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Literacy Boost Rwanda

Teacher Survey & Observation Report

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Saima Malik, Stanford University
Janvier Gasana, Rwanda Education Board
Erin Raab, Stanford University
Kijoo Cha, Stanford University
Dr. Claude Goldenberg, Stanford University

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Executive Summary

Introduction

In the autumn of 2013, researchers from Stanford University led an assessment of the teaching of reading in the Gicumbi district of Rwanda. Coordinated by Save the Children staff, with approval from both the Rwanda National Ethics Committee (RNEC) and the Stanford University Ethics Review Board (referred to as the Stanford IRB), and with in partnership with the Rwanda Education Board (REB) and the Rwandan Ministry of Education (MiniEduc), the Stanford team and its partners designed and piloted a teacher survey and classroom observation of teachers of early Primary grade students in the district. Save the Children conducted the teacher survey as part of their regular monitoring protocol and the Stanford team led analysis of this survey data. The Stanford research team and its partners collaborated in conducting the classroom observations.

The purpose of this assessment was to establish a baseline for the randomized control trial of Literacy Boost, which began implementation in January 2014. Literacy Boost is a holistic early grades reading program designed to help children learn to read better, both in-school through teacher training and support, and out-of-school through community and home activities.

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

How do teachers in Gicumbi approach the teaching of reading (including teachers' knowledge, attitudes and practice surrounding literacy instruction) at baseline?
How can this inform Literacy Boost implementation in these schools?

The teacher survey examines teachers' knowledge, attitudes and practices surrounding literacy instruction and the classroom observation provides a more in-depth look at classroom practices around reading instruction for a subset of these teachers.

Context

As this report focuses on teachers, we briefly describe the general requirements for teaching in Gicumbi. In order to get a teaching position in Gicumbi as well as in the rest of Rwanda, primary teachers need to have a certificate in teaching graded or described as A2. A teacher must also have a minimum of 18 year of age.

Data and Methods

Sample Selection

All teachers (those who were employed as teachers in Gicumbi district) were invited to participate in the survey. The teacher survey was completed by 452 teachers from 102 schools across all 21 sectors of Gicumbi district. At the end of the survey, teachers indicated their assent to be observed teaching a Kinyarwanda lesson. Twenty-one schools were randomly selected and two teachers (mostly Primary 1 but in some cases Primary 2) within each school who had consented to be observed were selected for classroom observation for a total of 42 teachers.

Survey Sample

A total of 452 primary school teachers completed the teacher survey. Respondents consisted of 39.6 percent male and 60.4 percent female teachers¹ with a mean age of 38 years. On average, teachers surveyed had 13 years of teaching experience with 8 years of experience at their current school. A vast majority of teachers (90.5 percent) had completed 6 years of secondary education.

Observation Sample

¹ There were fewer female teachers in the Control group than the Teacher Training (TT) only and the Literacy Boost (LB) groups.

A total of 42 Primary 1 and Primary 2 teachers (across 21 schools) were observed teaching a Kinyarwanda lesson by Save the Children staff members. These teachers were 77.6 percent female and 21.4 percent male. Of the classes observed, 73.8 percent were Primary 1 and 26.2 percent were Primary 2 classrooms. There was a mean of 44.9 students (22.1 male and 22.8 female) in each class. On average, the lessons observed lasted about 42 minutes.

Personnel

Survey and observation instruments were created and pilot tested by Save the Children staff and the Stanford University research team prior to data collection. Items were refined so that they were relevant to teachers and classrooms in the context of Gicumbi. Save the Children administered the teacher survey and collected data as part of their monitoring efforts and the Stanford research team agreed to analyze this data. Save the Children and the Stanford research team collaborated in administration of the classroom observations.

Data Collection

Save the Children, Rwanda staff members collected survey data. Staff members explained the purpose and methodology of the survey to teachers. Teachers who consented to participate signed a consent form before completing the survey.

Save the Children staff members served as observers for the first round of observations. Six staff members were divided into 3 teams of 2 observers each. Each teacher was observed twice and by two observers on each occasion². This was done so that reliability of classroom observations could be assessed during the analysis phase. Observation teams also received thorough training on reducing subjectivity in observation and inter-rater reliability during the observation pilot phase. Each teacher was observed by a different team on each of the two observation days. Scores from the four observations were averaged to create one composite observation per teacher. This average observation provided a picture of typical teaching practice for that teacher.

Analysis

Quantitative data was analyzed using STATA statistical software. Data was tabulated and summarized for simple descriptive statistics including means, standard deviations and percentages. In addition, ANOVA and Chi-square tests were used to check for any significant differences between the Control, Teacher Training Only and Literacy Boost groups at baseline³. Qualitative items were analyzed using Dedoose software. Codes were developed based on teacher responses and these codes were used to analyze frequencies and co-occurrences of the various responses.

Findings

Reading Material in the Classroom

Teachers displayed a good understanding of the importance of literacy materials over non-literacy materials in the development of reading skills. When presented with a list of items, a majority indicated they would purchase textbooks (77.7 percent), storybooks (61.2 percent) and flash cards (48.4 percent) over distractor items (such as soccer balls and science equipment) to help their students learn to read.

Teachers reported that reading materials (including textbooks, storybooks and posters) were only present in less than half of the classrooms and that students interacted with books (other than textbooks) daily in only 42 percent of classrooms. However few, some textbooks were found in all of the classrooms observed. Dictionaries were found in just over half of the classrooms observed whereas storybooks, religious books and newspapers were found in under half of the classrooms.

² With the exception of 6 teachers, (2 of whom had 3 observations and 4 of whom had 2 observations-due to unavailability for a follow up observation on the part of the teacher or illness on the part of an observer).

³ ANOVA and Chi-square tests revealed significant differences between groups on some items at baseline and these are mentioned in the report. However, since these differences are not more than we would expect to see by chance we can be assured that randomization of groups was appropriately done.

Most commonly found in classrooms were textbooks in Kinyarwanda (11-50 per classroom on average), followed by textbooks in English (11-50 per classroom on average) and some other print material in Kinyarwanda (1-10 per classroom on average). It is important to note that these estimates are presented as ranges that may conceal how few books were actually present. In addition, the number of students may exceed the amount of material available in classrooms.

Observers noted that some type of print material was present on the walls of 69 percent of classrooms. Most of the material found on classroom walls was teacher-made (54.8 percent of classrooms had items with text in Kinyarwanda, 45.2 percent in English, 9.5 percent in French and 7.1 percent with only images). Some of the material found on classroom walls was professionally printed or store bought (7.1 percent of classrooms had items with text in Kinyarwanda, 21.4 percent with text in English and 7.1 percent with images only). Very few classrooms had student-made material on the walls (4.8 percent of classrooms had items with text Kinyarwanda, 4.8 percent in English and 2.4 percent in French). The type of material present on walls most often was words matched to pictures whereas songs or poems were found least often on classroom walls.

Observation of General Pedagogy

In general, teachers observed provided clear instructions, responded when students were off task and used positive discipline strategies most often. Teachers almost never promoted small group interactions between students and students never asked questions during lessons. A minority of teachers observed linked lessons to previous learning in class or to students' home experiences. Only 7 percent of teachers were observed assigning literacy homework. No teachers were observed explicitly teaching students how to handle books.

Time spent on Literacy Instruction

On average, teachers spent about 26 minutes (out of an average 42 minutes) on letter knowledge, decoding/encoding or phonological awareness (including awareness of phonemes and syllables) activities, about 14 minutes on reading fluency and reading comprehension activities and about 3 minutes on vocabulary instruction.

Alphabet Knowledge

The Kinyarwanda curriculum for P1 prescribes that a pupil should be able to recognize all letters of the alphabet by end of P1 including some letter combinations. A majority of teachers surveyed (67.6 percent) felt that children should be able to identify all letters of the alphabet by Primary 1. The baseline reading assessment found that students in Primary 1 knew only 34.7% of their letters.

The majority of teachers surveyed (82 percent) identified 'being able to identify letters and the sounds they represent' as one of five most important skills for children to read well. Observers noted that teachers or students identified letters/letter sounds in 45 percent of classrooms and students wrote letters in their notebooks in 17 percent of classrooms observed. Teachers/students wrote letters in the air with their fingers (a kinesthetic, creative method of practicing letters) in 5 percent of the classrooms observed. There was evidence of teachers and students participating in decoding and encoding activities in the classroom and the activity they participated in most often (69 percent of classrooms) was sounding out words.

Phonological Awareness

The concept that teachers seemed to struggle with the most was that of phonemes and phonemic awareness. Based on discussions with team members in country, the concept of phonemes is unfamiliar to teachers in Rwanda and is not usually taught in classrooms. Unfamiliarity with the concept of phonemes may be associated with the issues faced during translation of this term on the survey forms as well, a fact that limits our interpretation of any findings related to phonemic awareness. Future rounds of assessment may shed light on potential benefits of phonemic awareness instruction in the teaching of Kinyarwanda language.

Only 31 percent of teachers identified ‘awareness of how words can be broken down into individual sounds’ as one of five most important skills for children to read well. While teachers seemed to have an understanding of the concept of syllables in a word, they did not display a correct understanding of phonemes. When asked how many phonemes are in the word ‘muraho’, only 1.4 percent correctly responded ‘6’.

Observers noted that very few teachers identified or played with words with the same beginning, middle and ending sounds. Almost no teachers used clapping or tapping to practice listening for sounds in words and only a few used clapping or tapping to listen for syllables in words during literacy lessons. There was some evidence of students generating words that contained specific sounds (50 percent of classrooms) and listening for and identifying a sound within a word said orally (26 percent of classrooms). Teachers and students in very few classrooms separated words or syllables into phonemes and teachers hardly ever made explicit mention of breaking words up into syllables.

Vocabulary

Only 20 percent of teachers surveyed identified ‘having a good vocabulary’ as one of five core reading skills and vocabulary instruction took up the least amount of observed literacy instruction time (mean=3 minutes). However, teachers seemed to display a strong understanding of activities that would develop vocabulary skills among students. During classroom observations, while teachers taught the meanings of words, less than half of the teachers taught words related to the text children had read. Almost none of the teachers explicitly taught the orthographic (standardized system for using a particular writing system) and morphological (identification, analysis, and description of the structure of a given language) structures of the words and only half practiced new vocabulary words with students. Only a few teachers taught the meanings of words by having students generate synonyms or antonyms for words.

Reading Fluency

Of teachers surveyed, 72 percent identified ‘reading accurately with proper pacing and intonation’ as one of five core skills for reading well. A majority of teachers surveyed (84.5 percent) reported an accurate understanding of what it means to read fluently. While teacher survey data indicates that teachers do not model/exhibit fluent reading to students regularly (only about 9 percent reported doing so daily), a majority of the teachers observed (90 percent) modeled fluent reading in the classroom. Some type of text (textbook, storybook, newspaper etc.) was read out loud in 95.2 percent of the classrooms observed. Teachers were observed encouraging students to read fluently (88 percent) and explicitly teaching students about fluent reading (83 percent) during lessons.

However, all students did not have the opportunity for independent reading out loud daily. While some students read individually to the entire class during observations, the number of students in the class (mean=44.9) would likely inhibit every student being able to do so regularly.

Reading Comprehension

While a majority of teachers (82 percent) identified ‘understanding what you read’ as one of five core reading skills, survey responses indicate that many teachers were unclear about which specific skills are associated with successful comprehension of text that is read (a notable number of teachers selected options such as ‘reading out loud without mistakes’ (39.3 percent), ‘reading out loud with accuracy’ (35.1 percent) and ‘repeating a text from memory’ (29.1 percent) from a list of options defining what it means to comprehend a text. According to teacher report, the strategies used to teach reading comprehension strategies most often in classrooms observed involved asking questions about text (87 percent) and asking students to summarize text (82 percent).

Observation of Teacher Questions

On average, teachers called on about four students during the lesson. Most of the questions the teachers asked students were closed ended, short answer questions (questions that elicit ‘Yes/No’ responses or very short responses such as ‘what item did the boy leave at home?’) When students responded to questions incorrectly, teachers observed had a variety of responses including calling on

another student, providing the right answer, repeating the question and providing clues about the right answer.

Literacy Assessment

Of the teachers surveyed 97.6 percent reported tracking students' literacy skills and progress in some way. Teachers report many students struggling with each of the five core literacy skills. Reading fluency was the skill that students were reported to have the most difficulty with, followed by letter identification and writing letters.⁴

Most of the teachers observed (98 percent) provided informal assessment to individual students during the lesson while only 29 percent provided formal assessment. While a majority of teachers (83 percent) kept summative assessment records, very few teachers (2 percent) kept formative assessment records of their students.

Literacy Homework

Fewer than half of the teachers surveyed reported providing any regular literacy homework to their students and teachers assigned literacy homework in only 7 percent of classrooms observed.

Second Language Learners in the Classroom

A quarter of teachers (24 percent) indicated that they had students in their classrooms whose home language was something other than Kinyarwanda (while 43 percent of teachers observed indicated this to be the case). About 76 percent of the students who have a home language other than Kinyarwanda are reported as having difficulty understanding instructions in the classroom. Only 38 percent of teachers of second language learners are fluent in the students' home language, 21 percent are conversational and 7 percent know some words and phrases. Over half of the teachers of second language learners report never using the students' home language in class in order to clarify concepts.

Recommendations

Given that frequent exposure to reading material is essential to reading development, provision of books (and other reading materials) to classrooms where they are not present is a necessary first step towards building students' literacy skills. In addition, it is recommended that LB training include guidance regarding the importance of frequent exposure to reading material to literacy acquisition as well as help teachers to develop strategies to effectively incorporate the use of books (other than textbooks) into lessons.

It is recommended that the LB program underline the importance of print material in the environment of young literacy learners and encourage teachers to create print-rich environments for their students. In addition, it is recommended that material displayed on classroom walls include examples of various types of print including letters of the alphabet, syllables, words matched to pictures, sentences, songs and poems.

Based on teacher responses to survey items, there may be a need to improve teacher knowledge regarding phonemes as well as the importance of phonological awareness and vocabulary skills to reading success. However, further research is necessary to determine if phonemic awareness is truly critical for successful reading acquisition in young children. Nonetheless, it is recommended that an understanding of phonemes be emphasized during the teacher-training component of LB implementation. Strategies that are effective in teaching vocabulary skills must also be emphasized with teachers during LB implementation.

⁴ There was a significant difference between groups in terms of understanding words in Kinyarwanda with more students reported to be struggling with that skill in the control group (41.9 percent) than the TT only group (28.9 percent). Additionally, significantly more students were reported to be struggling with decoding in the control group (51.1 percent) than the TT only group (37.6 percent).

Furthermore, classroom observations suggest that there is a need to support teachers in developing creative strategies to teach letter knowledge, reading comprehension and reading fluency.

It is recommended that LB expose teachers to research regarding the benefits associated with early involvement in literacy activities and encourage a culture where students begin to learn letters prior to the start of Primary 1.

While teachers do focus on letter knowledge activities, there is a need for supporting teachers to do so in more varied, creative ways (one such way may be writing letters in the air with fingers) that provide students with opportunities to practice their letters.

The LB program should aim to increase teacher knowledge regarding the important features of reading out loud to students (with prosody, i.e. appropriate rhythm, stress, and intonation), the benefits associated with reading out loud regularly to young literacy learners, and encourage teachers to increase the frequency of this teaching strategy. Additionally, while it is encouraging that many teachers report students reading out loud regularly, it is important that *all* teachers allow students opportunities to practice reading out loud so that students are able to practice reading fluently. The LB program can encourage teachers to create more opportunities for students to read individually, providing them with greater practice and allowing for more productive feedback when it comes to fluency.

The LB program should support teachers in learning the wide variety of strategies that are useful in teaching students to comprehend text. By having students participate in activities such as summarizing a text, discussing their opinions of content read or linking text to their own life experiences, teachers can enhance students' comprehension beyond basic facts contained in text. These strategies should be highlighted during LB implementation.

Currently, teachers appear to be asking mainly fact-based questions about text students read. LB training can encourage teachers to ask questions that help students to think more deeply about content that they are exposed to and allow students to be more creative and expressive in their dialogue about text they read.

Information regarding the importance of formative assessment as well as strategies to conduct and record this type of assessment is essential to include in LB implementation. Assignment of literacy homework should also be encouraged during LB implementation so that children have the opportunity to practice literary skills beyond the walls of their classrooms.

If the home language is indeed different than the language of instruction, it is imperative that teachers employ strategies that will ease learning for these second language learners. These strategies could include speaking clearly at a comfortable pace, using the home language strategically (brief explanations or definitions), and employing cognates (words that look and/or sound the same or very similar in both the home language and Kinyarwanda) during lessons to aid comprehension. It is recommended that these strategies that are useful for the instruction of second language learners be highlighted during LB implementation so that those students whose home language is not Kinyarwanda may fully benefit from the lessons presented.

Conclusion

Teacher Baseline assessment indicates that there are some gaps in teacher knowledge regarding the core skills of literacy development. When asked which five skills are most important in learning to read, 82 percent of teachers surveyed included letter knowledge, 82 percent included reading comprehension, 72 percent included reading fluency, 31 percent included phonological awareness (translated as identifying constituents within a word) and 20 percent included vocabulary in the list. There appears to be a lack of clear understanding among teachers regarding the concept of phonemes and phonemic awareness activities did not occur in all classrooms (although words with specific

sounds were generated in 50 percent of classrooms and specific sounds with a spoken word were identified in 26 percent of classrooms).

Classroom observations provide evidence that although teachers focus on some skills (letter knowledge, reading comprehension and fluency) in Primary 1 and Primary 2 classrooms, they are being taught in very basic ways indicating that teachers could benefit from support regarding more creative ways to teach them. Only a minority of teachers considered vocabulary one of the core reading skills and teachers observed spent the least amount of time on vocabulary instruction.

A lack of clear understanding among teachers regarding the core skills of reading development may ultimately impact student acquisition of literacy skills. Given that Literacy Boost has as strong teacher training component that highlights these core skills as well as supports teachers to adopt evidence based strategies for teaching reading within the local context, the program has the potential to positively impact literacy instruction in Gicumbi. The recommendations provided below will help target LB implementation in the district and strengthen the teaching of literacy skills in classrooms. Follow-up assessments will provide insight into the effectiveness of teacher training in this context.

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1 Introduction

This report presents findings from teacher surveys and classroom observations conducted between August and October 2013 as part of the baseline assessment of the randomized trial of Literacy Boost in Rwanda.

Teachers were recruited from the 102 schools that participated in a randomized control trial of Save the Children's Literacy Boost program. Following collection of the baseline data, the 21 sectors of Gicumbi district were assigned to either receive Literacy Boost (LB group), the teacher training part of Literacy Boost (TT only group), or to receive no program support from Save the Children for the initial phase of the project (Control group). The teacher survey covered 452 teachers from 102 schools across these 21 sectors of Gicumbi district. The classroom observation covered 42 teachers from 21 schools within the district.

This study examines teacher beliefs and practice related to the main components of reading development including letter knowledge/alphabetic principle, phonemic awareness, vocabulary, reading comprehension and reading fluency. The teacher survey examines teachers' knowledge, attitudes and practices surrounding literacy instruction and the classroom observation provides a more in-depth look at classroom practices around reading instruction for a subset of these teachers. Data gathered through the teacher survey and classroom observations is presented to provide an idea of the type of literacy instruction students receive in classrooms in participating schools. This understanding will be used to inform implementation of Literacy Boost in this region as well as provide a baseline against which to compare the literacy beliefs and practices of teachers following participation in teacher training or the Literacy Boost program.

The key research questions addressed in this report include the following:

- I. How do teachers in Gicumbi approach the teaching of reading (including teachers' knowledge, attitudes and practice surrounding literacy instruction) at baseline?
- II. How can this knowledge inform Literacy Boost implementation in these schools?

The report first describes the research methods used including sampling, instrument development, data gathering and analysis. Then it presents findings regarding availability of reading material in classrooms as well as teachers' knowledge, attitudes and practices regarding literacy instruction. The report concludes with recommendations for implementation of Literacy Boost in country.

2 Context⁵

As this report focuses on teachers, we briefly describe the general requirements for teaching in Gicumbi. In order to get a teaching position in Gicumbi as well as in the rest of Rwanda, primary teachers need to have a certificate in teaching graded or described as A2. A teacher must also have a minimum of 18 year of age.

The literacy rate in Gicumbi is 70.5 percent which is similar to the national level 67.7 percent with at least 13 percent of men to 11.1 percent women having completed primary education.

Northern Province statistics show that 15.2 percent of the population has no education, while 70.2 percent have attained primary education and 13.2 percent have attained secondary education.

Completion of primary school enables individuals contribute largely in physical economic development activities like agriculture and animal husbandry, making traditional handcraft, carpentry, commerce and trade, motorcycle transport, some load carriers in town. Of recent, many people are involved in political responsibilities as well as all the above activities do not impede them from

⁵ Source of all the data in this section come from the Rwanda Demographic and Health Survey 2010

participating in different political activities like leadership for example. In this area you can find some people who are village leaders, local defenses, in charge of community policing, etc.

Individuals who have completed secondary studies in Gicumbi district are involved in a wide range of activities including those listed above. Many of them are able to do jobs that have slightly advanced skills than the primary leavers or those who didn't have a chance to complete primary. Often completion of secondary education gives individuals more chances of employment based on post-secondary education including technical and vocation responsibilities. Secondary leavers often get training in education and end up in primary school teaching. A number also take up local leadership responsibilities including becoming Executive Secretaries of cells, secretaries in various institutions as well as veterinary assistants and at the cells levels. Other characteristic jobs include being accountants, cashiers in Savings and Credit Cooperatives, nurses, working in the policemen, serving in restaurants and bars, ticket inspectors on buses etc. A significant number also remain unemployed due to a range of reasons including mainly low levels of education.

A significant proportion of the population of Gicumbi district live on agriculture with a majority of the people involved in crop production and others involved in small scale animal husbandry. The district is largely rural with a hilly landscape. A section of the population also works on tea plantations mainly in the low laying swampy valleys. The district has wide rice fields in different wetland valleys made up of small patches owned by individuals. This often enables rice producers to cultivate at the same time and sell collectively. Other sources of livelihood include stone quarry business and charcoal making.

3 Data and Methods

3.1 Sample Selection

A survey of teaching practices was conducted with all willing teachers in primary schools in the Gicumbi district of Rwanda. The criterion for inclusion was that an individual be employed as a teacher in the Gicumbi district. A total of 452 teachers completed the survey. Teachers were asked to indicate on the survey form whether they would allow researchers to observe their teaching practice. Ninety four percent of the teachers surveyed agreed to be observed. For observation, 21 schools were randomly selected and two (either Primary 1 or Primary 2) teachers from within each school who had agreed to the observations were observed, for a total of 42 teachers. Preference was given to Primary 1 teachers but in schools where two Primary 1 teachers were either not available or had not agreed to be observed, a Primary 2 teacher was observed.

3.2 Instrument Development

3.2.1 Teacher Survey

The Stanford research team collaborated with Save the Children's Education team in Gicumbi district to develop the teacher survey form. Survey items were based on content outlined in the Literacy Boost Teacher Training Manual and aimed to investigate teacher understanding of components of literacy development, teaching and assessment strategies and the teaching of literacy skills to second language learners. Members of the Stanford research team drafted the survey, trained the Education team on the instrument remotely and sought their feedback for adjustments to the form. Following training, the Education team translated the revised survey form into Kinyarwanda and piloted it with 9 teachers in a neighboring district. The form was also translated back to English to confirm that the intended meaning of items was retained during translation⁶. The Education team provided feedback from the

⁶ A note about translation: Translation of the Kinyarwanda version of the survey from Kinyarwanda back to English revealed that the term 'phonemic awareness' had been translated in different ways on different items (e.g. as 'constituents of a word' and 'to know how words are pronounced'). These translations do not fully capture the intended meaning of the term. This error was noted following survey data collection and appropriate adjustments could not be made to the form. Since the translation did not accurately capture the intended meaning of phonemic awareness, any findings regarding teacher understanding of phonemic awareness from the survey form are limited.

pilot to the Stanford team regarding the contextual relevance of items, item redundancy, any challenges in survey administration and survey completion time. Following this feedback, the Stanford team made further adjustments to the survey form. The final form consisted of 6 sections and 45 items and had a completion time of approximately one hour. The last item on the survey form sought teacher permission to observe their classroom during a Kinyarwanda lesson.

3.2.2 Classroom Observation

The Stanford research team created the teacher observation form in order to assess the presence and use of print material in the classroom and literacy instruction practices of teachers in Gicumbi at baseline. Observation items were based on content outlined in the Literacy Boost Teacher Training manual and included checks for presence and use of reading material, explicit instruction of and strategies used to teach the five components of literacy development, classroom management and assessment strategies used by the teacher and literacy instruction for second language learners.

Members of the Gicumbi Education team served as observers for the baseline classroom observations. The Stanford research team trained the observers on the observation instrument in person. Training included piloting the form in 14 classrooms in a neighboring district. The team held an extensive debriefing and discussion following each pilot session with the aim of developing a shared understanding of items to try to achieve high inter-rater reliability and revise items to be more relevant based on experiences in the field. Items were modified based on both contextual relevance and to facilitate coding and inter-rater agreement.

The final form consisted of 196 items, most of which required observers to estimate the number of print materials (e.g. tick ‘Yes’ or ‘No’), to indicate presence of a teacher behavior/reading activity (e.g. tick ‘Yes’ or ‘No’), or indicate frequency of a behavior/activity on a scale (e.g. tick ‘Never’, ‘A Few Times’, ‘Sometimes’ or ‘Frequently’).

3.3 Data Collection

3.3.1 Teacher Survey

Once survey development was complete, the Gicumbi Education team administered the survey with teachers in the district as part of their regular monitoring protocol. Teachers signed consent forms prior to survey administration. Teachers were given the survey, instructed to complete the form independently and return it to the Education team member at the school.

3.3.2 Classroom Observation

Members of the Gicumbi Education team served as observers for the baseline observation of classroom teaching. Observers participated actively in piloting the tool and modifying items based on pilot feedback. In order to maximize inter-rater agreement, each item was discussed during the pilot phase until a shared understanding of the item and its corresponding scale was reached. Each classroom observation was conducted by two independent observers on two separate occasions (four observations total⁷) so that inter rater agreement could be assessed during the data analysis phase. Two team members were paired as co-observers and remained in this pairing for all classroom observations.

Teachers had indicated they would participate in the observation study when filling out the teacher survey. They also read and signed a more in-depth consent form, approved by the Rwanda National Ethics Committee and by the Stanford University Human Subjects Internal Review Board prior to the classroom observation. Observation pairs were present in the classroom for the duration of a lesson, and filled out the observation form during and immediately after observing. In some cases, if clarification was required (e.g. regarding presence of formal assessment records or location of books) observers spoke briefly with the teacher following the lesson. Observers did not share or discuss their individual observations with their partners.

⁷ With the exception of 6 teachers, (2 of whom have 3 observations and 4 of whom have 2 observations - due to unavailability for a follow up observation on the part of the teacher or illness on the part of an observer)

3.4 Data Analysis

3.4.1 Teacher Survey

Data from the teacher surveys was entered into excel by Save's Education team members. The original forms were kept in the Gicumbi office and the secondary data excel files (with names of teachers removed) were sent electronically to the Stanford research team. Data entry accuracy was checked through double entry of a randomly selected 10 percent of the data. Data entry accuracy for the quantitative survey data was 98.9 percent. Stanford team members cleaned and analyzed the quantitative data using Stata statistical analysis software. Data was tabulated and summarized for basic descriptive statistics such as means, standard deviations and percentages. ANOVA and chi-square tests were used to check for any differences between groups at baseline.

3.4.2 Qualitative Data

The qualitative items included in this report (teacher description of reading activities used most frequently in the classroom) were analyzed using the analysis software Dedoose. Using the survey form, Literacy Boost toolkit, and discussions with Rwandan teachers, the initial codes of Phonemic Awareness, Letter – Sound correspondence, Storytelling, Vocabulary, Reading Fluency, Reading Comprehension, and Writing were established. As new potential codes emerged, they were first recorded as memos, then, if they appeared at least five times, a new code was created and applied to all relevant answers.

Each answer given by teachers was coded individually (i.e. they were not coded by combining the two answers each individual teacher provided). Some codes were specific to who the actor was (i.e. teacher does something or students do something), other codes were used to specify the category of literacy skill (i.e. reading fluency or letter-sound correspondence, and still other codes were used to disentangle specifics within activities (i.e. if only individual words were read, or if the reading activity was from the blackboard or a text).

The number of codes that could apply to any particular answer was not limited; that is, each answer could be coded for several different features at once. For instance, Participant 323 answered *“Reading aloud a text for children, gives the meaning of the new words after student read one by one encouraging who read fluently.”* This was coded with all of the following: Teacher models, Reading text, Reading fluency, Vocabulary, Students Show/do, and Teacher feedback/encouragement.

After the initial round of coding, the codes and results were reviewed to be sure they were accurately representing the data. A few codes were deleted because they did not contribute to making meaning from the answers, and a few had their definitions revised and were recoded. The most substantive change was in the “Reading Fluency” code. After the initial coding, it became clear there were actually two different kinds of answers emerging – those that specifically referenced a focus on “fluency” (i.e. mentioned the word fluency, or “respecting punctuation”, or the teacher modeling reading aloud), and those that were simply a “reading aloud” activity without explicit reference to building fluency. There is no overlap between the two codes so we could still look at the two holistically. We chose to make this distinction, because experience from classroom observations made it clear that not all “reading aloud” was actually focused on building fluency. In fact, many times, “reading aloud” as an activity consisted of was decoding text in a mono-tonic, almost staccato, tone of voice. Dividing the code in two allowed us to see how many teachers were explicit about focusing on fluency as a skill in their reading aloud activities.

3.4.3 Classroom Observation

Data from the classroom observations of 42 teachers was entered into excel by Education team members. The original forms were kept in the Gicumbi office and the secondary data excel files (with teacher names removed) were shared electronically with the Stanford research team. Data entry accuracy was checked through a double entry of a randomly selected 10 percent of the data. Data entry accuracy for the observation data was 98.5 percent. Stanford team members cleaned and analyzed the data using Stata statistical analysis software. Data was tabulated and summarized for basic descriptive

statistics such as means, standard deviations and percentages. Anova and chi-square tests were used to check for any differences between groups at baseline.

4 Findings

4.1 Demographics of Teachers Surveyed

A total of 452 primary school teachers completed the teacher survey. Respondents consisted of 39.6 percent male and 60.4 percent female teachers; mean age was about 38 years. As Table 1 shows, teachers surveyed had a mean of 13 years of teaching experience and 8 years of teaching at their current school. A vast majority of teachers (90.5 percent) had completed 6 years of secondary education.⁸

Table 4.1a: Teacher Survey Demographics

	Control	TT only	LB	Sig. Diff.	Overall
% Female Teachers	47.52	65.5	67.42	*	60.36
N	141	171	132		444
Mean Years at Current School (SD)	8.74 (7.71)	7.62 (6.25)	8.52 (7.24)	–	8.24 (7.03)
N	141	173	134		448
Mean Years of Teaching (SD)	12.82 (10.36)	12.66 (8.85)	14.66 (8.98)	–	13.3 (9.4)
N	140	174	132		446
Mean Age (SD)	37.74 (9.66)	36.96 (8.7)	38.59 (8.07)	–	37.69 (8.85)
N	144	173	133		450
Highest Formal Education					
% 4-year University (A0)	3.47	2.3	1.49	–	2.43
% 2-to-3-year University (A1)	3.47	2.87	2.24	–	2.88
% 7 years of Secondary School (D7)	1.39	0	0	–	0.44
% 6 years of Secondary School (A2)	88.19	92.53	93.28	–	91.37
% 5 years of secondary School (D5)	0.69	0.57	0	–	0.44
% 4 years of secondary School (D4)	0.69	1.15	0	–	0.66
% 6 years of primary School (P6)	0.69	0	0	–	0.22
N	144	174	134		452

*Significant difference between Control and TT Only groups as well as between Control and LB groups

As Table 4.1a shows, 95.1 percent of teachers were government schoolteachers. Most (98.0 percent) were responsible for teaching Kinyarwanda and mainly taught students at the Primary 1 (32.7 percent), Primary 2 (22.7 percent) and Primary 3 (20.9 percent) levels.

4.2 Demographics of Classrooms Observed

A total of 42 teachers (77.6 percent female and 21.4 percent male) were observed teaching a Kinyarwanda lesson. On average, lessons observed lasted about 42 minutes. Of the classes observed, 73.8 percent were Primary 1 and 26.2 percent were Primary 2 classrooms. There was a mean of 44.9 students (22.12 male and 22.80 female) students in each class observed.

A majority of the classrooms observed (97.6 percent) had adequate seating space for students There were chairs or benches with tables in most (93.8 percent) of the classrooms. The classrooms seemed well organized (95.2 percent) and blackboards were legible in all of the classrooms. Although natural

⁸ The Control group had significantly fewer female teachers than the TT only and LB groups.

light was the only source of light in a majority (95.2 percent) of the classrooms, observers thought that there was sufficient light for reading/learning in all of the classrooms observed.

Table 4.2a. Teachers and Classrooms observed

Gender of Teachers Observed					
	Control	TT only	LB	Sig. Diff	Overall
% Male	35.71%	21.43%	7.14%	-	21.43%
% Female	64.29%	78.57%	92.86%	-	78.57%
Grade Level Observed					
% Primary 1	57.14%	85.71%	78.57%	-	73.81%
% Primary 2	42.86%	14.29%	21.43%	-	26.19%
Mean number of students in classrooms observed					
	21.64				22.12
Male	(5.50)	21.5 (3.76)	23.21 (6.17)	-	(5.17)
	23.43	22.07			22.80
Female	(4.86)	(4.34)	22.90 (7.97)	-	(5.82)
	45.07	43.57	46.12		44.92
Total	(8.01)	(6.01)	(13.42)	-	(9.49)
Mean condition of classrooms					
Adequate seating space ¹	1.68 (.33)	1.63 (.40)	1.27 (.63)	-	1.53 (.49)
Well organized classroom ¹	1.59 (.33)	1.45 (.43)	1.46 (.43)	-	1.50 (.44)
Legible blackboard ¹	1.88 (.21)	1.82 (.32)	1.89 (.23)	-	1.86 (.25)
Adequate lighting ¹	1.91 (.19)	1.86 (.31)	1.89 (.23)	-	1.89 (.24)
Overall room condition ²	3.07 (.55)	2.13 (.42)	2.37 (.61)	*	2.53 (.66)
	41.79	39.38	44.01		41.96
Mean Observation Time (in minutes)	(8.52)	(6.13)	(8.27)	-	(7.71)
N	14	14	14		42

¹ 0=no, 1=somewhat, 2=yes

² 1=very poor, 2=poor, 3=good, 4=excellent

*significant differences between Control and TT only and Control and LB groups

4.3 Teacher Report of Reading Material in the Classroom.

The presence of various kinds of reading material in a child’s environment, particularly in the early years, has been linked to reading achievement and ability. In order to get a baseline assessment of how much reading material is available to students in classrooms in Gicumbi, teachers were asked to specify the type and amount of reading material available in their classrooms. Survey results based on teacher report indicated that most classrooms were lacking reading materials. According to teacher report, less than half of the classrooms contained any reading material (Fig.1). School textbooks were reportedly present in only 46 percent of the classrooms and storybooks were present in only 23 percent of the classrooms.

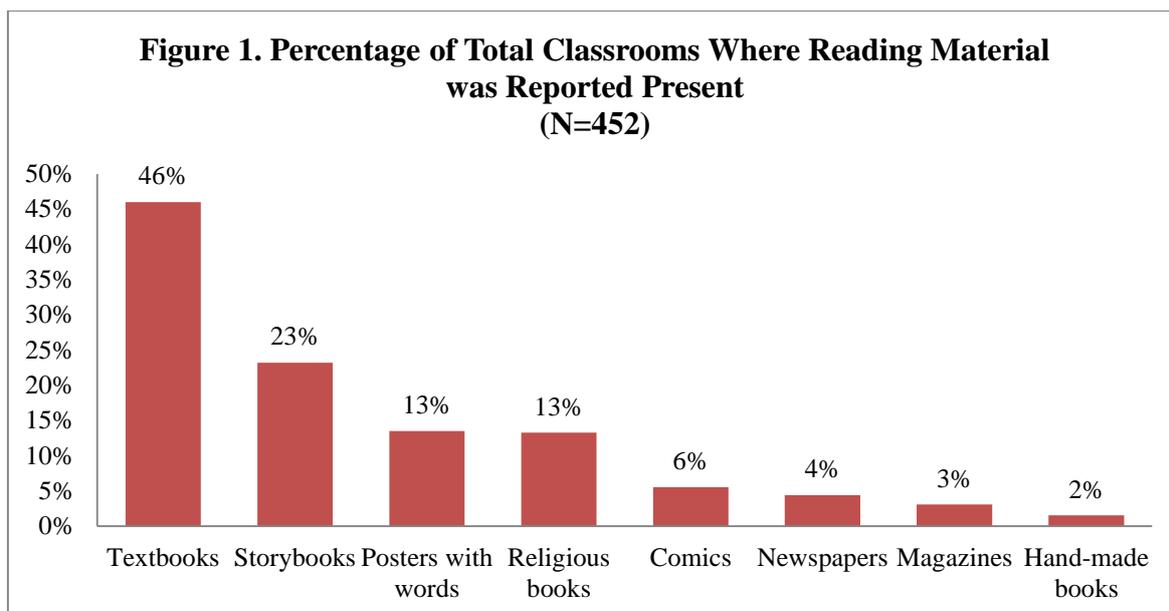


Table 4.3a shows the mean number of each type of reading material reported to be present in classrooms. Teachers reported a mean of about 15 textbooks, 4 storybooks and 2 posters with words in each classroom.

Table 4.3a. Mean Number of Reading Materials Reported in the Classroom

	Control (SD)	TT only (SD)	LB (SD)	Sig. Diff.	Overall
Storybooks	4.24 (9.23)	4.68 (11.35)	2.62 (7.25)	–	3.92 (9.63)
N	137	168	130		435
Newspapers	1.19 (6.99)	0.11 (.99)	0.23 (1.29)	–	0.49 (4.07)
N	144	174	134		452
Textbooks	15.12 (21.47)	16.05 (19.31)	13.77 (20.83)	–	15.09 (20.42)
N	132	168	126		426
Posters with words	1.26 (4.85)	3.34 (12.99)	1.01 (4.04)	–	1.99 (8.85)
N	144	174	134		452
Magazines	0.26 (2.51)	0.55 (3.83)	0.04 (.27)	–	0.31 (2.77)
N	144	174	134		452
Hand-made books	0.14 (.99)	0.06 (.76)	0.48 (5.19)	–	0.21 (2.91)
N	144	174	134		452
Religious books	0.38 (1.04)	0.17 (.60)	0.34 (1.19)	–	0.29 (.95)
N	139	173	131		443
Comics	0.41 (1.66)	0.23 (1.12)	0.19 (1.28)	–	0.27 (1.36)
N	130	161	130		421
Outliers in the number of reading materials (i.e., storybooks (90 or more), textbooks (80 or more), posters (90 or more), religious books (10 or more), and comics (10 or more)) were dropped considering the high likelihood of misunderstanding the items by respondents based on the local context.					

4.4 Books Observed in the Classroom

Classroom observers found textbooks in every class observed. Figure 2 shows that observers found dictionaries in just over half of the classrooms observed, storybooks and religious books in just under

half of the classrooms observed and newspapers or magazines in 12 percent of the classrooms observed.

Most of the books found in classrooms were in Kinyarwanda. Most commonly found in classrooms were textbooks in Kinyarwanda (11-50 per classroom on average), followed by textbooks in English (11-50 per classroom on average) and some other print material in Kinyarwanda (1-10 per classroom on average). It is important to note that these estimates are presented as ranges that may conceal how few books were actually present. In addition, the number of students may exceed the amount of material available in classrooms. Most textbooks and other print material found in classrooms were relevant to the grade level. There were relatively fewer storybooks, newspapers, magazines, dictionaries and religious books found in classrooms than textbooks. (Table 6)

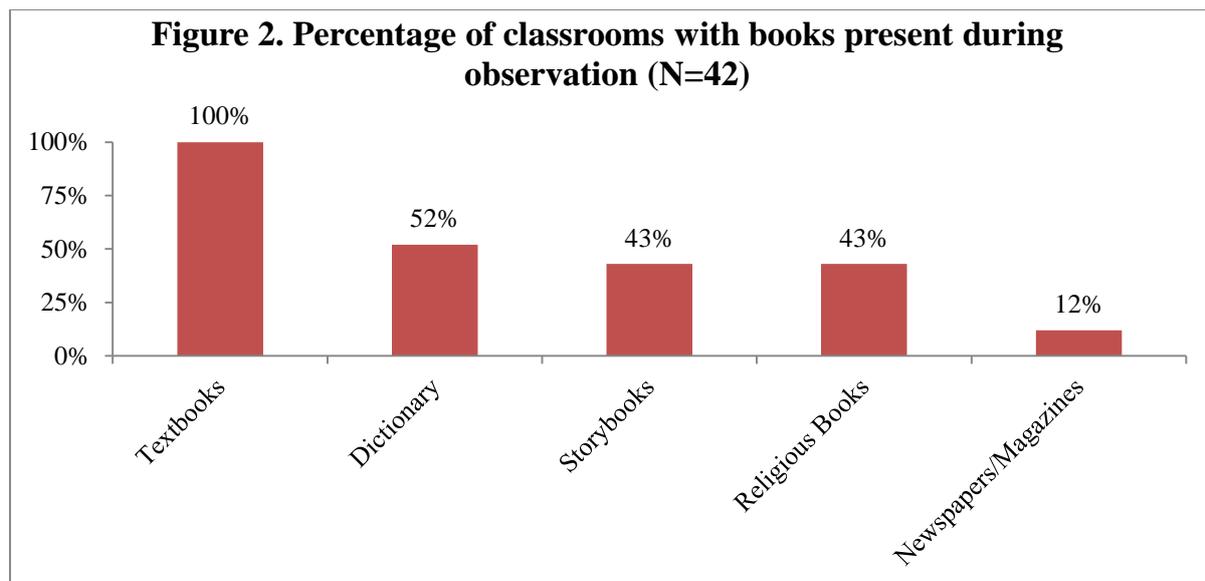


Table 4.4a: Mean number and type of books observed in the classroom

	Control (N=14)	TT Only (N=14)	LB (N=14)	Sig. Diff.	Overall
Textbooks					
Kinyarwanda	1.88 (.73)	2 (.62)	2.04 (.37)	-	1.97 (.58)
English	1.80 (.93)	1.75 (1.03)	1.42 (1.09)	-	1.66 (1.91)
Other language	0	0	0	-	0
Relevance of textbooks to the grade ¹	.96 (.13)	.95 (.14)	.92 (.16)	-	.94 (.14)
Storybooks					
Kinyarwanda	.82 (.97)	.11 (.29)	.34 (.60)	-	.42 (.14)
English	.57 (.87)	0	.48 (.68)	-	.35 (.67)
Other language	0	0	.02 (.07)	-	.01 (.04)
Relevance of storybooks to the grade ¹	.67 (.5) N=9	.19 (.38) N=7	.22 (.44) N=9	-	.37 (.48)
Newspapers/magazines					
Kinyarwanda	.18 (.54)	.04 (.13)	.12 (.29)	-	.11 (.36)
English	0	0	0	-	0
Other language	0	0	0	-	0
Relevance of newspapers/magazines to grade ¹	.5 (.58)	.25 (.5)	0	-	.27 (.47)
Religious books					
Kinyarwanda	.32 (.42)	.21 (.43)	.41 (.43)	-	.32 (.42)
English	0	0	.05 (.14)	-	.02 (.08)
Other language	0	0	0	-	0
Relevance of religious books to the grade ¹	.53 (.51) N=8	.33 (.52) N=6	.5 (.53) N=10	-	.47 (.50)
Dictionary					
Kinyarwanda	.18 (.37)	.07 (.27)	.11 (.29)		.12 (.31)
English	.68 (.46)	.29 (.43)	.30 (.44)		.42 (.47)
Other language	0	0	0	*	0
Relevance of dictionaries to the grade ¹	.14 (.33) N=12	.33 (.47) N=7	0 N=6		.16 (.35)
Other print material					
Kinyarwanda	.82 (.89)	1.25 (.98)	.80 (1.00)	-	.96 (.96)
English	.07 (.18)	.09 (.19)	.32 (.93)	-	.09 (.35)
Other language	.11 (.29)	.16 (.53)	0	-	.09 (.35)
Relevance of other print material to the grade ¹	.76 (.38) N=9	.88 (.31) N=12	.76 (.38) N=9	-	.81 (.35)

0=none, 1=1-10, 2=11-50, 3=more than 50

¹0=no, 1=yes

*significant differences between Control and TT only and Control and LB groups

4.5 Print Material Observed on the Walls

Visual stimuli in the classroom, particularly material containing text, are important for good reading pedagogy. Therefore, observers checked for the presence of material containing print on the walls of classrooms observed. Observers noted that some type of material was present on the walls of 69 percent of the classrooms observed. The remaining 31 percent of classrooms had no material on the walls. In situations where material was displayed on the classroom walls, observers analyzed the items present and categorized them as professionally printed (store bought), teacher-made or student-

made. When text was present, observers noted the language used on the item. As outlined below, most of the items found on classroom walls were teacher made and very few of the items were student made. Items containing words matched to pictures were found most often on classroom walls whereas songs or poems were found least often (Table 4.5a).

Observers found that most of the material found on classroom walls was teacher-made (54.76 percent in Kinyarwanda, 45.24 percent in English, 9.52 percent in French and 7.14 percent with only images). Some of the material found on classroom walls was professionally printed or store bought (7.14 percent in Kinyarwanda, 21.43 percent in English and 7.14 percent with images only). Very few classrooms had student-made material on the walls (4.76 percent in Kinyarwanda, 4.76 percent in English and 2.38 percent in French).

Table 4.5a: Types of Print Present in Classroom¹

	Control (SD)	TT Only (SD)	LB (SD)	Sig. Diff.	Overall (SD)
Items with only words	.52 (.50)	.41 (.60)	.17 (.29)	-	.37 (.49)
Items with words matched to pictures	.68 (.72)	.77 (.79)	.71 (.88)	-	.72 (.78)
Songs/Poems	.07 (.27)	.02 (.07)	0	-	.03 (.16)
Alphabet letters	.46 (.63)	.43 (.51)	.29 (.41)	-	.39 (.52)
Syllables	.29 (.51)	.29 (.59)	.14 (.36)	-	.24 (.48)
N	14	14	14		42

¹0=no, 1-minimal (less than 5), 2= a lot (5 or more)

Table 4.5b: Print Material Observed on the Walls

	Control (SD)	TT Only (SD)	LB (SD)	Sig. Diff.	Overall (SD)
Mean number of items on the wall	10.14 (12.66)	12.68 (14.87)	11.50 (16.50)	-	11.44 (14.43)
Mean number of professionally printed items					
With text in Kinyarwanda	0	1.36 (4.80)	.07 (.27)	-	.48 (2.78)
With text in English	.52 (.97)	.21 (.38)	.07 (.28)	-	.27 (.63)
With text in another language	0	0	0	-	0
Images only	0	.11 (.40)	.07 (.18)	-	.06 (.25)
Mean number of teacher made items					
With text in Kinyarwanda	5.07 (7.30)	5.09 (6.46)	5.82 (9.23)	-	5.32 (7.57)
With text in English	2.29 (6.15)	.45 (.86)	3.52 (8.03)	-	2.08 (5.85)
With text in another language	.04 (.13)	1.04 (3.89)	.12 (.31)	-	.40 (2.23)
Images only	1.41 (3.25)	1.57 (2.47)	.14 (.36)	-	1.04 (2.40)
Mean number of student made items					
With text in Kinyarwanda	0	.04 (.13)	.02 (.07)	-	.02 (.09)
With text in English	.07 (.28)	0	.02 (.07)	-	.03 (.16)
With text in another language	0	.29 (1.06)	0	-	.10 (.62)
Images only	0	0	0	-	0

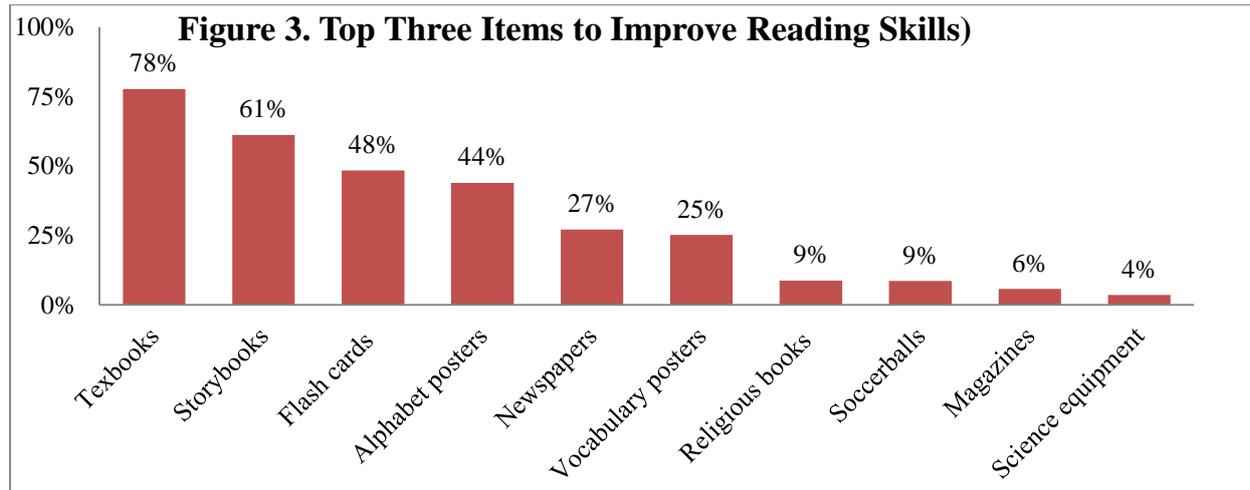
4.6 Teacher Knowledge.

To provide effective literacy instruction, it is helpful if teachers are aware of the importance of literacy materials, the various types of literacy skills a successful reader should possess, and what it means to be a fluent reader who comprehends texts – in other words, it is important for teachers to

know the end goal and also know the processes and materials they need to get there. Teachers surveyed were asked questions to understand their perceptions about these aspects of literacy instruction.

4.6.1 Teacher perception about the importance of literacy materials

Teachers were presented with a list of ten items including literacy items (e.g. textbooks, storybooks etc.) and non-literacy items (e.g. soccer balls, science equipment etc.) and asked which top three items they would purchase to help their students with reading skills. A majority of teachers indicated that they would purchase textbooks (77.7 percent), storybooks (61.2 percent) and flash cards (48.4 percent). Figure 3 shows that teachers selected literacy-related materials more often than the distractor items (such as soccer balls and science equipment) included in this question.

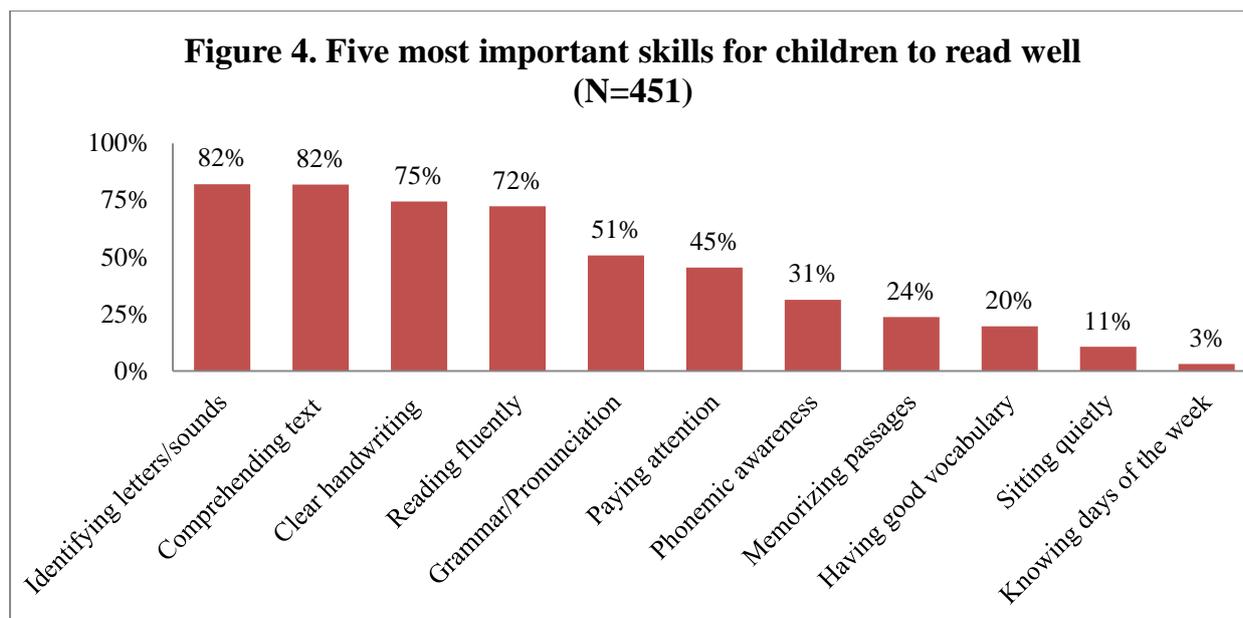


(N=448 for textbooks, storybooks, soccer balls and vocabulary posters, and N=446 for all other items)

4.6.2 Teacher perception of literacy skills

In order to assess teachers' perceptions about the core reading skills as outlined in the Literacy Boost program, teachers were presented with a list of 11 skills including skills that were directly related to literacy (e.g. comprehending text, reading fluently etc.) and skills that were not directly related to literacy (sitting quietly, knowing days of the week) and asked which five skills were most important for children to read well. As Figure 4 shows, overall, all teachers did not identify the five components of literacy development as the five core reading skills. While most teachers appropriately selected essential literacy skills such as letter knowledge, reading comprehension, and reading fluency, a high percentage of teachers included other skills such as clear handwriting, grammar and pronunciation, and paying attention in the top five most important skills for reading. In contrast, a relatively low percentage of teachers included phonemic awareness⁹ and vocabulary in their list of the top five skills important for reading achievement. This is contrary to what research has shown to be important (National Institute of Child Health and Development, 2000). This suggests that there is a need to improve teacher knowledge regarding the essential components of literacy development, in particular phonemic awareness and vocabulary.

⁹ translated here as 'constituents of a word'



(N=450 for phonemic awareness, having good vocabulary and days of the week)

4.7 Literacy instruction in the classroom.

In order to ascertain the kinds of activities teachers currently used, teachers were asked questions related to literacy instruction in their classrooms. These included questions about strategies teachers used to teach letter knowledge and reading comprehension to their students, how often students used books in their classrooms, opportunities for students to practice reading out loud and whether teachers assigned literacy homework and assessed students' literacy development.

4.8 Teacher Report of Reading Activities

4.8.1 Most frequent reading activities in the classroom

Teachers gave a wide variety of answers to the survey question, "What are the two reading activities you do most often with your students?" Of these answers, only about half (51 percent) were explicit about focusing on one of the main skills identified and developed through the Literacy Boost program (though some of the activities may be implicitly targeting these skills). The data suggests that the activity most frequently engaged in by students was reading aloud, though the qualitative data suggests that some of this reading aloud did not target reading fluency or understanding specifically. Similarly, while there were many teachers who indicated that they often focused on letter id and letter-sound correspondence and vocabulary in their reading activities, the qualitative data suggests that some of the current practices could be made more effective. (Table A4)

4.8.2 Most effective reading activities in the classroom

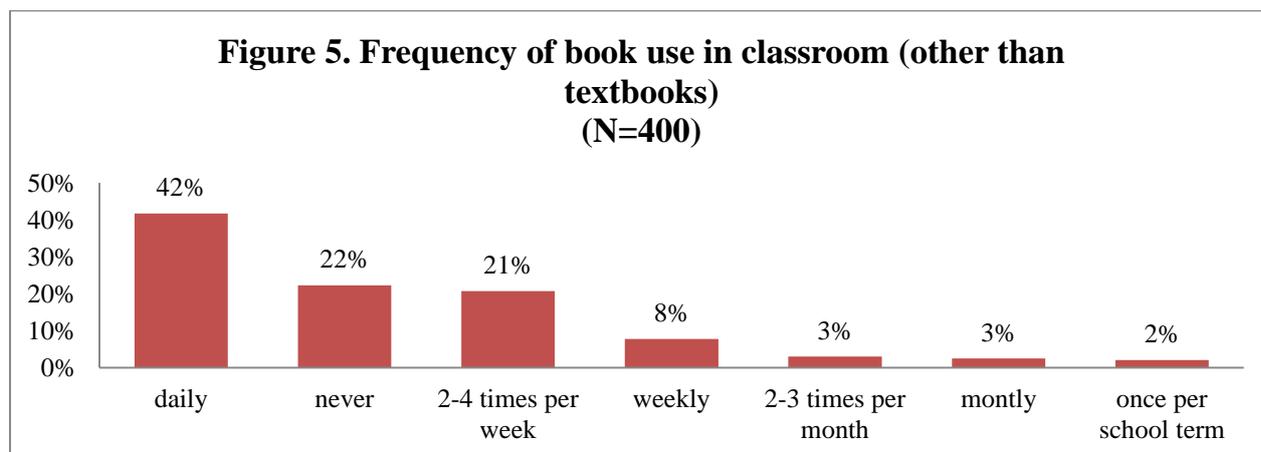
Some of the most effective reading activities reported by the teachers surveyed included the using instructional materials during lessons, reading at the blackboard, reading silently and showing students words matched to pictures.

4.9 Teacher Report of Use of Books (other than textbooks)

Regular and extensive interaction with books is important for children who are learning to read. As shown in Figure 5, students use books (other than textbooks) daily in only 42 percent of the classrooms surveyed and never have exposure to books other than textbooks in 22 percent of the classrooms.

The fact that a majority of classrooms were reported to have no books present along with teacher report of students' low interaction with books may be a severe impediment to the successful acquisition of literacy skills among students. Provision of books to the classrooms where they are not

present as well as an increased amount of interaction with books is essential towards the goal of successful reading development for students.



4.10 Components of Reading Development

Before teachers can be expected to successfully teach components of literacy to students, it is important that they have an understanding of what each component means as well as be familiar with the strategies that can be employed to teach each skill. To get an idea of teachers' perceptions about how to teach different literacy skills, some items on the survey presented them with the scenario of a teacher conducting a reading activity with students. They were then asked to identify from a given list which reading skill they thought was the focus of the reading activity.

In addition, while observing literacy lessons, observers made note of whether any of the basic reading components were explicitly addressed by teachers. They measured the amount of time teachers spent on each component and looked for which specific activities and strategies teachers employed to teach specific literacy skills. Both survey and observation results are outlined below.

4.11 Time Spent on Reading Activities

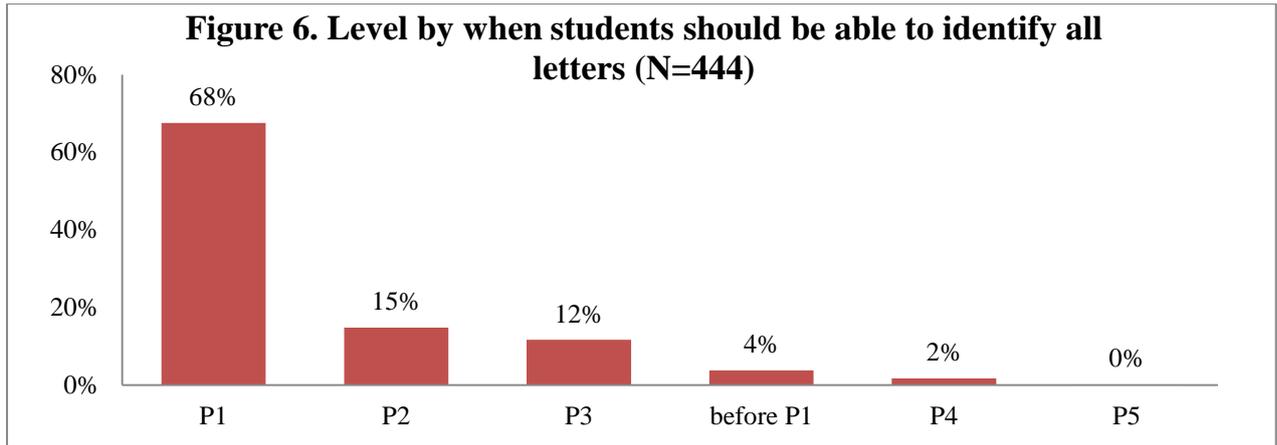
On average, teachers spent about 26 minutes on letter knowledge, decoding/encoding or phonological awareness activities (focusing on sounds/syllables within words), about 14 minutes on reading fluency activities and about 3 minutes on vocabulary instruction during classroom observations (Table A18).

4.12 Letter Knowledge

Letter knowledge is one of the most basic skills for literacy development. It refers to the understanding that sounds can be matched with printed letters and that these letters have names. A child who has letter knowledge would be able to recognize a letter by both its name as well as its associated sound.

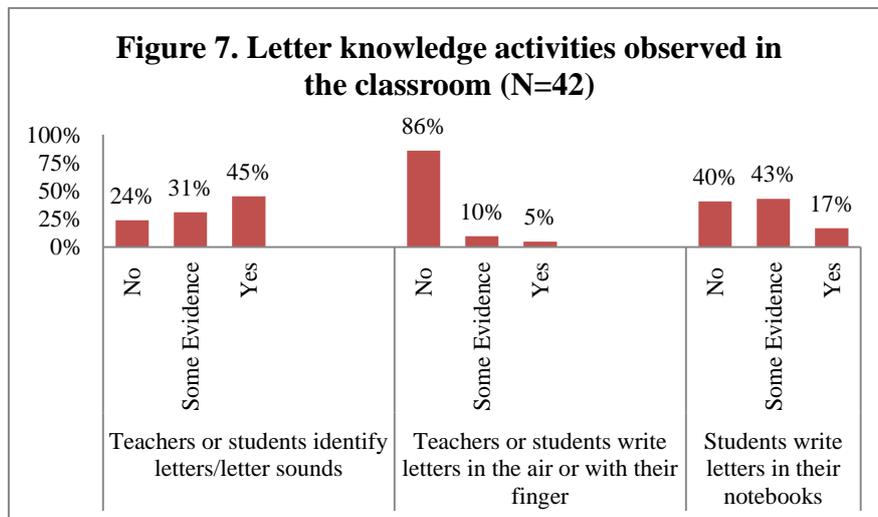
According to Metsala & Ehri (1998), knowledge of letter-sound relationships provides a powerful mnemonic system that bonds the written words to their pronunciations in memory. Muter & Diethelm (2001) found that phonological segmentation ability and letter knowledge proved significant predictors of both concurrent and later reading achievement irrespective of children's native language. Similarly, Bowey (1994) posits letter knowledge and phoneme sensitivity as the two skills that co-determine early reading development (in reciprocal relationship with each other).

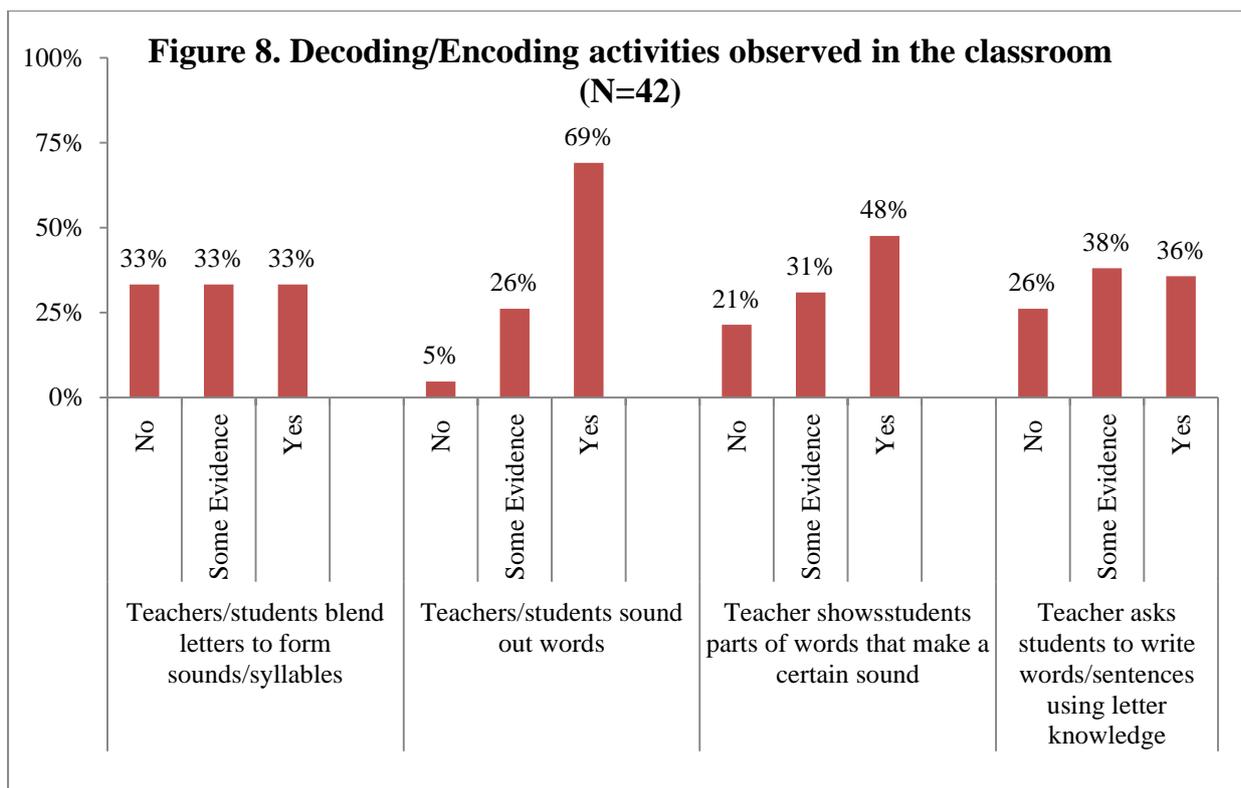
Following the Kinyarwanda curriculum for P1 which prescribes that a pupil should be able to recognize all letters of the alphabet by the end of P1 including some letter combinations, a majority of teachers surveyed (67.6 percent) felt that children should be able to identify all letters of the alphabet by P1 (Fig. 6).



A majority of teachers surveyed (64 percent) reported teaching letter names and sounds to their students. Some strategies teachers described using in their classrooms included using stories to introduce new letters, displaying flash cards and charts with letters on classroom walls and giving students words with a letter, emphasizing the target letter/sound and having the students repeat it.

Figure 7 shows that teachers/students identified letters and letter sounds in 45 percent of classrooms and students wrote letters in their notebooks in 17 percent of classrooms observed. Students in very few classrooms (5%) wrote letters in the air with their fingers. There was evidence of teachers and students participating in decoding and encoding activities in the classroom and the activity they participated in most often was sounding out words (69 percent) (Fig. 8).





4.13 Phonemic Awareness

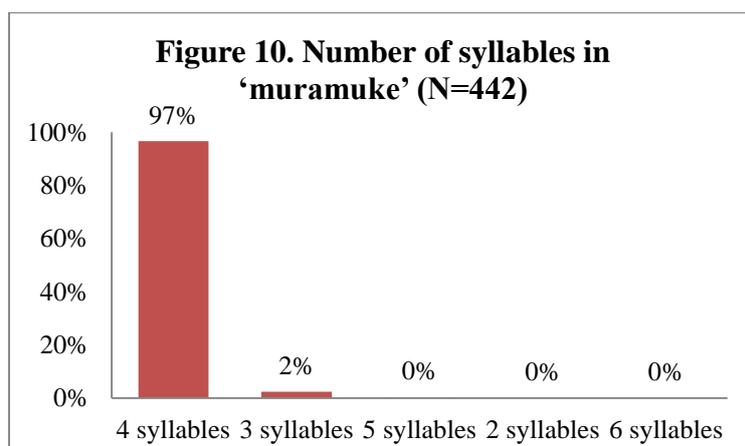
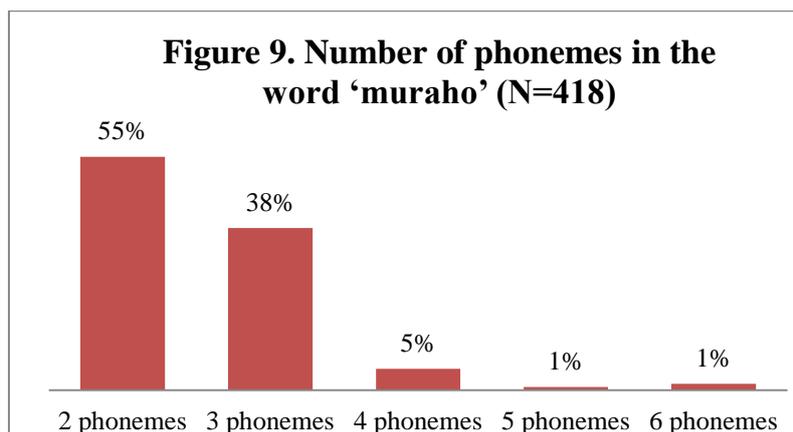
Phonemic awareness refers to the ability to differentiate between basic sounds and understand that words are made up of the smallest unit of sounds (called phonemes). Current research and theory suggests that it is beneficial for beginning readers to be able to hear these phonemes and differentiate between the different sounds they hear in words as a precursor to understanding that different letters make up words that are heard, read, and later, written. Research suggests that kindergarten students who lack the language competency known as phonemic awareness often experience subsequent difficulties learning to read (Bishop & Adams, 1990; Blachman, 2000, Pennington, Groisser & Welsh, 1993; Stanovich, 1986, 1988). One study found that the best predictor of poor reading achievement in grade 1 was phonemic awareness and that low phonemic awareness was highly predictive of continuing reading difficulties in grade 4 (Juel, 1988).

It is important to note that this research was done in the developed world, in a language with a very deep orthography. That is, the orthographic system for writing English is extremely complex, in contrast to “shallow” orthographies where the letter-sound relationship is more consistent. Less research has been done on the relationship between phonemic awareness in languages such as Kinyarwanda, with shallower orthographies. A study by Goldenberg and colleagues (in press) provides evidence that phonemic awareness instruction may not contribute to students’ learning to read in Spanish as it does for students learning to read in English. The importance of phonemic awareness instruction to the acquisition of Kinyarwanda reading skills is currently unclear.

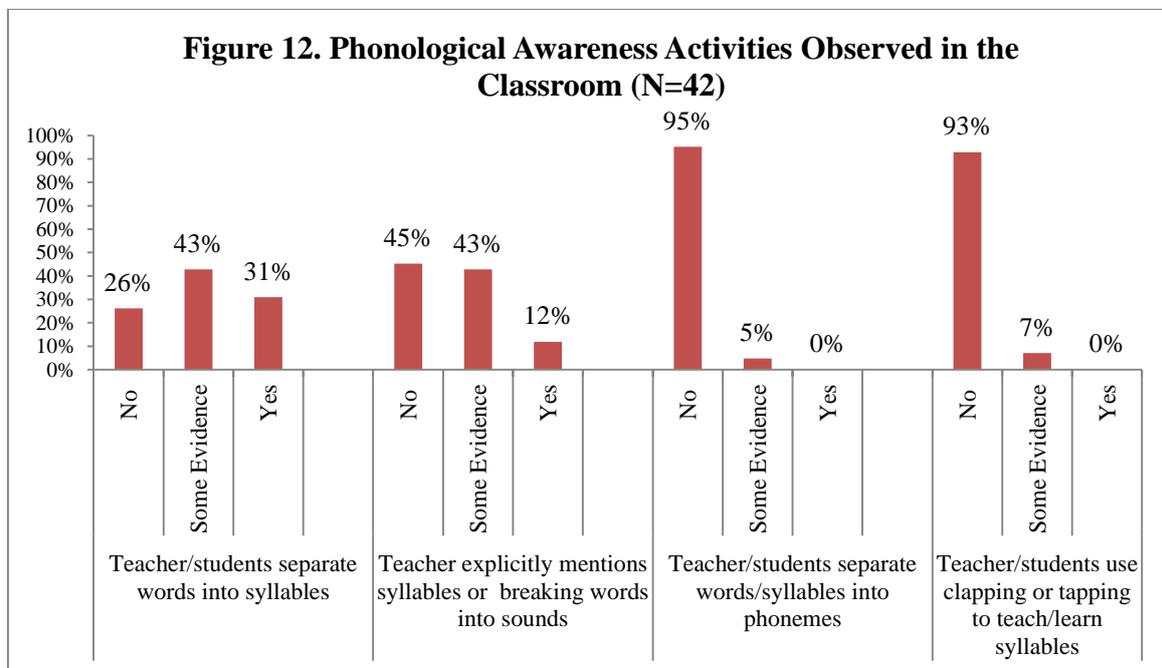
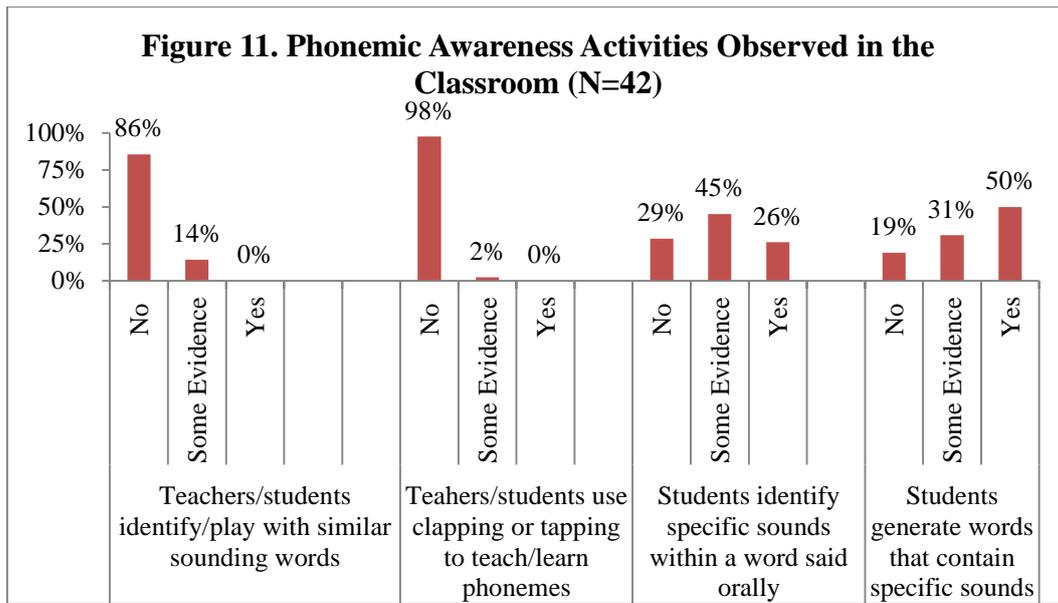
When the survey was translated from Kinyarwanda back into English, the back-translation revealed that the word/phrase that came closest to describing the number of individual phonemes in a word was ‘individual constituents’. This translation does not fully capture the meaning of phoneme and it is possible that teachers may not have fully understood questions regarding phonemic awareness on the survey and subsequently interpretation of any findings related to phonemic awareness are limited.

Teachers surveyed did not display an understanding regarding the concept of phonemes. When asked how many phonemes are in the word ‘muraho’, only one percent of teacher correctly responded ‘6’ (Fig.9).

In contrast to the lack of understanding regarding phonemes, teachers seemed to have a strong understanding of the concept of syllables in a word. When asked how many syllables are present in the word ‘muramuke’, a majority of teachers (97 percent) correctly responded that there were 4 syllables (Fig. 10). There is confirmatory evidence of this in the student reading assessment baseline, where students scored very highly on the assessment of syllabic awareness but scored very low on the phonemic awareness assessment.



Observers noted that very few teachers identified or played with words with the same beginning, ending or middle sounds. Almost no teachers used clapping or tapping to practice listening for sounds in words and only a few used clapping or tapping to listen for syllables in words. There was some evidence of students generating words that sounded the same or listening for and identifying a sound within a word said orally (Fig. 11). While pilot testing indicated that most words were read syllabically, teachers observed hardly ever made explicit mention of breaking words up into syllables. In very few classrooms did teachers and students separate words or syllables into phonemes (Fig. 12).



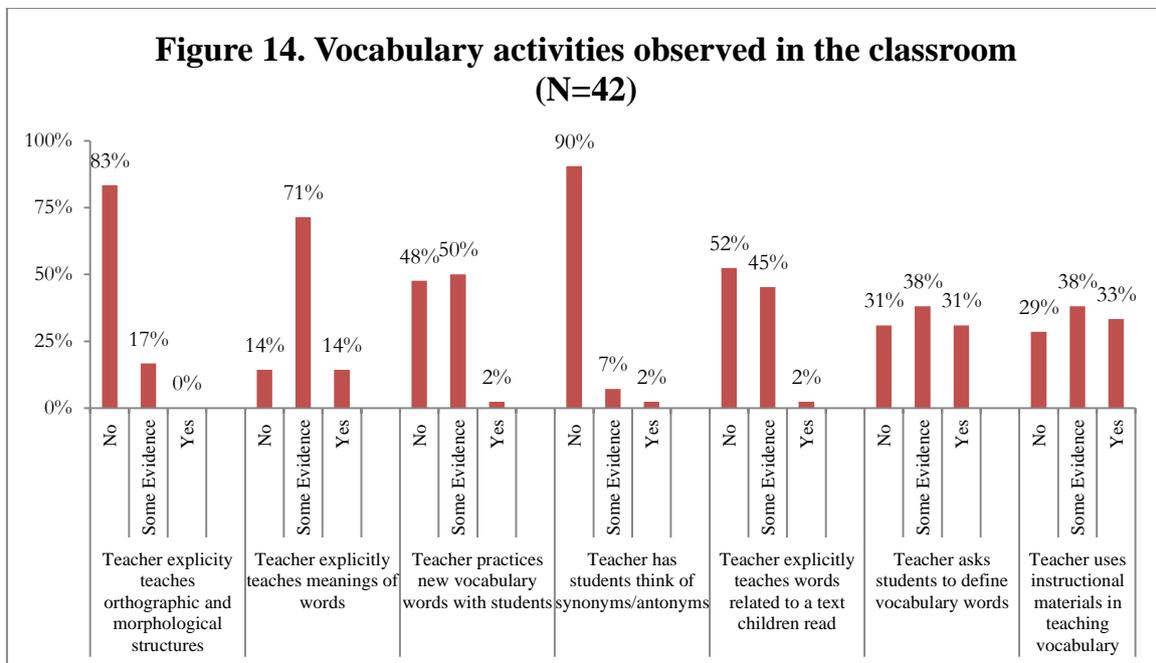
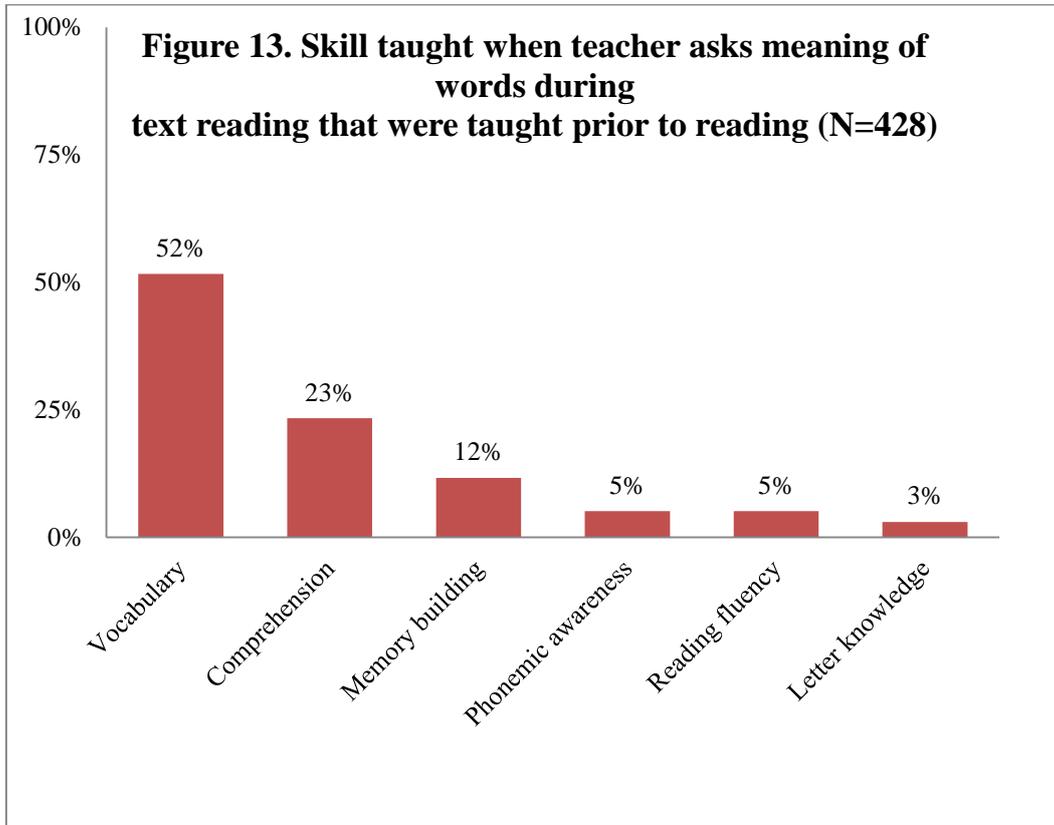
4.14 Vocabulary

Explicitly teaching word meanings can modestly improve children’s comprehension of text (Stahl & Fairbanks, 1986). The best strategy to teach vocabulary is to combine direct instruction and conversation about words with wide reading (Chall, 1996)

When asked which literacy skill was being taught if a teacher taught the meanings of words to students prior to a read aloud, then asked them the meanings of those words as the story was read, a little over half of the teachers appropriately responded that the skill was ‘vocabulary’ (Fig. 13). A notable amount (23 percent) felt that the skill taught was ‘reading comprehension’ and some (12 percent) thought it was ‘memory building’.

In the classrooms observed, while teachers taught the meanings of words, less than half of the teachers taught words related to the text children had read. Hardly any of the teachers explicitly taught the orthographic and morphological structures of the words and only half practiced new vocabulary words with students. Only a few teachers taught the meaning of words by having students generate

synonyms or antonyms for words (Fig. 14). These effective strategies to teach vocabulary skills can be emphasized with teachers during Literacy Boost implementation.



4.15 Reading Fluency

Fluency is most often defined as the reader’s reading rate, gauged in words read correctly per minute. A lack of oral fluency is often indicative of reading difficulty among poor readers (Allington, 1983).

Research has suggested that there are two strategies that can be used to increase fluency among early readers; modeling of reading fluently by the teacher and repeated reading of texts (Smith, 1979; Allington, 1977; Cunningham, 1979; Samuels, 1979).

Survey results indicated that most teachers understood what it means to be a fluent reader. When asked what it means to be a fluent reader, 84.5 percent of teachers chose the correct response ‘being able to read a text out loud with accuracy, appropriate speed, and expression.’

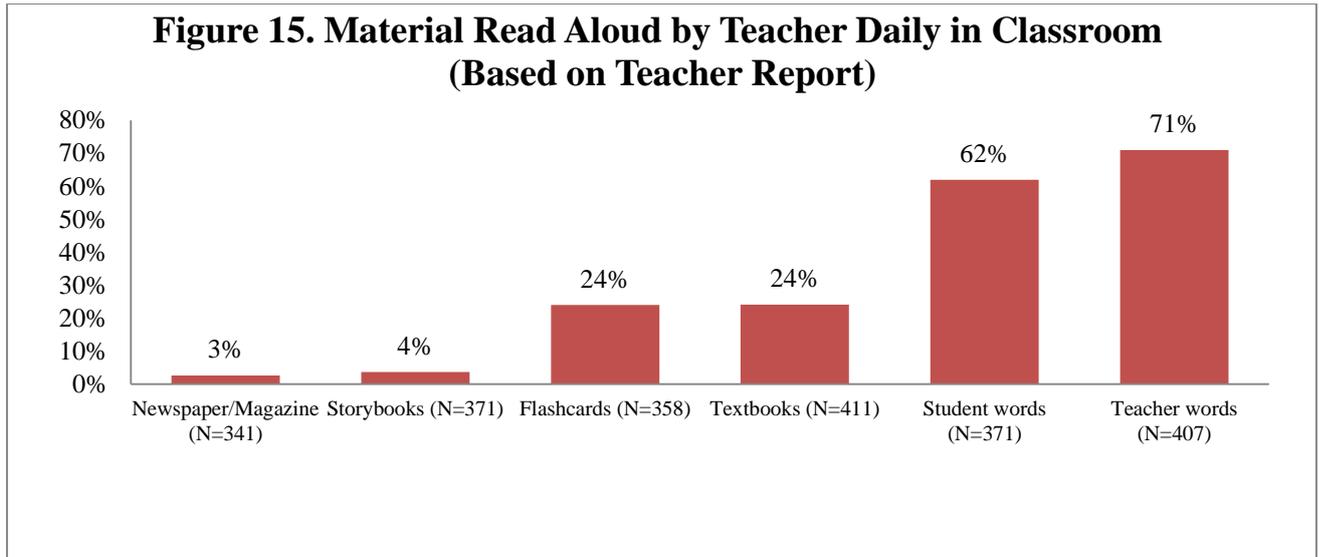
4.15.1 Teacher Reading Out Loud

By reading books out loud to students, teachers can model reading fluently with appropriate speed and inflection, encourage students to make predictions about text before and during reading, summarize text along the way and show how to decode with unfamiliar words. Teacher reading text aloud to students may also generate an interest in reading various types of books. Teachers were asked to indicate what material they read out loud to their students and how frequently. Survey baseline results indicate that many teachers never read books (story books and textbooks) out loud to their students and those who did read out loud to students, did not do so on a daily basis (Table 3.20). Figure 15 indicates that of the material that was reported to be read out loud daily by the teacher, words teacher wrote on the board was the most common (71 percent), followed by words students wrote on the board (62 percent). Textbooks were only read aloud daily by 24 percent of teachers surveyed and very few teachers reported reading storybooks out loud in the classroom on a daily basis.

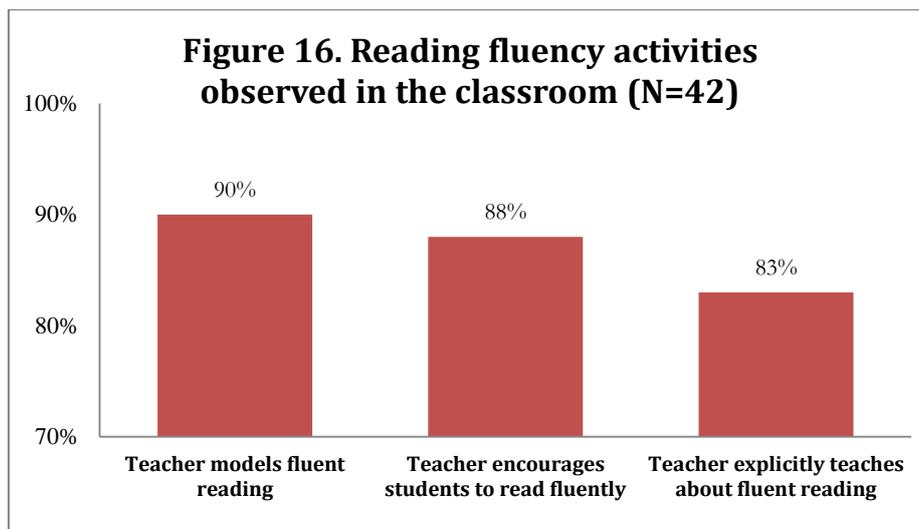
Table 4.15 Percentage of Teachers Reporting Frequency and Type of Material They Read Out Loud in the Classroom

	% Words Teacher Writes on the Board	% Words Students Write on the Board	%Textbooks	% Storybooks	% Newspapers or Magazines	% Flashcards or Word Strips
Never	2.95	10.51	6.57	32.35	58.36	38.27
Once per school term	0	0	3.65	5.12	5.28	1.4
Monthly	0.98	0	3.41	12.13	7.33	2.51
2-3 times per month	1.97	2.43	5.6	11.86	6.45	2.23
Weekly	3.19	4.58	13.38	21.83	11.73	12.01
2-4 times per week	19.9	20.49	43.31	12.94	8.21	19.55
Daily	71.01	61.99	24.09	3.77	2.64	24.02
N ¹	407	371	411	371	341	358

¹ Sample size varies here due to missing responses on each item. Missing data here may have indicated ‘never’ responses but were not coded as such.



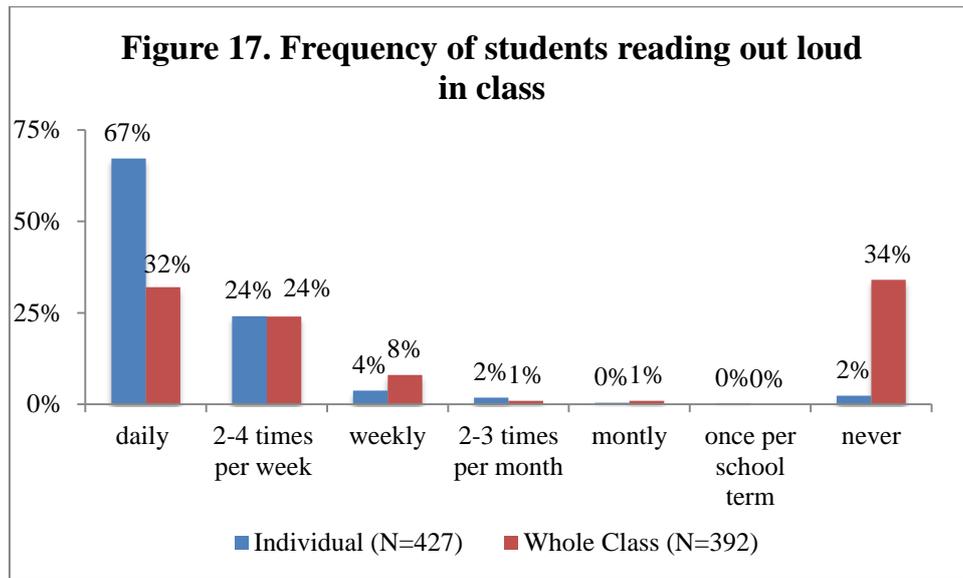
Some type of text (textbook, storybook, newspaper etc.) was read out loud in 95.2 percent of the classrooms observed. While it is encouraging that contrary to survey responses, a majority of the teachers observed modeled fluent reading, encouraged students to read fluently and explicitly taught students about fluent reading during lessons observed (Fig. 16), based on teacher survey responses, it is possible that this activity does not happen regularly.



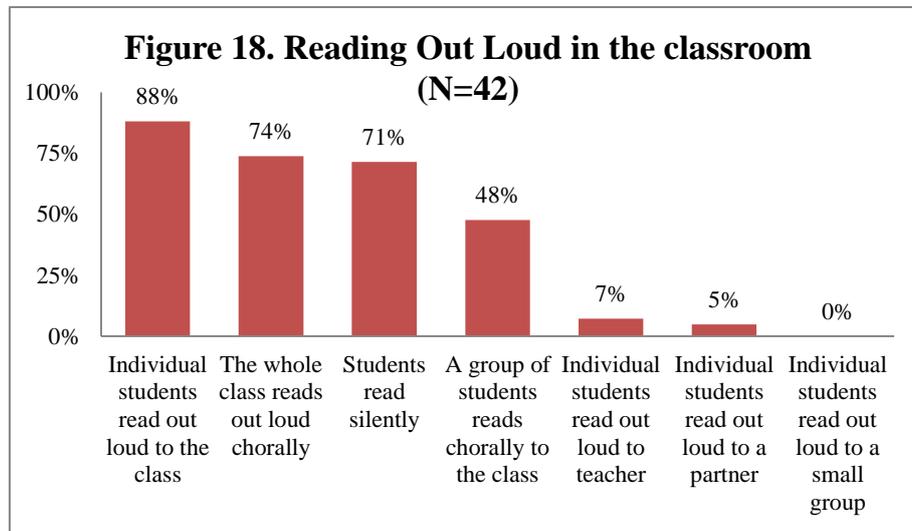
4.15.2 Students Reading Out Loud

Practicing to read out loud with appropriate prosody is essential for children to become fluent readers, and also allows teachers to assess the reading skills of individual students. Survey results indicate that not all students have the opportunity to practice reading out loud regularly. Figure 15 shows that most (67 percent), but not all, teachers report having students read out loud individually daily in the classroom. Similarly, Figure 17 shows that while some students (32 percent) reportedly have opportunities to practice reading out loud with the whole class daily, there are a substantial number of classrooms where students never have this opportunity. While it is encouraging that many teachers report having students read out loud regularly, it is important that *all* teachers allow students opportunities to practice reading out loud with appropriate prosody individually and with others so that they are able to develop reading fluency. It is also important to understand what is being read out

loud, and how many students get to practice reading out loud, and how much emphasis is given to reading in a fluent manner with appropriate prosody and with meaning.



There was evidence of students reading out loud individually in 88 percent of classrooms observed and as a whole class in 74 percent of classrooms observed (Fig. 18). While students read individually to the entire class in a majority of classes observed, this activity is likely not possible to conduct with every student in the class daily as the class size (mean N = 44.9) would make this impractical.

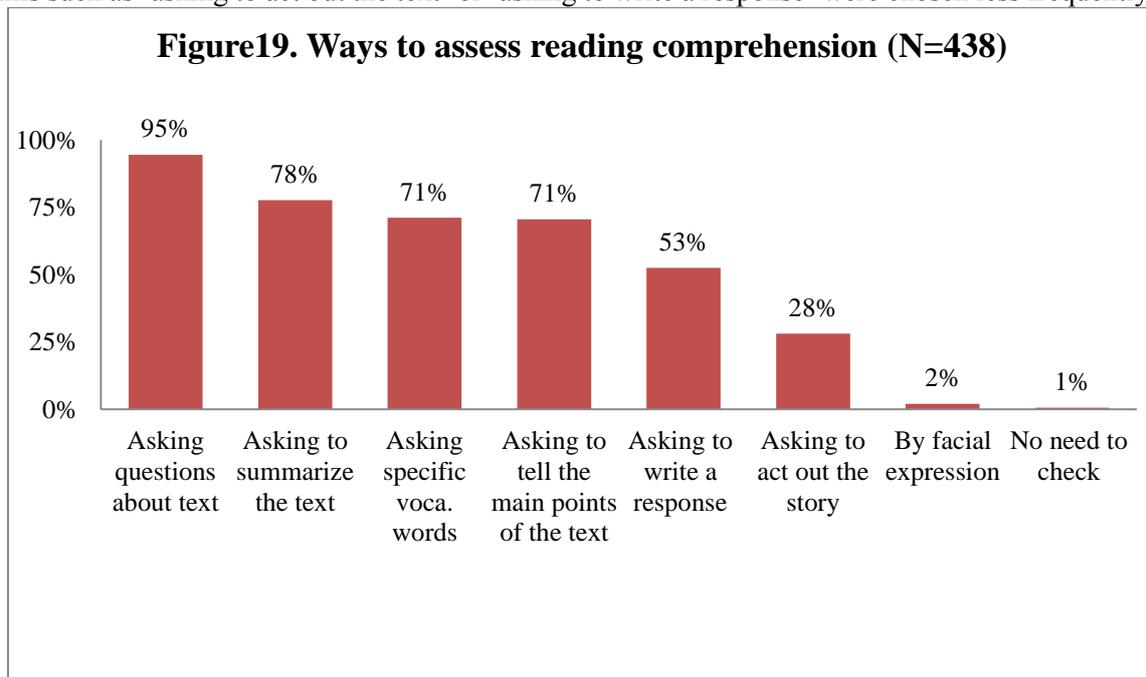


4.16 Reading Comprehension

Text comprehension is a complex process, requiring the involvement of many different components, relying upon many different kinds of information, and yielding complex mental representations (Kintsch & Rawson, 2008). It is essential that readers are able to comprehend sentences they have read so that information presented in printed text is understood, retained in memory and can be recalled in a useful manner. A variety of strategies may be employed to teach comprehension skills including having students read a printed text and then retell or summarize the content, answer questions based on the text, present students with some information from the text and have them fill in missing information, having students respond critically to the content or think of ways in which it was relevant to their own lives.

There appears to be a lack of clarity among teachers regarding the specific skills that are associated with successful comprehension of text. When asked to select from a list of skills what it means to comprehend a text, a majority of 450 teachers appropriately selected ‘being able to answer questions about the plot of the text’ (86.9 percent) ‘being able to summarize accurately in your own words (74.7 percent), ‘understanding, interpreting and using information from a text’ (65.6 percent) and ‘being able to relate it to a similar text you have read’ (40.4 percent). However, a fairly high percentage of teachers understood reading comprehension as ‘reading out loud without mistakes’ (39.3 percent), ‘reading out loud with accuracy’ (35.1 percent), ‘repeating a text from memory’ (29.1 percent), ‘understanding that spoken word is made up of individual sounds’ (12.2 percent) and ‘identifying letters’ (12.9 percent) (Fig. 19).

Survey results indicated that teachers are aware of the strategies used to assess lower level reading comprehension such as ‘asking questions about the text’ ‘asking students to summarize the text’ and ‘asking to tell the main points’. However, activities that would delve into higher-level comprehension skills such as ‘asking to act out the text’ or ‘asking to write a response’ were chosen less frequently.

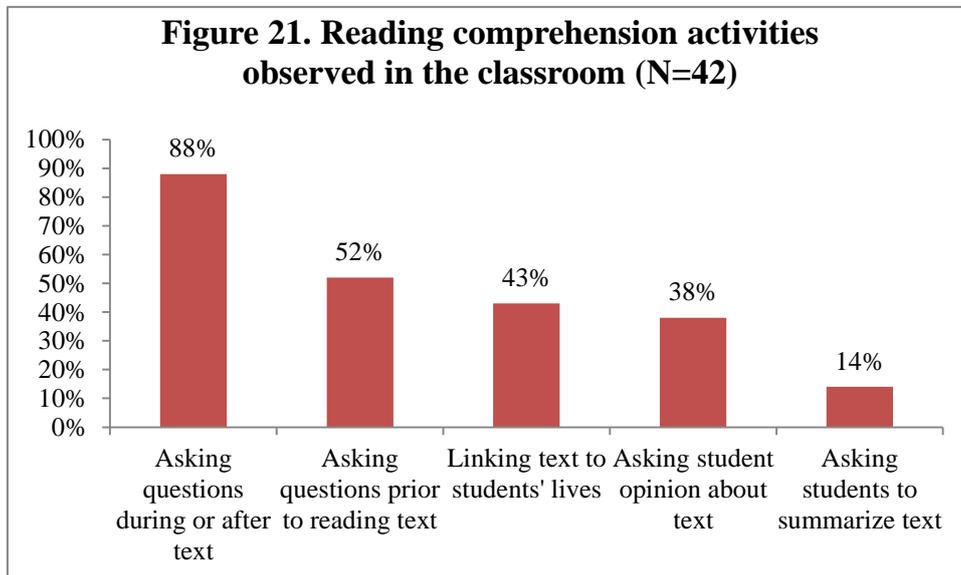
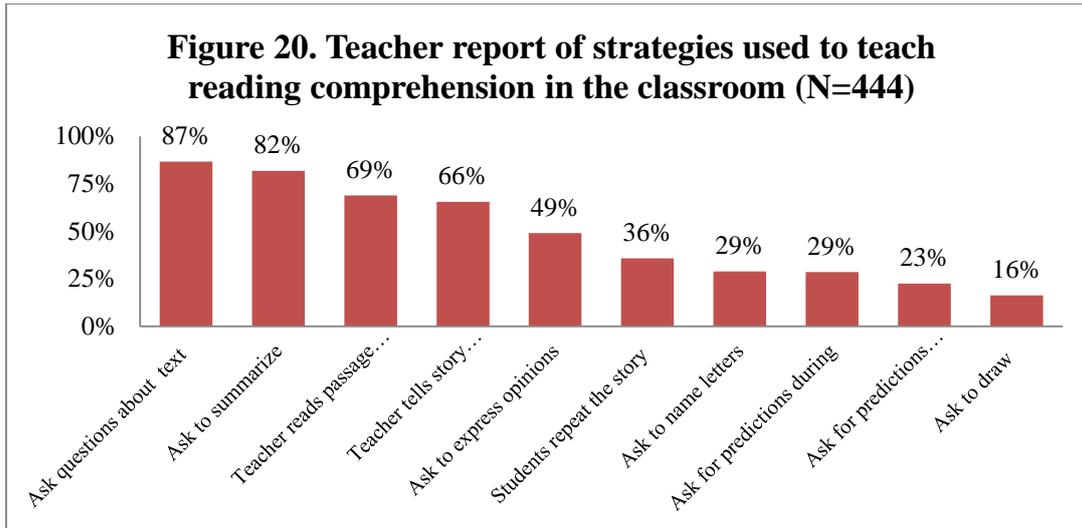


(N=437 for ‘Asking about specific vocabulary words’)

In total, 446 teachers (98.9 percent) reported teaching reading comprehension in the classroom. As Figure 20 indicates, a majority of these teachers reported using strategies that are generally considered to be associated with developing reading comprehension skills such as asking students to answer questions about what is happening in the text, asking students to summarize the text and telling students the meaning of the stories they read. While teachers reportedly employed useful strategies to teach reading comprehension skills, other good strategies such as asking for predictions before and during the reading of a text and having students retell the story were reportedly used less often. In addition, some teachers named an irrelevant strategy, asking students to name letters from the text, in order to teach comprehension skills.

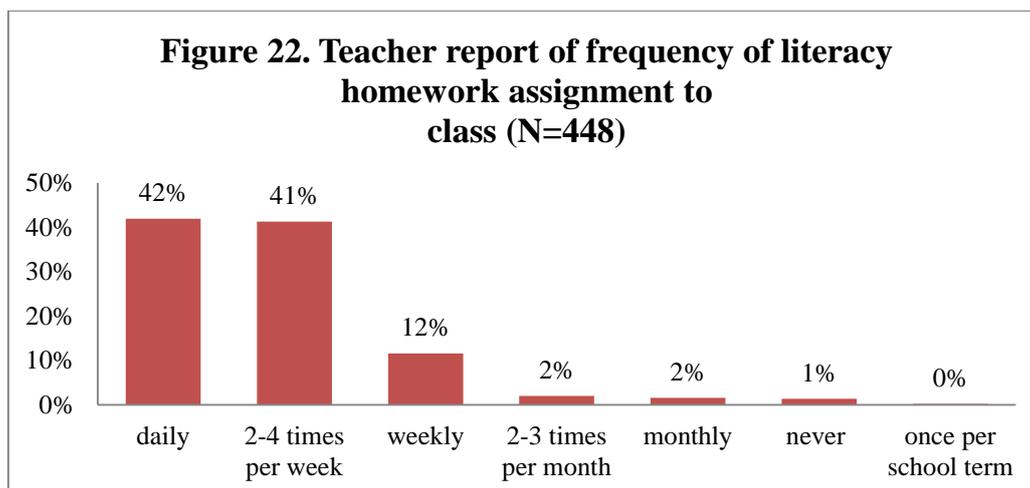
The reading comprehension strategy observed most often by teachers in classrooms observed involved asking questions during and after reading a text (Fig. 21)¹⁰.

¹⁰ Significant difference between Control and LB and TT-only and LB groups at baseline with percentage of teachers who asked children to summarize a text.



4.17 Literacy Homework

Assigning students homework that involves reading and writing regularly can provide them with additional practice of skills taught in the classroom and involve parents in the progress that children make towards learning how to read and write. Practice at home can help students understand the utility of literacy and that reading and writing are not skills that are limited to the classroom. Baseline survey indicates that fewer than half of the teachers surveyed provide any regular literacy homework to their students (Fig. 22) and there was evidence of teachers assigning literacy homework in only 7% of the classrooms observed. While there are presumably many reasons for this (lack of required materials at home, assumption that children do not have time as they help with household chores etc.), this indicates a missed opportunity in terms of practicing literacy skills learned in class.



4.18 Teaching Practice and Student Engagement

In addition to the teaching of literacy skills, observers made note of teaching practice and student engagement in the classroom in general. In general, teachers provided clear instructions, responded when students were off task and used positive discipline strategies most often (Table 7). Teachers hardly ever promoted small group interactions and students never asked questions during lessons (Table 7, Table 8). Only a minority of teachers observed linked lessons to previous learning in class or to students' home experiences. Hardly any of the teachers were observed assigning literacy homework to students or explicitly teaching students how to handle books.

Table 4.18a. Observation of Teaching practice and classroom management

	Control (SD)	TT only (SD)	LB (SD)	Sig. Diff.	Overall (SD)
Teacher provides clear instructions to students	2.86 (.31)	2.80 (.34)	2.93 (.21)	-	2.86 (.29)
Teacher responds when students are off task	2.52 (.40)	2.29 (.32)	2.53 (.41)	-	2.45 (.39)
Teacher uses positive discipline (praise, applause etc.)	2.23 (.62)	1.83 (.55)	2.40 (.37)	*	2.16 (.56)
Teacher uses negative discipline (corporal punishment, embarrassment etc.)	1.30 (.42)	1.32 (.37)	1.48 (.44)	-	1.37 (.41)
Teacher promotes small group interactions among students during lesson	1.04 (.13)	1.04 (.13)	1.07 (.27)	-	1.05 (.19)

1=never, 2=sometimes, 3=most-always

* significant difference between TT and LB groups

Table 4.18b. Observation of student engagement in the classroom

Student Engagement	Control (SD)	TT only (SD)	LB (SD)	Sig. Diff.	Overall (SD)
Students ask questions during lesson	1.11 (.40)	1.04 (.13)	1.05 (.18)	-	1.06 (.26)
Students actively participate during lesson	3.73 (.32)	3.66 (.32)	3.61 (.42)	-	3.67 (.35)
Students have the opportunity to practice skill or activity focused on during lesson	3.61 (.45)	3.25 (.73)	3.63 (.38)	-	3.50 (.56)
Teacher asks students questions related to the lesson	3.82 (.42)	3.73 (.40)	3.69 (.37)	-	3.75 (.39)

1=never, 2=a few times, 3=sometimes, 4=frequently

On average, teachers called on about four students during the lesson. Given that lessons observed were on average 42 minutes long and that there were, on average, about 45 students in each class observed, it seems that teachers are calling on very few students during lessons. Furthermore, most of the questions the teachers asked students were closed ended short answer questions (e.g. yes/no

questions) and the type of questions least asked were open ended long answer questions (e.g. How do you feel about character X and why?) (Table 9). When students responded to questions incorrectly, teachers responded in a variety of ways including calling on another student, providing the right answer, repeating the question and providing clues about the right answer (Table 10).

Table 4.18c. Observation of Teacher Questions

	Control (SD)	TT only (SD)	LB (SD)	Sig. Diff.	Overall (SD)
Mean number of students called on by teacher	3.73 (.37)	3.93 (.43)	3.82 (.50)	-	3.82 (.44)
Teacher asks questions that require a short, right/wrong answer	3.18 (.39)	3.50 (.55)	3.31 (.77)	-	3.33 (.59)
Teacher asks questions that require a long, right/wrong answer	1.48 (.42)	1.39 (.63)	1.82 (.71)	-	1.57 (.61)
Teachers asks questions that have multiple short answers	2.68 (.62)	2.82 (.53)	3.08 (.75)	-	2.86 (.64)
Teacher asks questions that require longer, open ended answers	1	1	1.03 (.13)	-	1.01 (.77)

1=none, 2=a few, 3=some, 4=most, 5=all

Table 4.18d. Observation of Teacher response to incorrect student answers

	Control (SD)	TT only (SD)	LB (SD)	Sig. Diff.	Overall (SD)
Teacher calls on another student to answer the question	2.14 (.36)	2.11 (.21)	2.03 (.31)	-	2.09 (.30)
Teacher provides the right answer	2 (.26)	2 (.20)	2.02 (.15)	-	2.01 (.20)
Teacher says the answer is incorrect and repeats question	2.13 (.31)	2.04 (.31)	2.20 (.31)	-	2.12 (.31)
Teacher provides student with clues regarding the correct answer	2.12 (.29)	2.21 (.26)	2.23 (.25)	-	2.18 (.27)

1=never, 2=sometimes, 3=frequently

4.19 Student Achievement, Literacy Assessment and Teacher Feedback

As students learn new skills in class, it is important for them to receive an appropriate type and amount of feedback. Acknowledging ones' strengths and weaknesses can help a learner to progress towards skill acquisition. Classroom observers noted whether teachers provided feedback to students and whether the feedback was directed towards individual students, a small group of students or the entire classroom. They noted that most of the oral feedback that teachers provided to students was to individual students (Table 11).

Table 4.19. Observation of oral feedback teacher gives to students (N=42)

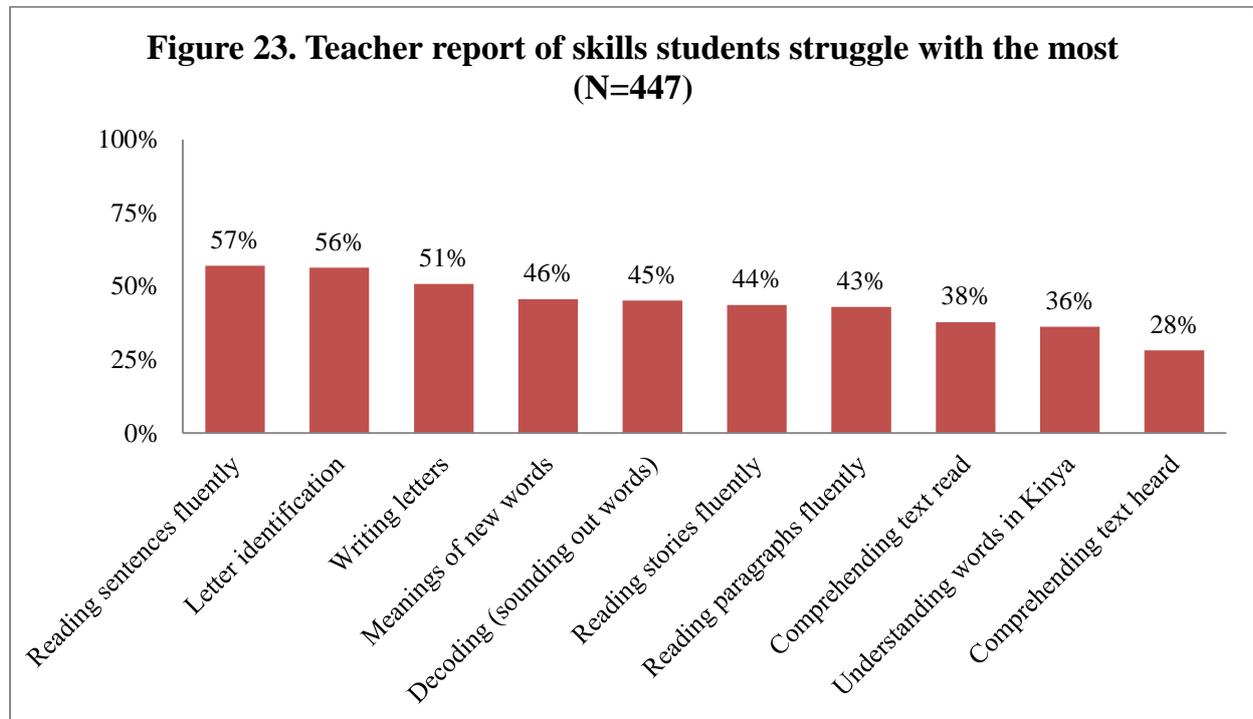
	Control (SD)	TT only (SD)	LB (SD)	Sig. Diff.	Overall
Oral feedback to individual students	2.29 (.54)	2.04 (.37)	2.38 (.38)	-	2.23 (.45)
Oral feedback to a small group of students	1.11 (.29)	1	1.06 (.19)	-	1.06 (.20)
Oral feedback to the entire classroom	1.95 (.42)	1.88 (.63)	2.40 (.37)	-	2.08 (.53)
N	14	14	14		42

1=Never, 2=Sometimes, 3=Frequently

4.19.1 Student Achievement

Baseline assessment, based on teacher report, found that a substantial number of students are struggling with each of the literacy skills presented to teachers. Teachers believed that reading fluency is the skill that students have the most difficulty with, followed by letter identification and writing

letters (Fig. 23)¹¹. Figure 24 outlines the percentage of teachers surveyed who feel that most to all of their students have developed the skills: identifying some letters, identifying all letters, reading a word out loud, reading a sentence out loud, reading a paragraph out loud and summarizing a text.

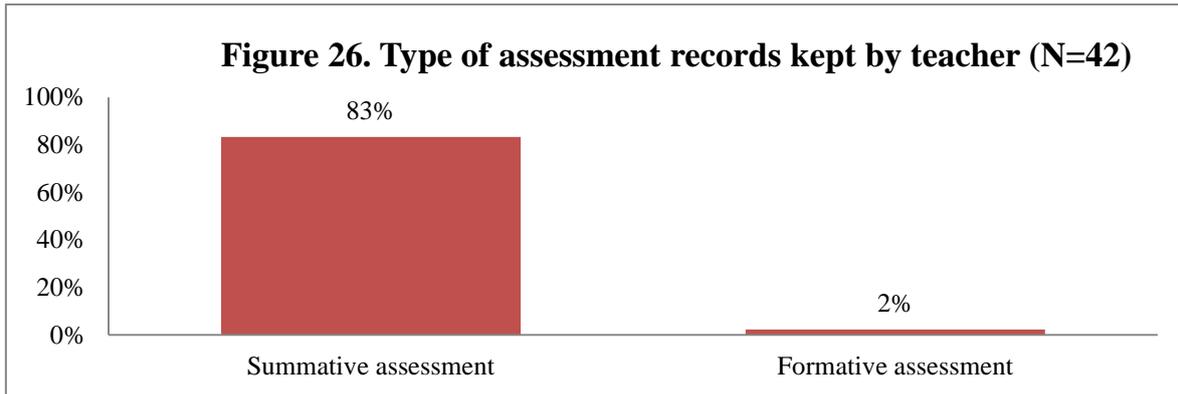
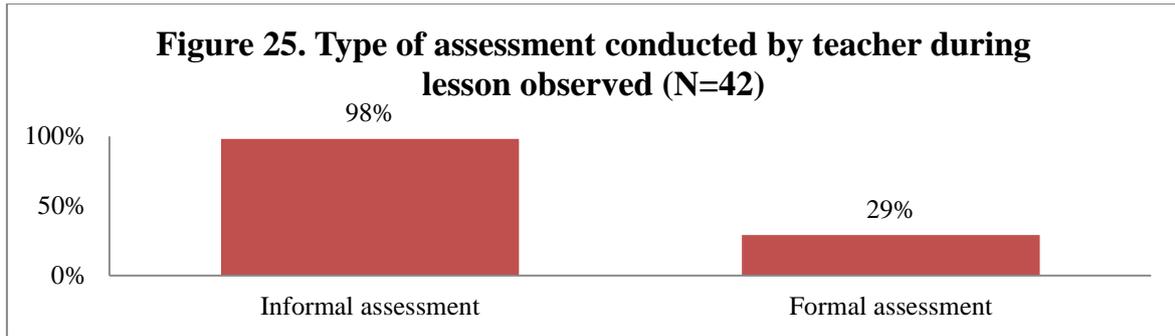


4.19.2 Literacy Assessment.

In order to help children improve their reading and writing skills, it is important for teachers to track their progress, both formally and informally. Of the teachers surveyed 97.6 percent (N=414) reported tracking students' literacy skills and progress in some way. Some of the strategies used by teachers to assess students' reading abilities included having students read out loud individually, having students summarize text, having students write words on the board and giving students dictation, exercises, homework and tests related to content covered in class.

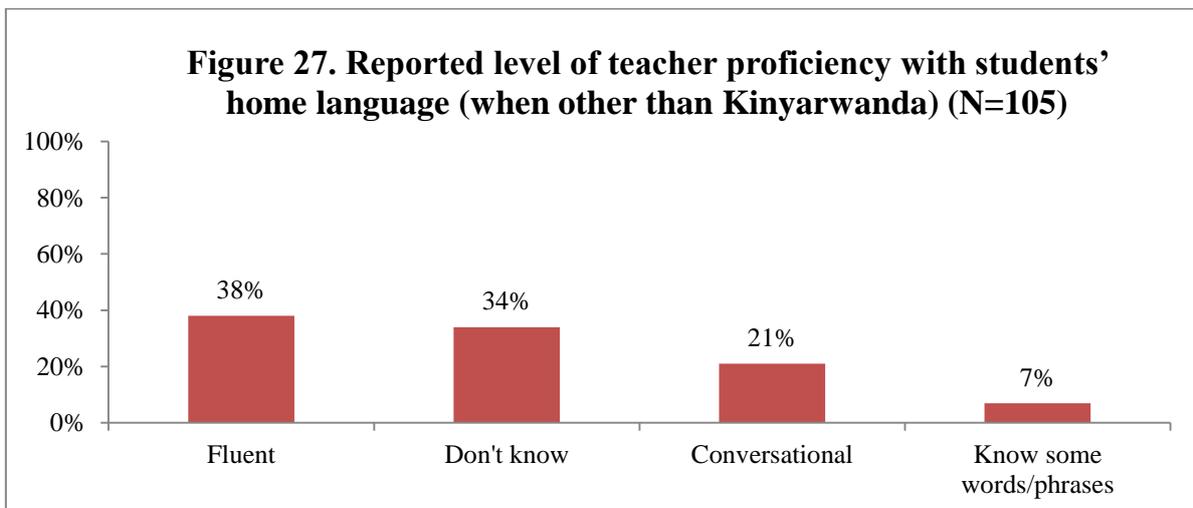
Most of the teachers were observed providing informal assessment to students during the lesson (Fig. 25). Very few teachers were observed providing formal assessment. When observers checked to see what type of assessment records teachers kept, a majority of teachers shared summative assessment records such as scores from tests or final exams. Very few teachers kept formative assessment records of their students that would enable them to chart student progress throughout the school year and adjust instruction accordingly (Fig. 26).

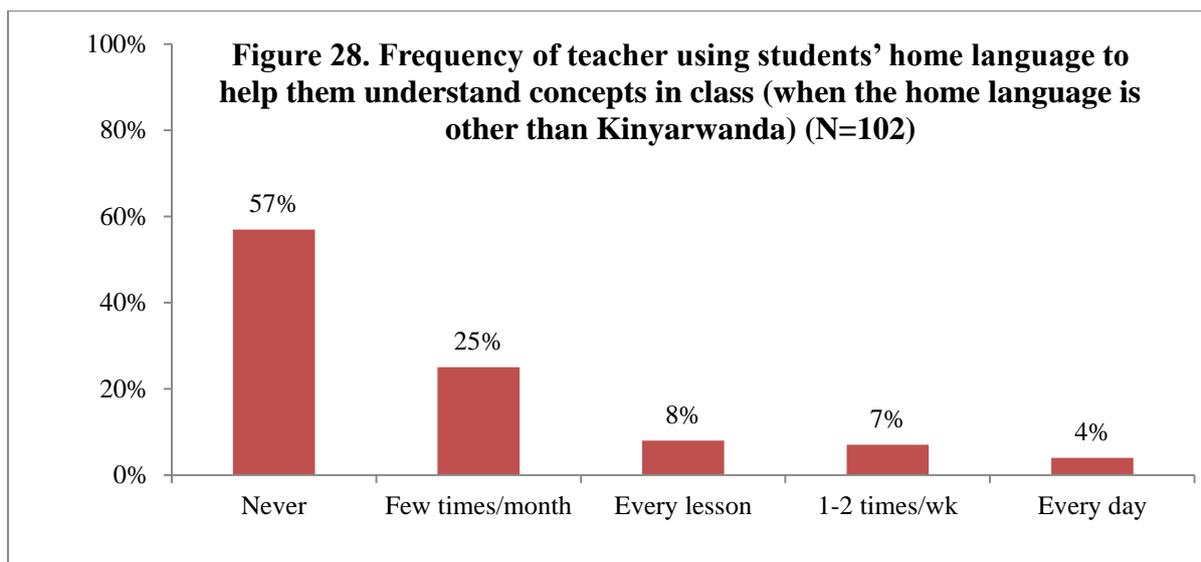
¹¹ There was a significant difference between groups in terms of understanding words in Kinyarwanda with more students reported to be struggling with that skill in the Control group (42 percent) than the TT only group (28.9 percent). Additionally, significantly more students were reported to be struggling with decoding in the Control group (51.1 percent) than the TT only group (37.6 percent).



4.20 Language of Instruction

Teachers reported that all of the students learn to read in Kinyarwanda. A quarter of teachers (24 percent) indicated that they had students in their classrooms whose home language was something other than Kinyarwanda (while 43 percent of teachers observed indicated this to be the case). About 76 percent of the students who have a home language other than Kinyarwanda are reported as having difficulty understanding instructions in the classroom. Figure 27 shows that only 38 percent of teachers of second language learners are fluent in the students' home language, 21 percent are conversational and 7 percent know some words and phrases. Over half of the teachers of second language learners report never using the students' home language in class in order to clarify concepts (Fig. 28).





5 Recommendations for Literacy Boost Implementation

Baseline assessment found that there is a lack of print material, especially books other than textbooks, in classrooms in Gicumbi. This lack of books may be associated with the low levels of regular reading out loud that has been found to take place in classrooms in this study. Given that the presence of reading material is an essential first step towards successful acquisition of literacy skills for young children, it is recommended that classrooms be provided with an adequate number and type of books during LB implementation. In addition to providing books and other reading materials to classrooms where they are lacking, Literacy Boost should aim to increase teacher knowledge regarding the importance of frequent exposure to books (textbooks and other) as well as train them on strategies to effectively incorporate books into lessons.

It is recommended that the Literacy Boost program underline the importance of print material in the environment of young literacy learners and encourage teachers to create print-rich environments for their students. The material displayed on classroom walls should include examples of various types of print including letters of the alphabet, syllables, words matched to pictures, sentences, songs and poems.

As the project moves into the teacher training phase, it may be useful to think about how to make small changes in the activities that teachers already employ that would make them more effective in achieving their teaching/learning goals, as well as introducing new activities and methods for the skills that do not currently receive much focus by teachers (e.g. reading comprehension and writing).

It is recommended that LB expose teachers to research regarding the benefits associated with early involvement in literacy activities and encourage a culture where students know their letters prior to start of Primary 1.

While teachers may be using a variety of strategies to teach letter knowledge, it is recommended that teachers be supported in the use of creative strategies (such as writing letters in the air with fingers) that provide students with opportunities to practice their letters in a variety of ways.

While teachers indicated an understanding of syllables, they seemed to struggle with the concept of phonemes. It is highly recommended that an understanding of phonemes be emphasized during the Teacher Training component of LB implementation. Teacher training should provide teachers with an understanding of phonemes, outline the importance of phonological awareness as a basic component of reading development and provide teachers with tools to develop phonological awareness skills among students.

LB training should emphasize the importance of vocabulary skills towards reading success. Strategies that are effective in teaching vocabulary skills must also be emphasized with teachers during LB implementation.

The LB program should aim to increase teacher knowledge regarding the important features of reading out loud to students (with prosody (rhythm, stress, and intonation)) and subsequently increase the frequency of this teaching strategy. Additionally, while it is encouraging that many teachers report that students read out loud regularly, it is important that *all* teachers allow students opportunities to practice reading out loud with fluency and appropriate prosody. While reading words out loud is important, reading sentences and passages out loud from a variety of text is essential to developing reading fluency. Literacy Boost training should encourage teachers to incorporate daily read-aloud time into their lesson plans and to read various types of text out loud on a regular basis to students. The Literacy Boost program can also encourage teachers to create regular opportunities for students to read individually, providing them with greater practice and allowing for more productive feedback when it comes to fluency

LB training should assist teachers in understanding skills that indicate reading comprehension among students and which are indicators of other literacy skills. While teachers have a good grasp on some explicit ways to assess reading comprehension, there is a need to increase teacher knowledge regarding the various methods to assess student's deeper understanding about the text (i.e. strategies that have students interact with text in a more meaningful way than simply parroting back facts from the text). Literacy Boost should build on the methods teachers already use and support them in developing additional effective strategies to teach reading comprehension skills in the classroom. By having students participate in activities such as summarizing a text, discussing their opinions of content read or linking text to their own life experiences, teachers can enhance students' comprehension beyond basic facts contained in text. These strategies can be highlighted during Literacy Boost implementation. Currently, teachers appear to be asking mainly fact-based questions about text students read. Literacy Boost training can encourage teachers to ask different types of questions, particularly questions that help students to think more deeply about content that they are exposed to and allow students to be more creative and expressive in their dialogue about text they read.

Information regarding the importance of formative assessment as well as strategies to conduct and record this type of assessment is essential to include in LB implementation. Assignment of literacy homework should also be encouraged during LB implementation so that children have the opportunity to practice literary skills beyond the walls of their classrooms.

If the home language is indeed different than the language of instruction, it is imperative that teachers employ strategies that will ease learning for these second language learners. These strategies could include speaking clearly at a comfortable pace, strategically employing words from the students' home language during lessons to aid comprehension (but not engaging in simultaneous translations), and using visuals, and using visuals, gestures, and other redundant information to help students understand lesson content. Supporting teachers in the use of these strategies will ensure that all students are able to benefit from the literacy lessons presented in class.

6 Conclusion

Teacher Baseline assessment indicates that there are some gaps in teacher knowledge regarding the core skills for literacy development. When asked which five skills are most important in learning to read, 82 percent of teachers surveyed included letter knowledge, 82 percent included reading comprehension, 72 percent included reading fluency, 31 percent included phonemic awareness (translated as identifying constituents within a word) and 20 percent selected vocabulary.

Classroom observations provide evidence that although teachers are focusing on development of letter knowledge skills in Primary 1 and Primary 2 classrooms, these skills are being taught in traditional, basic ways (such as reading the letter or writing the letter in students' notebooks) indicating that

teachers may benefit from support regarding varied, creative (i.e. more kinesthetic and fun) ways to teach these skills.

It is presently unclear whether phonemic awareness is an essential component of acquiring literacy in Kinyarwanda. Baseline results found that there appears to be a lack of clear understanding among teachers regarding the concept of phonemes and phonemic awareness activities did not occur in all classrooms (words with specific sounds were generated in 50 percent of classrooms and specific sounds with a spoken word were identified in 26 percent of classrooms). However, the importance of phonemic awareness in the Rwandan classroom is still not clear. Similarly, vocabulary skills were not widely considered a core reading skills by teachers and the least amount of observed lesson time was spent on vocabulary instruction.

Reading fluency is the skill that the highest number of teachers reported their students to be struggling with. Teachers may be modeling reading to students but they do not appear to be doing so (with books other than textbooks) regularly. In addition, not all students are provided the opportunity to practice reading books out loud on a regular basis-although this may be in part due to a lack of reading material in the classroom.

Comprehension skills are currently being taught in a very basic way such as asking direct questions about text and asking students to summarize text. Teachers may benefit from training on strategies that allow students to think about text that is read on a deeper level, such as explicitly relating text to their own lives or generating new ideas based on ideas found within the text.

Although there appears to be adequate seating and lighting in classrooms, there is a need for more print material on the walls of the classrooms, in particular examples of developmentally appropriate and meaningful use of print such as songs and poems. There appears to be very little small group interaction between students during literacy lessons, teachers call on very few students and students almost never ask questions during lessons. Although teachers ask questions of students, most of the questions teachers ask are short, closed ended questions. Teachers could benefit from literacy instruction strategies that allow students more independent practice of skills learned during lessons as well as more 'hands-on' participation during class.

Although teachers appear to conduct informal assessment of students during lessons and keep summative assessment records, most teachers do not keep formative assessment records. Because charting student progress through formative assessment can guide lesson planning and the strategies teachers use within lessons, it is imperative that teachers be encouraged to keep formative assessment records of each student. Only a handful of teachers give literacy homework to students. In this way, students miss the opportunity to practice literacy skills at home and possibly involve family members in their literacy development.

Some teachers indicated the presence of students in their classrooms who are struggling with Kinyarwanda, indicating the need for strategies that cater to the needs of second language learners during literacy instruction. If there are learners in the classroom who are struggling due to a difference between home language and language of instruction, teachers will benefit from strategies such as speaking clearly at a comfortable pace, and employing cognates (words that are the same or very similar in both the home language and Kinyarwanda) during lessons so that second language learners may participate comfortably and work towards successfully acquisition of literacy skills as well.

A lack of clear understanding among teachers regarding the core skills of reading development may ultimately impact student acquisition of literacy skills. Given that Literacy Boost has a strong teacher training component that highlights these core skills as well as supporting teachers to adopt evidence-based strategies for teaching reading within the local context, the program has the potential to positively impact literacy instruction in Gicumbi. The recommendations provided will help target LB implementation in the district and strengthen the teaching of literacy skills in classrooms. Follow-up assessments will provide insight into the effectiveness of teacher training in this context.

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Appendix A: Descriptive Statistics

Table A1. Teacher Posts, Grades and Subjects Taught

	Control	TT only	LB	Sig. Diff.	Overall
Current Post					
% Volunteer Teachers					0.89 95.09 (N=448)
% Government Teachers	94.44	94.74	96.24	–	1.79 (N=448)
% Assistant Headmaster	3.47	0.59	1.49	–	1.11
% Headmaster	2.08	0.58	0.75	–	0.89
% Temporary Teacher	0.69	0.58	1.49	–	2.88 (N=451)
% Other Post	2.1	5.75	0	* (TT-LB)	
N	144	174	134		449
Grades Taught					
% Kindergarten	0.69	1.15	0	–	0.66
% Primary 1	31.25	38.51	36.57	–	35.62
% Primary 2	30.56	31.03	34.33	–	31.86
% Primary 3	27.78	24.71	31.34	–	27.65
% Primary 4	22.92	20.11	28.36	–	23.45
% Primary 5	9.03	9.77	8.96	–	9.29
% Primary 6	9.03	6.9	5.22	–	7.08
N	144	174	134		452
Subjects Taught					
% Kinyarwanda	96.53	98.28	99.25	–	98.01
% English	28.47	33.33	25.37	–	29.42
% French	3.47	5.75	1.49	–	3.76
% Mathematics	40.97	45.4	27.61	* (TT-LB)	38.72
% Science & Technology	6.25	11.49	10.45	–	9.51
% Social Studies	22.92	22.41	20.15	–	21.9
% Sports	32.64	35.63	35.07	–	34.51
% Culture	17.36	18.39	7.46	* (TT-LB)	14.82
% Drama	6.94	7.47	2.99	–	5.97
% Music	22.92	32.18	25.37	–	27.21
N	144	174	134		452

* Significant differences between Teacher Training (TT) only and Literacy Boost (LB) groups

Table A2. Teacher Understanding of Literacy Materials and Literacy Skills

	Control	TT only	LB	Sig. Diff.	Overall
The Top 3 Important Items to Improve Reading Skills					
% Textbooks	79.02	75.58	78.95	–	77.68 (N=448)
% Storybooks	59.44	61.05	63.16	–	61.16 (N=448)
% Soccer balls	6.99	12.21	6.02	–	8.71 (N=448)
% Vocabulary Posters	25.87	27.91	21.05	–	25.22 (N=448)
% Newspapers	30.77	26.32	24.24	–	27.13
% Alphabet Posters	41.96	45.61	43.94	–	43.95
% Science Equipment	5.59	3.51	1.52	–	3.59
% Magazines	4.90	7.02	5.30	–	5.83
% Religious Books	8.39	8.77	9.09	–	8.74
% Flash Cards	49.65	43.86	53.03	–	48.43
N	143	172	133		446
Five Key Skills to Becoming a Good Reader					
% Memorizing Passages	26.57	26.44	17.16	–	23.73
% Identifying Letters and Sounds	81.82	81.03	83.58	–	82.04
% Knowing Days of the Week	1.4	3.47	4.48	–	3.11 (N=450)
% Phonemic Awareness	32.87	26.01	36.57	–	31.33 (N=450)
% Clear Handwriting	73.43	75.29	74.63	–	74.5
% Reading Fluently	71.33	74.14	70.9	–	72.28
% Having Good Vocabulary	16.78	20.23	21.64	–	19.56 (N=450)
% Understanding What is Read	82.52	83.33	79.1	–	81.82
% Sitting Quietly	6.29	12.07	13.43	–	10.64
% Paying Good Attention	52.45	45.4	38.06	–	45.45
% Good Grammar/Pronunciation	51.05	45.4	57.46	–	50.78
N	143	174	134		451

Table A3. Teacher Understanding of Reading Comprehension and Fluency

	Control	TT only	LB	Sig. Diff.	Overall I
Meaning of Being a Fluent Reader					
Understanding new vocabulary words	1.41	2.35	2.26	–	2.02
Understanding that spoken words are made up of ind. sounds	1.41	2.94	0.75	–	1.8
Reading out loud with accuracy, appropriate speed, expression	83.8	85.29	84.21	–	84.49
Understanding, interpreting, and using info. from a text	2.82	1.76	3.76	–	2.79
Identifying the alphabet letters	9.15	6.47	3.76	–	6.42
Answering questions about the plot of the text	1.41	1.18	5.26	–	2.47
Total N	142	170	133		445
Meaning of Comprehending a Text					
Reading out loud without mistakes	36.36	39.88	41.79	–	39.33
Summarizing in their own words	69.23	73.99	81.34	–	74.67
Understanding, interpreting, and using information from text	65.73	63.58	67.91	–	65.56
Reading out loud with accuracy, appropriate speed, expression	34.27	33.53	38.06	–	35.11
Repeating the txt from memory	32.17	23.12	33.58	–	29.11
Relating to a similar text	44.06	38.15	39.55	–	40.44
Understanding that spoken words are made up of ind. sounds	13.29	12.14	11.19	–	12.22
Answering questions about the plot of the text	87.41	84.97	88.81	–	86.89
Identifying the alphabet letters	11.19	15.03	11.94	–	12.89
N	143	173	134		450

Table A4. Frequency Co-Occurrence Chart for Reading Skills with Actors & Activities Mentioned by Teachers (Note: number of total mentions in answers not teachers)

	Total in Reading Activity 1&2	Words with letter in them	Read from Blackboard	Reading Silently	Reading text	Repeat after teacher	Story-telling	Students Show/Do	Teacher Feedback	Teacher models	Use Instructional Materials	Vocabulary	Words
Phonemic Awareness	47	12					22	5			10		
Reading Comprehension	54			11	11		5	11				6	
Reading Aloud (without explicit reference to fluency)	113		10	13	14	7		88	24	15		6	
Reading Fluency	123			10	6	12		50	20	78		11	
--All Reading Aloud	236		10	23	20	19		138	44	93		17	
Decoding/ Encoding	36	7	9					9					16
Letter Id & Letter-Sound Correspondence	100	47				5	11	20		7	19		15
Writing	41	5						13	5				14
Vocabulary	61			7	5			13		12			

Table A5. Teacher Report of Literacy Instruction in the Classroom

	Control	TT only	LB	Sig. Diff.	Overall I
% Teaching Reading Comprehension	99.29	98.26	99.25	–	98.88
N	141	172	133		446
% Teaching Letter Names/Sounds	62.79	64.71	64.29	–	63.97
N	129	153	126	–	408
Strategy Used to Teach Reading Comprehension					
Teacher's reading passage repeatedly	72.34	71.18	62.41	–	68.92
Having students repeat the story	36.17	37.65	33.08	–	35.81
Telling students the meaning of story	68.79	65.88	61.65	–	65.54
Asking to predict about the text before reading it	24.11	22.35	21.05	–	22.52
Asking to predict about the text while reading it	32.62	29.41	23.31	–	28.6
Asking to answer questions about the text	88.65	84.71	87.22	–	86.71
Asking to summarize the text	81.56	82.94	80.45	–	81.76
Asking to make visual representations of the text	15.6	16.47	16.54	–	16.22
Asking to express opinions about the text	53.9	44.12	50.38	–	49.1
Asking to name the letters out loud	29.79	30.59	25.56	–	28.83
N	141	170	133		444

Table A6. Teacher Report of Reading out Loud in the Classroom

	Control	TT only	LB	Sig. Diff.	Overall
Students reading out loud individually					
Never	3.68	2.98	0	–	2.34
Once per school term	0.74	0	0	–	0.23
Monthly	0	1.19	0	–	0.47
2-3 times per month	3.68	1.19	0.81	–	1.87
Weekly	4.41	4.17	2.44	–	3.75
2-4 times per week	18.38	26.79	26.83	–	24.12
Daily	69.12	63.69	69.92	–	67.21
N	136	168	123		427
Students reading out loud in chorus as a class					
Never	29.55	37.67	34.21	–	33.93
Once per school term	0	0.68	0	–	0.26
Monthly	0.76	0.68	0	–	0.51
2-3 times per month	0.76	0.68	1.75	–	1.02
Weekly	12.88	4.79	6.14	–	7.91
2-4 times per week	21.97	23.29	28.95	–	24.49
Daily	34.09	32.19	28.95	–	31.89
N	132	146	114		392
Teacher reading out loud a storybook to students					
Never	20.33	35.29	29.57	–	28.9
Once per school term	4.07	3.92	4.35	–	4.09
Monthly	5.69	7.19	7.83	–	6.91
2-3 times per month	9.76	7.19	6.96	–	7.93
Weekly	22.76	19.61	23.48	–	21.74
2-4 times per week	26.02	19.61	19.13	–	21.48
Daily	11.38	7.19	8.7	–	8.95
N					391
Teacher reading out loud other texts to students					
Never	22.05	23.53	22.73	–	22.82
Once per school term	5.51	5.88	3.64	–	5.13
Monthly	7.09	10.46	10	–	9.23
2-3 times per month	11.02	10.46	10	–	10.51
Weekly	24.41	19.61	23.64	–	22.31
2-4 times per week	19.69	22.88	21.82	–	21.54
Daily	10.24	7.19	8.18	–	8.46
N	127	153	110		390

A7. Teacher Report of Materials Read and Frequency of Reading Out Loud

	Control	TT only	LB	Sig. Diff.	Overall
Words teacher wrote					
Never	3.88	3.05	1.75	–	2.95
Once per school term	0.78	1.22	0.88	–	0.98
Monthly	2.33	1.83	1.75	–	1.97
2-3 times per month	5.43	2.44	1.75	–	3.19
Weekly	18.6	20.73	20.18	–	19.9
Daily	68.99	70.73	73.68	–	71.01
N	129	164	114		407
Newspapers or magazines					
Never	52.68	64.44	56.38	–	58.36
Once per school term	6.25	5.93	3.19	–	5.28
Monthly	8.93	4.44	9.57	–	7.33
2-3 times per month	10.71	4.44	4.26	–	6.45
Weekly	14.29	11.11	9.57	–	11.73
2-4 times per week	5.36	8.15	11.7	–	8.21
Daily	1.79	1.48	5.32	–	2.64
N					341
Textbooks					
Never	9.02	7.01	3.31	–	6.57
Once per school term	4.51	2.55	4.13	–	3.65
Monthly	3.01	3.18	4.13	–	3.41
2-3 times per month	5.26	4.46	7.44	–	5.6
Weekly	11.28	15.29	13.22	–	13.38
2-4 times per week	45.11	44.59	39.67	–	43.31
Daily	21.8	22.93	28.1	–	24.09
N	133	157	121		411
Storybooks					
Never	27.56	37.96	30.84	–	32.35
Once per school term	3.94	6.57	4.67	–	5.12
Monthly	11.81	11.68	13.08	–	12.13
2-3 times per month	11.02	9.49	15.89	–	11.86
Weekly	26.77	21.17	16.82	–	21.83
2-4 times per week	14.17	10.22	14.95	–	12.94
Daily	4.72	2.92	3.74	–	3.77
N	127	137	107		371
Words students wrote					
Never	6.61	15.07	8.65		10.51
Once per school term	–	–	–	–	–
Monthly	–	–	–	–	–
2-3 times per month	1.65	2.05	3.85	–	2.43
Weekly	4.96	5.48	2.88	–	4.58
2-4 times per week	17.36	17.81	27.88	–	20.49
Daily	69.42	59.59	56.73	–	61.99

N	121	146	104	–	371
Flashcards/word strips					
Never	32.77	35.92	48.45		38.27
Once per school term	2.52	1.41	0		1.4
Monthly	0.84	4.93	1.03		2.51
2-3 times per month	0.84	4.93	0		2.23
Weekly	15.13	12.68	7.22		12.01
2-4 times per week	18.49	17.61	23.71		19.55
Daily	29.41	22.54	19.59		24.02
N	119	142	97		358

A8. Frequency of homework assignment involving reading or writing

	Control	TT only	LB	Sig. Diff.	Overall
Never	1.4	0.57	2.29	–	1.34
Once per school term	0.7	0	0	–	0.22
Monthly	1.4	0.57	3.05	–	1.56
2-3 times per month	2.1	1.72	2.29	–	2.01
Weekly	15.38	12.07	6.87	–	11.61
2-4 times per week	39.86	39.08	45.8	–	41.29
Daily	39.16	45.98	39.69	–	41.96
N	143	174	131		448

A9. Teacher Report of Assessment of Reading Skills

	Control	TT only	LB	Sig. Diff.	Overall
% Assessing reading abilities	97.69	98.12	96.77	–	97.58
	130	160	124		414
How to check text comprehension					
By facial expression	2.16	2.4	1.52	–	2.05
No need to check	0	1.2	0.76	–	0.68
Asking about specific vocabulary words	71.94	74.1	66.67	–	71.17 (N=437)
Asking to summarize the text	74.82	77.84	80.3	–	77.63
Asking to tell the main points of the text	73.38	68.26	70.45	–	70.55
Asking to write a response	55.4	49.1	53.79	–	52.51
Asking questions about the text	93.53	94.61	95.45	–	94.52
Asking to act out the story	25.18	30.54	28.03	–	28.08
N	139	167	132		438

A10. Teacher Report of Frequency of Holding and Using Books (Other than Textbooks) at School

	Control	TT only	LB	Sig. Diff.	Overall
Never	17.19	25.81	23.08	–	22.25
Once per school term	0.78	2.58	2.56	–	2
Monthly	0.78	3.23	3.42	–	2.5
2-3 times per month	2.34	3.23	3.42	–	3
Weekly	10.94	7.1	5.13	–	7.75
2-4 times per week	20.31	14.84	29.06	–	20.75
Daily	47.66	43.23	33.33	–	41.75
N	128	155	117		400

Table A11. Teacher Knowledge About Phonological Awareness

	Contr ol	TT only	LB	Sig. Diff.	Overall
Number of syllables in the word "Muramuke"					
% 2 syllables	0	0	0.76	–	0.23
% 3 syllables	4.32	2.33	0.76	–	2.49
% 4 syllables	95.68	96.51	97.71	–	96.61
% 5 syllables	0	1.16	0	–	0.45
% 6 syllables	0	0	0.76	–	0.23
N	139	172	131		442
Number of phonemes in the word "Muraho"					
% 2 phoneme	47.33	56.88	59.84		54.78
% 3 phonemes	39.69	39.38	34.65		38.04
% 4 phonemes	10.69	1.88	3.15		5.02
% 5 phonemes	1.53	0	0.79		0.72
% 6 phonemes	0.76	1.88	1.57		1.44
N	131	160	127		418

Table A12. Teacher Knowledge about Literacy Skills and Teaching Strategies

	Control	TT only	LB	Sig. Diff.	Overall
Teaching Strategy: Teaching that syllables together form a word (mu-ra-ho)					
% Phonemic awareness	33.06	37.42	34.96	–	35.37
% Memory building	1.61	0.61	2.44	–	1.46
% Reading fluency	12.9	8.59	11.38	–	10.73
% Letter knowledge	45.97	49.08	45.53	–	47.07
% Reading comprehension	0.81	0	0	–	0.24
% Handwriting	3.23	0.61	4.88	–	2.68
% of Vocabulary	2.42	3.68	0.81	–	2.44
N	124	163	123		410
Teaching Strategy: Asking to sound a word without the first letter (Meza-->Eza)					
% Phonemic awareness	37.31	43.21	37.3	–	39.57
% Memory building	2.24	3.7	1.59	–	2.61
% Reading fluency	8.96	6.17	4.76	–	6.64
% Letter knowledge	41.79	39.51	51.59	–	43.84
% Reading comprehension	0	0	0.79	–	0.24
% Handwriting	0	0.62	0	–	0.24
% Vocabulary	9.7	6.79	3.97	–	6.87
N	134	162	126		422
Teaching Strategy: Asking to tell the meaning of the words taught					
% Phonemic awareness	6.67	5.39	3.17	–	5.14
% Memory building	8.89	12.57	13.49	–	11.68
% Reading fluency	5.93	3.59	6.35	–	5.14
% Letter knowledge	5.19	2.99	0.79	–	3.04
% Reading comprehension	23.7	25.15	20.63	–	23.36
% Vocabulary	49.63	50.3	55.56	–	51.64
N	135	167	126		428
Teaching Strategy: Asking to practice reading out loud					
% Phonemic awareness	23.7	23.98	18.25	–	22.22
% Memory building	4.44	2.92	3.97	–	3.7
% Reading fluency	59.26	63.74	67.46	–	63.43
% Letter knowledge	6.67	4.09	4.76	–	5.09
% Reading comprehension	5.19	3.51	3.17	–	3.94
% Handwriting	0	0	0.79	–	0.23
% Vocabulary	0.74	1.75	1.59	–	1.39
N	135	171	126		432

Table A13. Teacher Report of Skills Students Struggle with the Most

	Control	TT only	LB	Sig. Diff.	Overall
% Letter identification	58.04	53.18	58.78	—	56.38
% Writing letters	47.55	47.4	58.78	—	50.78
% Understanding words in Kinyarwanda	41.96	28.9	39.69	* (C-TT)	36.24
% Decoding (sounding out words)	51.05	37.57	48.85	* (C-TT)	45.19
% Figuring out the meaning of unfamiliar words	48.95	43.35	45.04	—	45.64
% Reading sentences fluently	58.74	53.18	60.31	—	57.05
% Reading paragraphs fluently	39.86	42.77	46.56	—	42.95
% Reading stories fluently	39.16	43.93	48.09	—	43.62
% Comprehending text read to them	29.37	24.86	31.3	—	28.19
% Comprehending text they read	38.46	35.26	40.46	—	37.81
N	143	173	131		447

*significant differences between Control and TT only groups

Table A14. Teacher Report of Percentage of Students in Their Classroom Having Developed Specific Literacy Skills

	Control	TT only	LB	Sig. Diff.	Overall
Identification of some letters					
% None	0.72	0.58	0	–	0.46
% A few	18.12	28.65	19.38	–	22.6
% About half	18.84	19.3	24.81	–	20.78
% Most	46.38	40.35	48.84	–	44.75
% All	15.94	11.11	6.98	–	11.42
N	138	171	129	–	438
Identifying all letters					
% None	1.46	1.82	1.57	–	1.63
% A few	22.63	26.67	28.35	–	25.87
% About half	17.52	20	18.11	–	18.65
% Most	41.61	41.82	44.88	–	42.66
% All	16.79	9.7	7.09	–	11.19
N	137	165	127	–	429
Reading out loud a sentence					
% None	2.16	3.59	0	–	2.07
% A few	32.37	44.31	46.51	–	41.15
% About half	23.74	26.35	27.91	–	25.98
% Most	30.94	21.56	22.48	–	24.83
% All	10.79	4.19	3.1	–	5.98
N	139	167	129	–	435
Reading out loud a word					
% None	3.6	4.13	3.64	–	3.8
% A few	34.23	28.1	29.09	–	30.41
% About half	10.81	27.27	25.45	–	21.35
% Most	37.84	31.4	35.45	–	34.8
% All	13.51	9.09	6.36	–	9.65
N	111	121	110	–	342
Reading out loud a paragraph					
% None	5.97	10	11.29		9.09
% A few	37.31	48.12	43.55		43.3
% About half	17.91	18.75	24.19	*(C-TT/C-LB)	20.1
% Most	29.85	19.38	20.97		23.21
% All	8.96	3.75	0		4.31
N	134	160	124		418
Summarizing a text					
% None	15.38	17.83	21.77	–	18.25
% of A few	43.08	45.22	50	–	45.99
% of About half	17.69	18.47	15.32	–	17.27
% of Most	20.77	17.83	12.1	–	17.03
% of All	3.08	0.64	0.81	–	1.46
N	130	157	124	–	411

*significant differences exist between groups

Table A15. Teaching in Kinyarwanda and Home Language of Students

	Control	TT only	LB	Sig. Diff.	Overall
% Teaching in a language other than Kinyarwanda					
	28.06	37.21	26.12	–	31.01
N	139	172	134		445
Other Languages of Instruction					
% Teaching in Rukiga	4.21	3.79	3.85	–	3.93 (N=331)
% Teaching in Kiswahili	1.05	1.52	1.92	–	1.51 (N=331)
% Teaching in English	40.62	48.12	32.69	–	41.14
N	96	133	104		333
Language of reading in school					
% Kinyarwanda	100	100	100	–	100
N	138	166	132		436
Number of students whose home language is Kinyarwanda					
% None	2.8	9.25	6.11	–	6.26
% A few	11.19	8.09	6.11	–	8.5
% About half	0.7	0.58	1.53	–	0.89
% Most	9.09	6.36	5.34	–	6.94
% All	76.22	75.72	80.92	–	77.4
N	143	173	131		447
Number of students having home language other than Kinyarwanda and difficulty understanding instructions in Kinyarwanda					
% None	74.31	72.99	82.58	–	76.22
% A few	15.97	11.49	6.82	–	11.56
% About half	4.17	5.17	3.79	–	4.44
% Most	3.47	8.05	5.3	–	5.78
% All	2.08	2.3	1.52	–	2
N	144	174	132		450
Teacher speaking students' home language					
% Don't know	10.64	12.21	5.97	–	9.84
% Know some words and phrases	2.84	0	2.24	–	1.57
% Conversational	4.96	8.14	7.46	–	6.94
% Fluent	81.56	79.65	84.33	–	81.66
N	141	172	134		447
How often teachers speak other languages to help students understand concepts					
% Never	66.4	55.77	54.29	–	58.81
% A few times per month	10.4	7.05	7.62	–	8.29
% 1-2 times per week	2.4	2.56	2.86	–	2.59
% Everyday	3.2	3.21	8.57	–	4.66
% In every lesson	17.6	31.41	26.67	–	25.65
N	125	156	105		386

Table A16. Time spent on reading activities (in minutes)

Mean Observation Time (in minutes)					
	Control (SD)	TT Only (SD)	LB (SD)	Sig. Diff.	Overall (SD)
Total Observation Time	41.79 (8.52)	39.38 (6.13)	44.01 (8.27)	-	41.96 (7.71)
Total number of minutes spent on letter knowledge, decoding/encoding and phonemic awareness activities	25.59 (10.19)	28.59 (8.96)	25.04 (15.44)	-	26.41 (11.68)
Total number of minutes spent on vocabulary instruction	2.77 (1.44)	2.03 (1.43)	2.57 (2.13)	-	2.45 (1.69)
Total number of minutes spent on reading fluency	14.88 (7.94)	9.89 (8.94)	16.57 (12.18)	-	13.78 (10.03)
N	14	14	14		42

Table A17. Teacher Belief Regarding Grade By Which Children Should Know All Letters of the Alphabet

	Control	TT only	LB	Sig. Diff.	Overall
% Before Primary 1	1.4	3.47	7.03	-	3.83
% By Primary 1	68.53	67.63	66.41	-	67.57
% By Primary 2	13.99	15.61	14.84	-	14.86
% By Primary 3	13.29	11.56	10.16	-	11.71
% By Primary 4	2.8	1.16	1.56	-	1.8
% By Primary 5	0	0.58	0	-	0.23
N	143	173	128		444

Table A18. Language of Instruction

	Control (SD)	TT only (SD)	LB (SD)	Sig. Diff.	Overall (SD)
Rukiga					
Teacher used Rukiga as language of instruction	0	0	.02 (.07)	-	.01 (.39)
Teacher used Rukiga to explain or clarify concepts	.04 (.13)	.05 (.18)	.02 (.09)	-	.04 (.14)
Students used Rukiga to ask questions or discuss	.04 (.13)	.05 (.18)	0	-	.03 (.13)
English					
Teacher used English as language of instruction	0	0	0	-	0
Teacher/students used English words or phrases during class	.54 (.18)	.30 (.39)	.27 (.30)	*	.37 (.32)
Teacher explicitly taught English vocabulary words/language	0	0	.02 (.09)	-	.01 (.05)
Students used or practiced English	0	0	0	-	0
N	14	14	14		42

Table A19. Second language learners in the classroom

	Contro l (SD)	TT only (SD)	LB (SD)	Sig. Diff.	Overall l (SD)
Mean number of students who speak Rukiga	11.68 (18.19)	6.75 (14.17)	3.91 (9.74)	-	7.45 (14.46)
Mean number of students who do not speak Kinyarwanda fluently	7.25 (7.92) N=6	9.29 (12. 62) N=7	7.92 (11.73) N=6	-	8.21 (10.47)
% Teachers who do/need to do something to help second language students	100 % (N=5)	85.71% (N=7)	42.86% (N=7)	-	73.68% (N=14)