USAID/Uganda Literacy Achievement and Retention Activity

Early Grade Reading in Uganda Analytic Report: Contextual Factors that Impact Reading Outcomes

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ACRONYMS AND ABBREVIATIONS

CCT	coordinating center tutor
EGR	early grade reading
EGRA	Early Grade Reading Assessment
ICYD	Integrated Child and Youth Development Activity
LARA	Literacy Achievement and Retention Activity
LOI	language of instruction
NICHD	National Institute of Child Health and Human Development
ORF	oral reading fluency
PRIMR	Kenya Primary Math and Reading Initiative
RQ	research question
RTI	RTI International
SES	socioeconomic status
SHRP	School Health and Reading Program
SMC	School Management Committee
SRGBV	school-related gender-based violence
USAID	U.S. Agency for International Development

1.SUMMARY

This study used multi-variate regression analysis of secondary data from U.S. Agency for International Development (USAID)–supported, large-scale early grade reading (EGR) efforts in Uganda from 2012 to 2020 to identify the significant contextual factors associated with learning outcomes. The results of analysis of the contextual factors that impact reading achievement in Uganda underscore the importance of basic inputs, most previously confirmed in the literature.

In the area of school, classroom, and system, the Uganda findings are consistent with the literature in the areas of teacher training, ongoing support, and getting books in the hands of learners. The Uganda analysis provides new evidence for the importance of head teacher training and the role of school leadership and management. It also provides evidence that diverges from the literature in finding the positive association between reading achievement and gains and school community support.

For teacher and instructional support, the Uganda analysis findings are consistent on the importance of books and a print rich environment, explicit instructional practices, assessment, teachers' language and use of teachers' guides. The Uganda analysis provides new evidence on the importance of use of textbooks, lesson planning, teacher-learner relationships and teacher background and provides divergent evidence on the importance of learner work on classroom walls.

For learner and home factors, socio-economic status (SES) and reading at home were found to be associated with increased reading achievement in both the existing literature and the Uganda analysis. The analysis also provides confirming evidence around learner age and repetition.

The recommendations for future EGR programming in Uganda are as follows:

- Undertake key components of reading programs such as those supported by the Ministry of Education and Sports through the Global Partnership for Education, SHRP, and LARA. This includes a 1:1 book ratio, teacher training and support, and assessment.

- Consider rapid assessments and "catch-up" programs to get early readers on track.

- Invest in teacher training that is proven to work, i.e., training that focuses on key instructional practices and includes model demonstration and practice.

- Provide ongoing teacher support through coaching with a focus on observable behaviors.

- Increase the amount of learning materials in the hands of learners and in the classroom.

- Promote positive school behaviors, such as teacher support, SMC support, links to home, and accountability.

- Promote active classroom environments.

- Provide modest support to reading-at-home efforts.

- Class size matters. Although it may not be the most cost-effective investment, especially without changing the availability of materials, instructional practices, and school and classroom dynamics, it is still a factor that needs to be considered.

Although rich data sets from USAID-supported education programs from 2012 to 2020 provided an opportunity to explore reading outcomes, there were limitations to this approach. Mainly, the expected contextual factors were either not found in the data or were found but were non-significant. Even if a contextual factor was not significantly associated with learning outcomes, however, it does not mean that it was not potentially associated with learning outcomes. This study attempts to mitigate this challenge by situating the analytical findings within the existing literature.

2. INTRODUCTION

USAID has been supporting EGR in Uganda since 2012—first through the USAID/Uganda School Health and Reading Program (SHRP), which supported the Ministry of Education and Sports' (MoES') efforts from 2012 to 2019, and then through the USAID/Uganda Literacy Achievement and Retention Activity (LARA), which started in 2015 and is slated to end in 2021. Combined, SHRP and LARA reached more than 4.4 million learners in 7,600 schools (**Figure 1**). SHRP and LARA have collectively

Figure 1. SHRP and LARA EGR achievements

distributed 6.5 million pupil reading books and teachers' guides in 12 local languages and English and provided reading pedagogy training and ongoing support to more than 53,000 teachers.[1] Under SHRP, learners in program schools were correctly reading significantly more local language words per minute at the end of Primary (P)4 in 10 of the 12 languages[2]. Also, by the end of P4, significantly more learners in program schools from nine local languages were correctly reading more than 40 words per minute in English. Under LARA, learners in program schools scored significantly higher on local language oral reading fluency and comprehension tests by the end of P3 in both Luganda and Runyankore-Rukiga.[3] In Runyankore-Rukiga program schools, learners also correctly read significantly more words per minute in English.

Over the course of the eight years, SHRP and LARA have generated a substantial amount of data. The data were collected first and foremost to monitor outcomes and impacts, to ensure that activities were being implemented as intended, and to generate learning that would be incorporated into the program to improve implementation. To support USAID efforts to chart the course for future support, the Agency requested that RTI International

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[1] If MoES' reading reform efforts through the Global Partnership for Education, which followed the same methodology, are included, then numbers increase to more than 10,000 schools, 6 million learners, 8.4 million books, and almost 66,000 teachers trained and supported.

[2] SHRP examined 12 languages during its randomized control trial

[3] The NORC external evaluation examined two out of the three LARA-focused languages: Luganda and Runyankore-Rukiga.

revisit the data to gain a better understanding of the contextual factors that impact reading achievement.

> **Note regarding the selection of factors to include in the analysis**. The selection criteria for contextual factors included in this analysis intentionally cast a wide net, starting with a review of the existing literature, with attention to lower primary grades in the global south—specifically Uganda. The research team identified factors that are either associated with improved reading outcomes or with related school and classroom outcomes, such as teachers' instructional practice and attendance, and then mapped the data set to this selection. Factors with insufficient data were dropped, whereas additional factors emerging from the data set (but lacking evidence in the literature), such as a teacher's gender and certification level, were considered for inclusion by the research team on a case-by-case basis. The research team included these factors if they were considered to be potentially impactful or relevant to the Ugandan context.

3. LITERATURE REVIEW

This literature review presents the existing body of evidence regarding the contextual factors selected for this analysis, which are grouped into the following three categories: (1) schools, classrooms, and systems; (2) teacher characteristics and instructional practices; and (3) learners and home environment.

Schools, Classrooms and Systems

Key school-level factors, from the limited evidence in the global south, suggest that attendance rates, safety, and school leadership are some of the factors that may improve learning among students. Although no direct causal linkage between attendance and literacy scores was drawn, high rates of absenteeism among students and teachers observed in multiple African countries negatively impact students' opportunities to learn (Benavot & Gad, 2004; Dubeck et al., 2012), which is especially relevant in Uganda, where approximately one out of five teachers is absent on a typical school day (Bold et al., 2017). In terms of safety, in Ghana, students victimized by bullying scored at least 0.22 standard deviation lower than their peers in a standardized mathematics examination (Kibriya et al., 2017). As related to the system, an intervention in Liberia with a school management component had a greater impact on reading outcomes than the same intervention without the school management component (Piper & Korda, 2011). Additionally, there is clear evidence that the effectiveness of otherwise successful school-level interventions can be diminished by a lack of agency and buy-in of the head teachers (Bold et al., 2018) and limited managerial capacity (Stecher et al., 2001).

Within the classrooms, providing more time for learning can be especially critical for learners at risk of falling behind in learning to read, but simply adding minutes to the day is not sufficient because key determinants of the impact include how that time is used and the quality of instruction (Patall et al., 2010). Researchers (Brunette, et al., 2019) found that in Uganda, the complexity of the language of instruction (LOI) is another significant predictor of the impacts of reading interventions in 12 Ugandan languages, whereas in Ethiopia, the critical fluency thresholds that the students needed to reach to "achieve the most benefit"

when introduced to English were found in four mother tongues (Nakamura et al., 2019). These findings underline the importance of explicit guidance for teachers and students transitioning from their first language(L1) to their second language (L2), especially given that the classroom observation data from Uganda have shown that when using the local language, teachers were better able to discern issues that are specific to reading skills (Altinyelken et al., 2014). Although the effect sizes of the interventions that provide books to learners vary from zero to more than five across studies, research consistently points to the importance of coupling books (often referred to as primers which are used specifically for literacy instruction) with explicit print awareness instruction (i.e., the direction of text and having learners point to text as they read), as well as a print-rich classroom environment (Kim et al., 2016).

Systems that provide teachers with relevant and quality training have, in all but a few cases, shown higher associated student outcomes (National Institute of Child Health and Human Development [NICHD] et al., 2000) because these teachers were more likely to use evidence-based teaching methods (Darling-Hammond, 2000). However, training alone may not be enough. The findings of a meta-analysis (Joyce & Showers, 2002) showed that 95% of teachers who received some form of school-level coaching or support after a training session had demonstrated the skill in their classroom, compared with just 5% who only received the training. Effective school-level teacher support is not one dimensional—it and should incorporate a mix of external coaching, in-school mentoring, embedded professional development (Pretorius & Currin, 2010; Themane & Thobejane, 2019), and inter-school peer-learning networks (Craig et al., 1998; Pouezevara et al., 2018; Westbrook et al., 2013; Evans, 2013).

Although the SMC's findings are mixed, researchers (Barr et al., 2012) found no effects when implementing a traditional school report card activity with SMCs, but identified "substantial impacts on student and teacher absenteeism" in a second treatment group engaged in a discussion about developing and using their own monitoring tools and defining objectives, roles, and indicators.

Teacher Characteristics and Instructional Practices

Interventions have improved reading outcomes for learners with different ability levels, different socioeconomic statuses (SESs), and across multiple languages. These interventions are successful when teachers are trained and supported to provide explicit, step-by-step instruction on more than one phonemic awareness skill or strategy (NICHD, 2000) and to create multiple opportunities to model and practice reading with fluency (Kim et al., 2016).

As a conduit for achieving explicit reading instruction, step-by-step teachers' guides that support a scaffolded approach for instruction have shown to be a cost-effective tool in systems where teachers rely mainly on choral recitation and memorization of text (Barber et al., 2010; Eble et al., 2021; Global Education Evidence Advisory Panel, 2020; Piper et al., 2018). Teachers' guides and other materials should also guide teachers to create enough time for students to practice their skills, including multiple opportunities to read and re-read text each day (Kim et al., 2016) and time to practice reading on their own with grade-level texts (Kuhn & Stahl, 2003). Reading gains have also been linked with question generation (Rosenshine et al., 1996), and dialogic reading practices have been linked with improved

oral language (Bekman et al., 2011; Ntuli & Pretorius, 2005) and vocabulary development (Opel et al., 2009).

A meta-analysis of 21 studies found varying impacts of formative assessment on children's outcomes, noting that teachers' abilities to use, interpret, and respond to classroom-based findings on students' reading levels is key (Fuchs & Fuchs, 1986). Other studies found that many teachers in low- and middle-income countries do not know how to identify students who are struggling or with what they are struggling (Akyeampong et al., 2011;).

Rigorous evidence from the global south that links teacher's background and professional behavior is quite limited, though connections can be made between the factors selected for this analysis and other possible predictors of student achievement (e.g., instructional practice).

Teaching in an L2 impacts teachers' ability to implement the effective learner-centered practices previously discussed, as teachers observed in 12 sub-Saharan African countries relied more heavily on chorus teaching and memorization. In addition, learners were less likely to answer questions or participate in discussions than when a class was conducted in the local language or mother tongue (Alidou et al., 2011). When considering the role of teacher's lesson planning, although there is no evidence linking lesson plans or planning to reading achievement, researchers (Kim et al., 2016) suggest that programs should develop scripted lesson plans over having teachers develop their own plans.

No linkage was found in the review of literature between teachers' years of experience and their instructional practice; however, the authors of a 2011 World Bank report (Bruns et al., 2011) found that teacher promotion in most systems was based on years of teaching and certification rather than on student learning.

Anecdotal evidence from Ugandan teachers and students regarding the importance of positive school climate interventions and resulting changes in teacher–child relationships, implemented by STiR Education (2020) and LARA (RTI International, 2020), drove the inclusion of positive teacher-student relationships in this analysis. Another teacher-level factor selected for this analysis (i.e., teachers' peer support) is discussed with teacher coaching and support in the previous section of this literature review and is recognized as an effective means for improving teachers' instructional practice.

Learners and Home Environment

Most Ugandan learners in the early grades are older than the official age for that grade (Brunette, et al., 2017) and this can be directly linked to repetition. Repetition, in turn, has been shown to be an ineffective way to help struggling students improve their level of attainment (N'tchougan-Sonou, 2001; Smith, 1989) and leads to repeaters having lower average scores on reading tests than non-repeaters (Smith & Barrett, 2010). Interestingly, researchers (Weatherholt et al., 2019) found that pre-primary education may have a "protective effect" against repetition in Uganda—learners who attended pre-primary school were almost 4 times less likely to repeat a grade than learners who did not attend. Outside of Uganda, several studies tested low-cost pre-primary models at large scale and found positive impacts on learning in India (Ganimian et al., 2020), Kenya (Ngware et al., 2018), and Uruguay (Berlinski & Galiani, 2007). Although some pre-primary programs had initial impacts that faded over time (Attanasio et al., 2017; Dillon et al., 2017; Hasan et al., 2019), others had long-term impacts on enrollment (Gormley et al., 2018), cognitive development, and learning (Berlinski et al., 2009, Martinez et al., 2017; Wolf et al., 2019).

In addition to over-age and repetition, students' learning outcomes can be negatively impacted by their disability status, SES, and prior exposure to violence. In Uganda, students with disabilities are three to four times more likely to be out of school (Sylla et al., 2012). Family members with disabilities must also be considered. For instance, according to a study (Sylla et al., 2012), P6 learners in Uganda who missed school to take care of a family member with a disability had lower than average reading scores. The Kenya Primary Math and Reading (PRIMR) Initiative had positive impacts for all students, but greater increases were found among "less poor" groups of children (Piper et al., 2015). The first section of this review discusses the linkage between negative effects of experiencing violence and their impact on students' test scores.

By the end of P3, evidence suggests that proficiency in the L1 is critical for children at the point of transitioning to their L2 as the LOI (in P4). In Ethiopia, structural breaks for L1 to L2 decoding transfer were detected in four mother tongues (Nakamura et al., 2019), whereas in Kenya, the transfer of language skills from Kiswahili to English was only evident for learners who received explicit Kiswahili literacy instruction (Kim & Piper, 2019). In addition to achieving a minimum level of reading proficiency in their mother tongue, students are also more likely to become stronger readers when their parents are involved (Senechal, 2006) and educated because more literate mothers in multiple countries have shown to make more "learning-oriented" decisions for their children (Andrabi et al., 2017; Behrman et al., 1999; Guryan et al., 2008).

4.   RESEARCH DESIGN

The objectives of this current research were to identify the contextual factors that are significantly linked with reading outcomes and to provide recommendations for future USAID-funded reading interventions. The research team accomplished these objectives by conducting a secondary data analysis of existing data sets collected as part of the monitoring and evaluation activities from the USAID/Uganda LARA and SHRP from 2012 to 2020. The research team conducted multi-variate analyses to determine which contextual factors predict student learning outcomes. Although these analyses included demographic factors (e.g., SES), the focus was on predictors of learning outcomes that could be potentially incorporated into future programming.

Research Questions

The research questions focus on determining factors for student learning (Research Question 1) and student learning gains (Research Question 2). Research Question 3 interprets the findings of the previous two questions into practical implications for reading programs. The three research questions are as follows:

- **Research Question 1:** What student-, teacher-, and school-level factors are associated with higher local language and English reading performance in Uganda?

- **Research Question 2:** What are the student-, teacher-, and school-level characteristics associated with gains in learning outcomes?

- **Research Question 3:** What are the implications of the findings for implementing reading programs in Uganda?

The difference between Research Questions 1 and 2 relate to understanding achievement versus learning gains. Research Question 1 focuses on the contextual factors that are linked with achievement at a single, fixed point in time. In contrast, Research Question 2 focuses on growth, specifically changes in learning outcomes between two time points. Therefore, Research Question 1 is more related to the value added of a reading program over time (**Figure 2**), whereas Research Question 2 is more related to reading program impact evaluations, usually measured by the change in learning outcomes over time.

Figure 2. Student learning gains and learning achievement.

About the Data

For a data set to be considered for the secondary analysis for this study, the research team established minimum requirements: (1) the data set must have learning outcomes and (2) surveys or observations must have been conducted during data collection visits (e.g., classroom observations of lesson instructions or head teacher interviews) (**Table 1**). Evaluations of the LARA Journeys program also included school-related gender-based violence (SRGBV) surveys. The research team employed a common link, such as a school code, to merge these surveys or observations with student outcome data.

Table 1 shows which survey tools were used alongside the learning outcomes, however not every tool was used consistently in every data collection cycle. Consequently, data for many of the surveys conducted was limited to certain grades, languages, and years.

Table 1. Secondary Data Used for Analysis.

| EGR Program Data Set/Years | Data Set Structure | Instruments | | | | | | | Languages | Number of Schools Sampled | Grades Studied | |
		Local Language EGRA	English EGRA	Teacher Interview	Head Teacher Interview	Classroom Observation	SRGBV Student Interview	SRGBV Staff Interview			RQ1	RQ 2
SHRP 2012–2018	Cohort longitudinal	✓	✓	✓	✓	✓			12 local languages	378	P2	P2 to P3
NORC LARA Evaluation 2017–2019	Cross-sectional	✓		✓	✓	✓			Luganda and Runyankore-Rukiga	264	P3	NA
LARA Longitudinal 2018–2019	Student longitudinal	✓					✓	✓	Luganda	98	P3	P2 to P3
LARA Monitoring 2016–2019	Cohort longitudinal	✓	✓	✓	✓				Luganda, Runyankore-Rukiga, and Runyoro-Rutooro	63	P1	P2

Instruments

The evaluation data used the Early Grade Reading Assessment (EGRA) to assess students' early literacy skills. EGRA is an oral diagnostic assessment of pre-reading and reading skills that serve as a foundation for student academic success. Students were assessed in the LOI used in their school and in English. For the purposes of this secondary analysis, only the following two EGRA subtasks were used:

• Orientation to print. Students were given a paragraph segment and asked to show where they would begin to read, direction of reading, and moving to the next line of text. A score out of three was assigned.

• Oral reading fluency (ORF). Students were given a simple reading passage and given one minute to read it out loud. The number of correct words read was converted to a correct words per minute rate. If a child could not identify or read the first few designated items, the subtask was discontinued.

Limitations of Data Analysis

The wealth of LARA and SHRP data for secondary data for analysis presented the rare opportunity to explore contextual factors that explain learning outcomes. However, as with all secondary data analysis, there are potential restrictions or limitations, as follows:

• Some survey questions either had a protocol or questioning approach that made it challenging to find statistical significance where research suggested significant finding would be expected.

• Not all surveys were used with all grades and languages.

• Some surveys within the evaluations used smaller sample sizes. Consequently, statistical power was less than 80% in some instances. This increased the chance of a type II error, i.e., not finding a significant effect when one actually existed.

• A lack of variability of learning outcomes reduced the statistical significance or impact of some contextual factors.

• Not all contextual factors of interest were measured by the data sets.

Just because a contextual factor is not a significant finding for the secondary data analysis does not mean that it should not be considered an important factor. Alignment of the contextual factor findings with the literature review is a key consideration to ensure that the important contextual factors receive due consideration.

> Only one contextual factor from the SRGBV had an association with learning outcomes. Possible explanations for this include:
>
> • Although LARA data collected by NORC included SRGBV data, it was not possible to reasonably link this data with learning outcomes due to the two data sets having different students and grades.
>
> • Many SRGBV indicators had ceiling effects, with more than 90% of students giving a positive response. Consequently, the low variability in response made it difficult for the analysis to show an association between the SRGBV response and learning outcomes.

Method of Analysis

The analytical approach was to construct numerous multi-variate, ordinary-least squares regression models using either learning outcomes (RQ1) or gain scores at the school or student level (RQ2) as the response variables and contextual factor variables as coefficients. Due to the large number of factor variables available in the data sets, a few models per data set/research question were developed, grouping similar factors in single models where possible, e.g., grouping teacher interview responses and classroom observations in a single model. All models included demographic variables, such as SES, to control (as best as possible) for factors that LARA and SHRP could not easily influence.

All regression models were reduced to significant factors initially using a p-value of 0.15 as a cutoff for adding/dropping. In the end, only factors significant at the 0.05 level or above were included. The models were developed using at least two iterative add-drop processes to ensure result consistency: stepwise and a manual method that tried to retain covariates associated with the research from the literature review.

All models were built with a consideration of optimized variability of learning outcomes and balanced with the largest amount of data to maximize statistical power. Output for all contextual factors included estimated impact in terms of correct words per minute estimates and associated p-value, effect size in standard deviations (Cohen's d), and percentage of participants observed doing or agreeing with a particular behavior/action.

5. FINDINGS AND DISCUSSION

Baseline Reading Levels

To help frame the increases in reading achievement and gains associated with various factors, it is important to consider the learners' beginning reading results and the continued implications for those learners with poor reading skills. EGRA findings at the beginning of P1 showed that learners were not able to read a single word—there were 100% zero scores. Upon further observation in the classroom, it was noted that learners entered P1 totally unfamiliar with print, i.e., they did not know how to find a specific page or choose the correct book even when looking at a picture. The term "less than zero" was coined to reflect the learners with no basic pre-reading skills. Incorporating this concept into the EGRA confirmed what was observed in practice: 50% of the zero score learners did not know where to start reading or which direction to read (a basic pre-reading concept; **Figure 3**).

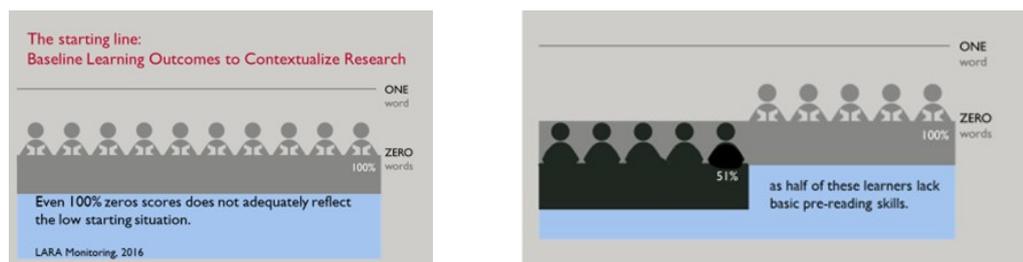**Figure 3. Baseline reading outcomes in P1 learners.**

Figure 4 illustrates that poor readers fall further behind as they progress to the next grade. The increase in correct words read per minute from the end of P2 to the end of P3 by those designated as nonreaders at the end of P2 increased by 7.1 words on average. This was half the increase experienced by beginner readers who read 15.8 additional words, emergent readers who read 12.7 additional words, and readers who were already fluent read an additional 8.5 words per minute at the end of P3 compared to end of P2.

Figure 4. Average Reading Fluency Gain (correct words per minute) P2 to P3 by Reading Proficiency.
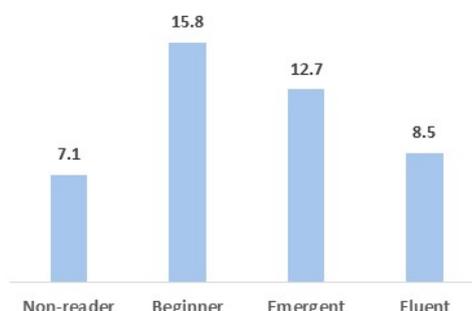

Figure 5. Average gain in words read.
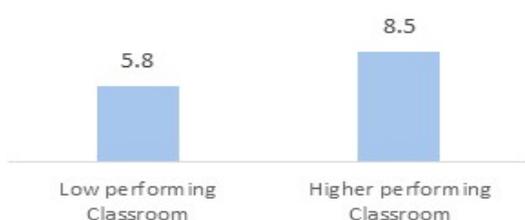
Learners in a poor performing classroom struggle to increase scores as shown in **Figure 5**. Non-readers in a low performing classroom (i.e., with more than 40% non-readers) gain literacy skills at a slower rate than non-readers in a higher performing classroom. On average, non-readers in a low performing classroom read 5.8 additional words from the end of P2 the end of P3, compared to non-readers in a higher performing classroom who gained an additional 8.5 words.[4]

It is important to acknowledge the baseline skill level when developing programs and policies (**Table 2**). One way to know where learners are is to conduct a rapid reading assessment. To increase learner skills, classrooms need a 1:1 book ratio, while teachers need training and ongoing support to ensure that they can help learners catch up. Because starting levels determine how quickly learners progress (in addition to their placement in a low or high performing class), it is paramount that planning and policy include a focus on equity.

Table 2. Implications of baseline skill levels.

Implications	What to do about it?
Know where learners are starting in terms of pre-reading skills and abilities	Conduct a rapid reading assessment
Adjust teaching to meet learners where they are	Implement EGR programs with a 1:1 book ratio and provide teacher training/support so they can help children catch up
Starting levels also determine how quickly learners progress to higher levels	Focus on equity

[4] LARA Longitudinal Data: Difference was 2.9 words (p = 0.03) and effect size = 0.30

Contextual factors significantly associated with reading achievement and gains

For this analysis and discussion, the contextual factor findings are grouped into the same three categories used in the literature review:

1.   Schools, classrooms, and systems

2.   Teacher characteristics and instructional practices

3.   Learners and home environments

For each of these categories, we summarize what we know from the literature, what we have found in the Uganda data and the implications of the findings.

Figure 6 is the key for understanding the presentation of results. Results are shown as additional words read per minute as reading achievement or gain (denoted by a dark blue border). The p-value is denoted by white dots and the effect size by the presence of check marks. The prevalence of the practice, i.e., whether most, some, or few are undertaking the practice.

Figure 6. Interpreting the findings

Impact measure: Additional words read per minute, achievement

PRACTICE	STATISTICAL SIGNIFICANCE	EFFECT SIZE
MOST >60%	○○○ p<0.001	✓✓ 0.50 or more
SOME 30–59%	○○ p<0.01	✓ 0.20 to 0.49
FEW <30%	○ p<0.05	Less than 0.20

□ GAINS
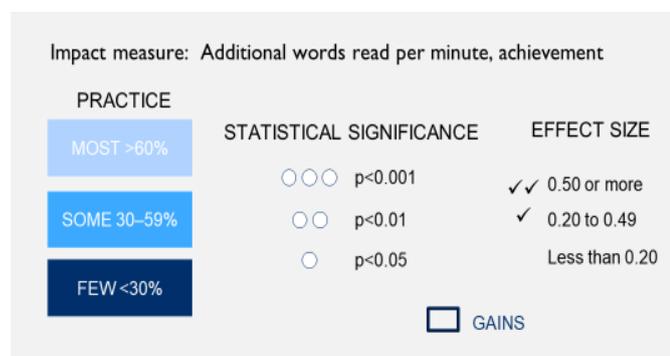
Schools, Classrooms and System Factors Associated with Reading Achievement

Table 3 lists the school, classroom, and system factors found to be significantly associated with reading achievement in the literature (left column), factors associated with other school-related outcomes (middle column), and factors with little or no evidence but included in this analysis because of their relevance to the Ugandan context or potential impact (right column). The factors with a check mark were found to be significantly associated with reading achievement (or gain) in the Uganda analysis.

Table 3. Evidence from the Literature and the Uganda Analysis (✓): Schools, Classroom and System

Existing Evidence of Impact on		
Student Learning Outcomes	**Other School Related Outcomes**	**Little/No Prior Evidence**
- Teacher training and ongoing support✓ - School leadership/management✓ - Books in learner's hands✓ - Time on task - Safety - LOI	- Class size✓ - Supportive SMC✓ - Teacher and student attendance (in lower primary) - Teacher-student relationships	Head teacher training✓

Factors found to be significantly associated with reading achievement in the literature that were also found to be significant in the Uganda analysis include teacher training and support, school leadership and management, and books in the hands of learners. Factors found to be significantly associated with other school-related outcomes in the literature, or that had little or no prior evidence of impact but that were found to have a significant impact on student's reading outcomes in the Uganda analysis, include class size, a supportive SMC, and head teacher training.

Table 4 shows the additional words read associated with each of the factors found to be significant in the Uganda analysis, as well as the p-value, effect size range, and the proportion practicing or undertaking the practice. The additional words read associated with these factors ranged from 1.3 to 8.0. Teacher training had the largest impact on reading achievement with an increase in 8.0 words in the local language and 6.8 words in English. Considering that few teachers were trained in the year of the survey, this is an important area for focus. Widespread access to pupil books and community support (as evidenced by the support of SMCs) were also found to be important factors. Regular review of lesson plans and evidence of having regular lesson plans are important indicators not only of teacher preparation and practice (regular lesson planning), but indicators of accountability and oversight at the school (as is having up-to-date attendance records).

Table 4. Contextual Factors Associated with Reading Achievement and Gain: Schools, Classroom, and System [5]

[Circles represent statistical significance, check marks effect size and shading percent practicing behavior (dark blue=few, medium blue=some, light blue=many, boxes with blue border are gains].

	Factor	**Local Language**	**English**
School Leadership	Head teacher training	4.4✓ ○○○	3.2 ○

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[5] Please refer to Table 6 on page 12 for explanation of symbols.

	Factor	Local Language	English
and Management	Teacher training	8.0✓✓ ○○○	6.8✓ ○○○
	School administer observes teacher	1.9 ○	
	Evidence of regular lesson planning	2.5✓ ○○	3.6✓ ○
	Lesson plans reviewed every week		9.1✓ ○
Ongoing Teacher Support	Up-to-date attendance records	1.3 ○○	
	Coordinating center tutor (CCT) observes class	2.4✓ ○	
Books in Learner's Hands	Percent of students with books	2.7 ○	
	At least half the learners have books	4.3✓✓ ○	
Community Support	SMC supports activities	2.4✓ ○	
	SMC supports activities that promote reading		2.3✓ ○
	SMC meets at least every 2 months	1.9 ○	

Figure 7. Class size reduction and gains in reading
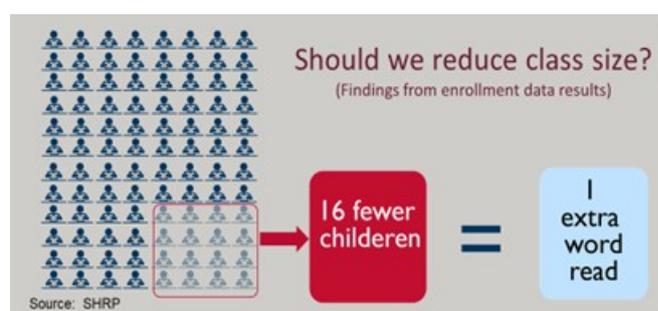
Class enrollment was also associated with reading achievement: one less student in a classroom led to a gain of 0.06 additional words. For example, learners in a classroom with 80 students would read one more word, on average, than a classroom with 96 students (**Figure 7**). Admittedly, this is a more modest gain compared to other factors and may not be a cost-effective focus.

The Uganda analysis lends evidence to the importance of training teachers and providing them with ongoing support, supplying pupil books and teachers' guides, ensuring school accountability, promoting school community support, and determining an appropriate class size. **Table 5** shows how to operationalize these findings. For example, for teacher training and ongoing support, it is important to connect training to specific instructional routines that include guiding learners to practice reading skills and assessing learner skills. Teacher training should include a significant amount of time modeling and practicing new reading-related routines and

behaviors. It is also important to train those who support teachers, e.g., CCTs, head teachers, and deputy head teachers, on how to coach and provide teachers with the guidance they need. This will help to better ensure that teachers can implement the new skills in the classroom.

Table 5. Implications of School, Classroom, and System Analysis.

Importance of….	What to do about it?
Training teachers and providing teacher support	• Connect training to specific instructional routines • Include specific training methods (modeling & practice) • Train CCTs, head teachers, and deputy head teachers on coaching skills
Providing pupil books and teachers' guides	• Teachers' guides revisions • Provide or replenish pupil books and teachers' guides
Accountability	• Create accountability measures for high leverage behaviors (e.g., observations and support)
SMC support	• Train and support SMCs to assist with specific reading-related activities
Class size	• Reducing class size has a small (but significant) impact. However, it may not be as cost-effective as other factors

Getting books into learners' hands (as is a print-rich environment, discussed later) is key to increasing learners' reading skills. Therefore, it is important that books are reprinted and replenished to ensure continued access beyond their 3- to 4-year lifespan. Teachers' guides to accompany the reading primers are also important, as is revising the guides as more is learned about effective reading instruction.

School and teacher accountability were also found to be positively associated with reading achievements, as measured by the evidence of lesson planning and up-to-date attendance records. These are both indicators that the school has accountability measures in place. It is important to create accountability measures to ensure that teachers are observed and supported in the classroom.

School community support is also important—both as SMC support to school activities in general and reading-promoting activities, which are associated with increased reading achievement and gains. Programs need to train and support SMCs to ensure their support is universal and consistent, and directly supports promoting reading achievement.

Teacher Characteristics and Instructional Practices Associated with Reading Achievement

Table 6 lists the instructional practices found to be associated with increased reading achievement in the literature (left column), factors associated with other school-related outcomes (middle column), and factors with little or no evidence but included in this analysis because of their relevance to the Ugandan context or potential impact (right column). Factors found to be associated with reading achievement (or gain) in the existing literature and in the Uganda analysis (denoted with a check mark) include explicit reading instruction practices around fluency instruction, student practice, adherence to the teacher's guide,

questioning and dialogic teaching, and formative assessment. Factors found to be significantly associated with other school-related outcomes in the literature, or that had little or no prior evidence of impact but that were found to have a significant impact on student's reading outcomes in the Uganda analysis, include vocabulary instruction and teachers background (e.g., teachers' sex, years of experience, and LOI), learner-teacher relationships, and lesson planning and organization.

Table 6. Evidence from the Literature and the Uganda Analysis (✓): Teacher Characteristics and Instructional Practices

Existing Evidence of Impact on:		Little/No Prior Evidence
Student Learning Outcomes	**Other School-Related Outcomes**	**Little/No Prior Evidence**
• Fluency instruction✓ • Books in learner's hands✓ • Adherence to teacher's guide✓ • Student practice ✓ • Questioning✓ • Discussion/dialogic teaching✓ • Assessment✓ • Phonics instruction	• Vocabulary instruction✓ • Teachers background (language) ✓ • Teacher peer support	• Teacher-learner relationships ✓ • Teachers background (e.g., sex and years of experience) ✓ • Lesson planning and organization✓

Table 7 shows the teacher characteristics found to be significantly associated with reading achievement in Uganda. Specifically, if the teacher is female, learners read 2.4 more words in English. If the teacher's mother tongue is the same as the LOI, learners read 2.4 additional words. Finally, learners read 0.4 words for each additional year of experience his/her teacher has.

Table 7. Contextual Factors Associated with Increased Reading Achievement and Gain: Teacher Characteristics. [6]

Factor	Local Language	English
Teacher is female		2.4 ○
Teacher's mother tongue is same as the LOI	2.4✓✓ ○	
Teacher experience (additional years)	0.4 ○○○	

Figure 8 shows the instructional practices found to be significantly associated with reading achievement and gains. The x-axis is the number of additional words read, while the y-axis

[6] Please refer to Table 6 on page 12 for explanation of symbols. Circles represent statistical significance, check marks effect size and shading percent practicing behavior.

is the percent of teachers who implemented the practice. The size of each bubble relates to the effect size, while the bubble's color corresponds to the area of practice: books/print environment (light blue), planning (bright blue), friendly practices (light gray), assessment (dark gray), and other explicit instruction (dark blue). It is worthwhile to emphasize the practices that are associated with a greater number of words read, but one should also focus on the practices that fewer teachers undertake, as found in the lower right quadrant (high impact, few teachers doing). The practices in the circle all have to do with the promotion of a print rich environment, including learners work displayed on the walls and the displays being in the local language. It is easy to observe the pervasiveness of the light blue bubbles—all practices related to books, including teachers' guides, and the print environment. Having a print-rich classroom is associated with 7.5 additional words read (effect size 0.53), while at least half of the learners having books is associated with an additional 4.3 words read (effect size 1.11).

Figure 8. Teacher instructional practices significantly associated with reading achievement and gains.
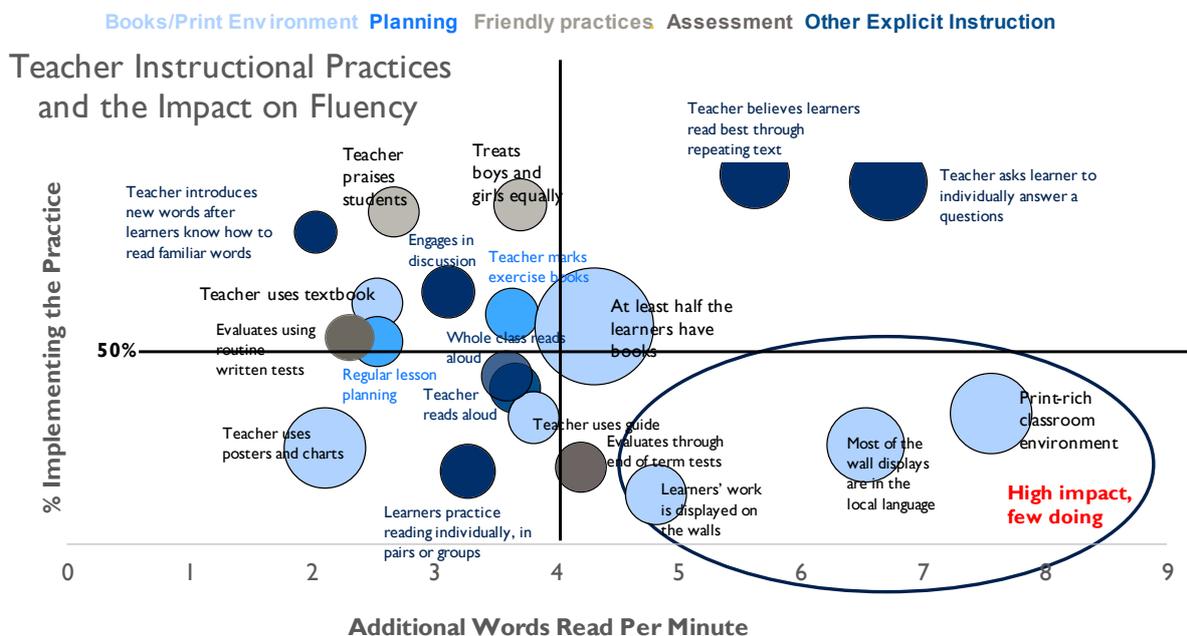
The dark blue circles represent other explicit instructional practices, including the high impact of teachers asking learners to individually answer a question, which is associated with an additional 6.7 words read. This reflects a questioning classroom and dialogic pedagogy, as does a teacher engaging learners in discussion.

Learners practicing reading (individually, in pairs, or in groups) during the reading lesson is very important to their acquiring fundamental reading skills, but it is surprising how little it is done during a reading lesson—it was observed in fewer than 20% of reading lessons. Although most teachers were observed praising students (87%) and treating boys and girls the same (89%), just over half carried out the planning activities (53% regularly planned lessons and 60% regularly marked exercise books). Assessment activities were carried out even less frequently.

The Uganda analysis provides evidence on the importance of explicit instructional practices. This includes teachers asking questions and engaging the class in a discussion; supporting individual, pair, and group practice of reading skills; the teacher reading aloud; and leaners reading aloud. This leads to the question: how do teachers acquire these explicit practices? First, it is important that these practices are included in teacher training, including practicing and modeling during training and through ongoing support provided in the classroom. The analysis also provides evidence for the importance of books in the hands of all learners and a print-rich classroom. These books (sometimes referred to as reading primers as mentioned above, which are ideally accompanied by a teachers' guide) should be provided and used daily. Supplementary reading materials, such as story books, should also be provided and teachers should be trained and supported in their use. Teachers should also be trained and encouraged to incorporate child-friendly practices (such as praising students and calling on boys and girls equally) and promote an active classroom in general (**Table 8**).

Table 8. Implications of Teachers/Instructional Practices Analysis.

Importance of….	What to do about it?
Explicit instructional practices	• Ensure specific instructional practices are modeled and practiced (during training and follow up support)
	• Encourage use of the teacher's guide
Print-rich classroom	• Books available at a 1:1 book-to-pupil ratio • Use books daily • Make other supplementary reading materials available and support teachers in their use. • Encourage active classrooms

Learner and home characteristics associated with reading outcomes

Table 9 lists learner and home characteristics associated with reading achievement and gains from the literature and the Uganda analysis. The literature and the Uganda analysis both found SES and reading at home to be significant predictors of reading achievement. The Uganda analysis (denoted with a check mark) also found that a learner's age (specifically being overage) and repetition of grades are significant predictors of reading achievement.

Table 9. Evidence from the Literature and the Uganda Analysis (✓): Learner and Home

Learner and Home	
• Attended Pre-primary • Age✓ • Repetition✓	• Read at home✓ • SES✓ • Exposure to violence • Disability

Table 10 shows the learner and home contextual factors found to be significantly associated with reading achievement in Uganda. Learners repeating a grade or being overage are both negatively associated with reading achievement. For example, grade repetition is associated with fewer words read in both the local language (-0.8 words) and English (-1.4 words). The learner being overage for his/her grade is associate with 1.9 fewer words read in the local language and 3.7 fewer words in English. Like teachers, a student's sex also impacts their achievements. For example, a female learner is associated with increased reading achievement (6.6 additional words) and reading gain (3.7 words) in the local language. Finally, a learner's exposure to someone reading in their home is significantly associated with a modest increase in the words read in all 10 local languages and English.

Table 10. Contextual Factors Associated with Increased Reading Achievement and Gain: Learner and Home. [7]

Factor	Local Language	English
Learner is repeating grade	-0.8 oo	-1.4 oo
Learner is overage for grade	-1.9 ooo	-3.7✓ ooo
Learner is wearing shoes	1.5 ooo	3.3✓ ooo
Learner is female	6.6✓ ooo	
	3.7✓ ooo	
Learner is exposed to someone reading in their home	0.7 oo	1.1 ooo

The analysis found significant associations between SES and sex and reading achievement. However, although these are unchangeable factors that one needs to be aware of, they are not a major focus considering scarce resources. Grade repetition was also associated with lower reading achievement. Ultimately, attention should be given to promoting home support for reading as efforts to improve reading and the quality of learning in general should make it possible for learners to progress to the next grade at the expected pace (**Table 11**).

Table 11. Implications of School, Classroom, and System Analysis

Importance of….	What to do about it?
SES and sex	• Unchangeable factors. Be aware, but effort should be focused elsewhere.
Home support and seeing someone read at home	• Small effect that warrants modest support.
Grade repetition	• Focus on quality learning to ensure learners can progress to the next grade as expected.

Discussion and Recommendations

[7] Please refer to Table 6 on page 12 for explanation of symbols. Circles represent statistical significance, check marks effect size and shading percent practicing behavior.

The findings from the Uganda analysis confirm findings in the literature, add new evidence, and (in some cases) diverge from the literature (**Table 12**).

Table 12. Linking Uganda Analysis to the Literature

	Consistent with Existing Evidence	Provides New Evidence	Divergent with Existing Evidence
Schools, Classroom, and System	• Training teachers • Ongoing support • Books	• Head teachers • School leadership/management	• SMC engagement
Teachers and Instructional Practices	• Explicit instructional practices • Assessment • Print-rich classroom • Teacher's language • Use of teachers' guides	• Use of textbooks • Lesson planning • Teacher-learner relationships • Teacher's sex and years of experience	• Learners' work displayed on classroom walls
Learner and Home	• SES • Reading at home • Age • Grade repetition		

In the area of school, classroom, and system, the Uganda findings are consistent with the literature in the areas of teacher training, ongoing support, and getting books in the hands of learners. The Uganda analysis provides new evidence for the importance of head teacher training and the role of school leadership and management. It also provides evidence that diverges from the literature, such as finding the positive association between reading achievement and gains and school community support.

For teacher and instructional support, the Uganda analysis findings are consistent in finding a positive association between reading outcomes and the importance of books and a print rich environment, explicit instructional practices, assessment, teachers language and use of teachers guides. The Uganda analysis provides new evidence on the importance of use of textbooks, lesson planning, teacher-learner relationships and teacher background. The analysis provides divergent evidence on the importance of learner work on classroom walls.

For learner and home factors, SES and reading at home associated with increase reading achievement was found in both the existing literature and the Uganda analysis. The Uganda analysis also provides confirming evidence around learner age and repetition.

The analysis of existing data from USAID-supported, large-scale reading programs in Uganda points to the importance of many basic inputs to reading acquisition, which are found in the literature and within USAID's current and past education programs (e.g., LARA and SHRP). These include teacher training, ongoing support for teachers in the classroom, books in the hands of learners, print-rich classrooms, the promotion of management and school behaviors, and positive and active classroom environments. The data also suggests the importance of rapid assessment to understand where learners are and developing "catch-up" programs to get learners on track. This is especially important during COVID-19 and the associated prolonged school closures.

The recommendations for future EGR programming in Uganda are as follows:

- Undertake key components of reading programs such as those supported by the Ministry of Education and Sports through the Global Partnership for Education, SHRP, and LARA. This includes a 1:1 book ratio, teacher training and support, and assessment.
- Consider rapid assessments and "catch-up" programs to get early readers on track.
- Invest in teacher training that is proven to work, i.e., training that focuses on key instructional practices.
- Provide ongoing teacher support through coaching with a focus on observable behaviors.
- Increase the amount of learning materials in the hands of learners and in the classroom.
- Promote positive school behaviors, such as teacher support, SMC support, links to home, and accountability.
- Promote active classroom environments.
- Provide modest support to reading-at-home efforts.
- Class size matters. Although it may not be the most cost-effective investment, especially without changing the availability of materials, instructional practices, and school and classroom dynamics, it is still a factor that needs to be considered.

Recommendations for the Integrated Child and Youth Development (ICYD) Activity's learning agenda

In addition to answering the research questions, RTI team was tasked with suggesting areas for learning and inquiry for future USAID EGR efforts. **Table 13** presents these factors, along with illustrative learning agenda questions. This list includes other factors identified in the literature as having an impact on reading or other school-related results that could not be included in the current analysis or did not generate significant results. The table includes factors that are considered especially relevant to the Ugandan context (based on RTI's experiences with SHRP and LARA) and recommended for the ICYD learning agenda.

Table 13. Factors Recommended for Consideration in the ICYD Learning Agenda.[8]

Category	Contextual Factor	Illustrative Learning Question
Schools, Classrooms, and Systems	Ongoing teacher support	• What is the best mix (e.g., content and frequency) of ongoing support to teachers in the classroom? • Who is best placed to provide this support?
	Classroom routines	• What classroom norms and routines are most critical to implementing desired instructional practices, including individual reading practice? • What are the best approaches for getting teachers to adopt these routines, e.g., training, coaching, peer support?
Teacher Characteristics and Instructional Practices	Remediation and differentiation	• How can teachers best support learners with a very low literacy skill base? • How do teachers identify learners that need targeted support? • What kind of differentiated support is possible given the resource context?

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[8] When developing studies for the learning agenda, research design of the approach should be considered carefully. A better in-depth understanding of why the contextual factors were associated with learning outcomes might well be achieved through qualitative or mixed-methods approaches.

Category	Contextual Factor	Illustrative Learning Question
Learners and Home Environments	Parents attitudes and knowledge	• What messaging and medium is most effective in shifting parents' attitudes towards reading instruction and reading in the household? • What about shifting their attitudes about schooling in general?

ANNEX A: ANALYSIS DETAILS

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

Bright blue effect size =0.2 to 0.49, light blue>0.50.

Schools, Classrooms, and Systems	Factor	Data	% YES	Impact on Local Language ORF	Impact on English ORF
School Leadership and Management	Head teacher trained to support EGR	LARA NORC	56	+4.36***	+3.16*
	Teacher trained to teach LARA-introduced skills in 2019	LARA NORC	15	+7.98***	+6.8***
	Are you ever observed by a school administrator?	SHRP	96	1.94*	
	How often are lesson plans reviewed? (every week compared to never)	SHRP	54		Every week 9.05*
	Is there evidence of regular lesson planning?	SHRP	53	2.54**	3.63*
	Attendance records taken last week? (GAIN)	SHRP	84		1.27**
Ongoing Teacher Support	CCT observes class once a term or more frequently	LARA monitoring	33	2.37*	
Books in the Hands of Learners	Percent of students in class observed with books	LARA NORC	53	+2.71*	
	At least half the learners have books (reference none to less than half) [GAIN]	SHRP	57	4.31*	
School Community Support	SMC supports activities (GAIN)	LARA Monitoring	65	2.32	
	SMC supports activities	LARA Monitoring	51	2.37*	
	Does SMC support activities that promote reading?	SHRP	71		2.3*
	Does SMC support activities that promote reading? (GAIN)	SHRP	71		1.43*
	How often does SMC meet (every 2 months or more vs. once/year or never)	SHRP	92	1.94*	
	Enrollment (range 1–233)	SHRP	Mean 94		-0.06***

Teachers	Factor	Data	% "Yes"	Impact on Local Language ORF	Impact on English ORF
Teacher Classroom and	Teacher praises students	SHRP	87	2.67*	
	Teacher uses textbook	SHRP	63	2.53**	

Teachers	Factor	Data	% "Yes"	Impact on Local Language ORF	Impact on English ORF
Instructional Practices (From Classroom Observation Unless Otherwise Noted)	Is there evidence of regular lesson planning?	SHRP	53	2.54**	3.63*
	Student question: "Teachers treat girls and boys equally"?	LARA longitudinal	89	3.7*	
	Teacher response: "I only introduce new words after pupils know how to read familiar words."	LARA NORC	82	+2.03*	
	Teacher response: "Learners learn to read best through repeating text."	LARA NORC	97	+5.62*	+10.2***
	Teacher reads aloud to the class	LARA NORC	41		3.66**
	Teacher asks learners to individually answer a question or to do a task.	LARA NORC	95	+6.72**	13.2***
	Students practice their reading individually, in pairs, or in groups	LARA NORC	19	+3.27**	
	Engage in discussion about theme or sub-theme	LARA NORC	66	+3.12*	
	The LARA P3 teacher guide is used in the lesson	LARA NORC	33		3.81 (p=0.05)
	"Fairly" or "very" reading-rich classroom environment	LARA NORC	34	+7.55***	+9.27***
	Most of the wall displays are in the local language	LARA NORC	16	+6.53**	
	Learners' work is displayed on walls	SHRP	13		4.81*
	At least half the learners have books (compared to none or less than half) [GAIN]	SHRP	57	4.31*	
	Teacher uses wall posters/charts (GAIN)	SHRP	25	2.10*	
	Has the teacher marked the exercise books in the last week?	SHRP	60		3.64*
	Teacher: I evaluate students using routine written tests	LARA NORC	54	+2.30**	
	Teacher: I evaluate students through routine written tests	LARA NORC	54		+2.32*
	Teacher: I evaluate students through end of term evaluations	LARA NORC	20		+4.15**
	Whole class reads aloud	LARA NORC	44	+3.60**	
	Teacher: I evaluate students through homework	LARA NORC	34	-1.55*	-3.05*
	Teacher: I evaluate students through end of year evaluations	LARA NORC	2		-8.21***
	Teacher guides learners to read printed material	SHRP	61	-3.87*	
	Has the teacher taught as indicated in the lesson plan (local language class)	SHRP	78		-3.73*
	Is the teacher female?	SHRP	57		2.41*

Teachers	Factor	Data	% "Yes"	Impact on Local Language ORF	Impact on English ORF
Teacher Characteristics	LOI same as teacher mother tongue (GAIN)	LARA monitoring	98	2.41*	
	Years teaching experience (GAIN) [range 0–22]	LARA monitoring		0.386‡	

Student and Home	Factor	Data	% "Yes"	Impact on Local Language ORF	Impact on English ORF
Student and Home Characteristics	Repeater	SHRP	11	-0.78**	-1.41**
	Student is overage for grade	SHRP	85	-1.91***	-3.68***
	Student is wearing shoes	SHRP	30	1.53***	3.31***
	Someone at home reads (newspapers, religious texts, books)	SHRP	67	0.65**	1.14***
	Female learner	LARA longitudinal	50	+6.6 **	
	Female learner (GAIN)	LARA longitudinal	50	+3.7***	

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