Gain (Base/End)**	**Effect Size (Base/End)**
Oral Passage Reading (pct)	17.2	25.9	27.3%	10.1% (±3.5%)	0.32
Oral Passage Reading (wcpm)	4.8	7.5	7.7	2.9 (± 1.0)	0.32
Reading Comprehension (pct)	13.9	20.2	21.9%	8.0% (±3.3)	0.27

Percent of P1 Learners with Zero Scores on FARS subtests				
Subtest	**Baseline (SY 2014)**	**Midline (SY 2015)**	**Endline (SY 2016)**	**Change in Zero Scores (Base/End)**
Oral Passage Reading (pct)	60.3	50.4	50.2	-10.1% (±5.6%)
Oral Passage Reading (wcpm)	60.3	50.4	50.2	-10.1% (±5.65)
Reading Comprehension (pct)	68.6	63.9	59.7	-8.9% (±5.4%)

Descriptive Statistics for P1 FARS subtests, by sex						
Sex	**Subtest**	**Baseline (SY 2014)**	**Midline (SY 2015)**	**Endline (SY 2016)**	**Gain/Loss (Base/end)**	**Effect Size (Base/End)**
Boys	Oral Passage Reading (pct)	16.4	22.4	22.4	6.0 (±2.3)	.21
	Oral Passage Reading (wcpm)	4.5	6.6	6.3	1.8 (±0.7)	.22
	Reading Comprehension (pct)	13.2	17.5	18.0	4.8 (±2.2)	.18
Girls	Oral Passage Reading (pct)	18.1	29.5	32.3	14.2 (±2.7)	0.43
	Oral Passage Reading (wcpm)	5.1	8.4	9.1	4.1 (±0.8)	0.42
	Reading Comprehension (pct)	14.5	23.0	25.7	11.1 (±2.6)	0.35

Descriptive Statistics for P2 FARS subtests					
Subtest	**Baseline (SY 2014)**	**Midline (SY 2015)**	**Endline (SY 2016)**	**Gain (Base/End)**	**Effect Size (Base/End)**
Oral Passage Reading (pct)	43.1	50.5	55.0	11.8% (±4.4%)	0.30
Oral Passage Reading (wcpm)	19.2	21.5	24.8	5.7 (±2.1)	0.30
Reading Comprehension (pct)	44.5	29.7	51.0	6.5% (±4.5%)	0.17

Percent of P2 Learners with Zero Scores on FARS subtests				
Subtest	**Baseline (SY 2014)**	**Midline (SY 2015)**	**Endline (SY 2016)**	**Change in Zero Scores (Base/End)**
Oral Passage Reading (pct)	32.7	25.5	25.5	-7.1 (±5.1)
Oral Passage Reading (wcpm)	32.7	25.5	25.5	-7.1 (±5.1)
Reading Comprehension (pct)	37.7	40.6	30.0	-7.7 (±5.4)

Descriptive Statistics for P2 FARS subtests, by sex						
Sex	**Subtest**	**Baseline (SY 2014)**	**Midline (SY 2015)**	**Endline (SY 2016)**	**Gain/Loss (Base/end)**	**Effect Size (Base/End)**
Boys	Oral Passage Reading (pct)	36.5	42.5	50.7	14.2 (±3.1)	0.38
	Oral Passage Reading (wcpm)	16.1	18.0	22.7	6.6 (±1.4)	0.37
	Reading Comprehension (pct)	40.0	26.7	48.3	8.3 (±3.1)	0.22
Girls	Oral Passage Reading (pct)	49.5	58.5	59.2	9.7 (±3.3)	0.24
	Oral Passage Reading (wcpm)	22.2	24.8	27.0	4.9 (±1.6)	0.25
	Reading Comprehension (pct)	48.8	32.5	53.8	5.0 (3.1)	0.12

Descriptive Statistics for P3 FARS subtests					
Subtest	**Baseline (SY 2014)**	**Midline (SY 2015)**	**Endline (SY 2016)**	**Gain (Base/End)**	**Effect Size (Base/End)**
Oral Passage Reading (pct)	37.5%	44.7%	43.7%	6.2% (±2.9%)	0.24
Oral Passage Reading (wcpm)	22.1	25.1	25.5	3.4 (± 1.8)	0.22
Reading Comprehension (pct)	33.9%	36.8%	40.1%	6.2% (±3.0%)	0.24

Percent of P3 Learners with Zero Scores on FARS subtests				
Subtest	**Baseline (SY 2014)**	**Midline (SY 2015)**	**Endline (SY 2016)**	**Change in Zero Scores (Base/End)**
Oral Passage Reading (pct)	21.3%	18.6%	13.5%	-7.8% (±4.3%)
Oral Passage Reading (wcpm)	21.3%	18.6%	13.5%	-7.8% (±4.3%)
Reading Comprehension (pct)	26.2%	36.8%	17.0%	-9.2% (±4.7%)

Descriptive Statistics for P3 FARS subtests, by sex						
Sex	**Subtest**	**Baseline (SY 2014)**	**Midline (SY 2015)**	**Endline (SY 2016)**	**Gain/Loss (Base/end)**	**Effect Size (Base/End)**
Boys	Oral Passage Reading (pct)	34.9	38.9	38.5	3.5 (±1.9)	0.14
	Oral Passage Reading (wcpm)	20.7	21.8	22.4	1.7 (±1.1)	0.11
	Reading Comprehension (pct)	32.9	34.0	38.0	5.1 (±2.1)	0.22
Girls	Oral Passage Reading (pct)	40.1	50.6	48.8	8.7 (±2.1)	0.34
	Oral Passage Reading (wcpm)	23.5	28.4	28.5	5.0 (±1.2)	0.33
	Reading Comprehension (pct)	34.9	39.6	42.1	7.2 (±2.2)	0.27

Descriptive Statistics for P4 FARS subtests				
Subtest	**Baseline* (SY 2015)**	**Endline (SY 2016)**	**Gain (Base/End)**	**Effect Size (Base/End)**
Kinyarwanda FARS				
Oral Passage Reading (pct)	60.5%	59.5%	-1.0% (±3.3%)	-0.03
Oral Passage Reading (wcpm)	40.6	40.1	-0.5 (± 2.3)	-0.02
Reading Comprehension (pct)	56.5%	59.1%	2.6% (±3.9%)	0.08
English FARS				
Oral Passage Reading (pct)	41.9%	53.3%	11.4% (±4.1%)	0.31
Oral Passage Reading (wcpm)	26.0	35.0	9.0 (±3.0)	0.33
Reading Comprehension (pct)	19.6%	25.6%	6.1% (±3.7%)	0.19

*Data was not collected in SY 2014 for P4 given that L3 will not roll-out the intervention until SY 2016. Baseline data was collected in SY 2015. Endline data was collected in SY 2016.

Percent of P4 Learners with Zero Scores on FARS subtests			
Subtest	**Baseline (SY 2015)**	**Endline (SY 2016)**	**Change in Zero Scores (Base/End)**
Kinyarwanda FARS			
Oral Passage Reading (pct)	8.2%	5.2%	-3.0% (±2.8%)
Oral Passage Reading (wcpm)	8.2%	5.2%	-3.0% (±2.8%)
Reading Comprehension (pct)	11.3%	12.3%	-1.0% (±3.7%)
English FARS			
Oral Passage Reading (pct)	22.5%	12.6%	-9.9% (±4.3%)
Oral Passage Reading (wcpm)	22.5%	12.6%	-9.9% (±4.3%)
Reading Comprehension (pct)	58.3%	48.9%	-9.4% (±5.6%)

Descriptive Statistics for P4 FARS subtests, by sex					
Sex	**Subtest**	**Baseline (SY 2015)**	**Endline (SY 2016)**	**Gain/Loss (Base/end)**	**Effect Size (Base/End)**
Kinyarwanda FARS					
Boys	Oral Passage Reading (pct)	57.0	52.4	-4.7 (±2.3)	-0.16
	Oral Passage Reading (wcpm)	38.2	35.1	-3.1 (±1.6)	-0.16
	Reading Comprehension (pct)	53.3	53.1	-0.2 (±1.8)	-0.01
Girls	Oral Passage Reading (pct)	63.9	66.9	3.0 (±2.1)	0.11
	Oral Passage Reading (wcpm)	43.0	45.3	2.3 (±1.5)	0.12
	Reading Comprehension (pct)	59.7	65.3	5.6 (±1.8)	0.16
English FARS					
Boys	Oral Passage Reading (pct)	40.3	48.8	8.5 (±3.0)	0.23
	Oral Passage Reading (wcpm)	24.8	31.2	6.4 (±2.0)	0.25

	Reading Comprehension (pct)	17.9	22.4	4.5 (±2.4)	0.14
Girls	Oral Passage Reading (pct)	43.4	58.0	14.6 (±3.0)	0.40
	Oral Passage Reading (wcpm)	27.2	38.9	11.7 (±2.2)	0.44
	Reading Comprehension (pct)	21.2	29.0	7.8 (±2.8)	0.23

DETAILED RESULTS FOR MARS SUBTESTS

Descriptive Statistics for P1 MARS subtests					
Subtest	**Baseline (SY 2014)**	**Midline (SY 2015)**	**Endline (SY 2016)**	**Gain (Base/End)**	**Effect Size (Base/End)**
Task 1: Adding Numbers (pct)	22.4	43.6	31.3	9.0 (± 3.1)	0.32
Task 1: Adding Numbers (cpm)	2.3	4.5	3.3	1.0 (± 0.3)	0.33
Task 2: Subtracting Numbers (pct)	15.1	39.2	28.2	13.1 (± 2.9)	0.51
Task 2: Subtracting numbers (cpm)	1.6	4.0	3.4	1.9 (± 0.4)	0.49
Task 3. Comparing Numbers (pct)	39.6	60.8	55.3	15.7 (± 3.6)	0.50
Task 3. Comparing Numbers (cpm)	4.7	7.0	7.6	2.8 (± 0.9)	0.37

Percent of P1 Learners with Zero Scores on MARS subtests				
Subtest	**Baseline (SY 2014)**	**Midline (SY 2015)**	**Endline (SY 2016)**	**Change in Zero Scores (Base/End)**
Task 1: Adding Numbers (pct)	41.0	23.1	23.1	-17.9% (±5.2%)
Task 2: Subtracting Numbers (pct)	58.5	32.7	35.0	-23.5% (±5.5%)
Task 3. Comparing Numbers (pct)	19.2	9.9	7.9	-11.3% (±3.8%)

Descriptive Statistics for P1 MARS subtests, by sex						
Sex	**Subtest**	**Baseline (SY 2014)**	**Midline (SY 2015)**	**Endline (SY 2016)**	**Gain/Loss (Base/end)**	**Effect Size (Base/End)**
Boys	Task 1: Adding Numbers (pct)	26.9	41.6	31.7	4.8 (± 4.7)	0.16
	Task 1: Adding Numbers (cpm)	2.8	4.3	3.4	0.6 (± 0.5)	0.17
	Task 2: Subtracting Numbers (pct)	17.6	38.3	27.9	10.4 (± 4.3)	0.38
	Task 2: Subtracting numbers (cpm)	1.8	3.9	3.6	1.7 (± 0.7)	0.39
	Task 3. Comparing Numbers (pct)	40.9	59.7	54.2	13.3 (± 5.2)	0.41
	Task 3. Comparing Numbers (cpm)	4.7	6.8	7.3	2.7 (± 1.0)	0.45
Girls	Task 1: Adding Numbers (pct)	17.7	45.7	30.9	13.2 (± 4.0)	0.54
	Task 1: Adding Numbers (cpm)	1.8	4.6	3.3	1.5 (± 0.4)	0.53
	Task 2: Subtracting Numbers (pct)	12.5	40.2	28.5	16.0 (± 3.9)	0.67
	Task 2: Subtracting numbers (cpm)	1.3	4.1	3.3	2.1 (± 0.5)	0.64
	Task 3. Comparing Numbers (pct)	38.3	62.1	56.4	18.2 (± 4.9)	0.59
	Task 3. Comparing Numbers (cpm)	4.8	7.2	7.8	3.0 (± 1.5)	0.33

Descriptive Statistics for P2 MARS subtests					
Subtest	**Baseline (SY 2014)**	**Midline (SY 2015)**	**Endline (SY 2016)**	**Gain (Base/End)**	**Effect Size (Base/End)**
Task 1: Adding Numbers (pct)	31.5	43.7	29.2	-2.4 (± 3.3)	-0.08
Task 1: Adding Numbers (cpm)	4.0	4.5	3.0	-1.0 (± 0.6)	-0.20
Task 2: Subtracting Numbers (pct)	45.3	50.9	40.1	-5.2 (± 3.8)	-0.16
Task 2: Subtracting numbers (cpm)	5.7	5.4	4.2	-1.4 (± 0.6)	-0.26
Task 3. Multiplying Numbers (pct)	24.8	32.1	27.9	3.1 (± 2.4)	0.15
Task 3. Multiplying Numbers (cpm)	4.2	3.4	2.9	-1.3 (± 0.7)	-0.21

Percent of P2 Learners with Zero Scores on MARS subtests				
Subtest	**Baseline (SY 2014)**	**Midline (SY 2015)**	**Endline (SY 2016)**	**Change in Zero Scores (Base/End)**
Task 1: Adding Numbers (pct)	28.4	21.2	25.0	-3.3% (±5.0%)
Task 2: Subtracting Numbers (pct)	21.9	16.6	21.5	-0.04% (±4.7%)
Task 3. Multiplying Numbers (pct)	15.7	11.0	11.6	-4.1% (±3.9%)

Descriptive Statistics for P2 MARS subtests, by sex						
Sex	**Subtest**	**Baseline (SY 2014)**	**Midline (SY 2015)**	**Endline (SY 2016)**	**Gain/Loss (Base/end)**	**Effect Size (Base/End)**
Boys	Task 1: Adding Numbers (pct)	33.1	45.7	31.3	-1.8 (± 4.9)	-0.11
	Task 1: Adding Numbers (cpm)	4.2	4.7	3.2	-1 (± 0.8)	-0.07
	Task 2: Subtracting Numbers (pct)	48.0	53.1	44.5	-3.4 (± 5.6)	-0.15
	Task 2: Subtracting numbers (cpm)	6.0	5.7	4.7	-1.3 (± 0.9)	-0.11
	Task 3. Multiplying Numbers (pct)	22.1	29.7	27.9	5.8 (± 3.3)	0.26
	Task 3. Multiplying Numbers (cpm)	4.0	3.0	2.9	-1.1 (± 1.1)	-0.06
Girls	Task 1: Adding Numbers (pct)	30.0	41.7	26.96	-3.0 (± 4.5)	-0.15
	Task 1: Adding Numbers (cpm)	3.8	4.3	2.73	-1.0 (± 0.8)	-0.16
	Task 2: Subtracting Numbers (pct)	42.8	48.7	35.61	-7.2 (± 5.2)	-0.27
	Task 2: Subtracting numbers (cpm)	5.3	5.2	3.72	-1.6 (± 0.9)	-0.27
	Task 3. Multiplying Numbers (pct)	27.4	34.5	27.87	0.5 (± 3.4)	0.00
	Task 3. Multiplying Numbers (cpm)	4.4	3.7	2.90	-1.5 (± 0.9)	-0.01

Descriptive Statistics for P3 MARS subtests					
Subtest	**Baseline (SY 2014)**	**Midline (SY 2015)**	**Endline (SY 2016)**	**Gain (Base/End)**	**Effect Size (Base/End)**
Task 1: Multiplying Numbers (pct)	45.5	52.2	44.8	-0.7 (± 3.4)	-0.02
Task 1: Multiplying Numbers (cpm)	5.5	3.6	4.8	-0.7 (± 0.5)	-0.16
Task 2: Dividing Numbers (pct)	26.8	32.2	25.9	-0.9 (± 3.1)	-0.03
Task 2: Dividing numbers (cpm)	3.5	2.2	2.8	-0.7 (± 0.4)	-0.19
Task 3: Adding Numbers (pct)	45.5	55.5	45.4	0.1 (± 2.9)	0.00
Task 3: Adding Numbers (cpm)	5.6	3.3	4.6	-1.0 (± 0.5)	-0.24
Task 4: Subtracting Numbers (pct)	38.3	45.9	38.2	-0.1 (± 3.0)	0.00
Task 4: Subtracting Numbers (cpm)	6.1	2.7	3.9	-2.3 (± 1.2)	-0.21

Percent of P3 Learners with Zero Scores on MARS subtests				
Subtest	**Baseline (SY 2014)**	**Midline (SY 2015)**	**Endline (SY 2016)**	**Change in Zero Scores (Base/End)**
Task 1: Multiplying Numbers (pct)	10.1	9.9	10.2	0.1% (±3.4%)
Task 2: Dividing Numbers (pct)	26.1	27.8	26.9	0.8% (±5.0%)
Task 3: Adding Numbers (pct)	9.5	5.4	4.4	-5.1% (±2.9%)
Task 4: Subtracting Numbers (pct)	17.6	12.0	12.5	-5.1% (±4.1%)

Descriptive Statistics for P3 MARS subtests, by sex						
Sex	**Subtest**	**Baseline (SY 2014)**	**Midline (SY 2015)**	**Endline (SY 2016)**	**Gain/Loss (Base/end)**	**Effect Size (Base/End)**
Boys	Task 1: Multiplying Numbers (pct)	44.3	50.3	43.3	-0.9 (± 4.8)	-0.03
	Task 1: Multiplying Numbers (cpm)	5.7	3.3	4.6	-1.1 (± 0.8)	-0.21
	Task 2: Dividing Numbers (pct)	27.7	33.3	27.5	-0.3 (± 5)	-0.01
	Task 2: Dividing numbers (cpm)	3.7	2.3	2.9	-0.8 (± 2.2)	-0.19
	Task 3: Adding Numbers (pct)	48.7	57.4	47.4	-1.3 (± 0.7)	-0.05
	Task 3: Adding Numbers (cpm)	6.4	3.4	4.8	-1.5 (± 0.8)	-0.31
	Task 4: Subtracting Numbers (pct)	42.6	49.9	42.5	0.1 (± 4.4)	0.00
	Task 4: Subtracting Numbers (cpm)	7.8	2.9	4.3	-3.5 (± 2.2)	-0.25
Girls	Task 1: Multiplying Numbers (pct)	46.7	54.2	46.2	-0.5 (± 4.8)	-0.02
	Task 1: Multiplying Numbers (cpm)	5.3	3.8	4.9	-0.4 (± 0.6)	-0.11
	Task 2: Dividing Numbers (pct)	26.0	31.0	24.5	-1.5 (± 4.4)	-0.05
	Task 2: Dividing numbers (cpm)	3.3	2.2	2.6	-0.7 (± 0.6)	-0.19
	Task 3: Adding Numbers (pct)	42.3	53.6	43.5	1.3 (± 3.8)	0.05
	Task 3: Adding Numbers (cpm)	4.8	3.1	4.4	-0.4 (± 0.5)	-0.13
	Task 4: Subtracting Numbers (pct)	34.1	42.0	34.1	0.0 (± 4.0)	0.00
	Task 4: Subtracting Numbers (cpm)	4.5	2.4	3.5	-1.0 (± 0.9)	-0.18

Descriptive Statistics for P4 MARS subtests				
Subtest	**Baseline* (SY 2015)**	**Endline (SY 2016)**	**Gain (Base/End)**	**Effect Size (Base/End)**
Task 1: Adding Numbers (pct)	77.0	77.2	0.2 (± 2.8)	0.01
Task 1: Adding Numbers (cpm)	10.0	8.9	-1.1 (± 0.6)	-0.20
Task 2: Subtracting Numbers (pct)	62.9	62.0	-0.9 (± 3.3)	-0.03
Task 2: Subtracting Numbers (cpm)	8.2	7.2	-1.0 (± 0.6)	-0.19
Task 3: Multiplying Numbers (pct)	51.8	47.6	-4.2 (± 2.9)	-0.17
Task 3: Multiplying Numbers (cpm)	7.1	5.1	-2.0 (± 0.7)	-0.33
Task 4: Dividing Numbers (pct)	33.1	29.6	-3.5 (± 3.1)	-0.13
Task 4: Dividing numbers (cpm)	4.9	3.1	-1.7 (± 0.7)	-0.30
Task 5: Comparing Numbers (pct)	34.7	47.3	12.7 (± 1.2)	0.62
Task 5: Comparing Numbers (cpm)	6.3	6.8	0.5 (± 0.3)	0.09

*Data was not collected in SY 2014 for P4. Baseline data was collected in SY 2015 and endline data in SY 2016.

Percent of P4 Learners with Zero Scores on MARS subtests			
Subtest	**Baseline* (SY 2015)**	**Endline (SY 2016)**	**Change in Zero Scores (Base/End)**
Task 1: Adding Numbers (pct)	2.6%	2.1%	-0.5% (±1.7%)
Task 2: Subtracting Numbers (pct)	7.8%	5.7%	-2.1% (±2.8%)
Task 3: Multiplying Numbers (pct)	5.6%	4.1%	-1.5% (±2.4%)
Task 4: Dividing Numbers (pct)	19.7%	16.1%	-3.6% (±4.3%)
Task 5: Comparing Numbers (pct)	27.6%	2.8%	-24.8% (3.8%)

*Data was not collected in SY 2014 for P4. Baseline data was collected in SY 2015 and endline data in SY 2016.

Descriptive Statistics for P4 MARS subtests, by sex					
Sex	**Subtest**	**Baseline* (SY 2015)**	**Endline (SY 2016)**	**Gain/Loss (Base/end)**	**Effect Size (Base/End)**
Boys	Task 1: Adding Numbers (pct)	80.0	79.5	-0.5 (± 3.9)	-0.02
	Task 1: Adding Numbers (cpm)	10.6	9.3	-1.3 (± 1)	-0.22
	Task 2: Subtracting Numbers (pct)	67.0	64.3	-2.7 (± 10)	-0.10
	Task 2: Subtracting Numbers (cpm)	8.8	7.6	-1.2 (± 3.3)	-0.22
	Task 3: Multiplying Numbers (pct)	51.6	45.8	-5.9 (± 0.9)	-0.22
	Task 3: Multiplying Numbers (cpm)	7.2	5.0	-2.2 (± 1)	-0.37
	Task 4: Dividing Numbers (pct)	34.3	29.8	-4.4 (± 4.3)	-0.16
	Task 4: Dividing numbers (cpm)	5.3	3.1	-2.1 (± 0.9)	-0.35
	Task 5: Comparing Numbers (pct)	34.2	46.6	12.3 (± 3.2)	0.62
	Task 5: Comparing Numbers (cpm)	6.3	6.6	0.3 (± 0.9)	0.06
Girls	Task 1: Adding Numbers (pct)	74.0	74.9	0.9 (± -2.2)	0.04
	Task 1: Adding Numbers (cpm)	9.4	8.4	-1.0 (± 0.9)	-0.19

	Task 2: Subtracting Numbers (pct)	58.7	59.6	0.9 (± 4.7)	0.03
	Task 2: Subtracting Numbers (cpm)	7.5	6.7	-0.8 (± 0.8)	-0.15
	Task 3: Multiplying Numbers (pct)	52.0	49.4	-2.5 (± 4)	-0.10
	Task 3: Multiplying Numbers (cpm)	7.0	5.3	-1.7 (± 0.9)	-0.30
	Task 4: Dividing Numbers (pct)	32.0	29.3	-2.7 (± 0.9)	-0.10
	Task 4: Dividing numbers (cpm)	4.5	3.1	-1.4 (± 0.9)	-0.25
	Task 5: Comparing Numbers (pct)	35.1	48.2	13.1 (± 3.3)	0.63
	Task 5: Comparing Numbers (cpm)	6.3	7.0	0.7 (± 0.9)	0.13

*Data was not collected in SY 2014 for P4. Baseline data was collected in SY 2015 and endline data in SY 2016.

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