Rapid Feedback MERL Lecture Pour Tous
Findings Memo | Research Question 1: COMMUNITY ENGAGEMENT
February 10, 2020

Executive Summary

Background

Lecture Pour Tous (LPT), a USAID-funded technical assistance program, is a five-year initiative to teach reading in national languages in Grades 1 to 3 Senegal. LPT supplies training and support to inspectors, school directors, and teachers in their efforts to improve student literacy in national languages. LPT's activities target three key intervention areas: early grade reading (EGR) instruction (Outcome 1); EGR instruction delivery systems (Outcome 2); and parent and community engagement in a subset of schools receiving Outcome 1 and 2 activities (Outcome 3).

As part of LPT's commitment to using evidence to drive improvement, it has partnered with Mathematica and Results for Development to participate in Rapid Feedback Monitoring, Evaluation, Research, and Learning (Rapid Feedback MERL) to conduct a rigorous evaluation of LPT's community engagement activities. The evaluation pairs a randomized control trial (RCT) with qualitative data collection to answer the research question, "Do parent and community engagement activities (Outcome 3 activities as a whole) reinforce Lecture Pour Tous' activities to improve early grade reading in primary schools (Outcome 1 activities as a whole)?" This memo presents the findings from both the qualitative and quantitative analyses to answer this research question.

Key Takeaways

Our analyses suggest that Outcome 3 activities are reinforcing LPT's broader efforts to support early grade reading in primary schools.

Our quantitative analyses suggest that the community engagement activities are having meaningful positive impacts across multiple domains, though not for all outcomes within these domains. These include:

- The community engagement intervention is reaching families and is changing behavior in the home around reading by a meaningful amount.
- Teachers and parents are more likely to communicate by a meaningful amount, and there are some meaningfully positive and potentially no meaningfully negative effects on teacher practices.
- The community engagement intervention is highly likely improving children's ability to read invented words, and moderately likely improving children's abilities to identify correct letter sounds, words in their native language, and French words by a

meaningful amount, but not the more advanced skills such as oral reading fluency and reading comprehension.

- Findings for key subgroups, including child gender, whether the child is learning in the mother tongue or not, cohort, and urban/rural status, are similar to those for the overall sample.

The qualitative research supports the quantitative findings, showing several positive findings related to LPT's community engagement activities. These include:

- School management committees (called *Comités de gestion d'écoles* in French - CGE) are offering community engagement activities as expected, and there is a higher frequency and wider range of activities in Outcome 3 communities than in non-Outcome 3 communities.
- CGEs highlighted several important facilitators to community engagement, including having dynamic and proactive members to implement activities.
- Community mobilizers are engaging with parents and the CGE and implementing activities as planned. Communities are finding these activities useful.
- SBCC (social behavior change communication), including posters and radio announcements, images in the LPT books, and the involvement of the entire family have contributed to parents supporting reading at home.
- Parents in Outcome 3 communities are more likely to apply reading support techniques than parents in non-Outcome 3 communities.
- While non-Outcome 3 communities mention the lack of education as being a significant barrier to helping their child read at home, Outcome 3 communities do not feel the same. They report that they can engage with their children in reading despite not having an education or being literate.
- Children in Outcome 3 communities are more likely to read at home than children from non-Outcome 3 communities.
- Increased parent-teacher interactions have motivated teachers in the classroom.

Despite these positive findings, the qualitative data also highlighted some challenges to the implementation and sustainability of the community engagement activities, including:

- Some CGEs were not aware of LPT grant eligibility requirements and grant application procedures, and many wished they had more flexibility in managing their funds.
- Despite the PAV support and grant provision process, CGEs are still reporting that a lack of resources is the largest obstacle to implementing community engagement activities.
- Barriers to engagement in CGE activities include scheduling conflicts, lack of sensitization, and a lack of communication regarding community events.

- Challenges for community mobilizers include the number of schools they are required to cover, the distance to these schools, out-of-pocket costs, and the monthly activity targets.
- Lack of time was the greatest barrier to parents helping their children read at home and to parent-teacher interaction. Although most parents are aware of and use the school-home tool, some schools have either not received the tool or are not using it.

I. Introduction/background

A. USAID/Lecture Pour Tous

LPT, a USAID-funded technical assistance program in Senegal, which will run from October 2016 to July 2021, is teaching reading in national languages (Wolof, Pulaar, and Seereer) in Grades 1 to 3 to increase literacy and facilitate learning in French within the context of national bilingual reforms led by the Ministry of Education (Ministère de l'Education Nationale - MEN). This represents a shift from the traditional early grade reading approach in Senegal, in which children learned to read only in French. LPT's activities center on three key intervention areas: EGR instruction (Outcome 1); EGR instruction delivery systems (Outcome 2); and parent and community engagement in a subset of schools receiving Outcome 1 and 2 activities (Outcome 3).

B. Rapid Feedback MERL Engagement with LPT

Rapid Feedback MERL applies proven evaluation methods to test the effectiveness of specific components of an activity. These evaluation methods are employed in rapid cycles to allow for timely feedback and course adjustment earlier than is typically done. Since December 2017, Rapid Feedback MERL has worked with USAID Senegal and Chemonics International (Chemonics) to apply the Rapid Feedback MERL approach to specific LPT activities.

C. Purpose of this memo

LPT's Outcome 3 activity, the Community Literacy Support Plan (CLSP), involves supporting parents, communities, and school-level institutions to improve community engagement and interest in student literacy in national languages in several ways. The CLSP supports (1) school management committees and community mobilizers in implementing community engagement activities and (2) an SBCC campaign to encourage parent engagement in reading with their children. This support to parents and communities is intended to improve their engagement with children's reading at home.

Rapid Feedback MERL is conducting a rigorous evaluation of LPT's community engagement activities pairing an RCT with qualitative data collection. The goal of this research is to answer the question, "*Do parent and community engagement activities (Outcome 3 activities as a whole) reinforce Lecture Pour Tous' activities to improve early grade reading in primary schools (Outcome 1 activities as a whole)?*" This memo presents the full set of findings from both the qualitative and quantitative analysis.[1]

D. Outline of this memo

In section II, we describe the activities implemented under CLSP, outline the research questions, explain the focus of the Rapid Feedback MERL engagement, and provide a brief summary of the literature on community engagement interventions to improve early grade reading. In section III,

[1] RF MERL had shared a preliminary memo incorporating only qualitative findings in November 2019. This memo pulls together the quantitative findings and the qualitative findings into one full set of findings.

we summarize the quantitative evaluation design and in section IV we discuss the qualitative evaluation design. In section V we present findings from both the quantitative and qualitative research. We present key takeaways in section VI and finally, in section VII, we discuss next steps.

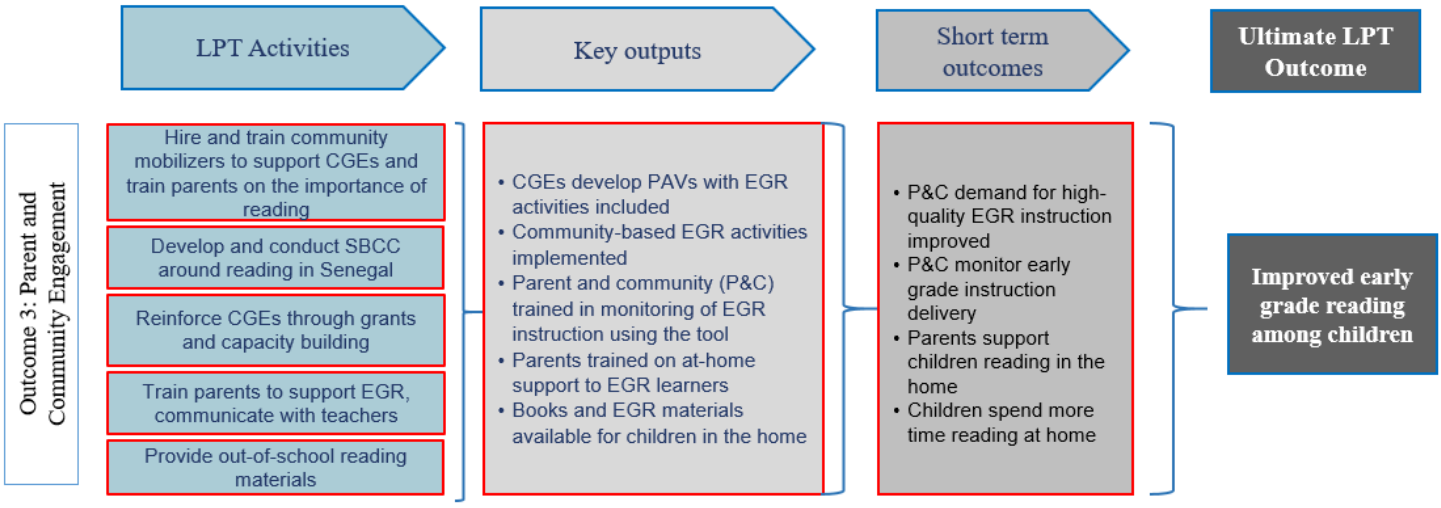
II. Study overview

A. Description of LPT community engagement theory of change

According to LPT's theory of change for the CLSP (Figure II.1), the provision of training and support to parents, community members, CGEs, and community mobilizers as well as SBCC campaigns will improve parents' knowledge, attitudes and practices towards helping their children with reading at home. These activities will also increase parents' demand for high-quality early grade reading instruction and improve the monitoring of early grade reading instruction within communities. These changes in parental behavior will result in improved early grade reading skills among children.

LPT's theory of change assumes that changing the attitudes and practices of parents related to reading is critical to child literacy, and that targeted approaches that encompass SBCC interventions as well as other community engagement activities are needed. In the sections that follow we provide a brief description of each of the CLSP activities and the status of their implementation based on the documentation available to Rapid Feedback MERL at the time of writing.

Figure II.1: LPT Outcome 3 Theory of Change



B. Implementation of Activities

LPT is implementing Outcome 3 activities in a randomly selected 20 percent of the school-communities receiving LPT in 6 regions (Diourbel, Kaffrine, Kaolack, Louga, Matam and Saint

Louis).[2] Outcome 3 activities were rolled out in two waves: to 157 schools during SY 2017-2018 (the first cohort), and to 453 schools in SY 2018-2019 (the second cohort) (out of a total of 3,300+ schools participating in the LPT program).

School Management Committees (CGEs)

CGEs which are comprised of school leadership and other community members, work towards improving the quality of instruction and the infrastructure of primary schools. These committees have an essential role in implementing LPT's community engagement activities. In order to increase CGEs' understanding of LPT and to improve their ability to implement the desired activities, LPT trains CGEs on how to structure their annual volunteer action plans (plans d'action volontaire, PAV), and how to apply for and effectively manage CGE grant funding (Chemonics 2019b). LPT has also simplified the planning and organization of activities by generating a short list of potential community-based EGR activities for CGEs to implement, and by providing CGEs with small grants and assistance from community mobilizers. The first round of 49 grants were issued to CGEs in Kaffrine, Kaolack and Matam in August 2018 and were meant to support summer reading camps at the start of the school year and later parent and community engagement activities. By June 2019, LPT had signed a second round of grants for 711 CGEs (covering all remaining CGEs who had not received a first-round grant) (Chemonics 2019c).

Community Mobilizers

Although the original CLSP included the participation of local non-governmental organizations (NGOs) and community-based organizations in implementing community engagement activities and supporting CGEs, LPT quickly realized that this strategy was not feasible and created a new strategy dependent on community mobilizers (Chemonics 2019b). Once USAID approved LPT's new strategy, the Outcome 3 team identified, selected, and trained community mobilizers and their supervisors based in IEFs. Training includes how to lead parent dialogue sessions and home visits as well as how to monitor and support CGE activities.

Each community mobilizer covers between 7 and 11 school communities, depending on distance and access, to ensure that mobilizers are able to reach their communities at least twice a month, holding parenting sessions, home visits and supporting CGE members in the implementation of their grant activities (Chemonics 2019b). Each month, community mobilizers are also asked to report on attendance and create monthly reports of their activities to submit to supervisors, who monitor the community mobilizer activities and provide support as necessary. As of June 2019, 3,563 parent dialogue sessions and 2,812 home visits have been implemented by community mobilizers (Chemonics 2019b, 2019c).

[2] In Fatick, USAID is implementing community engagement activities through the *Nos Enfants Lisent* program.

CGE and community mobilizer activities

Through CGEs and community mobilizers, LPT has implemented a series of community engagement activities including:

- Community forums: CGEs lead discussions on the importance of EGR for long-term academic success in these events, which are open to the entire community. The forums illustrate the link between increased parental support and improved reading skills and encourage parents and students to participate in school-sponsored reading activities (Chemonics 2019b).
- Parent dialogue sessions: CGEs and community mobilizers hold causeries, or parent dialogue sessions, that mostly target parents of children in LPT classes. During these sessions, community mobilizers use images to model positive behaviors and facilitate discussions between parents.
- Home visits: CGEs and community mobilizers specifically target households with struggling students with the hopes of improving parent reading behaviors and techniques. Community mobilizers are asked to consult with teachers and/or directors to understand which students need attention.
- Reinforcement classes: These remedial reading courses for students that are struggling in class occur both during the *camps de vacances*, or summer reading clubs, and during the school year.
- Reading clubs: In these clubs, also called clubs de lecture, children are grouped by reading level and spend time reading out loud to one another. Facilitators lead activities around reading comprehension and competencies.
- Mobile library: Some communities were also provided with a *malette de lecture*, or mobile library, in order to facilitate access to reading materials.

Additionally, LPT developed an *outil école-maison*, or a home-school tool, which is designed to increase effective communication between parents and teachers around students' early grade reading progress using colors and images (Chemonics 2019a). Community mobilizers and CGE members hold information sessions with teachers and parents to demonstrate how to use the tools (Chemonics 2019b). Parents are asked to return the tool back to the teacher every 15 days to ensure continuous communication.

SBCC

LPT has also implemented a community-level SBCC plan in target communities. The communication campaign includes poster displays and customized radio programs that focus on increasing parent and community awareness and engagement of EGR activities. Each CGE received a package of posters to post in gathering areas throughout the community. For the radio component, LPT works with selected local radio stations to deliver targeted programming

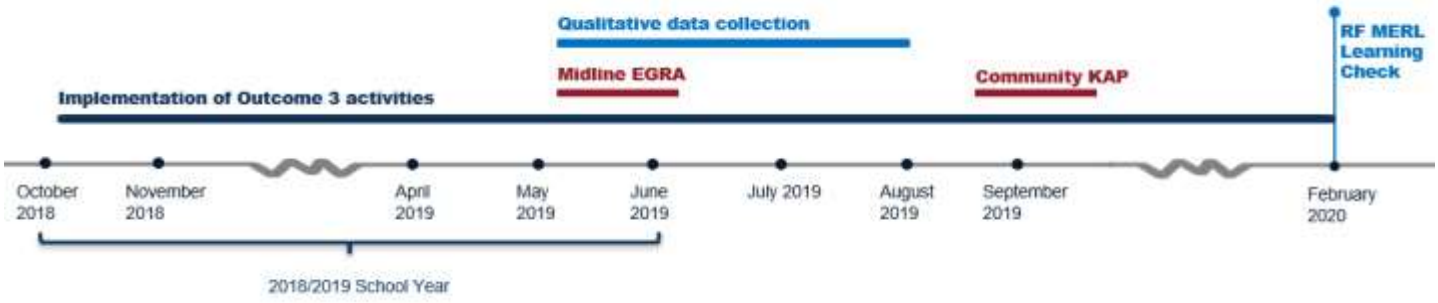
including public service announcements, jingles, and interviews with CGE members, school directors, inspectors and other local actors (Chemonics 2019c). As of June 2019, the program had delivered 144 radio programs and 1,571 public service announcements and had distributed 4,500 instructional cartoons, 3,000 signs and banners and 9,793 posters (Chemonics 2019a, 2019b, 2019c).

C. Research questions

In this rapid feedback engagement, we plan to answer research question (RQ1): *Do community and parent engagement activities (Outcome 3 activities as a whole) reinforce Lecture Pour Tous' activities to improve early grade reading in primary schools (Outcome 1 activities as a whole)?* Based on the theory of change in Figure II.1, Rapid Feedback MERL and LPT have identified three sub-questions for a rapid feedback engagement:

1. Do community engagement activities increase parents' involvement in children's early grade reading and improve learning outcomes?
2. Do community engagement activities improve teachers' knowledge, attitudes and practices in teaching early grade reading in primary schools?
3. Do community engagement activities improve children's reading skills?

Figure II.2: RQ1 Engagement Timeline



D. Summary of community engagement literature

Increasing parent, family, and community involvement and support is a common strategy for improving children's literacy in developing countries. The support often includes home education or tutoring for children provided by family or community members, as well as trainings for parents on how to better support their child's education (Spier et al., 2016). In addition, community engagement activities often include support for school-based management activities, community volunteers and mobilizers, and social behavior change and communication activities.

Parent training and *family or community tutoring* programs are among the most frequently used out-of-school approaches to improve early learning. A systematic review of literature found that

in some contexts, home education or tutoring programs can lead to improved child literacy outcomes (Spier et al., 2016). For example, the *Read India* program, which used community members as tutors, was found to have helped children increase reading skills, particularly among children with the lowest pretest scores (Banerjee et al, 2010). The systematic review also identified individual studies that demonstrated positive impact of parent training programs on child literacy outcomes, although the lack of high-quality studies prevented the authors from drawing broad conclusions about the overall effectiveness of such programs (Spier et al., 2016).

School-based management interventions can take multiple forms, but they usually involve a decentralization of responsibility and grant decision-making power to local school–related entities (Bruns et al. 2011; Gertler et al, 2012; Barrera-Osorio, et al., 2009). The underlying assumption is that handing over some fiscal and administrative responsibilities to the communities or parent committees will improve the effectiveness of school management because these groups may have a better understanding of the school's needs and parents' preferences and are well-positioned to translate them into effective policies (Hanushek and Woessmann, 2007; Besley and Coate, 2003). School management committees are typically established as the principal body to carry out school-based management interventions such as developing school improvement plans, monitoring performance of teachers and students, financial management, curriculum development, and infrastructure development among others (Barrera-Osorio et al, 2009; Bruns et al, 2011; Kozuka et al, 2016).

The literature on whether school-based management interventions improve learning outcomes is mixed. In some cases, decentralization of school management has positively affected teacher and director accountability (Barrera-Osorio et al., 2009; Duflo et al., 2015) and dropout and retention rates (Bruns et al. 2011; Beasley and Huillery, 2017; Carr-Hill et al. 2016; Gertler et al., 2012). Evidence from Burkina Faso suggests that activities carried out by the school management committees can lead to increased student enrollment, decreased student repetition, and lowered teacher absence (Kozuka et al, 2016). However, a systematic review of literature on the effects of school-based management carried by Snilstveit et al. (2016) found zero to small average effects on math, language and composite test scores. However, the same reviewers observed larger than average effects on learning outcomes from comprehensive school-based management programs that include developing school improvement plans, capacity-building activities, and a greater degree of decentralization in financial decision-making (Snilstveit et al, 2016).

Another common strategy for providing the necessary support to parent and community engagement is through *community mobilizers or volunteers*. Community mobilizers can play different roles in various sectors. They often fill a role of educating, working with, and supporting parents, teachers, and educators to build their capacity and inform them on the importance of education and literacy and the associated interventions and strategies (Catholic Relief Services, 2014). Community mobilizers are often parents, community members, and/or teachers who are supporting early grade reading (Suwannakhae, 2013; Gramling & Rosenkoetter, 2006). Using

volunteers to serve as the community mobilizers and participate in literacy activities, including tutoring, can be cost-effective in the short-term (Jacob et al., 2014) but not always in the long-term as volunteers do not always have the incentives to continue their work. For example, a forthcoming study by Mathematica did not find evidence to suggest community engagement activities implemented by a community volunteer led to changes in literacy skills. The evaluation of the Leer Juntos, Aprender Juntos intervention in Peru and Guatemala, was an RCT comprising of two treatment arms: the first was early grade reading instruction with linguistically diverse communities, and the second was the new instruction as well as a community action component (Mathematica, forthcoming). The community action component aimed to improve parent and community involvement through a range of activities, including community meetings, reading activities, and the provision of reading materials, implemented by a community volunteer. The rigorous evaluation did not find impacts of the community focused component on literacy skills in either country (the authors note that the design assumed that the two interventions were additive, which may not be the case).

Interventions involving *social behavior change communication (SBCC)* and direct training of parents are also promising approaches for improving a child's learning environment, especially when used in combination. Recent studies have shown that mass communication campaigns including media such as radio programs, posters, and community theater forums can increase parents' knowledge and awareness of the importance of supporting a child in learning how to read (Schmidt et al., 2016a; Schmidt et al., 2016b). Parents exposed to SBCC interventions in Senegal and Malawi were more likely to engage in reading-supportive behaviors and reflected a strong recall of the main messages of the campaign when prompted. Community theater forums in Nigeria were particularly effective where there was not a strong culture of reading among the community (Infosearch Services Limited, 2011). However, it is still unclear as to which combination of messages and media are most effective (Schmidt et al., 2016a; Schmidt et al., 2016b). Pilot programs in other regions and countries have demonstrated that ensuring adequate exposure to the campaigns was a limitation to the interventions (Huebner et al. 2005). It is therefore important to tailor campaign messages and mediums to make sure they are grounded in a local context and widely received. In addition, targeted training of parents, when combined with mass communication campaigns, has been shown to promote early child reading behavior. In-person instruction and workshops that encouraged parents to read with their children were particularly effective (Huebner et al., 2005; Save the Children, 2011.)

The literature on other community engagement interventions types have shown mixed results. Studies on the provision of libraries, e-readers, laptops, and print material for use outside of school do not have enough empirical evidence to suggest that they positively affect learning outcomes (Spier et al. 2016). However, there is evidence that educational TV viewed at home can improve children's early literacy development. Another study in Ghana found that community awareness efforts to inform parents of a new instructional pedagogy negated the gains seen from teacher training. Teacher training improved children's literacy when delivered alone but had no

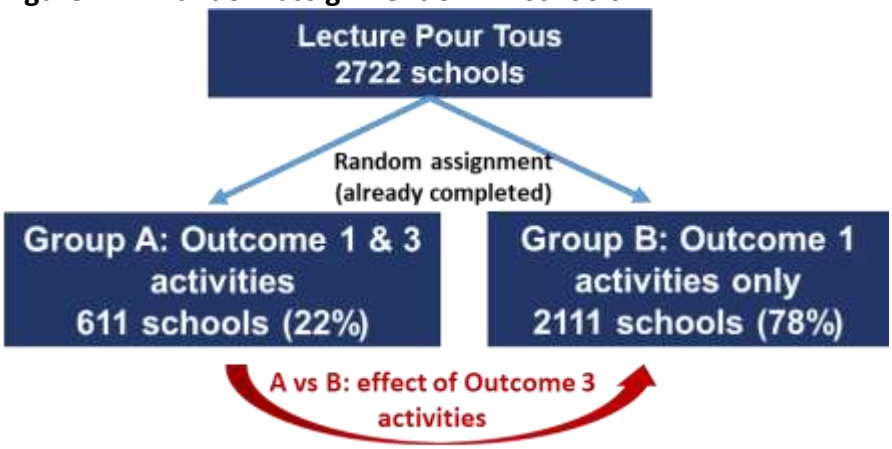
impact when they were delivered at the same time as trainings on parental awareness (Sharon, 2018). Parents were concerned that their child would not learn enough from the new child-centered and activity-based learning approaches being introduced and pressured teachers to use the old approaches instead.

III. Quantitative Evaluation Design

A. Methodology

For the quantitative analysis, we employ a randomized control trial (RCT) — the most rigorous evaluative framework for assessing program impacts — using LPT's random assignment of schools to determine which schools would receive and Outcome 3 activities. We understand that LPT stratified its sample by commune and ensured that at least one school per commune was selected to receive Outcome 3. Figure III.1 depicts how LPT randomly assigned all schools in the six recipient regions into either the treatment or the control groups. For this evaluation, we estimate the causal effect of Outcome 3 activities by comparing outcomes across a subsample of schools assigned to receive activities linked to Outcomes 1 and 3 (group A, or treatment group) with the outcomes across a subsample of schools assigned to receive only Outcome 1 activities (group B, or control group).[3]

Figure III.1. Random assignment of LPT schools



Note: Figure reflects the regions included in this analysis. In addition, LPT had randomly selected schools in St. Louis to receive Outcome 3 activities, and some Fatick communities were receiving an alternative community engagement intervention from *Nos Enfants Lisent*.

B. Parent, child and teacher outcomes

This evaluation aims to measure impacts on short- and medium-term outcomes in order to determine whether the theory of change holds true. We examine parent, child, and teacher

[3] Among the activities linked to Outcome 3 (see Table A.1 in the Appendix), 'Adapting SBCC materials' is the only one that can have a direct impact across all school and communities, not just the ones assigned to group A, as it includes the dissemination of messages around parental behavior and early grade reading at the national level through radio programming which can reach all schools and communities.

outcomes. Many outcomes are measured in multiple ways. Table III.1 below shows the outcome domains, measures, and data sources for the RCT.

Table III.1. Outcome domains, measures, and data sources for quantitative study

Domain	Level	Outcomes (* indicates primary outcome of interest in each domain; some outcomes have multiple measures)	Data Sources
1. Exposure to community engagement activities	Parent	1. Parent participation in community activities focused on reading* *(2 parent-reported measures)* 2. Parent familiarity with early grade national language reading program *(2 parent-reported measures)* 3. Parent knowledge of community activities focused on reading *(2 parent-reported measures)* 4. Parent exposure to SBCC *(1 parent-reported measure)* 5. Parent interaction with community mobilizer *(1 parent-reported measure)*	• Community KAP
	Child	6. Child participation in community activities focused on reading* (*3 measures – 2 child-reported and 1 parent-reported*)	• EGRA Child Context • Community KAP
2. Parent knowledge and attitudes about reading	Parent	1. Knowledge of at-home strategies for helping children learn to read* *(2 parent-reported measures)* 2. Confidence in ability to help children learn to read *(1 parent-reported measure)* 3. Attitude about roles parent can play in helping their children learn to read *(1 parent-reported measure)*	• Community KAP
3. Parent engagement in reading at home	Parent	1. Frequency of parent listening to child read out loud* *(1 parent-reported measure)* 2. Frequency of parent reading with child *(1 parent-reported measure)*	• Community KAP
	Child	3. Participation of household members in reading with child (*4 measures – 2 child-reported and 2 parent-reported*)	• Community KAP • EGRA Child Context
4. At-home reading environment	Child	1. Availability of printed materials in the house* (*2 child-reported measures and 1 parent-reported measure)* 2. Availability of an appropriate place for child to read at home *(1 child-reported measure)*	• EGRA Child Context • Community KAP
5. Parent and teacher interaction	Parent	1. Parent in-person communication with teacher* *(1 parent-reported measure)* 2. Receipt of information on child's progress in reading *(1 parent-reported measure)* 3. Parent attitude about receiving information from teacher about child performance *(2 parent-reported measures)*	• Community KAP
	Teacher	4. Parent in-person communication with teacher *(1 teacher-reported measure)* 5. Frequency of sharing information on student's progress in reading with parent**(1 teacher-reported measure)*	• EGRA SSME – Teacher
6. Teacher knowledge, attitudes, and practices	Teacher	1. Knowledge of LPT EGR instructional concepts and practices* *(5 teacher-reported measures)* 2. Self-reported use of LPT EGR instructional practices *(3 teacher-reported measures)*	• EGRA SSME – Teacher
i. Child reading skills	Child	1. Letter identification (national language) normalized across grades and languages* *(1 child-reported measure)* 2. Decoding or familiar word reading (national language) normalized across grades and languages* *(1 child-reported measure)*	• EGRA Child Literacy Assessment

		3. Decoding (national language) normalized across grades and languages* *(1 child-reported measure)* 4. Oral reading fluency (national language) normalized across grades and languages *(1 child-reported measure)* 5. Reading comprehension (national language) normalized across grades and languages *(1 child-reported measure)* 6. Familiar word reading (French) normalized across grades and languages *(1 child-reported measure)*	

C. Estimation strategy

We use a Bayesian analysis as our main analysis for this study for two main reasons. First, by using Bayesian analysis we can enhance the statistical precision of the impact estimates by drawing on patterns in the data, which we encode in the model through structured assumptions. These assumptions describe, for example, how similar we expect impacts to be for measures that belong to the same outcome, or outcomes in the same domain. With these assumptions, the model can "borrow strength;" if little information is available about one outcome, the model draws on data for the other outcomes in that domain to inform the results. This is particularly useful with small sample sizes, as in this study. Importantly, the model only borrows strength to the extent that the data support the governing assumptions – if impacts differed greatly across outcomes that belong to the same domain, the model would discount the assumption in favor of the evidence in the data.

Second, from a Bayesian analysis we can draw probabilistic conclusions that allow us to summarize findings in a more intuitive way and facilitate improved decision making (Chandler et al. 2019). Given the data that we have available, we can estimate (for RQ 1):

- the probability that the combination of intervention activities for LPT Outcomes 1 and 3 is meaningfully less effective than engaging only in Outcome 1,
- the probability that the two groups are equally meaningfully effective in producing the desired outcome, and
- the probability that the combination of intervention activities for LPT Outcomes 1 and 3 is more meaningfully effective than engaging only in Outcome 1.

For instance, we could state that "there is a 45 percent chance that the community engagement intervention led to a meaningful increase, and increase of at least 0.1 standard deviations, in the proportion of children reading at home."

These statements are useful for decision-making because they summarize the magnitude and certainty of the impact estimate in a single value, while at the same time framing the estimate relative to threshold of what is meaningful. For this report, we have determined with USAID that a meaningful impact of the community engagement intervention means there is an impact of at least 0.1 standard deviations (SD) on the outcome of interest. In addition, these Bayesian probability statements also offer an alternative to interpreting results using p-value or significance stars alone, both of which have been shown to be problematic when it comes to

making informed decisions (Wasserstein and Lazar, 2016; Wasserstein et al., 2019; Amrhein et al., 2019).

To reap the benefits of probabilistic inference and borrowing strength without incurring undue computational cost, we adopted a two-stage approach to analysis. In the first stage, we estimated impacts using a traditional frequentist regression in each of 13 small "cells" that we formed by crossing outcome, sample (teacher, parents, and children), and subgroup (defined by key background characteristics such as the respondent's gender, urban or rural location, whether nor not the child's mother tongue is the same as the language of instruction (L1) or not (L2), and grade in school, as inputs to the analysis).[4] The output of the first stage of our analysis was a set of impact estimates, one per cell, along with their standard errors. These impact estimates and standard errors in turn served as input to the second stage of our analysis, a Bayesian hierarchical meta-regression that summarizes average impacts across important dimensions of the intervention, such as determining the average impact across outcomes, subgroups, or populations. Splitting the data into these fine-grained cells both gives a clearer picture about how impacts may vary for different segments of the population and allows us to estimate findings separately for subgroups of interest.

As in a traditional frequentist meta-regression, we fit a new model using Bayesian hierarchical meta-regression to the impact estimates from all combinations of subgroup, outcome, and sample (teachers, parents, and children). The approach is called a meta-regression because the inputs are themselves the products of a regression. Reanalyzing these estimates through another regression allows us to summarize across them. For example, in a traditional meta-analysis we might be interested in the average impact across outcomes for particular subgroups of interest, or in whether the average impact differs for short- and medium-term outcomes. The Bayesian meta-regression serves the same purpose of summarizing average impacts across important dimensions of the intervention, such as determining the average impact across outcomes, subgroups, or populations, but additionally includes assumptions about the relationships among these features of the data to strengthen inference. See Appendix C for additional information about our analytic approach.

To ground this analysis in the literature about community engagement interventions, we also included impact estimates from the literature in the model. In this way, the current state of knowledge about community engagement interventions directly informs the model's assumptions about the effects of the Senegal intervention. However, to ensure that the information from the literature does not exert undue influence on our results, we also fit the same model to the Senegal study data only. Results were comparable between these two versions of the model, indicating that the information from the literature does not drive our findings.

[4] There were initially 16 cells, but we collapsed 6 of the cells into 3 cells due to small sample sizes. See Appendix C for additional details.

We conducted the analysis for the overall sample, as well as for key subgroups for primary outcomes in each domain (identified in Table III.1). We present the findings in the form of figures that show the probability that the community engagement activities had a positive meaningful effect, no meaningful effect and a negative meaningful effect on each outcome across all 7 of our outcome domains. We also provide tables (for each domain) with additional information that can be used to interpret the main findings. We show the mean in the control group, the value of 0.1 sd, the impact estimate in odds ratios, the 95% credible interval of the impact estimate, the resulting treatment odds, and what these imply for the treatment mean for each outcome in each domain.

Limitations of analyses and caveats. As with any analytic approach, Bayesian analysis has several limitations. We focus here on those that are specific to this Bayesian analysis. It is important to keep in mind that while a Bayesian analysis mitigates, to some extent, some errors (Type I, which is to identify an impact of the program when there is not one, and Type II, which is failing to identify an impact of the program when there is one), it does not eliminate them and can introduce other errors. For example, whether probability statements are well-calibrated – that is, whether an event labeled as 80 percent likely actually occurs 80 percent of the time – depends heavily on the plausibility and appropriateness of the model's assumptions, which in this case are grounded in the literature. Even when the assumptions are well-specified, there is still a risk of making the wrong choice based on the findings from the analysis (as with any analysis).[5] For example, a weak pilot that has a very small sample with a lot of random variation (noise) and little useful information (signal) in the data may conclude that the data suggest that there is a 70% chance that the intervention is better than its alternative. Based on that, one may want to implement the intervention. However, the noise in the data from this small sample could be driving the results.

D. Data collection summary

The RQ 1 evaluation leverages quantitative data collected by LPT's partners and qualitative data collected by the Rapid Feedback MERL team. Table III.2 summarizes the different quantitative data sources analyzed in this report.

[5] Notice that this critique is not unique to a Bayesian analysis. Similarly, one could make the wrong choice with a frequentist analysis if they don't stick to the typically used threshold of a p-value of less than 0.05. The Bayesian analysis is more transparent and also allows us to make decisions based on noisier results.

Table III.2. Quantitative Data Sources

Data source	Data collector	Timing	Sample sizes
EGRA SSME with teachers EGRA and child context survey with children	EdIntersect (LPT subcontractor)	May/June 2019	274 schools 378 teachers 4,171 students
Community KAP survey	Plan International (LPT subcontractor)	September 2019	183 schools 1,715 parents

Note: We also incorporated information from baseline EGRA (from May/June 2017) and KAP (from March 2018) data collection in the analyses.

LPT and its partner EdIntersect collected child, teacher, and director data in schools in 2017, 2018, and 2019. Each round of data collection used an early grade reading assessment (EGRA) administered to children along with a short child context survey, as well as Snapshot of School Management and Effectiveness (SSME) questionnaires administered to teachers and directors. We use the existing quantitative data from the baseline (2017) and midline (2019) data collection efforts (which we refer to as "EGRA data collection") to analyze the effect of the Outcome 3 interventions on child and teacher outcomes. See Appendix A for additional information about quantitative data collection.

LPT and its partner Plan International also conducted a separate data collection in a different sample of communities in 2018 and 2019. These data collections focused on measuring parents' knowledge, attitudes, and practices related community reading events, the LPT curriculum, and parent's involvement in children's reading at home. We use these data (which we will call the "Community KAP data collection") to analyze the impact of the Outcome 3 interventions on parent outcomes and parent-reported child outcomes.

E. Sample Description

Midline EGRA sample description. The midline EGRA sample covers the 5 regions in our analysis and the three LPT targeted national languages as shown in Table III.2. There are 274 schools included, with 378 teachers. Five to 12 percent of the treatment and control samples are located in urban areas. In addition, 4171 students are included in the sample, of which 66 to 70 percent of the treatment and control samples are in CI and 34 to 30 percent are in CP. Above 80 percent of the children in the sample speak the same language at home as is used for reading instruction in school. See Appendix B, Table B.1.

Midline KAP sample description. The midline KAP sample covers the same five regions and three languages as the EGRA sample. It includes 183 schools of which 116 are in the treatment group and 67 are in the control group. 18% of the treatment group schools are in urban areas and 36% of the control group schools are in urban areas. The sample also contains 1715 parents (or other adult relations) of which 1040 are associated with treatment group schools and 675

with control group schools. 70% of treatment group parents were female and 66% of control group parents are female. 53% of the treatment group is literate and 51% of the control group were literate. See Appendix B, Table B.2.

Equivalence. Our regression analyses of the midline and baseline samples indicate that random assignment created equivalent groups. The midline samples exhibit balance overall on demographic characteristics that do not vary over time between treatment and control groups for both EGRA and KAP datasets, with some differences in the KAP data. The control group in the midline KAP data contains 18 percentage points more urban schools than the treatment group; this difference is accounted for in our analysis. Also, the control group families in the KAP data are somewhat more likely (10 percentage points) to speak a national language that is not one of the three targeted languages by LPT than treatment group families. The baseline EGRA and KAP samples demonstrate equivalence between treatment and control groups for both demographic characteristics as well as some outcomes such as child reading outcomes. Appendix B contains more detailed information on the samples and balance tests, which rely on traditional methods, such as tests for the significance of the difference in means between the two samples, following the standard in the literature.

IV. Qualitative evaluation design

A. Methodology

RF MERL is working with LPT to conduct a mixed methods evaluation to assess the impact of Outcome 3 on key student, parent and teacher outcomes to answer the three sub-questions described above. This evaluation uses a RCT design with a qualitative research component to complement the quantitative findings. This preliminary memo focuses only focus on the qualitative findings, based on data collected by the Rapid Feedback MERL team. Table IV.1 summarizes the different qualitative data sources analyzed in this report.

Table IV.1. Qualitative Data Sources

Data source	Data collector	Timing	Sample size
Interviews with teachers, directors, and community mobilizers. Focus groups with CGE members and non-CGE parents.	APAPS (Rapid Feedback MERL subcontractor)	May/June 2019	18 schools
Interviews with project stakeholders at LPT, USAID, and MEN	Rapid Feedback MERL	July/August 2019	11 individuals

B. Qualitative data collection summary

Rapid Feedback MERL hired the Senegalese firm APAPS to conduct qualitative data collection with project beneficiaries in each of the six Outcome 3 regions. APAPS collected data on community engagement training and implementation from teachers, directors, community

mobilizers, CGE members and non-CGE parents in 18 communities/schools, spread across region and LPT language of instruction. The sample sizes, by region and language of LPT instruction, are presented in Appendix Table A.1.

In addition, the Rapid Feedback MERL team conducted interviews with 11 project stakeholders at LPT, USAID, and the MEN. The full list of interviewees is presented in Appendix A, along with additional details on data collection. Given the small sample sizes, findings from the qualitative data should be interpreted as suggestive evidence of what is happening in some schools and is not necessarily representative of what is happening in the full sample of LPT schools.

V. Findings

In this section, we present findings from both the quantitative and qualitative research on the implementation of LPTs community engagement activities, parental engagement in reading at home, parent-teacher interactions, teacher knowledge and practices, child literacy skills and intervention sustainability.

A. Implementation of community engagement activities

1. Current state of implementation

Our qualitative research shows that LPT is implementing Outcome 3 activities as planned.

i. CGE structure, management, and activity implementation

Finding 1: While both groups offer community engagement activities, Outcome 3 CGEs are offering a wider range and higher frequency of community engagement activities compared to non-Outcome 3 communities. Community engagement activities are being implemented in Outcome 3 and non-Outcome 3 communities. These include reinforcement classes for struggling students, home visits organized by the CGE, and end-of-year celebrations that awarded prizes to successful students. However, Outcome 3 communities reported implementing a wider range and greater number of activities such as parent dialogue sessions and forums, summer reading clubs, all-year reading clubs, and introducing mobile libraries. All CGEs in Outcome 3 communities reported organizing parent dialogue sessions and a majority also reported organizing community forums. In comparison, very few parent dialogue sessions and forums and no summer reading clubs, reading clubs, or mobile libraries were implemented by the CGEs interviewed in non-Outcome 3 communities.

> « *Parfois les mercredis soir ou les lundis ils se réunissent ici les parents d'élèves avec l'appui du CGE pour essayer de sensibiliser davantage les parents d'élèves.* » - Teacher in Matam (Outcome 3)
>
> « *Pour la lecture, le CGE a essayé de regrouper les enfants pour leur donner des cours de renforcement et à la fin du mois l'enseignant reçoit une rémunération.* » - Teacher in Diourbel (non-Outcome 3)

In addition, CGEs in Outcome 3 communities were more likely to hold frequent meetings than CGEs in non-Outcome 3 communities. CGEs meetings in Outcome 3 communities occur 1 to 4

times a month and are attended by 5 to 50 people on average. For non-Outcome 3 CGEs, meetings occur 3 times a year to 3 times a month and are attended by 5 to 30 people on average. Many non-Outcome 3 CGE members mentioned participating in meetings only if necessary, and some CGE presidents noted that it was sometimes hard to meet/have a quorum.

Finding 2: LPT training has allowed CGEs to better understand the LPT program and provided CGEs with financial management and planning support; however, several CGEs were still unsure about the grant eligibility requirements and grant application procedures A majority of CGEs in Outcome 3 communities reported receiving one LPT training on community engagement. Training themes included information on how to manage funds, simulations of community engagement activities, and information on the creation of CGE action plans (PAVs) for implementing reading-related activities. According to a few Outcome 3 CGE members that participated in focus groups, providing the committees with training on how to manage funds and integrate the community engagement activities into annual planning was particularly useful. LPT staff also noted that the PAV support in training helped CGEs meet the requirements for receiving a grant. LPT further supported the drafting of the PAVs by providing CGEs with a narrowed list of suggested activities to implement, which helped CGEs understand the opportunities available to them.

However, although the process of applying for and receiving a grant was discussed during training, some CGEs did not know that they were able to apply for funds and wanted more details as to how the grant process works and how much money is available. LPT staff also reiterated that LPT needs to reinforce the communication and explanation of the application and eligibility process, as well as the management of funds once received.

Overall, Outcome 3 and non-Outcome 3 CGEs described their role primarily as a support system for the school through financial and resource management and as an intermediary between the community and the school. However, CGEs in Outcome 3 communities were more likely to mention their role helping parents better understand the LPT program.

> « *Le CGE doit jouer le rôle d'accompagnateur des parents d'élèves, des enfants, se concerter beaucoup avec les parents, les inciter à plus d'efforts et engagements pour leurs enfants.* » - CGE member in Kaolack (Outcome 3)

Finding 3: A majority of the Outcome 3 CGEs visited in Kaolack and Matam claimed to have received grants during the 2018-2019 school year, although many expressed an interest in having more flexibility in managing their funds.[6] Most Outcome 3 CGEs in Kaolack and Matam noted that they had submitted grant application forms, received a grant, and were then told exactly what to do with the grant money by LPT. For example, some CGEs mentioned that LPT had sent money to be used exclusively for forums (especially for refreshments and set-up). CGEs

[6] According to our data, 5 schools in Kaolack and Matam received grants. According to LPT data, grants were supposed to be distributed in Kaffrine as well. Unless otherwise specified, this finding refers to the 5 grant receiving CGEs in Kaolack and Matam.

also reported using grant money to implement summer reading clubs and reading clubs, which aligns with LPT's intended use of Round 1 grants.

Many CGEs in Kaolack and Matam that received grants did not understand the reason why grant funds were restricted to specific activities and wanted to receive more funds to use for other reading-related community engagement activities. Several of the grant receiving CGEs also noted that there were delays in the receipt of funds, which sometimes meant that the community had to front the costs of the events or delay the events. For those Outcome 3 and non-Outcome 3 CGEs that had not received grants during the 2018-2019 school year, many were particularly interested in applying for the 2019-2020 school year, especially in Kaffrine.

Finding 4: CGE members highlighted the importance of having dynamic and proactive members to implement activities. Although having active members was cited as the primary facilitator to implement activities, CGE members and directors in Outcome 3 and non-Outcome 3 communities also noted that support from the community mobilizers and high levels of community participation in activities, especially in community forums, facilitated activity implementation. Some CGE members also mentioned that the perceived positive effects of LPT activities incentivized CGE members to continue implementing community engagement activities.

Finding 5: CGEs reported several obstacles to implementing community engagement activities, the largest of which is the lack of resources and funds. Many CGE members, directors and teachers in both Outcome 3 and non-Outcome 3 communities noted that without sufficient funding, it is not possible to organize community engagement activities. This is exacerbated when funding is not consistent: some years CGEs receive funding, while in other years, they do not. In non-Outcome 3 communities, some directors noted that they were paying out-of-pocket to fund school-related community activities.

> « *Ces deux dernières années le CGE est un peu laissé en rade parce que notre école n'a pas beaucoup de moyens et le CAQ qui nous aidait, on ne l'a pas vu ces deux dernières années le CGE ne peut pas marcher comme il se doit.* » - CGE member in Fatick (non-Outcome 3)

Aside from financial constraints, both Outcome 3 and non-Outcome 3 CGE members, school directors, and teachers also identified that members were sometimes unavailable to implement and advertise activities. In non-Outcome 3 communities, CGE members and teachers suggested that some committee members do not understand the LPT program, which affected implementation of activities. LPT staff also noted that CGEs had some difficulties in implementing parent dialogue sessions and forums, including doing so in a systematic manner, given the difficulty of logistics and the sheer number of parents that participate.

Finding 6: Existing CGE funding sources may not be enough to sustain the community engagement component past 2021 when LPT funding will end. Most CGEs (Outcome 3 and non-Outcome 3) in focus groups mentioned that they received resources from sources for their scope of work. These included fees from parents for student registration and parent associations,

government-related sources such as the BCI (*Banque pour le Commerce et l'Industrie*) or the CAQ (*Contrat d'Amélioration de la Qualité*), and other banks. However, these alternative sources of finance account for only a small portion of general implementation costs. MEN staff expressed concern about the dependency of CGEs on LPT grants to implement community reading activities, and wanted to work with LPT to help communities become autonomous in implementing these activities. In order to do so, both USAID and LPT staff have suggested alternative sources for funds, such as other NGOs, the community itself and the *collectivités territoriales* (local governments), which fund community engagement activities for the *Nos Enfants Lisent* project in Fatick.

However, it is important to note that the training provided to CGEs in creating a PAV could prove useful in obtaining future funding from other sources if CGEs are able to maintain their skills and continue creating strong PAVs in the future.

ii. Community mobilizer (training, perceived role, activity implementation)

Finding 7: Most community mobilizers find LPT trainings to be useful and are receiving support from an LPT-trained supervisor. Community mobilizers noted receiving three to four formal LPT trainings that included an initial training, reinforcement training, and sometimes a CGE training as well as a summer reading club training. Community mobilizers also mentioned that they were sometimes trained at the same time as the directors and CGE, which helped community mobilizers understand how to engage with and help the CGE. Most community mobilizers noted that the training was useful because they could learn about the LPT program, practice organizing and implementing community engagement activities in different scenarios and review the tools and techniques to help parents engage with children at home. These were very useful when helping parents understand concepts in the field. Community mobilizers underscored the usefulness of LPT training, and the thorough documents and materials provided by LPT, including the local language comics and drawings. According to LPT staff, at the end of the training, the community mobilizers create maps of their communities and plan home visits.

> « *Parfois, [mon superviseur] m'appelle au téléphone pour me parler de mon planning dans le souci de mieux faire. Donc elle me donne des conseils et elle m'oriente pour que je puisse faire le travail comme il le faut.* » - Relais in Kaolack (Outcome 3)

For support after training, community mobilizers can also reach out to LPT supervisors at the IEF level, who serve as a technical support. LPT staff noted that these supervisors tried to visit community mobilizers at least once a month and helped them with their planning and implementation of activities; to a certain extent, the supervisor coaches the community mobilizers. Most community mobilizer respondents noted calling their supervisor if they had any questions or issues to address and that the supervisors were responsive.

Finding 8: Respondents described the role of community mobilizers as informing and supporting parents to read at home with their children and demonstrating the purpose of the LPT program. Directors, teachers, parents and community mobilizers described the community mobilizer as an intermediary between the school, home, CGE, and community. Respondents said that the community mobilizer support parents through the parent dialogue sessions and home visits to ensure that parents implement best practices. LPT staff said that the community mobilizers were a kind of a coach for parents and that they help share information rapidly to parents and CGE. Community mobilizers are also very important for LPT's M&E team, since community mobilizers produce reports of community engagement activities and submit them to IEFs for validation.

> « *Le rôle du relais, à mon avis c'est à moi d'aider les parents d'élèves à pouvoir accompagner leurs enfants dans la lecture. C'est moi qui dois aussi aider la communauté, je suis leur technicienne.* » - Relais in Kaffrine (Outcome 3)

Finding 9: Community mobilizers are implementing activities as planned, and communities are finding them useful. Parents, teachers and CGE members noted that in any given community, the community mobilizer conducts home visits around 2-4 times a month. As intended, community mobilizers often first ask teachers and directors to find out which students are having difficulties in order to determine which households to visit. According to community mobilizer respondents, each home visit lasts around 30 minutes to 1 hour, with each community mobilizer completing approximately 10-12 visits per month across multiple communities. However, some parents indicated that the community mobilizer had never visited, but this could be because community mobilizers are visiting weaker students' households. Regarding the community mobilizer-implemented parent dialogue sessions, community mobilizers noted that these meetings occur twice per month on average. Parents, CGE members, teachers and directors noted that parent dialogue sessions could occur 1-4 times a month. According to community mobilizers, they are paid by activity with each home visit valued at 2500 CFA and each parent dialogue session at 5000 CFA. In addition, respondents also noted that community mobilizers helped with the implementation of other activities such as the summer reading clubs, SBCC distribution, reinforcement classes, and the reading clubs.

> « *La venue du relais est très utile. Cela a permis des efforts vis-à-vis de l'enfant et les rencontres à l'école ont renforcés cela. Depuis qu'il a commencé à venir dans les maisons je vois qu'il y a des améliorations.* » - Parent in Kaffrine (Outcome 3)

> « *Un jour, il est entré dans ma classe pour me demander le nom des élèves qui ont des difficultés. Je lui ai donné les noms de trois élèves, ensuite il est allé chez eux pour voir leurs problèmes.* » - Teacher in Kaolack (Outcome 3)

Parents, community mobilizers, and directors view the community mobilizer role and the activities that they implement as particularly useful. Community mobilizers seem to be promoting an interest in parental engagement at home and parents particularly enjoyed the fact

that home visits are personalized, which further encourages them to use and interact with the techniques and tools that they receive. Overall, according to parents and community mobilizers, parents are applying these techniques to promote reading at home and are now more aware of the LPT program.

CGE members, directors and community mobilizers also highlighted the mutually beneficial relationship between the community mobilizer and the CGE. While the community mobilizer often helps with CGE activity planning and implementation, the CGE can also help spread the word about community mobilizer visits and invite the community mobilizer to CGE meetings. In turn, the community mobilizer can then share that information with parents during home visits. LPT and USAID staff also stressed the importance of this relationship, and that they would like the community mobilizer to have a more formalized and integrated role within the CGEs.

> « *Avant les causeries je viens tous les mois pour rencontrer les membres du CGE pour leur présenter mes activités et choisir les dates ensemble. Mes causeries réussissent plus si je passe par le CGE.* » - Relais in Kaolack (Outcome 3)

Finding 10: Challenges for community mobilizers include the number of schools required to cover, the distance to these schools, out-of-pocket costs, the length of the contracts, and the monthly activity targets. Community mobilizers work under three-month contracts with monthly targets for home visits and community activities. Each community mobilizer is expected to cover around 7 schools, with some schools at around 50-70 km away from where the community mobilizer is based. Due to the distance between schools and the difficulty of obtaining transport to reach communities, community mobilizers report that they are sometimes unable to complete all the activities expected of them in a month. Community mobilizers noted that there were many additional out-of-pocket costs for transport, photocopying, and communication, especially when the payments for community mobilizers were delayed. In addition, community mobilizers are often not working solely for LPT, which makes it particularly difficult for them to accomplish all assigned monthly activities. Several community mobilizer respondents noted that travel distance, the volume of work, and the length of the contract were some of the main causes for community mobilizer turnover.

> « *Le volume de travail et l'étendue de la zone avec des pistes impraticables et sans moyens ; ainsi que les types de contrats de travail qui nous est fait et les retards de paiement des indemnités.* » - Relais in Matam (Outcome 3)

> « *Dans mon travail de relais, ce qui peut nous coûter ce sont les photocopies. C'est moi qui prends mon argent pour les démultiplier.* » - Relais in Kaffrine (Outcome 3)

There are differences in opinions among LPT, community mobilizers, and USAID Senegal on how to address these challenges. LPT staff and community mobilizers suggested that a solution to this issue would be to assign one community mobilizer for each school and to improve the mapping of communities. However, USAID staff stated that a 1:1 ratio of community mobilizer to community/school was unrealistic, given the resources available for this portion of the LPT program. LPT staff also noted that it would be better if CGEs could help with the home visits and parent dialogue session, given that community mobilizers have so many activities to complete in a month. A few community mobilizers also suggested that LPT should provide them with SIM cards, to make communication easier with communities and supervisors. LPT staff noted that they were considering paying community mobilizers for transport and a small additional amount for other costs. However, USAID and MEN staff noted that they would prefer if the community mobilizer role could be entirely voluntary, therefore removing the stipend. As MEN staff suggested, the Ministry is unlikely to be able to pay community mobilizers once the LPT program is over, and it believes that CGEs, *collectivités territoriales* (local government), and communities can help fund activities that community mobilizers are currently undertaking.

> *« Même les puces de téléphones il n'y a aucun relais qui en dispose et on est obligé d'appeler parce qu'on ne peut pas programmer un RV dans une école sans informer le directeur. »* - Relais in Kaolack (Outcome 3)

Finding 11: Most community mobilizers noted that community buy-in to the community mobilizer activities and support from CGEs, supervisors and other community mobilizers facilitate their work. According to the community mobilizer, when parents and the community appreciated the visits, it was easier for the community mobilizer to communicate and engage with parents. Some community mobilizers and directors also noted that communication and engagement was easiest when the community mobilizer came directly from the community and was interested in the LPT mission. In addition, community mobilizers noted that having a strong relationship with the community was useful for planning and organizing activities, for example by picking days when parents are available. Directors, teachers, CGE members and community mobilizers also highlighted that the community mobilizer working in tandem with both the CGE and the school made it easier to coordinate activities and keep parents updated about events. Several community mobilizers also mentioned the importance of the support from supervisors and other community mobilizers through ICT or in person, to help answer questions about their tasks.

> « *D'ailleurs notre point fort c'est que les relais font partie du CGE. On a eu la chance d'avoir un relais qui fait partie de la communauté. »* - Director in Kaffrine (Outcome 3)

> *« Les autres relais, il y a un groupe WhatsApp qu'on a créé, on l'a appelé le suivi parental. Toutes difficultés que tu as, tu le poses dans le groupe, tes collègues relais ou tes collègues superviseurs ou le coordinateur te donne des éclaircissements. »* - Relais in Kaffrine (Outcome 3)

2. Community participation in LPT engagement activities

Our quantitative and qualitative research show that parents and children are aware of and are participating in LPT Outcome 3 activities.

i. Quantitative findings

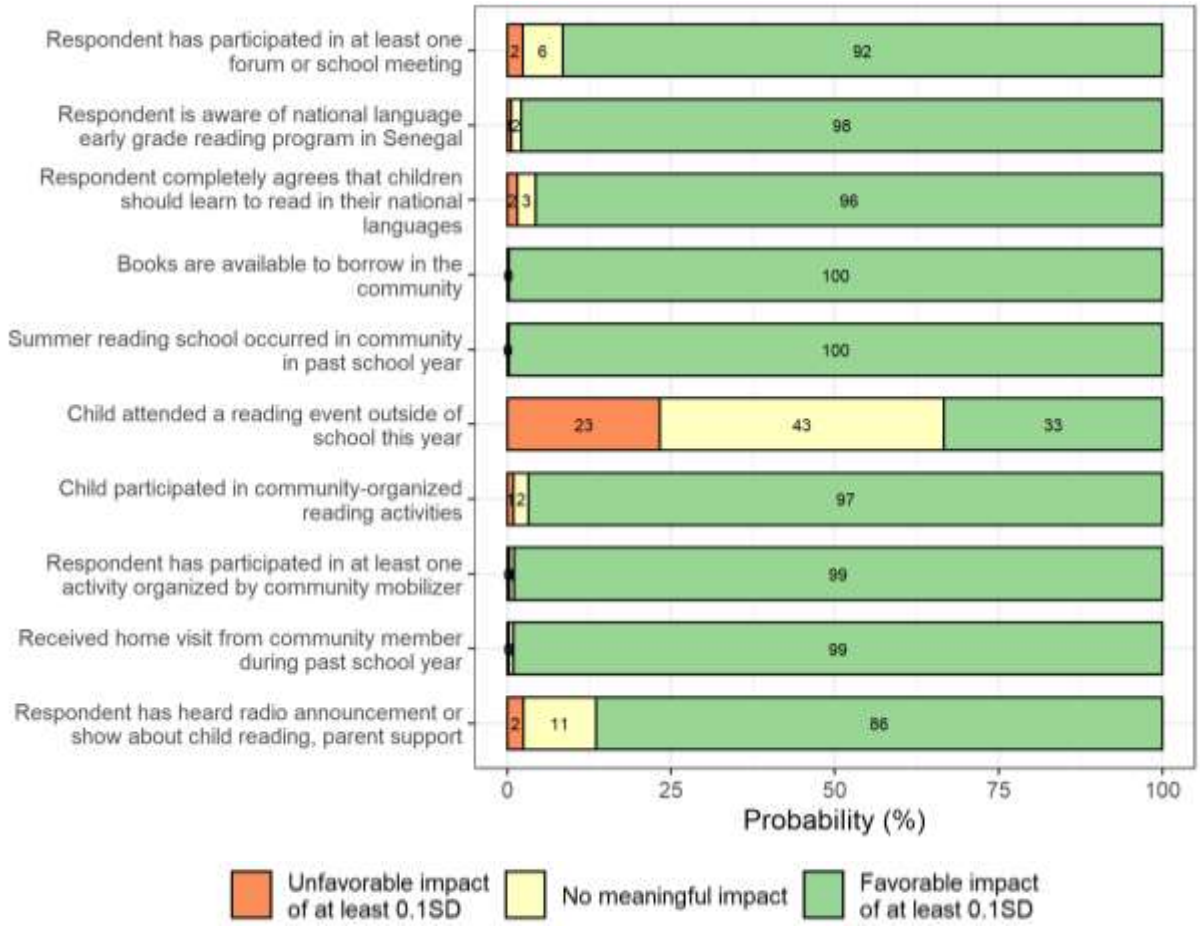
Finding 12: We have a high level of confidence that the community engagement intervention had positive effects on the parent and child awareness of and participation in LPT community engagement activities related to reading in the community (Figure IV.1). There is a 90-100% probability that the community engagement activities had a meaningful positive impact on eight outcome measures in this domain. These outcomes are participating in forums or school meetings, awareness of the national language EGR curriculum, agreement that children should learn to read in their national languages, availability of books to borrow, summer reading schools, child participation in community reading activities, participation in an event organized by the community mobilizer, and receiving a home visit from the community mobilizer.

Box 1. Meaningful impacts

A meaningful impact of the community engagement intervention means there is an impact of at least 0.1 standard deviations (SD) on the outcome. The meaningful impact can be positive (green in the figure) or negative (orange in the figure). Any impact estimates smaller than 0.1 SD is considered to be not meaningful (yellow in the figure).

In addition, there is an 86% probability that the community engagement activities meaningfully increased parents' likelihood of hearing a radio announcement or show about child reading and parental support, an 11% probability that there was no meaningful effect on the outcome, and a 2% probability that there was a meaningful negative impact. With a high level of confidence, the intervention did not meaningfully worsen the remaining outcome in this domain, though it's hard to say whether the outcome improved meaningfully or not. There is a 33% probability that the community engagement activities increased children's likelihood of attending a reading event outside of school, a 43% probability that there was no meaningful effect on the outcome, and a 23% probability that there was a negative impact.

Figure IV.1 Probability of meaningful impacts on exposure to community engagement activities



The effects of the community engagement intervention on the eight outcomes that are highly likely to have had a favorable impact of at least 0.1 SD are large and meaningful (all outcomes in this domain except for whether a child attended a reading event outside of school this year and a respondent has heard a radio announcement or show about child reading, parent support). The impact estimates in odds ratios (See Box 1) vary from 2 to 6 across these eight outcomes, indicating that the intervention increases the odds of the desired outcome occurring by between 2- and 6-fold (Table IV.1). See Appendix D.II for additional graphs that present the impact estimate and its credible interval.

Table IV.1 Impacts on exposure to community engagement activities

	Control Mean (percent)	0.1 SD*	Impact Estimate (Odds Ratio)	95% credible interval		Treatment Odds	Adjusted Treatment Mean (percent)
				Lower 95 (Odds Ratio)	Upper 95 (Odds Ratio)		
Respondent has participated in at least one forum or school meeting	51.8	0.55	2.4	0.9	5.6	2.6	72.4
Respondent is aware of national language early grade reading program in Senegal	64.7	0.33	2.3	1.2	4.2	4.2	80.6
Respondent completely agrees that children should learn to read in their national languages	91.5	0.16	2.2	1.0	4.1	23.3	95.9
Books are available to borrow in the community	5.5	0.17	4.2	1.9	8.2	0.2	19.5
Summer reading school occurred in community in past school year	5.5	0.22	6.0	2.4	12.9	0.4	25.7
Child attended a reading event outside of school this year**	20.5	0.23	1.1	0.5	2.0	0.3	22.2
Child participated in community-organized reading activities	7.6	0.20	2.4	1.1	4.8	0.2	16.8
Respondent has participated in at least one activity organized by community mobilizer	30.1	0.54	3.9	1.5	8.5	1.7	63.5
Received home visit from community member during past SY	14.7	0.25	2.8	1.5	5.1	0.5	32.6

Respondent has heard radio announcement or show about child reading, parent support	44.0	0.40	1.8	0.9	3.3	1.4	58.6

Source: Community KAP Midline data collection, July 2019, parent survey (treatment sample size = 1,125; control sample size = 675); EGRA Midline data collection, May and June 2019, child survey (treatment sample size = 2,343; control sample size = 1,828)

Notes: Sample sizes may be smaller in the event of missing data. * 0.1 SD is the magnitude of an impact that is considered meaningful in this analysis. ** Outcome is self-reported by the child; all other outcomes are reported by parents or another family member.

Box 2. Interpretation of odds ratios

The *odds ratio* is the ratio of the *odds* of two different events happening. For example, the *odds ratio* for the community engagement intervention's effect on participation in forums or school meetings is 2.4. In other words, the intervention slightly more than doubles the *odds* of participation, so that the *odds* of participation are over twice as high for parents exposed to the community engagement intervention (treatment) as for those that are not exposed to the intervention (control). To better understand what this means, we first calculate the *odds* of participation in control communities. Since the control group mean is 52 percent (only 52 percent of parents in non R3 communities participated in forums or school meetings), the *odds* of participation in control communities is 1.1:1 (52% who participate divided by 48% who don't participate in the control group yields an odds of participation of 1.1:1). We can then calculate the *odds* of participation in treatment communities using the *odds ratio*. Since the *odds ratio* is 2.4, the *odds* of participation in treatment communities are 2.6:1 (2.4 times 1.1 yields 2.6). These *odds* imply that closer to 72 percent of parents in the treatment group are participating in the forums (72.4% participating divided by 27.6% not participating in the treatment group yields 2.6), holding all else constant.

ii. Qualitative findings

Finding 13: Communities are participating in and understand the purpose of community engagement activities. Parent dialogue sessions and forums appear to be the most frequently attended activity, particularly for female parents. There is a strong understanding of the goals of community engagement activities in both Outcome 3 and non-Outcome 3 communities. Respondents in Outcome 3 and non-Outcome 3 communities perceive the goals of community engagement activities as explaining the importance of national language

« On avait organisé un grand forum, ou la LPT avait décliné l'objectif du projet. Cela a favorisé l'engagement de beaucoup de parents dans l'éducation de leurs enfants. Parce qu'avant ils ne savaient pas, maintenant ils commencent à s'imprégner davantage. » - Member of CGE in Kaffrine (Outcome 3)

learning and parental engagement at home. LPT staff and inspectors also noted that inspectors sometimes take advantage of these Outcome 3 community engagement activities to communicate directly with communities and recruit students for CI classes.

> « *C'est ce qui fait qu'à chaque causerie, les parents sont présents surtout les femmes.* » - CGE member in Kaolack (Outcome 3)
>
> *« Pour moi celle qui marche le plus c'est les forums parce qu'y a beaucoup de personnes qui l'assistent. Les parents de même que les élèves et les enseignants y participent. »* - Parent in Kaolack (Outcome 3)

Parent dialogue sessions and forums appear to be the most frequently attended community engagement activity, particularly for female parents. Members of CGEs, directors, teachers, parents, and community mobilizers from Outcome 3 communities were more likely to have participated in parent dialogue sessions and forums compared to other activities. In some cases, non-Outcome 3 directors reported leading parent dialogue sessions for parents, often during the same meeting in which LPT books were distributed to parents. Most parents were informed about these activities through their children, the director, the community mobilizers, or the CGE. Respondents often brought up that female parents were more likely than male parents to attend these activities, and that parents of children who were not in LPT classes sometimes joined in as well.

Findings from this small sample suggest that Outcome 3 and non-Outcome 3 communities also have similar teacher and director involvement in community reading activities, although the activities differ somewhat. While both Outcome 3 and non-Outcome 3 teachers and directors attended summer reading clubs, Outcome 3 teachers and directors were more likely to attend reading clubs during the school year and non-Outcome 3 directors and teachers were more likely to have participated in the reinforcement classes.

Finding 14: Outcome 3 communities are responding positively to community activities. Respondents in Outcome 3 communities responded positively to community engagement activities and suggested that these activities promoted reading throughout the community. In Outcome 3 communities, CGE members, directors, parents, and community mobilizers overwhelmingly noted that the activities were useful for parents and children, and a majority of parents wanted activities to continue. MEN staff also supported this finding and suggested that parents are learning to read by helping their children learn to read. In addition, parents noted that positive results from the LPT program convince parents that activities are worthwhile.

> « *Cela élargit l'apprentissage dans la communauté car tu apprends en apprenant ton enfant. Ce qui fait qu'en un moment donné, tout le monde pourra lire.* » - Parent in Kaolack (Outcome 3)

Finding 15: Barriers to participation in community engagement activities include scheduling conflicts, and the lack of sensitization and poor advance notification of community events. Many parents in Outcome 3 and non-Outcome 3 communities wanted to be notified about activities further in advance and mentioned that activities sometimes coincided with market

> « *C'est parce qu'ils n'étaient pas au courant parce que l'enfant a oublié d'en parler à ses parents ou bien parce qu'ils n'ont pas le temps.* » - Parent in Kaffrine (Outcome 3)
>
> *« Les parents n'ont pas l'habitude de venir à l'école. Ce sont les femmes qui viennent le plus en réunions.* » - Parent in Fatick (non-Outcome 3)

days, which made them difficult to attend. Some respondents from Outcome 3 communities posited that a lack of "*sensibilisation*" or explanation of the purpose of these activities also hindered attendance at community engagement events. This idea was supported by CGE members, parents, community mobilizers and directors in Outcome 3 communities who noted that the attendance to community engagement activities was often higher when they were notified about events in advance than when they were not notified. Many parents said their children would inform them about events at the end of each school day, which was particularly useful to keep parents informed about activities. In addition, several respondents in non-Outcome 3 communities stressed the importance of involving parents and the community in the process from the start, so that the community is more invested in attending activities.

Additional barriers to participation include the lack of awareness of LPT programs, low education levels of parents, and potential gender-bias. LPT staff and parents noted that it was problematic that men did not attend at the same rate as women, since the goal of LPT parental engagement activities is to involve parents of both sexes. For non-Outcome 3 communities, CGE members, parents, directors and teachers mentioned that parents are not always aware of the LPT program and are not used to coming to school. In one case, a director noted that parents don't attend the activities because they do not have an education.

Finding 16: The poster and radio announcement campaigns are being implemented in Outcome 3 communities and there is spillover to non-Outcome 3 communities. All Outcome 3 communities received both the poster and radio components of SBCC campaigns. Parents, CGE members, directors, and teachers mentioned the longer format radio programs in local languages and appreciated that listeners were given the opportunity to call in to the interviews with LPT directors or community mobilizers. Respondents also mentioned they had heard shorter radio spots that promoted support for children at home. However, in parent focus groups it was clear that not all respondents heard the programs on the radio or listened to the radio at all.

> « *Ils ont nommé un enfant en disant qu'il ne pouvait lire et il pleurait. Son père est venu et lui a demandé ce qui se passait il lui a répondu ils disent que je ne sais pas lire et le père lui répond à partir d'aujourd'hui ça ne serait plus le cas je vais t'aider à chaque fois que tu descendras de l'école.* » - Parent in Kaffrine (Outcome 3)

In addition to radio programming, most respondents noted that communities had received 10-15 posters each, and that they were often placed in public gathering spaces. Many parent respondents recalled the images of entire families helping the child read at home.

Respondents in non-Outcome 3 communities also noted that they had access to SBCC posters and radio announcements. This was more common in Diourbel and Fatick, where three communities noted they had received and displayed posters. Most non-Outcome 3 communities also reported hearing about or listening to radio announcements. Some directors interviewed noted that they knew about the radio shows through WhatsApp director groups. The spillover could be explained by the fact that Outcome 3 radio programming has been implemented in all regions except for Fatick. Given that Outcome 3 radio programming is not the only LPT programming available (Outcome 2, which focuses on improved delivery systems for early grade reading instruction, also creates radio campaigns), it is unclear whether both Outcome 3 and non-Outcome 3 respondents were listening specifically to Outcome 3 radio announcements.

> « *On entend parler à la radio ce programme de lecture, même à la télé, on montrait des éléments sur l'apprentissage des langues nationales.* » - CGE member in Louga (non-Outcome 3)

Finding 17: Overall those receiving SBCC understand and are interested in the posters and radio announcements and find that they encourage parents to help their children with reading at home. Respondents wanted radio shows to happen more frequently and at convenient times. Many respondents, including community mobilizers, CGE members, directors, teachers, and parents, noted that the posters make the LPT message accessible to everyone in the community, even those who cannot read. The posters also help motivate parents and their families to imitate the images and apply those techniques at home. Respondents also felt that the posters and radio announcements helped them better grasp the importance of LPT, and parents enjoyed the ability to participate and ask questions during the radio shows.

> « *C'est très utile car en voyant l'affiche, […] même si le parent reconnait pas les écritures, les dessins aident.* » - Parent in Matam (Outcome 3)
>
> « *A travers les affiches et les émissions, les parents et tout le village peuvent comprendre l'importance du programme LPT.* » - CGE member in Kaolack (Outcome 3)

Given that respondents found SBCC components useful, many wanted radio shows to happen more frequently, at convenient times, and with clearer advertising in the community to notify of radio show timing. A few respondents in non-Outcome 3 communities also noted that they would like for the radio shows to be in different languages, especially given that some communities speak more than one local language. For the poster component, many CGE members and parents noted that posters can sometimes be torn down, and that this could be solved if every home received a poster instead.

> « *On augmente le nombre d'émissions et qu'on nous avertisse avant même le jour de l'émission pour nous permettre de nous préparer à l'écouter.* » - CGE member in Kaolack (Outcome 3)

For the sustainability of the SBCC component and to increase the frequency of the radio shows, LPT and MEN staff mentioned that radio hosts are being trained at the IEF and local levels so that they can organize their own radio shows and be less financially dependent on LPT.

B. Do community Engagement activities increase parents' involvement in children's early grade reading and improve learning outcomes?

1. Parent knowledge and attitudes

Our quantitative and qualitative research suggest that parents are learning how they can help their children to read as a result of the community engagement activities.

i. Quantitative findings

Finding 18: We have a high level of confidence that the community engagement intervention had positive effects on the parent knowledge of things they can do to help their children learn to read (Figure IV.2). There is an 80-97% probability that the community engagement activities increased, by a meaningful amount, parents' likelihood of identifying meeting with teachers or directors as a way to help their child in school, reading aloud with their child or their child reading aloud as a way to help their child in school, and knowing strategies to help their child learn to read. The effect of the community engagement intervention on the respondent identifying reading aloud with their child or their child reading aloud as a way to help their child in school is very large and statistically meaningful (Table IV.2). However, there is only a 64% probability that the community engagement activities increased parents' likelihood to indicate they feel strongly that it is their role to teach their child to read and a 29% probability of no meaningful effect on this outcome.

Figure IV.2 Probability of meaningful Impacts on parent knowledge and attitudes about reading

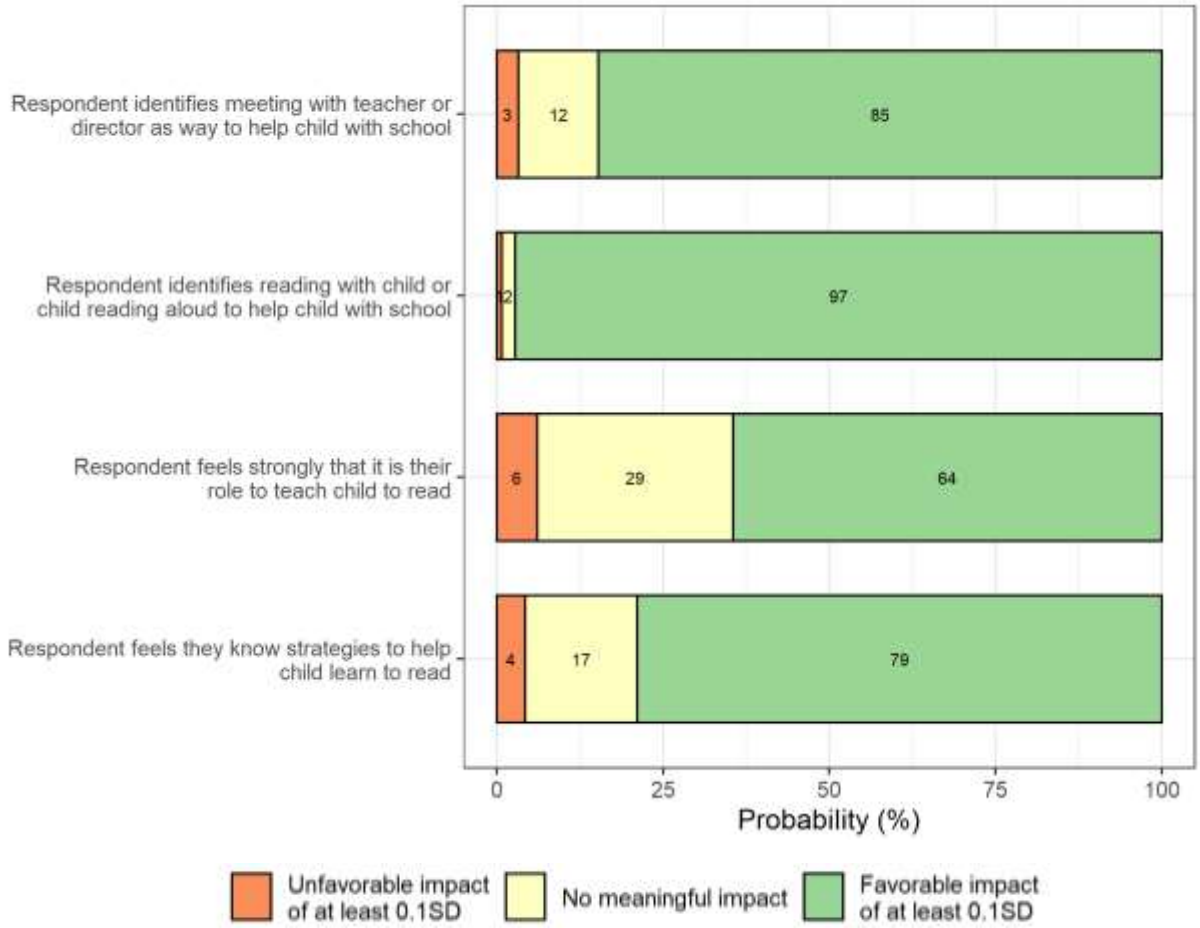


Table IV.2 Impacts on parent knowledge and attitudes about reading

	Control Mean (percent)	0.1 SD*	Impact Estimate (Odds Ratio)	95% credible interval		Treatment Odds	Adjusted Treatment Mean (percent)
				Lower 95 (Odds Ratio)	Upper 95 (Odds Ratio)		
Respondent identifies meeting with teacher or director as way to help child with school	65.1	0.38	1.7	0.8	3.0	3.2	75.9
Respondent identifies reading with child or child reading aloud to help child with school	19.7	0.22	2.1	1.2	3.5	0.5	34.3
Respondent feels strongly that it is their role to teach child to read	93.8	0.11	1.3	0.7	2.2	20.3	95.3
Respondent feels they know strategies to help child learn to read	89.3	0.20	1.6	0.8	2.7	13.0	92.8

Source: Community KAP Midline data collection, July 2019, parent survey (treatment sample size = 1,125; control sample size = 675)

Notes: * 0.1 SD is the magnitude of an impact that is considered meaningful in this analysis.

ii. Qualitative findings

Finding 19: Many respondents in non-Outcome 3 communities stated that parents need to be "educated" (literate) to help in any capacity, while respondents in Outcome 3 activities understand that illiterate parents can and should help children with reading at home. Although parents in Outcome 3 and non-Outcome 3 communities noted the importance of actively engaging with children at home to help promote learning in general, parents in Outcome 3 communities were more specific in describing the activities and techniques they could use to provide this support. In particular, Outcome 3 respondents noted that parents should be using the LPT materials to help children learn to read, even if the parent was not literate. On the other hand, some parents, directors and teachers in non-Outcome 3 communities suggested that, in order for parents to support their children at home in any capacity, they need to be literate or educated. Parents in Outcome 3 and non-Outcome 3 communities also noted that it was the parent's role to make sure that children are not overburdened with chores so that they have time to study at home. Parents in Outcome 3 communities went a step further and highlighted the importance of setting up the optimal conditions for children to read at home. Some parents, teachers and directors in Outcome 3 communities also mentioned that it was a parent's duty to go visit teachers to check on the child's progress.

> « *Pour rendre la lecture plus utile, après l'école les parents doivent prendre soin et aider leurs enfants à lire.* » - Parent in Matam (Outcome 3)
>
> « *Si tu n'as pas fait l'école tu ne peux pas aider ton enfant.* » - Parent in Fatick (non-Outcome 3)

2. Parent engagement at home

Our quantitative and qualitative research suggest that the community engagement intervention has had a positive meaningful effect on the at-home reading environment.

i. Quantitative findings

Finding 20: We have a high level of confidence that the community engagement intervention had positive meaningful effects on parent engagement around reading in the home (Figure IV.3). There is an 80-100% probability that the community engagement activities increased, by a meaningful amount, whether the respondent listened to child read out loud in the past week, another family member listened to the child read out loud in the past month, the respondent read with the child in the past week, or other family members read with the child in the past month. The effects of the community engagement intervention on these outcomes are fairly large and, in the case of respondents reading aloud with their child in the last week, statistically meaningful (Table IV.3). There is a high probability that the community engagement activities either increased a meaningful amount or did not meaningfully affect whether children read aloud to someone at home in the past week or receive reading homework and someone at home helps with it.

Figure IV.3 Probability of meaningful impacts on parent and family engagement in reading at home

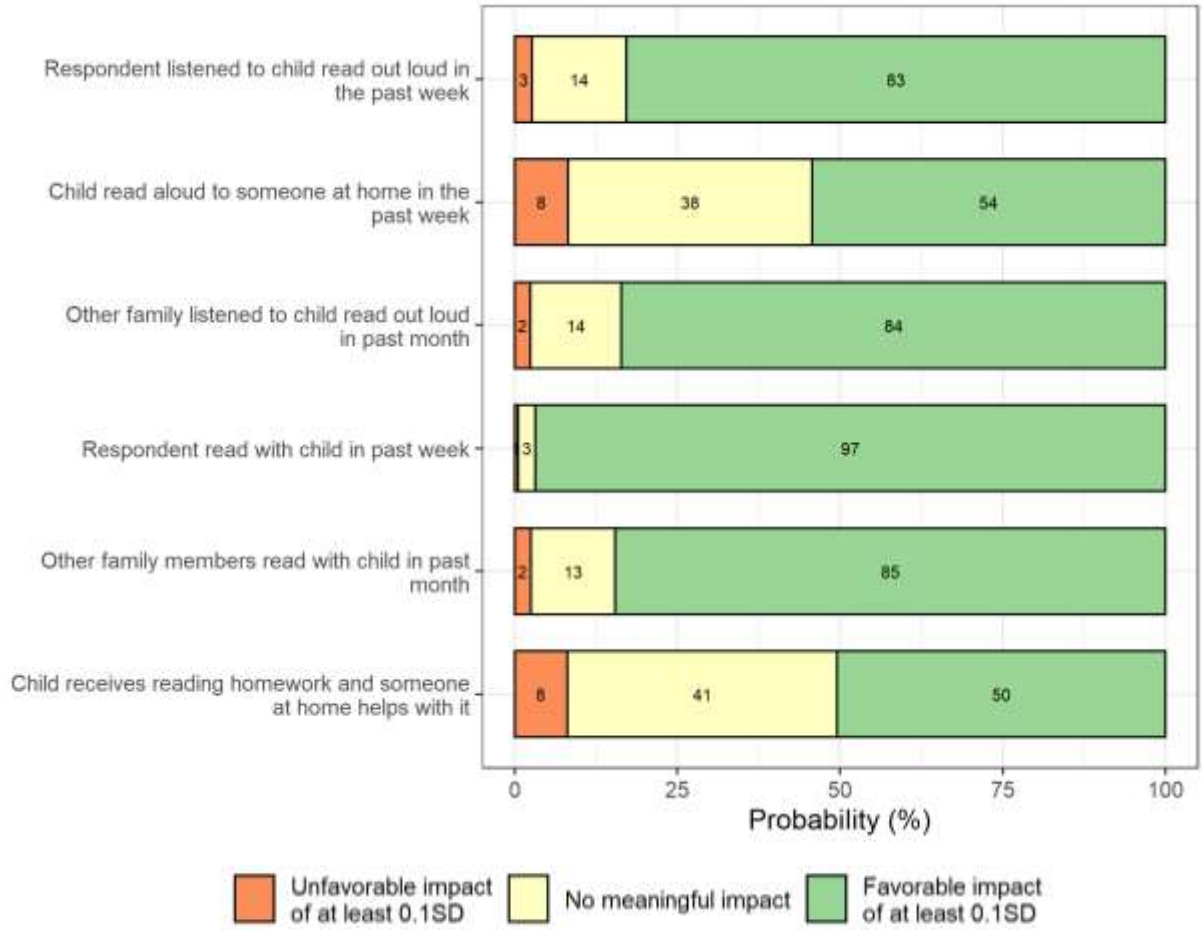


Table IV.3 Impacts on parent and family engagement in reading at home

	Control Mean (Percent)	0.1 SD*	Impact Estimate (Odds Ratio)	95% credible interval		Treatment Odds	Adjusted Treatment Mean (Percent)
				Lower 95 (Odds Ratio)	Upper 95 (Odds Ratio)		
Respondent listened to child read out loud in the past week	56.9	0.47	1.7	0.8	3.2	2.2	68.7
Child read aloud to someone at home in the past week**	72.1	0.30	1.3	0.7	2.1	3.2	76.4
Other family listened to child read out loud in past month	57.7	0.36	1.5	0.9	2.6	2.1	67.8

Respondent read with child in past week	20.3	0.29	2.3	1.1	4.1	0.6	37.2
Other family members read with child in past month	46.9	0.54	1.6	0.9	2.9	1.4	58.8
Child receives reading homework and someone at home helps with it**	81.6	0.17	1.2	0.7	1.9	5.4	84.3

Source: Community KAP Midline data collection, July 2019, parent survey (treatment sample size = 1,125; control sample size = 675); EGRA Midline data collection, May and June 2019, child survey (treatment sample size = 2,343; control sample size = 1,828)

Notes: Sample sizes may be smaller in the event of missing data. * 0.1 SD is the magnitude of an impact that is considered meaningful in this analysis. ** Outcome is self-reported by the child; all other outcomes are reported by parents or another family member.

Finding 21: We have a moderate level of confidence that the community engagement intervention had a meaningfully positive effect on the presence of children's books in the home, and does not have a meaningfully negative effect on other outcomes (there may be no meaningful effect) in the at-home reading environment domain (Figure IV.4). There is an 84% probability that the community engagement activities increased, by a meaningful amount, whether households have children's books in the home. The effect of the community engagement intervention on this outcome is substantial (Table IV.4). There is a high probability that the community engagement activities either had no meaningfully affect or had increased by a meaningful amount the other three outcomes in this domain including whether the household had any reading material, the child has an appropriate place to read in the home, or the child reads at home. For two of these outcomes, whether the household has reading material and whether the child reads at home, it is most likely that the community engagement intervention had no meaningful effect.

Figure IV.4 Probability of meaningful impacts on the at-home reading environment

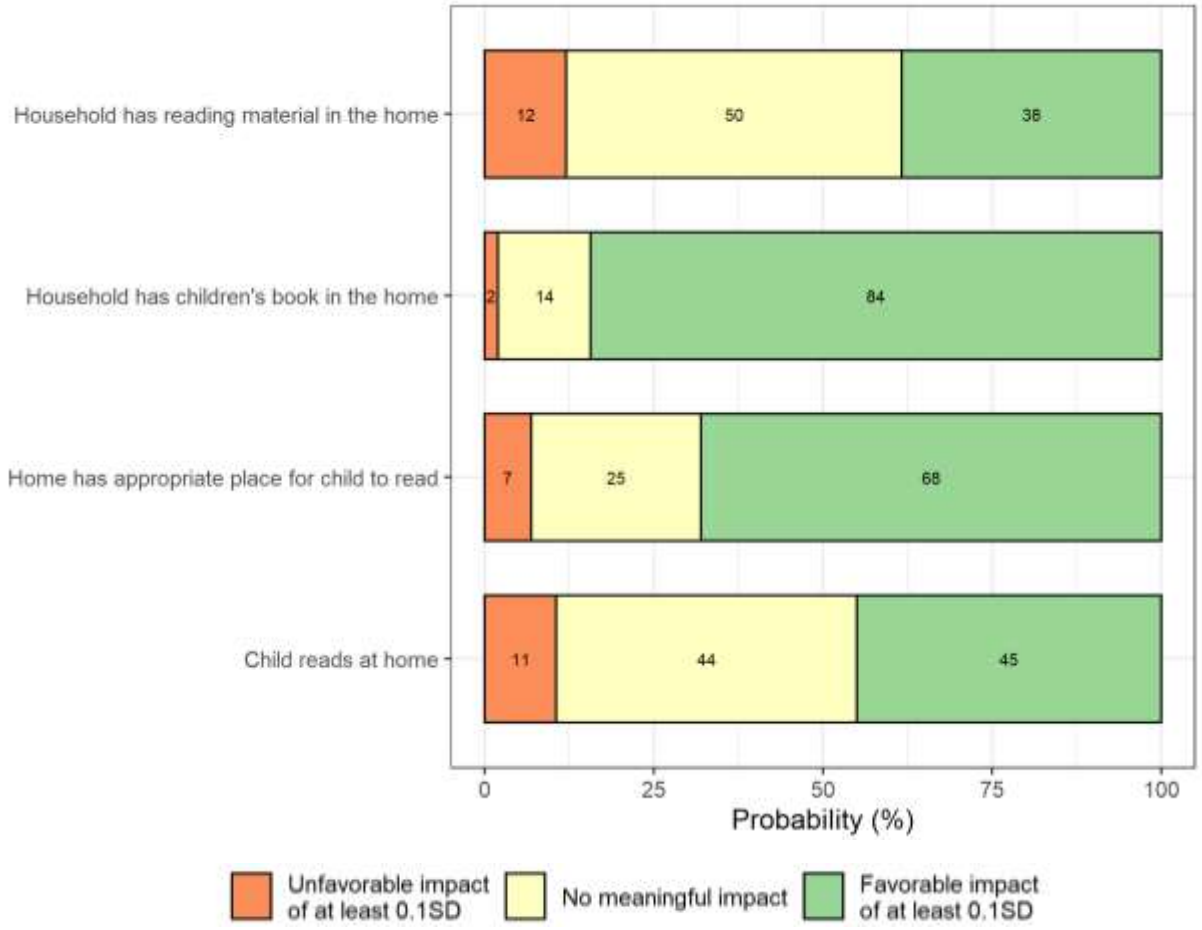


Table IV.4 Impacts on the at-home reading environment

	Control Mean (Percent)	0.1 SD*	Impact Estimate (Odds Ratio)	95% credible interval		Treatment Odds	Adjusted Treatment Mean (Percent)
				Lower 95 (Odds Ratio)	Upper 95 (Odds Ratio)		
Household has reading material in the home**	57.9	0.31	1.1	0.6	1.9	1.6	61.1
Household has children's book in the home	47.9	0.66	1.6	0.9	2.8	1.4	59.0
Home has appropriate place for child to read	74.3	0.48	1.4	0.7	2.6	4.1	80.5
Child reads at home**	94.8	0.11	1.2	0.7	2.0	21.8	95.6

Source: Community KAP Midline data collection, July 2019, parent survey (treatment sample size = 1,125; control sample size = 675); EGRA Midline data collection, May and June 2019, child survey (treatment sample size = 2,343; control sample size = 1,828)

Notes: Sample sizes may be smaller in the event of missing data. * 0.1 SD is the magnitude of an impact that is considered meaningful in this analysis. ** Outcome is self-reported by the child; all other outcomes are reported by parents or another family member.

ii. Qualitative findings

Finding 22: Children in both Outcome 3 and non-Outcome 3 communities are reading at home using LPT materials; however, children in Outcome 3 communities read more frequently and may read more frequently at home. According to parents and CGE members in Outcome 3 communities, children read at home between 3 times a week to every night, and all households have received the LPT at-home books. However, some respondents noted children sometimes had to share books. For non-Outcome 3 communities, the frequency of children reading at home ranged from 2 times a week to every night, and most, but not all, children had LPT books at home. There were also a few cases of students organizing study groups so that they could practice reading out loud with peers. Parents, CGE members, community mobilizers, directors, and teachers in both Outcome 3 and non-Outcome 3 communities all notice an increase in the frequency and motivation of children reading at home compared to before the LPT program started; however, this was much more frequently mentioned in Outcome 3 communities during interviews and focus groups.

> *"Ils lisent chaque soir après la descente et se regroupent les week-end pour lire.* » - Parent in Kaffrine (Outcome 3)
>
> *"Avec l'apprentissage de la langue maternelle c'est plus facile. Les enfants apprennent ce qu'ils parlent donc leurs esprits sont plus éveillés. »* - Parent in Fatick (non-Outcome 3)

Finding 23: In general, parents in Outcome 3 communities are more likely to apply reading support techniques such as reading at home with the child and listening to the child read out loud than parents in non-Outcome 3 communities. Parents in Outcome 3 communities also have a better understanding of parental engagement activities than parents from non-Outcome 3 communities. Parents and CGE members in Outcome 3 communities noted that most parents listen to their child when they are reading at home and sometimes read at home with the child using the LPT books. Parents also noted that reading with the child is important in order to help correct the child if they make a mistake. In comparison, respondents in non-Outcome 3 communities were less likely to mention these behaviors. Parents in Outcome 3 communities were also much more likely to stress the importance of creating a quiet space and time for children to read, whereas only a few respondents in non-Outcome 3 communities mentioned this. In some Outcome 3 communities, particularly in Kaolack and in more urban areas, parents are sometimes willing to pay for tutors as well. Some parents in Outcome 3 communities suggested LPT help hire tutors to help train their children at home.

> « *Moi je le fais parce qu'il m'arrive de rester dans le salon et de l'entendre. S'il vient, je lui dis amène ton cahier, on reste ensemble et il lit.* » - Parent in Kaolack (Outcome 3)
>
> « *Nous les réservons des places spéciales. Dès qu'il a envie de lire, alors nous disons d'aller à cette place pour sa tranquillité.* » - Parent in Kaolack (Outcome 3)

Finding 24: The greatest barrier to parents supporting reading at home was the lack of time. In non-Outcome 3 communities, additional barriers include not knowing the language of instruction and the lack of awareness of the LPT program. Parents in both Outcome 3 and non-Outcome 3 communities cited a lack of time and in some cases, the fact that children need to share LPT books at home. In addition, many respondents in non-Outcome 3 schools noted that many parents were unaware of LPT's role and curriculum and that parents were not as involved. To remedy this, many respondents suggested that parents needed more LPT awareness activities as well as formal training sessions on how to help their children read at home. In some cases, parents also noted they lack the resources to purchase reading materials or lamps to help children read at night.

> « *Nous voulons parfois aider nos enfants mais nous n'avons pas de temps.* » - Parent in Kaffrine (Outcome 3)
>
> « *Ils ont des livres mais je ne peux comprendre car je n'ai pas fait les bancs.* » - Parent in Louga (non-Outcome 3)

> « *Beaucoup de parents ne sont pas au courant du programme. Moi l'obstacle que je vois c'est le manque d'informations au niveau des parents.* » - CGE member in Diourbel (non-Outcome 3)

Finding 25: Facilitators to parents helping their children read at home include the images in LPT books and the involvement of the entire family in a child's learning. According to respondents in both Outcome 3 and non-Outcome 3 communities, LPT materials, especially the images, were conducive to parental involvement, given that even illiterate parents could understand the curriculum and better support the child while reading. In addition, parents found it easier to help their child at home if they had the support of the entire family. For Outcome 3 communities, many CGE members, parents, directors, community mobilizers, and teachers also highlighted the importance of the school-home tool (*outil école-maison*) to better understand their child's progress. In addition, several parents in Outcome 3 communities suggested that the home visits conducted by community mobilizers and forums conducted by CGEs also helped parents better understand how to support their children at home. Several parents also mentioned that they were learning to read in local languages by helping their children with reading, which further motivated them to support their children.

> « *Nous ne pouvons pas lire les lettres mais nous pouvons les corriger à partir des dessins.* » - Parent in Kaffrine (Outcome 3)

3. Parent-teacher interaction

Our quantitative and qualitative research suggest that the community engagement intervention has had a positive meaningful effect on some aspects of parent-teacher interaction.

i. Quantitative findings

Finding 26: We have a high level of confidence that the community engagement intervention had a positive meaningful effect on some aspects of parent teacher interaction, and either a positive or no meaningful effect on other aspects (Figure IV.5). There is an 80-90% probability that the community engagement activities increased, by a meaningful amount, whether parents report that teachers sent information to home about child's reading progress in past school year, parents report strongly believing it is important to communicate with their child's teacher, and teachers report speaking with at least 5 parents about child's reading progress in the past month. The effects of the community engagement intervention on these outcomes are substantial (Table IV.5). There is a high probability that the community engagement activities either increased by a meaningful amount or did not meaningfully affect whether a family member spoke with teacher or director about child in past school year, parents think teachers should communicate child results to parents, and teachers report sending written communications to parents about reading.

Figure IV.5 Probability of meaningful impacts on parent and teacher interaction

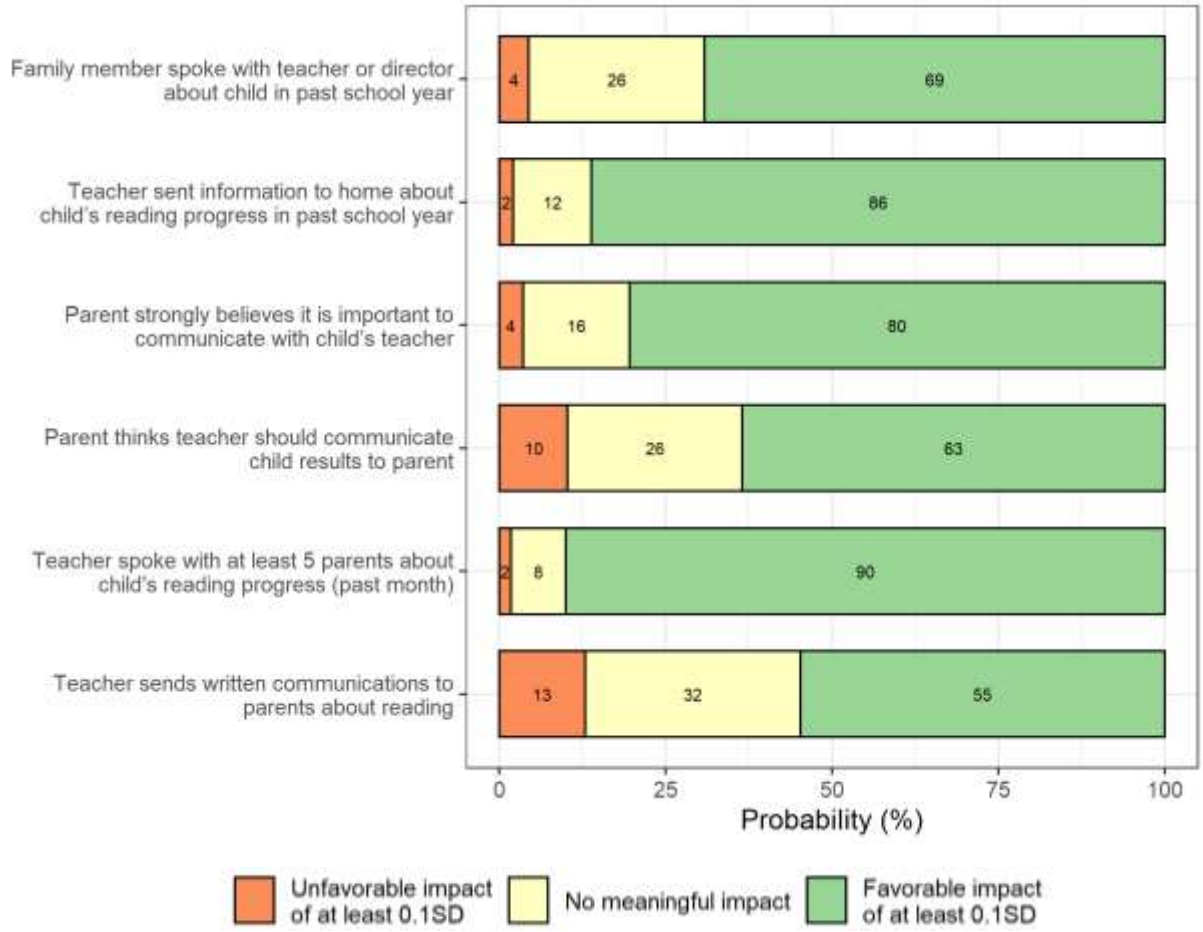


Table IV.5 Impacts on parent and teacher interaction

	Control Mean (Percent)	0.1 SD*	Impact Estimate (Odds Ratio)	95% credible interval		Treatment Odds	Adjusted Treatment Mean
				Lower 95 (Odds Ratio)	Upper 95 (Odds Ratio)		
Family member spoke with teacher or director about child in past school year	78.8	0.29	1.4	0.8	2.2	5.1	83.7
Teacher sent information to home about child's reading progress in past school year	33.4	0.53	1.8	0.9	3.5	0.9	47.6
Parent strongly believes it is important to	93.0	0.11	1.6	0.8	3.0	21.4	95.5

communicate with child's teacher							
Parent thinks teacher should communicate child results to parent	84.9	0.30	1.4	0.6	2.7	8.0	88.9
Teacher spoke with at least 5 parents about child's reading progress (past month)**	49.3	0.39	1.8	0.9	3.1	1.7	63.4
Teacher sends written communications to parents about reading**	13.5	0.25	1.3	0.6	2.2	0.2	16.7

Source: Community KAP Midline data collection, July 2019, parent survey (treatment sample size = 1,125; control sample size = 675); EGRA Midline data collection, May and June 2019, teacher survey (treatment sample size = 207; control sample size = 171)

Notes: * 0.1 SD is the magnitude of an impact that is considered meaningful in this analysis. ** Outcome is self-reported by the teacher; all other outcomes are reported by parents or another family member.

ii. Qualitative findings

Finding 27: Directors, teachers and parents report increased teacher interactions, whether at school, in homes or over the phone. Directors, teachers and parents in both Outcome 3 and non-Outcome 3 communities understand the importance of parent-teacher interaction so that parents can be informed about their child's progress. In Outcome 3 communities, all schools noted that parents visit and schedule meetings with teachers, and in some cases directors and teachers visit parents directly. Directors, teachers, and CGE members overwhelmingly stated that parents now visit the school more frequently, particularly when the school home tool is due to be brought back to school (every 15 days). When it was not possible to meet in person, some directors or teachers mentioned that they called parents directly. Non-Outcome 3 respondents also noted school visits but at a lower frequency, and parents sometimes visited only when the quarterly *compositions* were distributed by teachers.

> *« Ils sont plus engagés et viennent régulièrement prendre des nouvelles de leur enfant et au paravent ils ne le faisaient pas. »* - Teacher in Matam (Outcome 3)

Parents, directors and teachers in Outcome 3 schools stated that meeting with parents at home or over the phone facilitated parent-teacher interaction. In some cases, directors and teachers suggested that it was sometimes easier to meet parents directly in their homes to overcome time and distance barriers. Some teachers and directors in Kaolack also mentioned using the LPT SIM card to call parents directly.

Finding 28: In Outcome 3 communities, most parents are aware of, use, and appreciate the school-home tool. However, it appears that some schools have either not received the tool or are not using it. For those that used the tool, a majority thought it was useful because it helped the parent better understand their child's progress and pushed them to visit the school more often to ask questions. No respondents that used the tool had any complaints about the tool itself. Some parents who received and used the tool did note that they preferred in-person interaction with the teacher rather than using the tool. However, it appears that the tool was not fully rolled out to all Outcome 3 schools, or that some schools declined to use it. A few teachers noted that the tool was only used in CI classrooms, and would like the tool to be used for CP classrooms as well. Several schools stated that they did not use the tool and only used compositions for feedback to parents, much like in non-Outcome 3 communities. A few directors, teachers, and parents in Outcome 3 communities even mentioned that they had never seen the tool before.

> *« Ce qui les a le plus renforcées c'est l'outil école-maison puisque quand tu donnes une fiche au parent d'élève pour qu'il le signe et le fasse retourner il va se rendre compte que ce pourquoi on l'appelle est d'une grande importance et va le pousser à venir fréquenter les rencontres. »* - Parent in Kaffrine (Outcome 3)

Finding 29: Parents, directors and teachers cited a general lack of time and parental involvement as the largest barriers to parent-teacher interactions. In both Outcome 3 and non-Outcome 3 schools, respondents noted that directors, teachers and parents often did not have the time to meet. Some parents, particularly in non-Outcome 3 schools, are not involved and rarely come to visit the school. A few parents in Outcome 3 schools also noticed a lack of communication with teachers and directors. LPT staff also suggested that there weren't many training sessions on the tool, and that it took some time for community mobilizers and CGE to help teachers and parents understand how to use it.

> « *Parce que nos emplois du temps sont saturés, l'heure n'est beaucoup, le maitre qui a le CI en sérère n'a pas beaucoup de temps.»* - CGE member in Fatick (non-Outcome 3)

C. Do community engagement activities improve teachers' knowledge, attitudes and practices in teaching early grade reading in primary schools?

Our quantitative and qualitative research suggest that the community engagement intervention has had a positive meaningful effect on some teacher outcomes, but not all.

i. Quantitative findings

Finding 30: We have a high level of confidence that the community engagement intervention had mostly positive meaningful effects on some teacher knowledge and practices (Figure IV.6), but believe there were some mixed effects. There is an 80 to 100 percent chance that the intervention had a positive meaningful impact on some aspects of teacher KAP, including knowledge of the two basic elements of reading, of how to assess reading fluency, of

techniques for equitable participation, and being on schedule with EGR lessons. The effects of the community engagement intervention on these outcomes are, while not particularly large, statistically meaningful for knowledge of how to assess reading fluency and of techniques for equitable participation (Table IV.6). The community engagement intervention increased the percentage of the two basic elements of reading identified correctly by almost 9 percentage points. The intervention had either a positive or no meaningful effect on teachers' knowledge of the 3 types of questions to evaluate reading comprehension and using the teacher's guide during EGR lessons. However, there is a good chance that the intervention has either a meaningfully negative or no meaningful effect on two aspects: teachers correctly identifying the 5 components of reading and using "I do, we do, you do" at least five times in the past week.

Figure IV.6 Probability of meaningful impacts on teacher knowledge and practices about reading

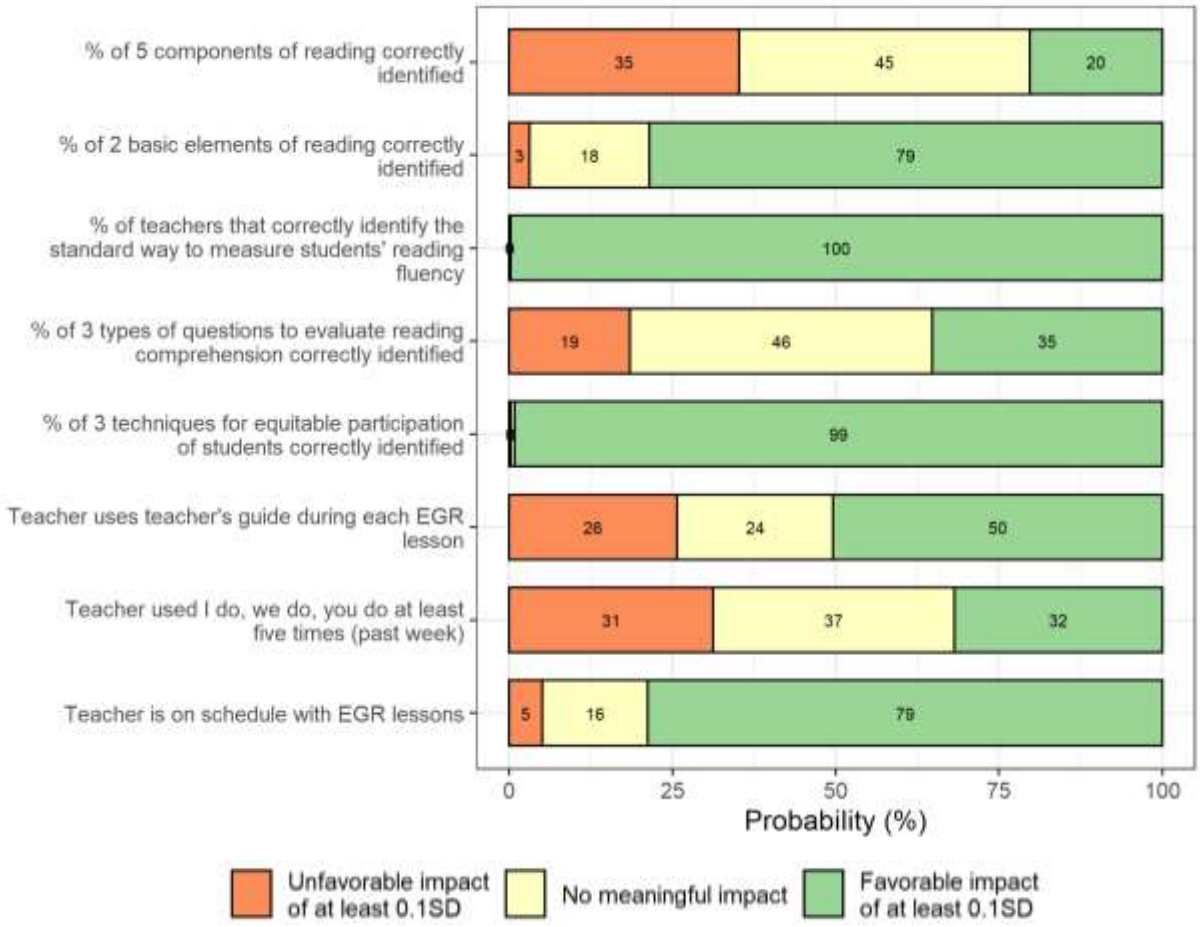


Table IV.6 Impacts on teacher knowledge and practices about reading

	Control Mean (Percent)	0.1 SD*	Impact Estimate (pp[a] or odds ratio [b])	95% credible interval		Treatment Odds	Adjusted Treatment Mean (Percent)
				Lower 95	Upper 95		
% of 5 components of reading correctly identified	78.1	0.24	-1.1[a]	-12.0	9.7	N/A	77
% of 2 basic elements of reading correctly identified	64.3	0.30	8.8[a]	-5.6	23.2	N/A	73.1
% of teachers that correctly identify the standard way to measure students' reading fluency	0.7	0.00	0.4[a]	0.2	0.6	N/A	1.1
% of 3 types of questions to evaluate reading comprehension correctly identified	54.4	0.28	1.7[a]	-11.8	15.3	N/A	56.1
% of 3 techniques for equitable participation of students correctly identified	34.9	0.17	13.1[a]	5.4	21.0	N/A	48.9
Teacher uses teacher's guide during each EGR lesson	95.1	0.18	1.3[b]	0.4	3.0	25.7	96.3
Teacher used I do, we do, you do at least five times (past week)	47.4	0.47	1.1[b]	0.5	2.1	1.0	49.2
Teacher is on schedule with EGR lessons	42.6	0.49	1.7[b]	0.7	3.1	1.2	55.2

Source: EGRA Midline data collection, May and June 2019, teacher survey (treatment sample size = 207; control sample size = 171)

Notes: * 0.1 SD is the magnitude of an impact that is considered meaningful in this analysis.; [a] impact reported in percentage points (pp); [b] impact reported with an odds ratio

ii. Qualitative findings

Finding 31: All directors and most teachers in Outcome 3 schools received training on community and parental engagement. All directors in Outcome 3 schools stated that they had received training on community engagement, sometimes over multiple days. A few directors even noted that they had participated in the training the CGE receives as well. Most teachers in Outcome 3 schools also reported receiving training on community engagement; however, a few teachers in Kaolack had not. Themes in training included helping parents and the community understand LPT, how to help a child read at home, and parent-teacher and parent-director

interaction. A few directors and teachers who had received the training suggested making trainings longer and more frequent.

Finding 32: Increased parent-teacher interactions, whether at school, in homes or over the phone, have motivated teachers in the classroom. Overall, most teachers in Outcome 3 and non-Outcome 3 schools felt that parent visits and parental investment helped motivate and encourage both teachers and students in the classroom.

> « *Les visites des parents d'élèves nous motive car on saura tel veut que son enfant étudie. Ce seul parent qui montre qu'il est intéressé par les études de son enfant, te pousse à tout donné pour leur réussite.* » - Teacher in Louga (non-Outcome 3)

D. Do community engagement activities improve children's reading skills?

Our quantitative and qualitative research suggests that the community engagement intervention has had a positive meaningful effect on some child reading skills but not all.

i. Quantitative findings

Finding 33: Findings indicate that the community engagement intervention is likely improving children's early literacy skills by a meaningful amount, but not the more advanced skills such as oral reading fluency and reading comprehension. There is a high likelihood, 80% probability, that the community engagement intervention is improving by a meaningful amount children's ability to read invented words, and moderate likelihoods of approximately 60% that it is improving children's abilities to identify correct letter sounds, words in their native language, and French words by a meaningful amount. However, it is unclear if the community engagement intervention is affecting, by a meaningful amount, children's abilities to read connected text (oral reading fluency) and children's abilities to comprehend what they are reading, and if so, in what direction.

To put this in perspective, the estimated impact of the intervention on students normalized invented word reading score is 0.22 standard deviations (Table IV.7). This indicates that the children in R3 communities have normalized oral reading fluency scores that are 0.22 standard deviations higher than the scores of children in non-R3 communities. For first graders learning reading in Wolof, where the mean number of invented words read per minute is 7.2 and the standard deviation is 1 invented word per minute, the impact reflects an improvement of 0.2 words per minute. This represents an improvement of 3.1% of the mean (7.2 invented words per minute).

Figure IV.7 Probability of meaningful impacts on child reading skills

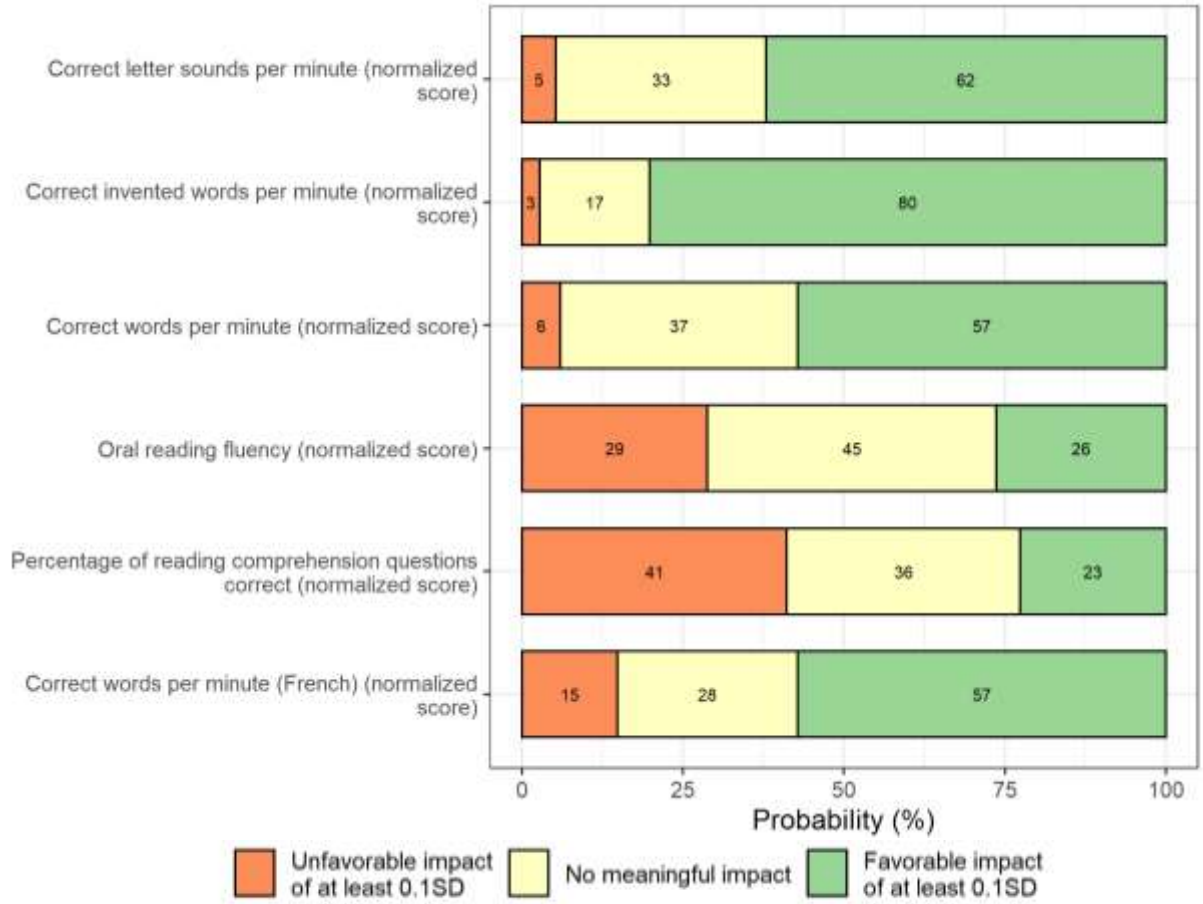


Table IV.7 Impacts on child reading skills

	Control Mean (z-score)	0.1 SD*	Impact Estimate (SD)	95% credible interval		Adjusted Treatment Mean (z-score)
				Lower 95 (SD)	Upper 95 (SD)	
Correct letter sounds per minute (normalized score)	-0.07	0.006	0.14	-0.18	0.47	0.07
Correct invented words per minute (normalized score)	-0.06	0.009	0.22	-0.11	0.56	0.16
Correct words per minute (normalized score)	-0.05	0.007	0.12	-0.21	0.46	0.07
Oral reading fluency (normalized score)	-0.05	0.008	-0.01	-0.37	0.34	-0.06
Percentage of reading comprehension questions correct (normalized score)	-0.06	0.010	-0.07	-0.52	0.32	-0.13

Correct words per minute (French) (normalized score)**	-0.07	0.017	0.14	-0.35	0.65	0.07

Source: EGRA Midline data collection, May and June 2019, child survey (treatment sample size = 2,343; control sample size = 1,828)

Notes: * 0.1 SD is the magnitude of an impact that is considered meaningful in this analysis. ** The French subtask was administered only to second graders.

ii. Qualitative findings

Finding 34. Overall, respondents in both Outcome 3 and non-Outcome 3 communities noticed improvement in children's interest in reading, their ability to read, their grades, and their engagement in class. However, many respondents noted that this was a result of the multiple components of the LPT program, not only parental engagement.

> « *Je vois que l'engagement des parents a un impact sur les élèves. Beaucoup d'élèves en début d'année ne savaient pas lire. Maintenant ils participent bien en classe, c'est par ce qu'ils sont bien encadrés à la maison.* » - CGE member in Kaffrine (Outcome 3)

E. Sustainability

Finding 35: In addition to the previous sustainability findings related to financing, LPT, USAID, and MEN staff all underscored the importance of engaging with parents and the community to encourage sustainability for the community engagement activities. The Ministry and LPT helped create a community of practice for community engagement at the national level. LPT has also helped establish best practice networks at the IEF level in all 19 departments covered by Outcome 3 (Chemonics 2019c). Key informant interviews made it clear that the MEN found the community engagement important, but that there was sometimes a lack of communication between LPT and the MEN especially regarding M&E data, and a lack of harmonization between LPT activities and other community engagement programs in Senegal. In addition, as discussed in prior sections, LPT, USAID, and the MEN are still unsure about how best to allocate funds for CGE-implemented community engagement activities and the community mobilizer role in the future.

VI. Key Takeaways

Our analyses suggest that Outcome 3 activities are reinforcing LPT's broader efforts to support early grade reading in primary schools.

Key takeaways from the quantitative analysis

Our quantitative analyses suggest that the community engagement activities are having meaningful positive impacts across multiple domains, though not all outcomes. These include:

- The community engagement intervention is reaching families and is changing behavior in the home around reading by a meaningful amount.
- Teachers and parents are more likely to communicate by a meaningful amount, and there are some meaningfully positive and potentially no meaningfully negative effects on teacher practices.
- The community engagement intervention is highly likely improving children's ability to read invented words, and moderately likely improving children's abilities to identify correct letter sounds, words in their native language, and French words by a meaningful amount, but not the more advanced skills such as oral reading fluency and reading comprehension.
- Findings for key subgroups, including child gender, whether the child is learning in the mother tongue or not, cohort, and urban/rural status, are similar to those for the overall sample.

Key takeaways from the qualitative analysis

The qualitative research supports the quantitative findings, showing several positive findings related to LPT's community engagement activities.

- School management committees (CGEs) are offering community engagement activities as expected, and there is a higher frequency and wider range of activities in Outcome 3 communities than in non-Outcome 3 communities.
- CGEs highlighted several important facilitators to community engagement, including having dynamic and proactive members to implement activities.
- Community mobilizers are engaging with parents and the CGE and implementing activities as planned. Communities are finding these activities useful.
- SBCC (social behavior change communication), including posters and radio announcements, images in the LPT books, and the involvement of the entire family have facilitated parents support reading at home.
- Parents in Outcome 3 communities are more likely to apply reading support techniques than parents in non-Outcome 3 communities.

- While non-outcome 3 communities mention the lack of education as being a significant barrier to helping their child read at home, Outcome 3 communities do not feel the same. They report that they can engage with their children in reading despite not having an education or being literate.
- Children in Outcome 3 communities are more likely to read at home than children from non-Outcome 3 communities.
- Increased parent-teacher interactions have motivated teachers in the classroom.

Despite these positive findings, the qualitative data also highlighted some challenges to the implementation and sustainability of the community engagement activities, including:

- Some CGEs were not aware of LPT grant eligibility requirements and grant application procedures, and many wished they had more flexibility in managing their funds.
- Despite the PAV support and grant provision process, CGEs are still reporting that a lack of resources is the largest obstacle to implementing community engagement activities.
- Barriers to engagement in CGE activities include scheduling conflicts, lack of sensitization, and a lack of communication regarding community events.
- Challenges for community mobilizers include the number of schools they are required to cover, the distance to these schools, out-of-pocket costs, and the monthly activity targets.
- Lack of time was the greatest barrier to parents helping their children read at home and to parent-teacher interaction.
- Although most parents are aware of and use the school-home tool, some schools have either not received the tool or are not using it.

References

Amrhein, Valentin, Sander Greenland, and Blake McShane. "Scientists rise up against statistical significance." Nature (2019): 305.

Banerjee, Abhijit, Rukmini Banerji, Esther Duflo, Rachel Glennerster, and Stut Khemani. “Pitfalls of Participatory Programs: Evidence from a Randomized Evaluation in Education in India.” *American Economic Journal: Economic Policy,* vol. 2, no. 1, 2010, pp. 1-30.

Banerji, Rukmini, James Berry, and Marc Shotland. “The Impact of Maternal Literacy and Participation Programs: Evidence from a Randomized Evaluation in India.” American Economic Journal: Applied Economics, vol. 9, no. 4, 2017, pp. 303-337.

Chandler, Jesse J., Ignacio Martinez, Mariel M. Finucane, Jeffrey G. Terziev, and Alexandra M. Resch. “Speaking on Data’s Behalf: What Researchers Say and How Audiences Choose.” *Education Review,* 2019*,* pp. 1-29.

Friedlander, Elliott, and Claude Goldenberg. “Literacy Boost in Rwanda: Impact Evaluation of a 2-year Randomized Control Trial.” Stanford, CA: Stanford University, 2016.

Ghitza, Y. and Gelman, A. (2013). Deep interactions with MRP: Election turnout and voting patterns among small electoral subgroups. *American Journal of Political Science*, *57*(3): 762-776.

Lugo-Gil, Julieta, Nancy Murray, Camila Fernandez, Steve Glazerman and Larissa Campuzano. “Impact Evaluation of *Leer Juntos, Aprender Juntos* Early Grade Intervention in Guatemala: Final Report.” Washington, DC: Mathematica Policy Research, Submitted to USAID, 2018a.

Lugo-Gil, Julieta, Nancy Murray, Steve Glazerman, Camila Fernandez, Larissa Campuzano and Ivonne Padilla. “Impact Evaluation of *Leer Juntos, Aprender Juntos* Early Grade Intervention in Peru: Final Report.” Washington, DC: Mathematica Policy Research, Submitted to USAID, 2018b.

Pradhan, Menno, Daniel Suryadarma, Amanda Beatty, Maisy Wong, Arya Gaduh, Armida Alisjahbana, and Rima Prama Artha. “Improving Educational Quality through Enhancing Community Participation: Results from a Randomized Field Experiment in Indonesia.” *American Economic Journal: Applied Economics*, vol. 6, no. 2, 2014, pp. 105-126.

Taylor, Stephen, Jacobus Cilliers, Cas Prinsloo, Brahm Fleisch, and Vijay Reddy. “Technical Report: THE EARLY GRADE READING STUDY: Impact evaluation after two years of interventions.” October 13, 2017.

Wasserstein, Ronald L., and Nicole A. Lazar. "The ASA statement on p-values: context, process, and purpose." American Statistician (2016): 129-133.

Wasserstein, Ronald L., Allen L. Schirm, and Nicole A. Lazar. "Moving to a world beyond “p< 0.05”." American Statistician (2019): 1-19.

Weisleder, Adriana, Denise S.R. Mazzucheli, Aline Sá Lopez, Walfrido Duarte Neto, Carolyn Brockmeyer Cates, Hosana Alves Gonçalves, Rochelle Paz Fonseca, João Oliveira, and Alan L. Mendelsohn. “Reading Aloud and Child Development: A Cluster-Randomized Trial in Brazil.” *Pediatrics*, vol. 141, no. 1, 2018, e20170723.

What Works Clearinghouse – WWC. “What Works Clearinghouse™ Procedures Handbook Version 4.0.” Washington, DC: Institute of Education Sciences, 2017.

Wolf, Sharon, J. Lawrence Aber, Jere R. Behrman, and Edward Tsinigo. “Experimental Impacts of the “Quality Preschool for Ghana” Interventions on Teacher Professional Well-being, Classroom Quality, and Children’s School Readiness.” *Journal of Research on Educational Effectiveness*, vol. 12, no. 1, 2019, pp. 10-37.

Appendix A: Quantitative Data Collection

Input on SSME and community KAP questionnaires. The primary sources of quantitative data for this study were (1) the teacher SSME questionnaire, child reading assessment, and child context survey that were administered as part of the LPT EGRA data collection in 2017 and 2019 and (2) the parent survey administered through the LPT community KAP data collection in 2018 and 2019.

Rapid Feedback MERL worked with LPT and its partners to provide input on the content of the midline EGRA SSME teacher questionnaire and the midline community KAP questionnaire to ensure that each questionnaire captured the data necessary to answer our research questions. Specifically, Rapid Feedback MERL suggested revisions and additions to the questionnaires to capture the following outcomes:

Teacher SSME

- Teacher knowledge and self-reported use of LPT EGR instructional concepts and practices
- Teacher and parent interaction

Community KAP

- Parent awareness of and participation in community reading events
- Child participation in community reading events
- Parent engagement in child's reading at home
- Parent and teacher interaction
- Child's at-home reading environment

LPT, EdIntersect, and Plan International accepted the majority of these suggestions.

Sample size and power calculations. We worked with LPT and its partners to develop a sampling approach for the midline EGRA and community KAP data collections. The goal was to expand the samples in a way that balanced our concern about statistical power with logistical and financial considerations. In our discussions, LPT and its partners agreed to stratify the sample on Outcome 3 status to ensure a sufficient sample size for the treatment group.[7]

[7] LPT indicated that Outcome 3 Cohort 1 would be the most important group to include in the analysis given that Cohort 2 only started to receive Outcome 3 activities during the middle to end of SY 2018-2019. However, both the EGRA and the Community KAP samples include both Cohort 1 and Cohort 2 schools. As a robustness check we conduct our analysis on two different samples – comparing cohort 1 to the control group and comparing cohort 2 to the control group – in order to try to determine whether the impacts differ depending on exposure to the intervention (See Appendix D).

Appendix B: Quantitative data description

Outcome measurement. For most outcomes we created simple variables based on the question, using either binary or continuous measures. However, for the reading skills assessment, we normalized the scores for each skill across grade (grades 1 and 2) and language of the assessment (Wolof, Pulaar and Seereer) so that we could analyze the data from across the different assessments together. We report findings for these normalized test scores, and we discuss what those findings would mean for each assessment.

Midline samples. Overall, as noted in the memo, the treatment and control samples are balanced in the midline EGRA and KAP data (Table B.1). Of the 31 comparisons made with the EGRA data, there was one difference between treatment and control significant at the 5% level and three additional differences significant at the 10% level. Of the 9 comparisons made at the school level, 1 difference was statistically significant at the 10% level, which is what we would expect to arise due to chance. Of the 14 teacher level comparisons, 1 difference was significant at the 5% level and one other was significant at the 10% level, which slightly exceeds the number of differences we would expect to arise by chance. In particular, the average number of years of experience teaching CP and the average age of the teacher were both slightly higher for the control group than for the treatment group. Finally, the 8 comparisons made for the child-level data contained one difference significant at the 10% level, which is about what we would expect to arise due to chance.

Table B.1. Summary of school, teacher, and child characteristics (midline EGRA sample)

	Treatment	Control	Difference		p-value	Sample size
School						
Region (%)						
Diourbel	24.4%	23.6%	0.7%		0.9314	274
Kaffrine	10.0%	13.7%	-3.7%		0.4376	274
Kaolack	22.4%	24.8%	-2.4%		0.7234	274
Louga	28.6%	24.6%	4.0%		0.6318	274
Matam	14.6%	13.3%	1.3%		0.7549	274
Urban (%)	4.8%	12.6%	-7.8%	*	0.0886	274
Language of LPT instruction (%)						
Wolof	68.3%	68.8%	-0.6%		0.9384	274
Pulaar	21.7%	22.6%	-0.9%		0.8841	274
Seereer	10.0%	8.6%	1.4%		0.7246	274
Teacher						
Female (%)	22.2%	27.5%	-5.3%		0.3755	378
Age (years)	35.3	37.1	-1.7	*	0.0705	378
Teacher's professional certification (%)						
CAP	59.2%	69.5%	-10.3%		0.1674	378
CEAP	31.8%	27.3%	4.5%		0.5118	378

None	8.4%	3.2%	5.2%		0.2634	378
Grade(s) taught currently (%)						
CI only	55.2%	52.3%	2.9%		0.5078	373
CP only	24.1%	27.6%	-3.5%		0.2206	373
CI and CP	15.6%	17.1%	-1.5%		0.7790	373
Number of years teaching CI (years)	3.3	3.7	-0.4		0.2737	378
Number of years teaching CP (years)	2.0	2.5	-0.4	**	0.0427	378
Home language (%)						
Wolof	61.9%	66.9%	-5.0%		0.4541	378
Pulaar	23.6%	23.1%	0.5%		0.9195	378
Seereer	10.8%	6.6%	4.3%		0.3537	378
Other	3.7%	3.4%	0.3%		0.8968	378
Child						
Female (%)	55.6%	53.7%	1.9%		0.2788	4,171
Grade (%)						
CI	70.3%	66.5%	3.8%		0.2212	4,171
CP	29.7%	33.5%	-3.8%		0.2212	4,171
Child's home language is the same as school's teaching language (%)	85.5%	82.6%	2.9%		0.3969	4,143
Language spoken at home (%)						
Wolof	51.7%	58.7%	-7.0%		0.1222	4,143
Pulaar	33.9%	28.1%	5.8%		0.1829	4,143
Seereer	13.4%	10.3%	3.1%		0.3234	4,143
Other	4.5%	7.5%	-3.1%	*	0.0788	4,143
Sample size (School)	132	142				
Sample size (Teacher)	207	171				
Sample size (Child)	2,343	1,828				

Source: EGRA Midline data collection, May and June 2019, teacher and child surveys
Note: We tested differences between group means by using two-tailed t-tests. Treatment and control group means include school-level weights. Sample sizes shown are for the full sample; some regressions may include a smaller size because of missing data.

Of the 17 comparisons made, the KAP data contain one difference significant at the 1% level and one more at the 5% level (Table B.2). Of the 9 comparisons made at the school level, 1 was significant at the 5% level, which exceeds the number expected due to chance. Namely, the control group has a higher percentage of schools in urban areas than the treatment group. Of the 8 comparisons made at the parent level, 1 was significant at the 1% level, which also exceeds the number expected due to chance. The percentage of households that speak a language other than Wolof, Pulaar, or Seereer is higher in the control group than the treatment group.

Table B.2. Summary of parent characteristics (midline KAP sample)

	Treatment	Control	Difference		p-value	Sample size
School						
Region (%)						
Diourbel	19.3%	29.9%	-10.6%		0.1553	183
Kaffrine	21.7%	19.3%	2.4%		0.7378	183
Kaolack	18.9%	18.1%	0.8%		0.8965	183
Louga	22.3%	16.6%	5.7%		0.3552	183
Matam	17.9%	16.1%	1.8%		0.7500	183
Urban (%)	17.5%	35.8%	-18.3%	**	0.0158	180
Language of LPT instruction (%)						
Wolof	60.6%	55.7%	4.9%		0.5452	183
Pulaar	24.2%	27.5%	-3.3%		0.6431	183
Seereer	15.2%	16.8%	-1.6%		0.7894	183
Parent						
Female (%)	69.6%	65.8%	3.9%		0.3114	1,715
Literate in any language (%)	52.6%	50.7%	1.8%		0.7147	1,715
Language spoken at home (%)						
Wolof	66.8%	68.8%	-2.0%		0.7581	1,715
Pulaar	30.5%	32.3%	-1.7%		0.7933	1,715
Seereer	11.4%	13.6%	-2.2%		0.5985	1,715
Other	2.9%	12.9%	-10.0%	***	0.0032	1,715
Child is Female (%)	50.4%	51.9%	-1.5%		0.3615	1,715
Child's Age (years)	8.5	8.4	0.2		0.1913	1,709
Sample size (school/community)	116	67				
Sample size (parent)	1,040	675				

Source: Community KAP Midline data collection, July 2019, parent survey
Note: We tested differences between group means by using two-tailed t-tests. Treatment and control group means include school-level weights. Sample sizes shown are for the full sample; some regressions may include a smaller size because of missing data.

Baseline samples. We analyzed baseline data to establish the equivalence between treatment and control groups for both demographics and outcomes. We used sample weights to test the significance of observed differences between the treatment and control groups for our EGRA dataset (used for teacher and child outcomes) as well as our KAP dataset (used for parent outcomes). The EGRA data contain one difference between treatment and control significant at the 1% level and two more differences significant at the 10% level (of 31 total comparisons). The KAP data contain four differences significant at the 10% level (of 53 total comparisons). In both cases, the number of significant differences is around the number we would expect to occur by chance; we conclude that treatment and control groups are equivalent at baseline. Tables B.3 and B.4 show baseline equivalence for the EGRA and KAP samples respectively.

Tables B.3 Baseline Equivalence (EGRA)

	Means					
	Treatment	Control	Difference in means		p-value	Sample size
Demographics						
School						
Region (%)						
Diourbel	9.8%	16.9%	-7.0%		0.2969	153
Kaffrine	18.8%	21.3%	-2.5%		0.8235	153
Kaolack	37.4%	20.6%	16.8%		0.1633	153
Louga	23.4%	8.2%	15.2%	*	0.0708	153
Matam	10.5%	33.0%	-22.5%	***	0.0073	153
Urban (%)	15.9%	6.7%	9.1%		0.3118	153
Language of LPT instruction (%)						
Wolof	69.1%	74.3%	-5.2%		0.5791	153
Pulaar	23.0%	15.0%	8.0%		0.3146	153
Seereer	7.9%	10.6%	-2.7%		0.5606	153
Teacher						
Female (%)	47.2%	39.7%	7.5%		0.5560	256
Age (years)	32.8	34.5	-1.7		0.3003	256
Teacher's professional certification (%)						
CAP	31.8%	51.9%	-20.2%	*	0.0911	256
CEAP	49.5%	43.8%	5.7%		0.6648	256
None	18.7%	4.3%	14.4%		0.1509	256
Child						
Female (%)	52.7%	53.0%	-0.2%		0.9083	2,836
Grade (%)						
CI	48.2%	48.7%	-0.5%		0.8134	2,836
CP	51.8%	51.3%	0.5%		0.8134	2,836
Language spoken at home (%)						
Wolof	40.5%	39.3%	1.2%		0.8895	2,836
Pulaar	47.0%	34.0%	13.1%		0.1314	2,836
Seereer	15.8%	27.3%	-11.5%		0.1106	2,836
Baseline outcomes						
Teacher						
Teacher meets with parents to discuss child's progress in school (%)	84.9%	92.7%	-7.9%		0.1844	256
Child						
Someone helps child with homework at home (%)	89.2%	88.4%	0.8%		0.7192	2,157
Child has something to read at home (%)	62.1%	67.2%	-5.1%		0.3099	2,836

Correct Sound of Letters Per Minute (normalized score)	0.0607	0.0224	0.0382	0.6794	2,836
Correct Words Per Minute (normalized score)	0.0487	0.0532	-0.0045	0.9532	2,836
Correct Invented Words Per Minute (normalized score)	0.0552	0.0472	0.0080	0.9258	2,836
Oral Reading Fluency (normalized score)	-0.0065	0.0254	-0.0318	0.6320	2,836
Correct Words Per Minute (French) (normalized score)	0.0586	-0.0108	0.0694	0.4023	2,836
Percentage of Reading Comprehension questions correct (normalized score)	0.0848	-0.0347	0.1194	0.1058	2,836
Number of schools	42	111			
Number of teachers	68	192			
Number of children	765	2,071			

Source: EGRA baseline data collection, 2017, teacher and child surveys
Note: We tested differences between group means by using two-tailed t-tests. Treatment and control group means include school-level weights. Sample sizes shown are for the full sample; some regressions may include a smaller size because of missing data.

Table B.4 Baseline Equivalence (Community KAP)

	Means					
	Treatment	**Control**	**Difference in means**		**p-value**	**Sample size**
Demographics						
School						
Region (%)						
Diourbel	13.61%	13.15%	0.46%		0.9624	98
Kaffrine	6.74%	13.71%	-6.97%		0.2601	98
Kaolack	34.98%	28.99%	5.99%		0.6478	98
Louga	33.69%	29.73%	3.97%		0.7321	98
Matam	10.97%	14.42%	-3.45%		0.7067	98
Urban (%)	10.91%	6.72%	4.19%		0.6498	98
Language of LPT instruction (%)						
Wolof	74.58%	71.33%	3.26%		0.7754	98
Pulaar	21.62%	22.80%	-1.18%		0.9128	98
Seereer	3.80%	5.87%	-2.07%		0.6731	98
Parent						
Female (%)	53.73%	61.17%	-7.44%		0.2312	968
Respondent relationship to child (%)						
Mother	34.22%	42.75%	-8.54%	*	0.0708	968
Father	35.07%	29.99%	5.08%		0.3890	968
Older sibling	3.70%	1.72%	1.98%		0.1617	968

Grandparent	11.27%	12.22%	-0.96%	0.6797	968
Aunt/Uncle	13.36%	11.80%	1.56%	0.5201	968
Other	2.38%	1.51%	0.87%	0.4905	968
Literate in any language (%)	49.00%	44.50%	4.50%	0.3960	968
Level of education (%)					
None	37.56%	37.60%	-0.04%	0.9931	968
Primary	8.19%	4.67%	3.52%	0.1680	968
Moyen/college	13.27%	14.13%	-0.86%	0.7507	968
Secondaire/lycee or higher	15.11%	10.64%	4.47%	0.2068	968
Coranic school only	25.87%	32.96%	-7.08%	0.1027	968
Maternal language (%)					
Wolof	52.02%	50.76%	1.25%	0.9012	968
Pulaar	33.90%	31.94%	1.95%	0.8424	968
Seereer	10.40%	15.52%	-5.12%	0.4354	968
French	0.00%	0.27%	-0.27%	0.1923	968
Other	3.68%	1.51%	2.17%	0.2016	968
Language spoken at home (%)					
Wolof	66.82%	68.20%	-1.38%	0.8884	969
Pulaar	32.56%	30.16%	2.41%	0.8110	969
Seereer	6.93%	11.98%	-5.05%	0.4026	969
French	2.84%	3.11%	-0.26%	0.8967	969
Other	0.44%	0.86%	-0.42%	0.4298	969
Number of household members (people)	14.32	14.31	0.01	0.9928	969
Household has electricity (%)	40.22%	31.41%	8.80%	0.4217	968
Household owns (%)					
Radio	78.76%	77.17%	1.60%	0.7153	969
Television	44.79%	36.56%	8.22%	0.3821	969
Mobile phone	94.76%	93.38%	1.38%	0.5533	969
Child					
Female (%)	47.88%	51.27%	-3.39% *	0.0610	969
Age (years)	8.54	8.70	-0.16	0.3646	961
Baseline outcomes					
Parent participation in the school (%)	83.46%	78.85%	4.61%	0.3901	968
Parent awareness of EGR program (%)	46.99%	37.81%	9.18% *	0.0771	968
Parent agreement with EGR program (%)	77.08%	78.54%	-1.47%	0.8286	968
Parent knowledge of community reading events (%)	4.82%	3.32%	1.50%	0.6480	968
Parent exposure to SBCC (%)	26.70%	20.87%	5.83%	0.3584	969

Parent cites meeting with teacher or director as helpful action (%)	73.36%	60.93%	12.43%	*	0.0788	969
Parent cites reading at home with child as helpful action (%)	30.28%	29.11%	1.17%		0.8807	969
Attitude about role parent can play (%)	85.70%	89.22%	-3.52%		0.3338	968
Parent engagement in reading at home (%)	63.70%	58.10%	5.60%		0.3745	968
Participation of household members in reading with child (%)	69.57%	65.30%	4.27%		0.4729	968
Communication with teacher (%)	85.18%	79.10%	6.08%		0.2217	969
Attitude about teacher communication (%)	65.89%	68.35%	-2.46%		0.6870	968
Availability of livre enfant in the home (%)	76.92%	73.15%	3.78%		0.5241	969
Appropriate place to read in the house (%)	89.12%	87.90%	1.22%		0.7009	968
Sample size (school/community)	24	74				
Sample size (parent)	243	726				

Source: KAP baseline data collection, 2017, parent surveys
Note: We tested differences between group means by using two-tailed t-tests. Treatment and control group means include school-level weights. Sample sizes shown are for the full sample; some regressions may include a smaller size because of missing data.

Baseline and midline sample comparison. There were some differences in the demographic composition of the baseline samples compared to the midline samples. Notably, the regional distribution of schools in the EGRA sample changed somewhat from baseline to midline although the distribution of languages of instruction remained mostly the same. Additionally, the distribution of CI and CP students is about evenly split in the baseline data but skews more towards CI in the midline data. In the KAP data, we see an even regional distribution of schools whereas one region (Louga) was overrepresented at baseline. The shift in regional composition of the sample is accompanied by a shift in the language of instruction with fewer Wolof schools and more Seereer schools at midline. Finally, we note a significant uptick in the percentage of households with access to electricity. Tables III.2 and III.3 present the full demographic descriptions of the EGRA and KAP midline datasets respectively.

Appendix C: Quantitative analytic approach

This analysis comprised two stages. First, we constructed cells and used standard frequentist methods to estimate the impact of the intervention in each cell. Second, we borrowed strength across cells in the second stage, using a Bayesian hierarchical meta-regression. This appendix provides details about each of those two stages of analysis in turn.

I. Stage 1: Cell construction and frequentist estimation of cell-specific impacts

Frequentist estimation of cell-specific impacts. Frequentist regressions were run independently for each outcome across the three samples (child, teacher and parent). We used ordinary least squares regression for continuous variables, and logistic regression for binary variables. We incorporated design and sampling weights in each regression. Design weights were used in all analyses and are based on the number of communities assigned to receive Outcome 3 in each stratum determined by LPT. Sample weights, created by LPT, are used for the EGRA and KAP analyses. We use school weights for outcomes of all levels; and child weights for child-level and parent-level outcomes. We also incorporated control variables in each regression to improve the precision of the estimate. The regression for each outcome was conducted separately for different subsamples defined by combinations of the key subgroups of interest, which we call cells, and the intervention cohort variable. This was done so that we could both incorporate differences across subgroups in the overall estimate, as well as conduct subgroup analyses in the Bayesian analysis.

Because we summarized across all outcomes of interest in the study in a single Bayesian model, we standardized the impact estimates using the traditional effect size calculations, to ensure the comparability of impacts across outcomes measured in different units. We used the same effect size equations as in the data collection process for estimates from the literature. For continuous outcomes we used the Hedges' g effect size and its standard error, while for binary outcomes we used the d_{Cox} effect size and a slight modification of its standard error, as defined in the What Works Clearinghouse Procedures Handbook:[8]

Outcome Type	Effect Size Calculation	Standard Error Calculation
Continuous (Hedges' g)	$g = \frac{\omega(y_T - y_C)}{\sqrt{\frac{(n_T-1)s_T^2 + (n_C-1)s_C^2}{(n_T+n_C-2)}}}$	$SE(g) = \omega\sqrt{\frac{n_T+n_C}{n_T n_C} + \frac{g^2}{2(n_T+n_C)}}$
Binary (d_{Cox})	$d_{Cox} = \frac{LOR}{1.65}$	$SE(d_{Cox}) = \left(\frac{1}{1.65}\right)\sqrt{\frac{1}{n_T^{*1}} + \frac{1}{n_T^{*0}} + \frac{1}{n_C^{*1}} + \frac{1}{n_C^{*0}}}$

[8] What Works Clearinghouse Procedures Handbook, Version 4.1. Available online at https://ies.ed.gov/ncee/wwc/Docs/referenceresources/WWC-Procedures-Handbook-v4-1-508.pdf

In these equations, starting from the top left, ω is a small-sample correction factor equal to $1 - \frac{3}{4N-9}$, where N is the total sample size in the analysis across the treatment and control conditions. To account for the complex survey design's effect on the variance of estimates, we used the effective sample size rather than the raw sample size when computing ω. The effective sample size for an outcome is equal to the raw sample size divided by the design effect for that outcome, which reflects the impact of variation in the survey weights on the variance of quantities estimated using data from a complex survey design. As such, it provides a more accurate picture of the amount of information available.

Throughout these equations, subscript T represents the treatment group, while subscript C represents the control group; y denotes the regression-adjusted outcome value; s denotes the standard error; and n denotes the sample size. Superscripts of 0 and 1 denote the value of the binary outcome variable, so that n_T^1 represents the number of treatment observations where the outcome is equal to 1. Finally, LOR is the log-odds ratio, where p represents the probability that a binary outcome is equal to 1:

$$LOR = \frac{\left(\frac{p_T}{1-p_T}\right)}{\left(\frac{p_C}{1-p_C}\right)}$$

To account for the complex survey design, we also slightly modified the equation for $SE(d_{Cox})$, as noted above through the use of asterisks. The asterisks indicate that, rather than using a simple count of observations, we used the effective sample size for each combination of treatment condition and outcome value, calculated as described above. In this process, we followed Ghitza and Gelman (2013), who employ a similar effective sample size calculation in pre-processing survey data for Bayesian analysis.

Finally, we combined the effect size and effect size standard error information from the parent, teacher and student samples, from the two different regression analyses – linear and logistic – into a single data file for analysis. To ensure the robustness of our analysis, we excluded effect sizes from the data set if the corresponding effective sample size was less than 4; we selected this cut-off to compromise between our goals of retaining as much data as possible and obtaining valid values of the small sample correction factor ω.

Cell construction. We analyzed the child data using the intersections of four binary variables: sex (male or female), urban (urban or rural), language (speaks language of instruction at home [L1] or does not speak language of instruction at home [L2]), and grade (CI or CP). These four variables produced 16 cells, three of which did not meet our minimum requirements of having at least two treatment observations, at least two control observations, and at least five total observations. Thus, we "collapsed" each of these three cells with a neighbor cell, reducing our total number of cells from 16 to 13. In particular:

- The cells “male urban L2 CI” and “male urban L2 CP” were collapsed int a single cell “male urban L2”
- The cells “female urban L1 CI” and “female urban L2 CI” were collapsed int a single cell “female urban CI”
- The cells “female urban L1 CP” and “female urban L2 CP” were collapsed int a single cell “female urban CP”

In addition to the three adjustments detailed above, it was necessary to make two smaller collapses that only affected specific outcomes. Due to missing values in our data, two of our outcome constructs failed to meet the minimum requirements described above. These were:

- The construct “child attended a reading event outside of school this year” did not have the requisite number of treatment observations in the cohort 2 “male urban L1 CI” cell. We combined this cell with “male urban L1 CP” only for this outcome and cohort.
- The construct “respondent completely agrees with national language reading program” did not have the requisite number of treatment observations in the cohort 2 “male urban L1” cell. We combined this cell with “male urban L2” only for this outcome and cohort.

II. Stage 2: Bayesian hierarchical meta-regression

We fit a single Bayesian hierarchical model to the impact estimates using the data from the Senegal intervention, for all combinations of data subset and outcome of interest across all three samples (parents, teachers, and children), including in the model assumptions about the relationships among data subsets with the same characteristics, samples, and outcomes, as well as the prior findings from the literature. We incorporate the data from the Senegal intervention conducting regression analysis first, and then combining that information with the impact estimates from the literature.

The main Bayesian analysis incorporated information from the literature into a complex hierarchical model. However, to gauge the influence of the information from the literature on our results, we also fit two sensitivity analyses that do not use this information. The Bayesian impact estimates were extremely consistent across the three analyses, implying that the inclusion of the information from the literature, and the form of the prior distribution when it is excluded, do not influence the results.

Main analysis. The expression for a Bayesian model includes two parts: the likelihood, which is equivalent to a regression equation, and the prior, which represents the analyst’s assumptions about the probability distributions of model parameters. In this model, the likelihood has two parts corresponding to the two sources of data: effect sizes from the Senegal intervention and effect sizes from the literature.

Senegal intervention likelihood. For an effect size $\hat{\theta}^{S}_{pcj}$ for a sample p, cell c, and outcome j with standard error s_{pcj}, the likelihood is:

$\hat{\theta}^{S}_{pcj} \sim N(\mu_{pcj}, s^2_{pcj})$, where:

$$\mu_{pcj} = \alpha^{S} + \beta^{Gender}_{g[c]} I_{Gender[c]} + \beta^{Urban}_{u[c]} I_{Urban[c]} + \beta^{Language}_{l[c]} I_{Language[c]} + \beta^{Grade}_{h[c]} I_{Grade[c]} + \beta^{Cohort}_{t[c]} + \beta^{Measure}_{j} + \beta^{Time}_{j} + \beta^{Sample}_{p} + \beta^{Residual}_{c}$$

In this equation, we represent the expected impact for a given combination of sample, cell, and outcome – on the effect size scale – as the sum of an overall intercept α^{S} that represents the average impact across all samples, cells, and constructs in the Senegal study; a series of terms $\beta^{Gender}_{g[c]} - \beta^{Cohort}_{t[c]}$ that represent the difference between the overall impact and the average impact across cells that share the same value of each cell characteristic; a term $\beta^{Measure}_{j}$ that represents the difference between the overall impact and the impact on this specific measure j; a term β^{Time}_{j} that represents the difference between the overall average impact and impacts for measures at different time frames, defined as short-term, medium-term, and long-term; a term β^{Sample}_{p} that represents the difference between the overall impact and the impact for sample p; and a term $\beta^{Residual}_{c}$ that represents the idiosyncratic effect of the combination of background characteristics in the cell. If, for example, impacts tend to be high for female students, and also high for students in rural areas, but low for female students in rural areas, the residual term will capture those interactions.

Because information for all background characteristics is not available for all samples, we multiply the term for a given background characteristic times an indicator that denotes whether this characteristic is relevant for this cell. For example, $\beta^{Gender}_{g[c]} I_{Gender[c]}$ is equal to $\beta^{Gender}_{g[c]}$ in cells where $I_{Gender[c]} = 1$, that is, cells where all observations in the cell have the same gender. In this way, we are also able to exclude terms from the likelihood in cases where cells are collapsed due to insufficient sample size; if, for example, there were not enough treatment observations in each grade to allow us to stratify by grade for a certain construct, we could create a cell containing observations from both grades. The likelihood for this cell would not include the $\beta^{Grade}_{h[c]}$ term because not all observations in this cell have the same grade level.

Literature likelihood. For effect sizes from the literature, the likelihood is simpler. For an effect size $\hat{\theta}^{L}_{kj}$ for study k and measure j, with standard error s^2_{kj}, the likelihood is:

$$\hat{\theta}^{L}_{kj} \sim N(\alpha^{L}_{k} + \beta^{Measure}_{j} + \beta^{Time}_{j}, s^2_{kj})$$

This expression contains terms for the average effect size in this particular study from the literature, α^{L}_{k}, a term representing the additional effect of the measure j, and a term representing the additional effect of the measure's time frame.

Priors. The central part of the prior places the average effect size in the RF MERL study in the context of the average effect sizes measured in the literature (see Appendix C.III for the information gathered from the literature):

$$\alpha^S, \alpha_1^L, \alpha_2^L, \dots, \alpha_K^L \sim N(\mu, \sigma^2)$$

This prior implies that the overall impact in each study from the literature, as well as the overall impact of the Senegal intervention, share a common distribution. We estimate the mean and variance of that distribution from the data, so that if overall impacts are similar across studies, the model will estimate a smaller variance, which leads to more "borrowing strength" across studies. "Borrowing strength" allows the model to obtain more plausible estimates for studies with little data by drawing on information from studies with more data. If, for example, the Senegal intervention had little data, the model might estimate the overall impact in the Senegal intervention, α^S, to be close to the overall mean impact across studies, μ. Importantly, the model only borrows strength to the extent that the data support the prior assumptions; if overall impacts are not similar across studies, the model will borrow less strength. In this way, we allow the average impact across similar studies in the literature to inform our understanding of the Senegal intervention's overall impact.

Another key term, $\beta_j^{Measure}$, also appears in both likelihoods and thus represents another link between the two data sources. This term represents the additional effect associated with measure j. For this study, an outcome represents a particular concept; there could be several ways of measuring the same outcome. For this reason, the prior groups measures based on their shared outcomes, and further groups outcomes into domains, which represent sets of related outcomes (see Table III.X for the list of domains, outcomes and information when outcomes have different measures). This nested structure lends itself to a hierarchical relationship:

$$\beta_j^{Measure} \sim N(\beta_{m[j]}^{Outcome}, \sigma_c^2)$$

$$\beta_m^{Outcome} \sim N(\beta_{d[m]}^{Domain}, \sigma_d^2)$$

$$\beta_d^{Domain} \sim N(0, \sigma_{Domain}^2)$$

The first level of the hierarchy represents the assumption that impacts for different measures of the same outcome should be more similar to each other than to impacts for measures of different outcomes. Similarly, the second level represents the assumption that the average impact across outcomes in the same domain should be more similar than for outcomes in different domains. Finally, the third level assumes that the average impact in each domain comes from a common distribution, but that average impacts can differ by domain. The subscripts c and d on the variances of the first- and second-level prior distributions allow the variance across a set of $\beta_j^{Outcome}$ or $\beta_m^{Concept}$ to vary by concept or domain, respectively. For

example, this model allows for higher variance across outcomes associated with parent-teacher interaction than across outcomes associated with the at-home reading environment.

Because each of these variances σ_c^2 or σ_d^2 may be estimated using only a few points – for example, if a certain concept only has two or three associated outcomes – we stabilize the variances through a hierarchical prior:

$$\sigma_c \sim N(\mu_{\sigma Outcome}, \tau^2_{\sigma Outcome})$$

$$\sigma_d \sim N(\mu_{\sigma Domain}, \tau^2_{\sigma Domain})$$

Subscripts on the remaining terms in the Senegal intervention and literature likelihoods indicate that each of these terms subsumes parameters corresponding to each possible value of the cell variable. For example, the subscript $g[c]$ on the term $\beta^{Gender}_{g[c]}$ represents the value g of gender that is common to all observations in cell c. Because there are two possible values of gender in this study, $g = Female$ and $g = Male$, we can think of $\beta^{Gender}_{g[c]}$ as shorthand for a choice between two options: β^{Gender}_{Female} and β^{Gender}_{Male}. For each cell, the likelihood includes the option that corresponds to the value of gender in that cell. If gender is not a defining characteristic for a cell, the indicator $I_{Gender[c]}$ ensures that this term does not enter the likelihood at all. Similar logic applies to terms that do not represent cell characteristics, such as β^{Time}_j and $\beta^{Population}_p$; there is one parameter for each time frame (short-, medium-, and long-term) and population (teachers, children, and parents).

For all such terms, we have no a priori expectation that impacts should be higher or lower for one value of the characteristic than another. For that reason, we borrow strength across the possible levels of each parameter. To ensure stability when borrowing strength across few data points, we also enforce a "soft" sum-to-zero constraint on the levels of these parameters. Using gender as an example,

$$\beta^{Gender}_{g[c]} \sim N(0, \sigma^2_{Gender})$$

$$\beta^{Gender}_{Female} + \beta^{Gender}_{Male} \sim N(0, 0.002)$$

The "soft" sum-to-zero constraint in the second line of equations implies that the sum of these two parameters has a distribution centered on zero with very small variance. This approach is more computationally tractable than forcing the parameters to sum exactly to zero.

The final term in the likelihood, $\beta^{Residual}_c$, is exempt from the sum-to-zero constraints because we estimate one $\beta^{Residual}$ for each cell c, providing adequate data for a stable estimate of the shrinkage variance $\sigma^2_{Residual}$.

As in the case of the hierarchical prior on the effects of each outcome, we stabilize the estimation of the prior variances through a hierarchical prior:

$$\sigma_{Gender}, \sigma_{Urban}, \ldots, \sigma_{Population} \sim N^+(\mu_\sigma, \tau^2_\sigma)$$

Other variance components, such as μ_σ, $\mu_{\sigma Outcome}$, $\mu_{\sigma Domain}$, τ_σ, $\tau_{\sigma Outcome}$, $\tau_{\sigma Domain}$, and σ_{Resid}, have $N^+(0,1)$ priors. The superscript "+" indicates that these distributions are defined over positive numbers only. All other hyperparameters will have $N(0,1)$ priors.

Model estimation and diagnostics. We implemented the model using rstan, the R implementation of the probabilistic programming language Stan. Because an exact analytic solution to a complex hierarchical model like that given above is typically infeasible, Stan uses Markov Chain Monte Carlo to sample from the model's posterior distribution. It is important to check convergence diagnostics before proceeding with the analysis to ensure that the results are stable.

In this case, the model fit without errors and produced Gelman-Rubin statistics ($\hat{R}$) of between 0.999 and 1.01, very close to the theoretical value at convergence of 1.00. The number of effective samples exceeded 500 for all parameters, well above the recommended minimum of 100.

Calculating overall and subgroup impacts. The Bayesian model defined above produces an impact, μ_{pcj}, for each combination of measure and cell. To obtain impacts for the overall sample and for subgroups of interest, we must aggregate these cell-specific impacts. We do so by taking a weighted average across the cells with estimates for each outcome, where each cell's weight is equal to the proportion of the total survey weight in that cell for that outcome.

For example, an input to the model might be the frequentist impact estimate on having children's books in the home, calculated among parents of male children living in rural areas whose native language is not the language of instruction. The Bayesian model produces an adjusted estimate on this measure for the same subpopulation and then combines this estimate with adjusted estimates for other subpopulations – such as parents of female children in rural areas whose native language is not the language of instruction, and all other combinations of child gender, urban/rural location, and native language relative to language of instruction – through a weighted average to produce an overall estimate of the intervention's impact on having children's books in the home. The weighted average represents each subpopulation proportionally to its share of the sample, so that if parents of male children in rural locations whose native language is not the language of instruction account for 5 percent of the parent sample, this impact estimate will contribute 5 percent to the overall impact estimate. To produce an estimate of the impact on urban children only, we recalculate the average using as input the adjusted estimates for data subsets with an urban location and adjust the weights accordingly to focus on this population.

Finally, we also translated impact estimates from the effect size scale – the scale on which we fit the Bayesian model and thus the scale of the raw output – to the original scale of the outcome. We transformed the impact estimates to the original scale of the data by reversing the standardization that took place as part of the effect size calculation. For continuous

outcomes, we multiplied estimates on the effect size scale by $\sqrt{\frac{(n_T-1)s_T^2+(n_C-1)s_C^2}{(n_T+n_C-2)}}/\omega$ to revert to the original scale. For binary outcomes, we multiplied by 1.65 and exponentiated the result to obtain an odds ratio, which is more interpretable than the log-odds ratio used in the effect size calculation.

Sensitivity analyses. To gauge the model's sensitivity to our reliance on data from the literature, we fit two sensitivity analyses. In both sensitivity analyses, we fit the model to data from the Senegal intervention only. These sensitivity analyses directly targeted the crux of the model: α^S, the overall average impact of the Senegal intervention. This term is especially important to the model because all other terms are defined relative to it; for example, $\beta_p^{Population}$ represents the additional impact of each population, relative to the overall average.

In each sensitivity analysis, the likelihood and priors remained the same as in the main analysis, with one exception that tested a modification to the prior on the overall impact of the Senegal intervention:

- Flat prior model: $\alpha^S \sim Uniform(-\infty, \infty)$
- Standard normal model: $\alpha^S \sim N(0, 1)$

These analyses test two aspects of the model's sensitivity. First, because they both exclude the effect sizes from the literature, they gauge the influence of those data on the results. Second, they test the influence of different assumptions about the distribution of the overall average impact. In the flat prior model, we assume that any value in the interval $(-\infty, \infty)$ is equally likely as a candidate for α^S; in the standard normal model, we assume that the plausible values for α^S are normally distributed with mean zero and standard deviation one, a more restrictive assumption that also tailors the distribution to plausible values on the scale of the input data.

The results of these two sensitivity analyses were extremely consistent with the results of the main analysis, suggesting that the data from the literature do not unduly influence our conclusions and that the model is robust to changes in the specification of the prior distribution for α^S.

III. Impact estimates from the literature

As noted above, to ground our Stage 2 analysis, we conducted a thorough literature review to identify previous impacts (priors) found in similar studies of community engagement interventions. In this appendix section, we summarize how the research team determined which studies to include, calculated effect sizes for each outcome from each study, assessed comparability between the outcomes examined in the literature and the outcomes of interest in this study, and gauged the quality of the studies with an eye toward their inclusion in this analysis.

Selected literature. We include the most rigorous evidence from comparable studies in the literature to inform our analysis. We restricted literature to only use studies using randomized control trials (RCTs), the gold standard for generating high-quality evidence. We also focused on interventions designed to improve early grade reading outcomes that incorporate a community engagement component. The evidence extracted from the 10 studies listed in Table C.1 represent the most informative impact estimates, which we call *priors*, to the Bayesian analysis of *Lecture Pour Tous*. Next, we link priors from the selected literature with results from the frequentist analysis according to the parent, teacher and child-level outcomes and constructs described in Table III.1 (in the main text). Conditional on adequate information being provided, such as an effect size and associated standard error or the components required to calculate them, we extract or ex post compute priors from these 10 studies following the technical approach described in the following section. Finally, we rank the quality of each prior (from strongest to intermediate or weakest according to the completeness of the information provided and the assumptions required to ex post compute) so that it can be appropriately incorporated in the Bayesian analysis.

Technical Approach. In the interest of including the most rigorous extant evidence in a consistent manner we incorporate priors in the form of effect sizes (a.k.a. standardized mean differences) following the approach recommended by the What Works Clearinghouse (*WWC Procedures Handbook 4.0*, 2017). Where possible, we use the effect sizes and associated standard errors reported in the literature.[9] However, many studies do not report effect sizes and/or their associated standard errors. In those cases, we extract the requisite information from the studies in question and ex post compute effect sizes for continuous outcomes using *Hedges' g* and for dichotomous outcomes using *Cox's index*. These are among the most commonly used standardized mean difference equations and have the benefit of incorporating adjustments for small sample sizes. *Hedges' g* represents the adjusted mean difference of a continuous outcome between two groups (e.g., treatment and control) scaled by a function of group variances and sample sizes (*ibid*, p. 13). Similarly, *Cox's index* represents the log odds ratio of an event occurring given a level of exposure (in the treatment group) relative to the absence of said exposure (in the control group) scaled by a function of total sample size and a normal distribution critical value (*ibid*, p. 14). This dichotomous effect size formulation is the least biased estimator of a population's standardized mean difference under normality conditions; in other words, *Cox's index* is an analogue to *Hedges' g*.

However, some studies do not report all the requisite statistics to facilitate ex post effect size computations. Below we briefly describe the two most common cases of incomplete information and the steps we take to overcome these limitations to generate comparable effect size measures:

[9] Although *Cohen's d* effect size formulation is upward biased in small samples, it approximates *Hedges' g* in large samples (*ibid*). As such, there are a few cases where we directly incorporate evidence reported as *Cohen's d*.

- Mean of outcome is not reported for the treatment group (continuous or dichotomous): treatment mean is computed as the sum of the control mean, which is typically reported, and the treatment regression coefficient.
- Variance of outcome is not reported for the treatment group (continuous): assume that the treatment group variance is equivalent to the control group variance, which is typically reported.

In addition, standard errors of effect sizes are often not made available in the literature. In order to account for the uncertainty associated with effect size estimates, we compute the ex post standard errors following guidance from the What Works Clearinghouse (*ibid*). Ex post standard errors associated with *Hedges' g* (for continuous outcomes) can be computed as a function of group sample sizes and the effect size itself (*ibid*, p. 16). Ex post standard errors associated with *Cox's index* (for dichotomous outcomes) can be computed as a function of group sample sizes, adjusted group probabilities, as well as a normal distribution critical value (*ibid*, p. 16). Although the computation for continuous and dichotomous outcomes differs, both equations are decreasing in sample size and neither relies on the Delta method to calculate the standard error of a transformed regression coefficient (the effect size).

Table C.1 RCTs focused on early grade reading outcomes that incorporate community engagement

Author(s)	Year	Title	Setting	Intervention(s)	Outcome(s) Included
Banerjee, Banerji, Duflo, Glennerster and Khemani	2010	Pitfalls of Participatory Programs: Evidence from a Randomized Evaluation in Education in India	Uttar Predesh, India	Three interventions: 1) information on existing village education committees, 2) information plus training community members on a testing tool for children, or 3) information, training on the testing tool and training volunteers to hold remedial reading camps.	1.1. Parent participation in community activities focused on reading; 1.2. Parent familiarity with early grade national language reading program; 1.6. Child participation in community activities focused on reading; 2.3. Attitude about roles parent can play in helping their children learn to read; 3.1. Frequency of parent listening to child read out loud; 3.3 Participation of household members in reading with child; 6.4 Engagement with teaching responsibilities; 7.1. Letter identification (national language); 7.3. Unfamiliar word reading (national language); 7.5. Reading comprehension (national language); 7.8 Non-language academic outcomes.
Banerji, Berry and Shotland	2017	The Impact of Maternal Literacy and Participation Programs: Evidence from a Randomized Evaluation in India	Bihar and Rajasthan, India	Three interventions: 1) adult literacy (language and math) classes for mothers, 2) training for mothers on how to enhance their children's learning at home, or 3) a combination of the two.	1.1. Parent participation in community activities focused on reading; 1.6. Child participation in community activities focused on reading; 3.2. Frequency of parent reading with child; 3.3. Participation of household members in reading with child; 3.4. Mother participates in child's education; 4.1. Availability of printed materials in the house; 4.2 Time spent on homework; 4.2. Availability of an appropriate place for child to read at home; 5.1. Parent in-person communication with teacher; 7.7 Other language assessment; 7.8 Non-language academic outcomes.

Friedlander and Goldenberg	2016	Literacy Boost in Rwanda: Impact Evaluation of Two Year Randomized Control Trial	Gicumbi, Rwanda	Two interventions: 1) teacher training on reading pedagogy or 2) teacher training plus community action activities organized around reading opportunities outside of school.	1.1. Parent participation in community activities focused on reading; 1.7 Parent is aware of community activities focused on reading; 2.4 Literacy competency; 4.3 Religion related reading opportunities at home; 7.1. Letter identification (national language); 7.2. Familiar word reading (national language); 7.3. Unfamiliar word reading (national language); 7.4. Oral reading fluency (national language); 7.5. Reading comprehension (national language).
Lugo-Gil, Murray, Fernandez, Glazerman and Campuzano	2018	Latin American and the Caribbean (LAC) Reading Evaluation Contract - Evaluation of *Leer Juntos, Aprender Juntos* Early Grade Intervention in Guatemala: Final Report	El Quiché, Guatemala	Two interventions: 1) training teachers to improve reading instruction or 2) training plus community action and parental participation components.	7.2. Familiar word reading (national language); 7.3. Unfamiliar word reading (national language); 7.5. Reading comprehension (national language).
Lugo-Gil, Murray, Glazerman, Fernandez, Campuzano and Padilla	2018	Latin American and the Caribbean (LAC) Reading Evaluation Contract - Evaluation of *Leer Juntos, Aprender Juntos* Early Grade Intervention in Peru: Final Report	Apurímac, Peru	Two interventions: 1) training teachers to improve reading instruction or 2) training plus community action and parental participation components.	7.2. Familiar word reading (national language); 7.3. Unfamiliar word reading (national language); 7.5. Reading comprehension (national language).
Taylor, Cilliers, Prinsloo, Fleisch and Reddy	2017	The Early Grade Reading Study: Impact Evaluation after Two Years of Interventions - Technical Report	North West, South Africa	Three interventions: 1) daily structured literacy lesson plans, additional reading materials like workbooks and flash cards, as well as training on how to use the materials, 2) the same daily structured literacy lesson plans and materials plus support from specialist reading coaches and teacher groups, or 3) parental involvement through trained community reading coaches.	7.7 Other language assessment.

Pradhan, Suryadarma, Beatty, Wong, Gaduh, Alisjahbana, and Artha	2014	Improving Educational Quality through Enhancing Community Participation: Results from a Randomized Field Experiment in Indonesia	Central Java, Indonesia	Four interventions: 1) block grant to existing school committee and expenditure plan facilitation, 2) planning and budgeting training to existing school committee, 3) election of school committee members, or 4) joint planning meetings between the school committee and village council (linkage).	1.1. Parent participation in community activities focused on reading; 1.2. Parent familiarity with early grade national language reading program; 1.3. Parent knowledge of community activities focused on reading; 2.3. Attitude about roles parent can play in helping their children learn to read; 3.3. Participation of household members in reading with child; 5.1. Parent in-person communication with teacher; 6.4 Engagement with teaching responsibilities; 7.7 Other language assessment.
Weisleder, Mazzuchelli, Lopez, Neto, Cates, Gonçalves, Fonseca, Oliveira and Mendelsohn	2018	Reading Aloud and Child Development: A Cluster-Randomized Trial in Brazil	Boa Vista, Brazil	One intervention: 1) parent workshops focused on reading aloud to children and access to a lending library with children's books.	3.3. Participation of household members in reading with child; 3.4 Other parent child engagement at home; 7.2. Familiar word reading (national language); 7.3. Unfamiliar word reading (national language); 7.7 Other language assessment.
Wolf, Aber, Behrman and Tisnigo	2019	Experimental Impacts of the "Quality Preschool for Ghana" Interventions on Teacher Professional Well-being, Classroom Quality, and Children's School Readiness	Greater Accra, Ghana	Two interventions: 1) teacher training on early childhood education pedagogy or 2) teacher training plus parental-awareness meetings organized through parent-teacher associations.	6.2 Self-reported use of LPT EGR instructional practices; 6.4 Engagement with teaching responsibilities; 7.5. Reading comprehension (national language); 7.8 Non-language academic outcomes.

Appendix D: Alternative findings figures

The figures in this appendix show the estimated impact and 95% confidence interval around that impact for each outcome by domain. Interpreting these figures without the full Bayesian analysis might lead us to conclude the intervention is potentially less effective than we might conclude from the findings presented in Chapter V. By ignoring the probabilities, we need to focus on the confidence intervals, and many overlap with zero (the relevant threshold for percentage point impacts, used with continuous variables) or one (the relevant threshold for odds ratios, used with binary outcomes). However, because the Bayesian analysis was able to incorporate the probabilities that the impact is positive, zero or negative, we gained additional information to inform decision-making.

Figure D.II.1 Impacts on exposure to community engagement activities

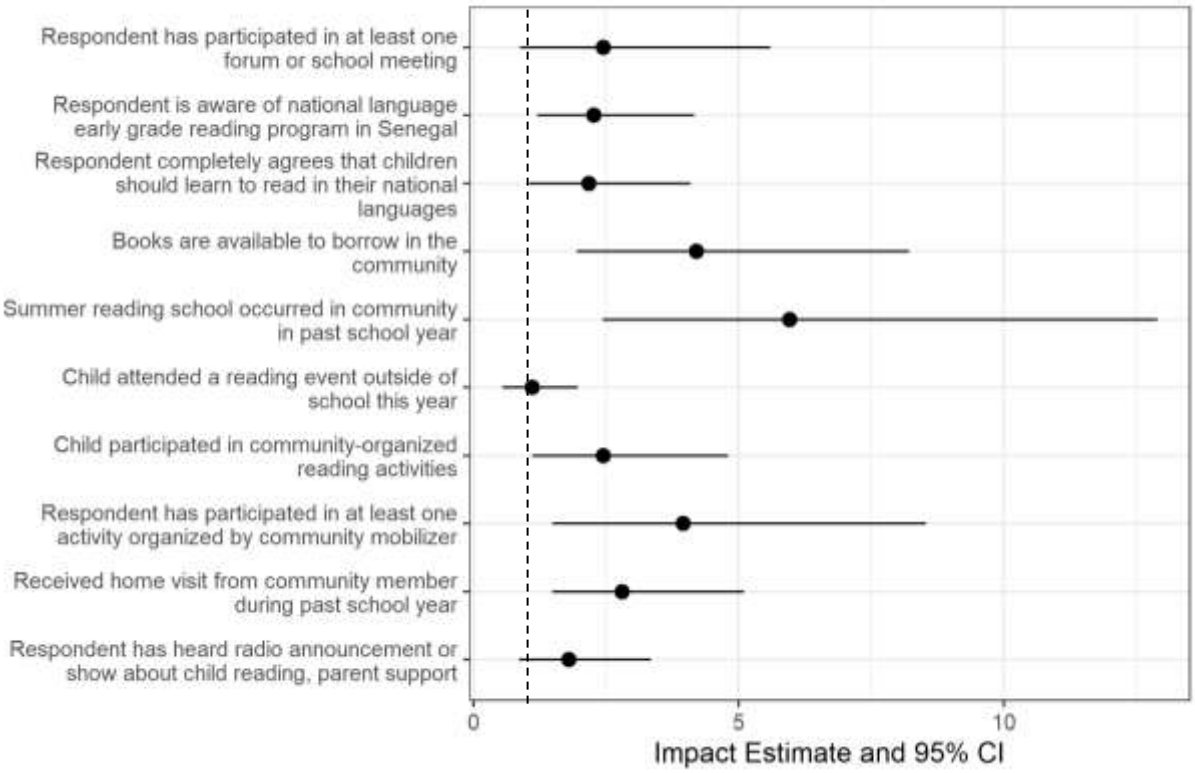


Figure D.II.2 Impacts on parent knowledge and attitudes about reading

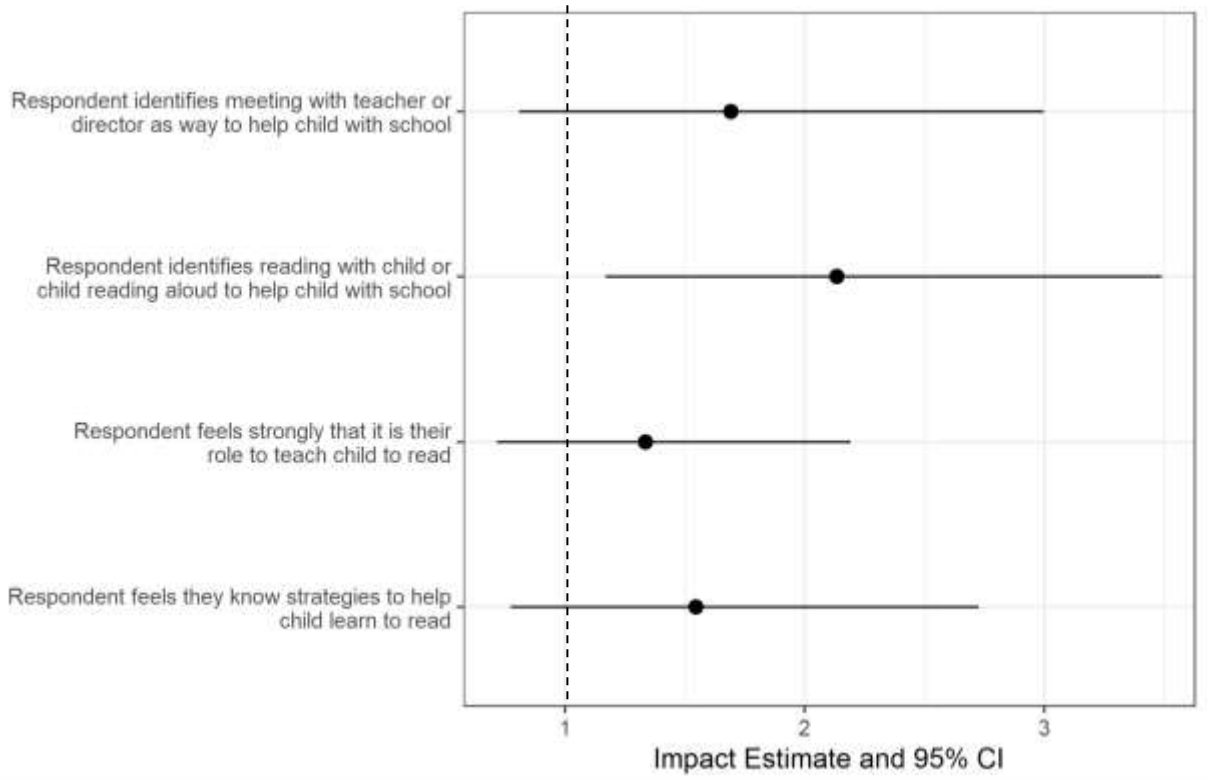


Figure D.II.3 Impacts on parent and family engagement in reading at home

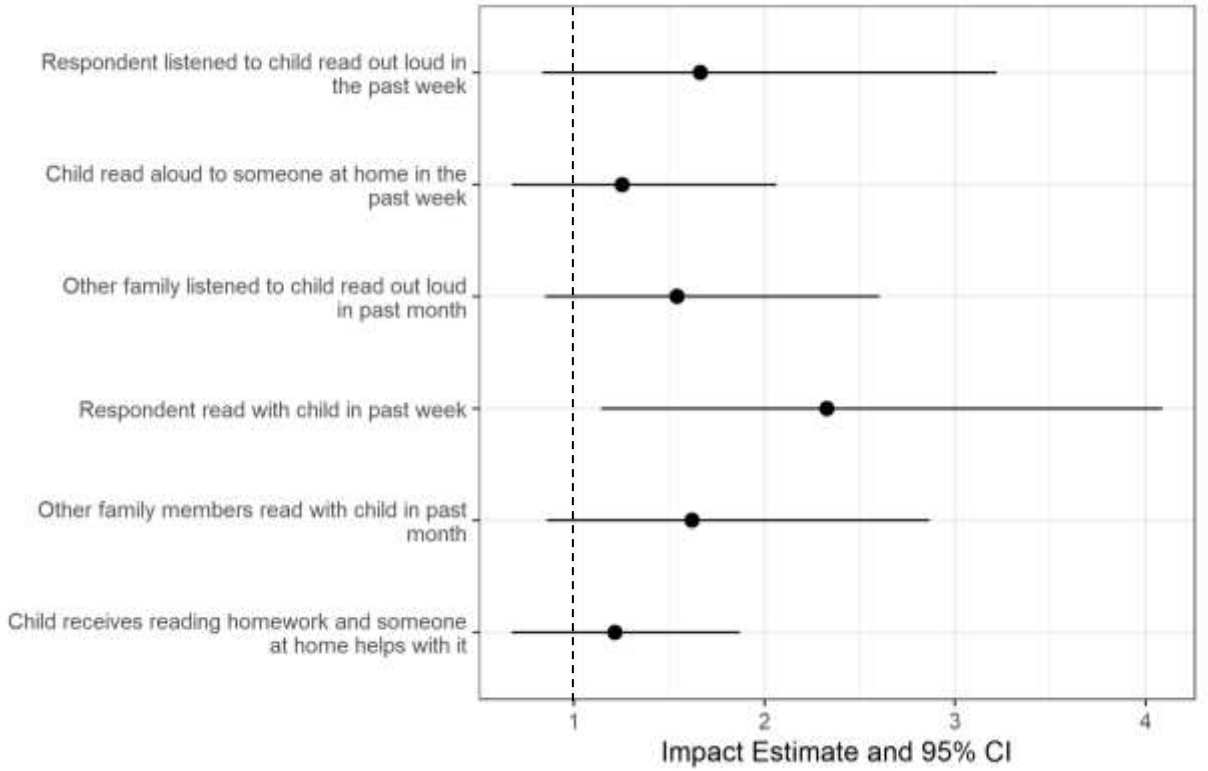


Figure D.II.4 Impacts on the at-home reading environment

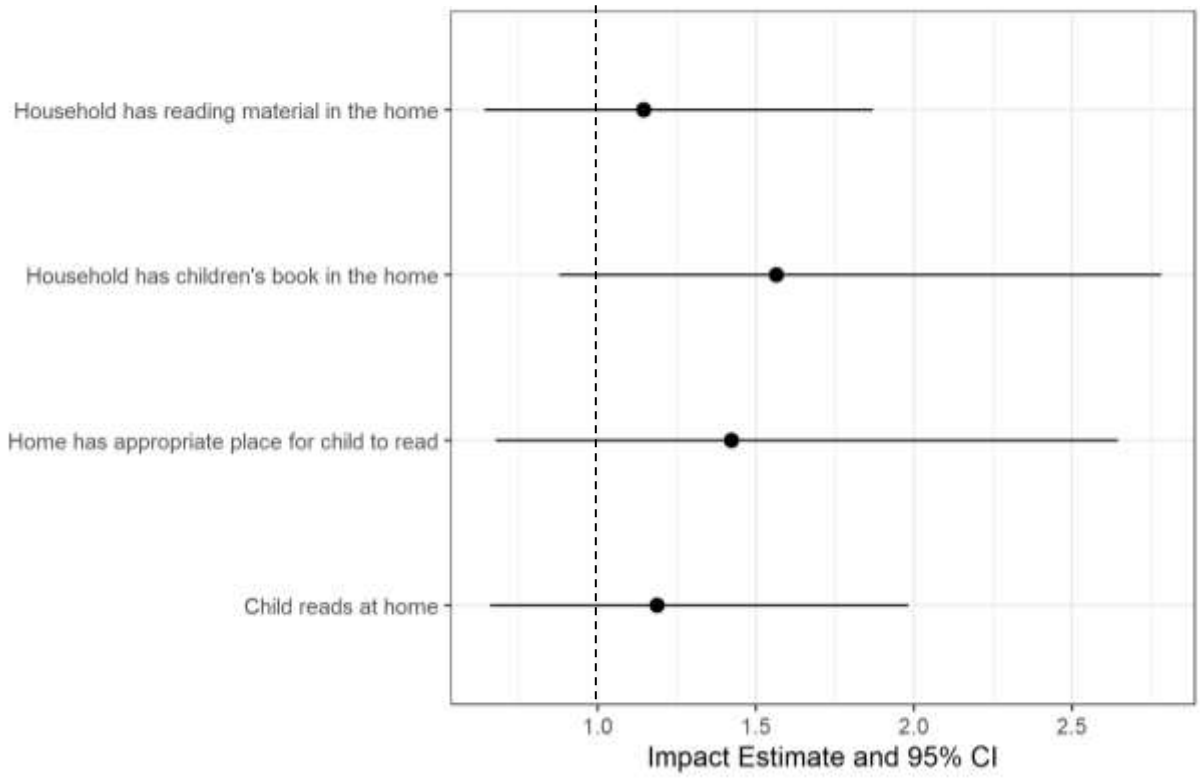


Figure D.II.5 Impacts on parent and teacher interaction

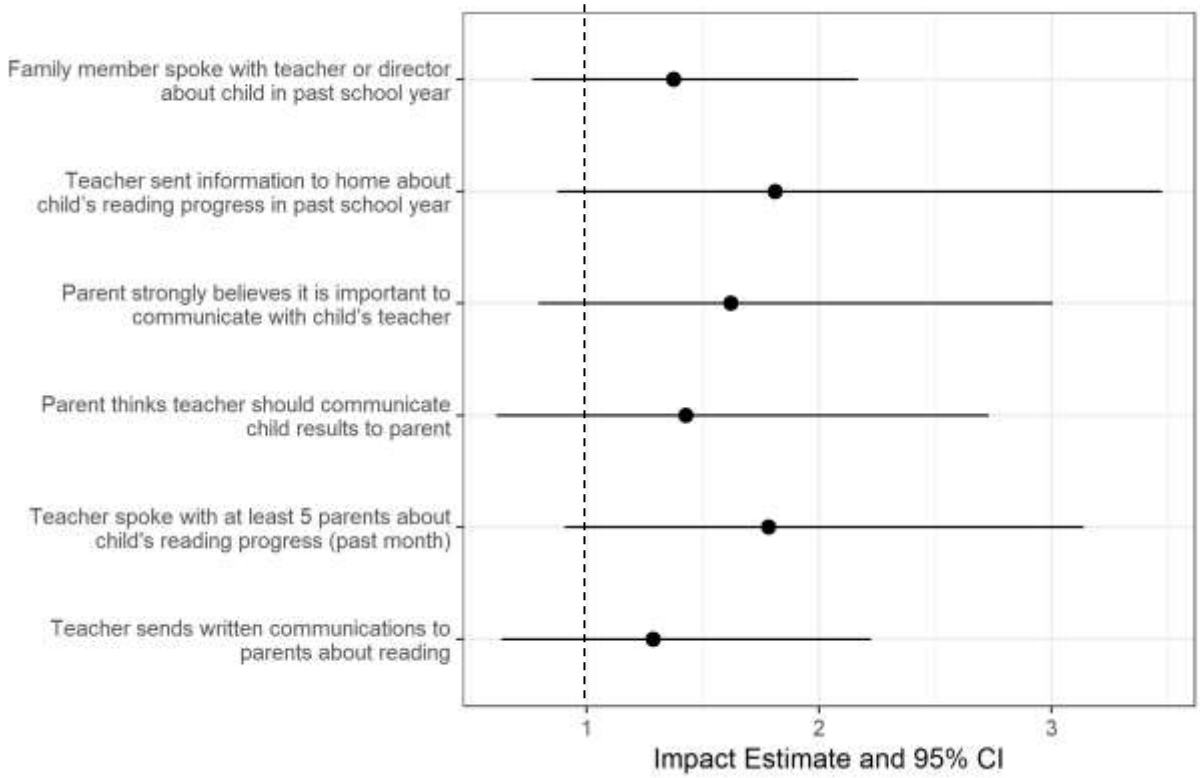


Figure D.II.6 Impacts on teacher knowledge, attitudes and practices about reading

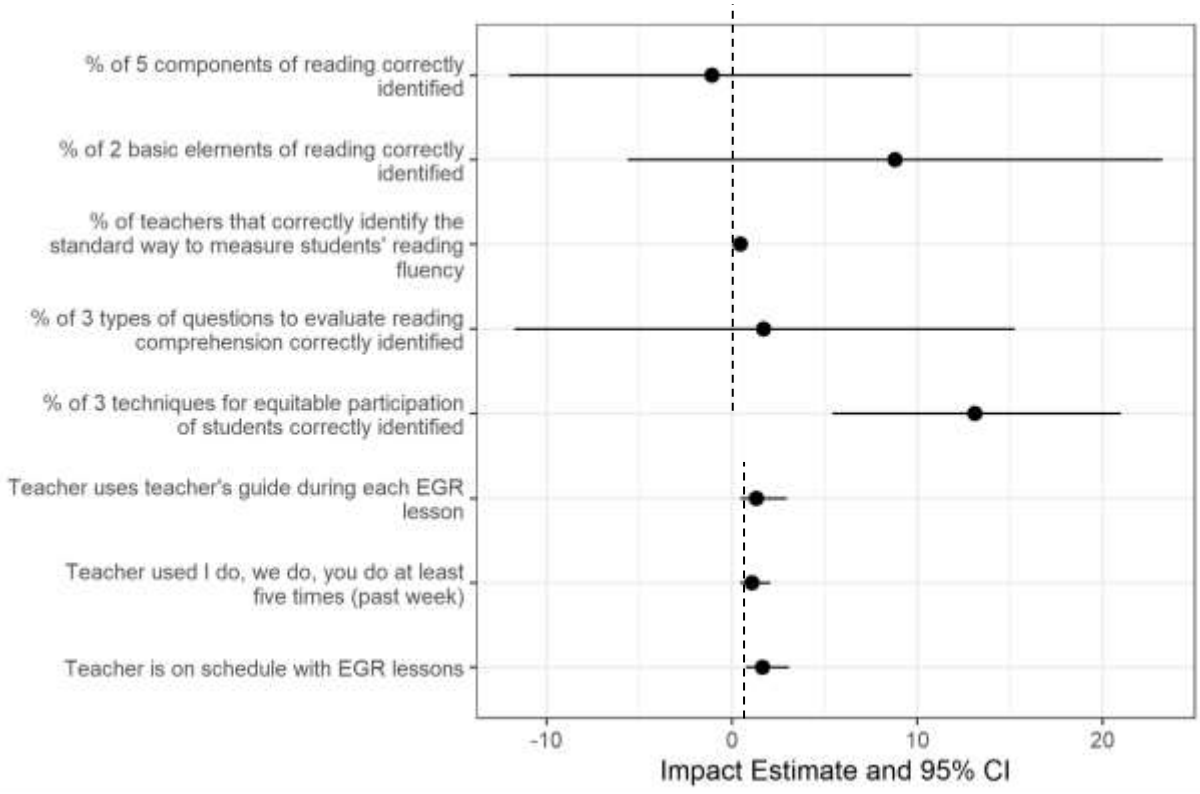
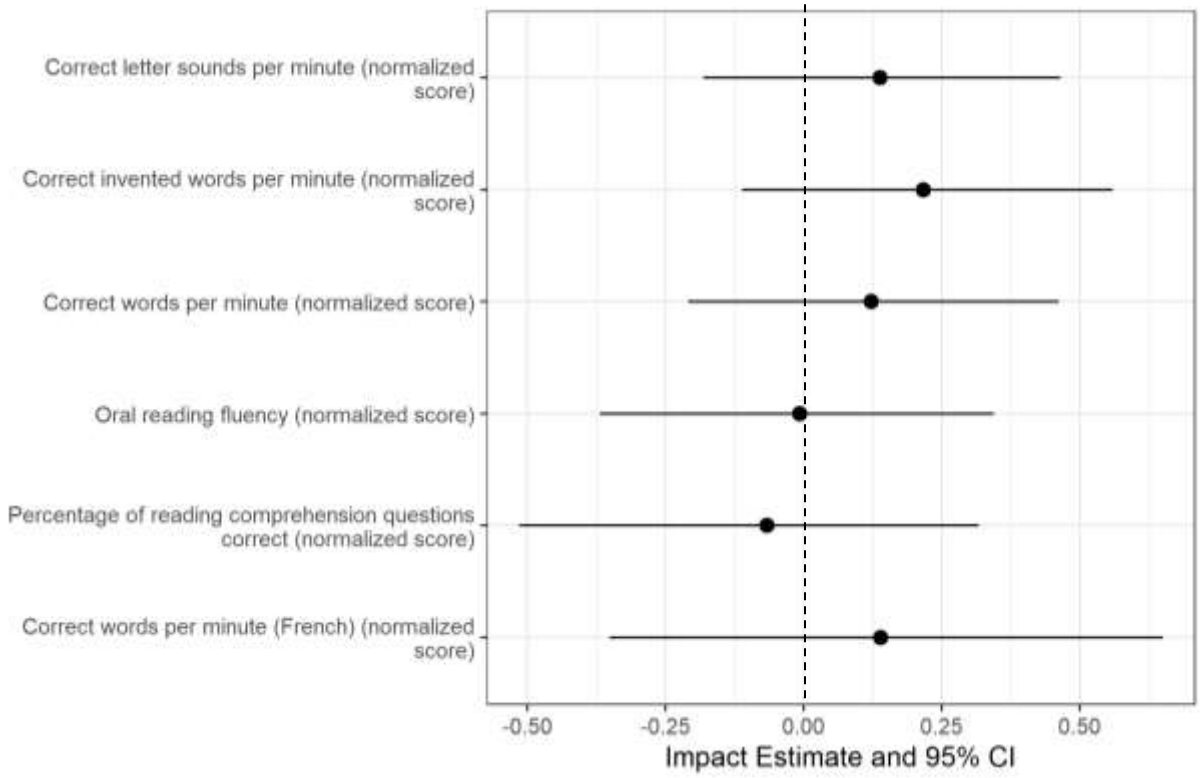


Figure D.II.7 Impacts on child reading skills



Appendix E: Data collection

Desk review

The Rapid Feedback MERL team reviewed all available LPT documentation to inform this study. The key documents that provided valuable insights on the rationale for LPT's community engagement model and the status of implementation are presented in Table E.1 below.

Table E.1. List of LPT documents reviewed

Document title	Document date
Community Literacy Support Plan	May 2017
Strategie de communication	July 2017
Appel A Candidature RFA N: 001-09-2018/LPT	September 2018
Plan d'action national de la campagne de communication de mass et SBCC	2019
Lecture Pour Tous Quarterly Report : Year 3, Quarter 1	January 2019
Lecture Pour Tous Quarterly Report : Year 3, Quarter 2	April 2019
Lecture Pour Tous Quarterly Report : Year 3, Quarter 3	July 2019

Qualitative data collection in communities

Sampling

The sample frame for the qualitative data collection in communities was the full list of LPT schools in the six regions receiving LPT Outcome 1 activities, excluding those that had not yet, for a variety of reasons, received the LPT program. Rapid Feedback MERL also excluded the schools sampled for inclusion in the EGRA midline data collection to minimize respondent burden. From the resulting list, Rapid Feedback MERL purposively sampled 18 schools/communities in which to conduct interviews and focus group discussions with inspectors, directors, and teachers. The objective was to sample six schools from each of the three languages, with coverage across all six regions. Within those strata we randomly sampled schools, and then replaced a few schools to ensure some coverage of urban schools, reflecting the fact that approximately 10-15 percent of all LPT schools are located in urban areas. The final sample included four urban schools. The distribution of these 18 schools across region and language of LPT instruction is shown in Table E.2.

Table E.2. Qualitative data collection – school sample size

Region	Schools/Directors			Total
	Pulaar	Seereer	Wolof	
Diourbel	0	2	0	**2**
Fatick	0	2	0	**2**
Kaffrine	1	0	3	**4**
Kaolack	0	2	2	**4**
Louga	1	0	1	**2**
Matam	4	0	0	**4**
Total	**6**	**6**	**6**	**18**

In total, Rapid Feedback MERL interviewed 18 school directors, 15 teachers[10], and 9 community mobilizers. RF MERL also held 18 focus groups with CGE members and 18 focus groups with non-CGE parents.

Protocol development

Rapid Feedback MERL first identified key themes related to community engagement for each respondent before drafting the full protocols. The draft protocols were revised at several stages, including after LPT's review, after the pretest, and after the pilot during data collection training.

Fieldwork

Rapid Feedback MERL contracted local data collection firm APAPS to conduct this work. APAPS was responsible for conducting a pretest of the protocols, recruiting and training qualified interviewers, conducting data collection, and providing original audio files and transcriptions in French to Rapid Feedback MERL. The key data collection activities and dates are summarized in Table E.3.

[10] In some schools, the director was also the CI and/or CP teacher, which is why fewer than 18 teachers were interviewed.

Table E.3. Qualitative data collection activities

Activity	Dates
Pretest in 2 communities in 1 region (Diourbel)	April 29, 2019
Interviewer training	May 6-10, 2019
Pilot in 4 communities in 1 region (Kaolack)	May 14-15, 2019
Data collection in 18 communities in 6 regions	May 20-31, 2019

Qualitative data collection with key stakeholders

In addition to the qualitative data collected in communities, Rapid Feedback MERL also conducted interviews with key project stakeholders at LPT, USAID, and MEN. The purpose of this data collection was to understand roles and responsibilities and coordination among the different project actors; the status of implementation of community engagement activities; and barriers and facilitators to the success of LPT's community engagement model.

RAPID FEEDBACK MERL interviewed the following stakeholders:

- Aissatou Balde, LPT Chief of Party, 12/2016 to 06/2019
- Ciara Rivera Vazquez, LPT Senior Education Advisor
- Rokhaya Thioune, LPT Parents and Community Engagement Advisor
- Cheikh Ibrahima Seck, LPT Social and Behavior Change Communication Specialist
- Rokhaya Niang, LPT Acting Chief of Party
- Dethie Ba, LPT Senior Monitoring Evaluation and Learning Specialist
- David Bruns, USAID Senegal Director of Education Office
- Kadiatou Cisse-Abbassi, USAID Senegal Education Officer, COR for LPT
- Badara Sarr, USAID Senegal Education Evaluation Specialist, ACOR for LPT
- Cheikh Beye, Inspecteur de l'enseignement élémentaire, LPT POC at MEN DEE
- Mame Sène Touré, MEN DEE