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DATA COLLECTION TEAM, UDS GHANA

GHANA TRANSITION-TO-ENGLISH PLUS (T2E+) IMPACT EVALUATION

ENDLINE REPORT

JULY 2023

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ACRONYMS

ASER	Annual Status of Education Report
B1, B2, etc.	Basic Grade 1, Basic Grade 2, etc.
CSO	Civil Society Organization
EGR	Early Grade Reading
EGRA	Early Grade Reading Assessment
EGRP	Early Grade Reading Program
ELM	Expressive Language Module
FHI360	Family Health International 360
GALOP	Ghana Accountability for Learning Outcomes Project
GES	Ghana Education Service
GLOI	Ghanaian Language of Instruction, local language
GOG	Government of Ghana
HLE	Home Literacy Environment
IP	Implementing Partner
IR	Intermediate Result
KG	Kindergarten
L1	First Language (mother tongue of child)
L2	Second Language (English)
MoE	Ministry of Education
NACCA	National Council for Curriculum and Assessment
NRRP	National Reading Radio Program
NTC	National Teaching Council
PLC	Professional Learning Circle
PTA	Parent Teacher Association
RAN	Resilient Africa Network
RCT	Randomized Controlled Trial
SES	Socio-economic Status
SHARE	Supporting Holistic and Actionable Research in Education
SISO	School Improvement Support Officer
SMC	School Management Committee
T2E	Transition-to-English
T2E+	Transition-to-English Plus
TLM	Teaching and Learning Material
UDS	University for Development Studies
UND	University of Notre Dame
USAID	U.S. Agency for International Development

EXECUTIVE SUMMARY

PROJECT BACKGROUND

Strong reading skills are critical to success in school. However, reading performance among early grade learners in Ghana has been persistently weak. Improving reading outcomes has become a central policy goal in Ghana. The Transition-to-English Plus Activity (T2E+) was one relevant intervention effort working towards this goal. From July 2021 to March 2023, T2E+ provided children in Kindergarten to Basic 3 (B3) grade levels in 5,425 public primary schools across 16 regions in Ghana with a multilingual education program. The program bolstered children's English reading skills by first teaching them transferable language and reading skills in their mother tongue. This component of the mother-tongue instruction began in September 2021, and was followed by English language instruction in January 2022.

USAID Ghana commissioned the USAID-funded Supporting Holistic and Actionable Research in Education (SHARE) mechanism to conduct impact assessment and potentially advocate for an expansion of T2E+. This project was led by the University of Notre Dame (UND) and its local partners - the University of Development Studies (UDS) Ghana and Resilient Africa Network (RAN). In assessing impact, several core components of the T2E+ Activity were analyzed.

EVALUATION PURPOSE

This report presents evaluation findings related to the effectiveness, cost, and implementation conditions around core interventions from T2E+. The research team used a randomized experiment with 100 schools that received the interventions under T2E+ (treatment) and 99 schools that did not (control) in B2 and B3. All children were assessed on a set of reading skills (e.g., letter-sound knowledge, non-word reading, and oral language fluency) as per USAID's Early Grade Reading Assessment (EGRA) in both English and the Ghanaian local language of instruction (GLOI). They were also evaluated on a set of oral language skills via USAID's Expressive Language Module (ELM), such as receptive and expressive vocabulary, story retelling, and inference making in English. Additionally, the evaluation team carried out 23 in-person focus groups and interviewed 17 individuals involved with T2E+. All focus group and interview participants were prompted with questions related to their experiences with T2E+ and their recommendations for improvement.

EVALUATION QUESTIONS & RESULTS

Four evaluation questions were assessed alongside an additional exploratory question on the relationship between children's reading skills in English and GLOI as requested by the Ghana Mission. Each question is presented below with a brief description of the relevant results:

- **Q1: How did T2E+ affect children's reading and language skills?** When comparing post-intervention outcomes between children in the treatment and control groups, T2E+ improved oral reading (EGRA) in all skills measured in English and GLOI in B2 and B3, with gains extending to several English oral language (ELM) skills in B3. Large improvements for English receptive vocabulary and reading fluency in English and GLOI in B3 were observed as well.
- **Q2: Did the effects of T2E+ differ by child gender?** Boys and girls equally benefited from T2E+.
- **Q3: What factors contribute to the implementation process of T2E+ in different school settings?** Several implementation conditions and support were essential for T2E's overall achievements. These included: (1) well-structured teaching and learning materials that are closely aligned with the national primary curriculum and children's learning needs; (2) continual monitoring of student progress and school operation; (3) participatory and application-oriented teacher training; and (4) frequent instructional coaching and mentorship for teachers.
- **Q4: What is the average per-learner cost of T2E+ for its effect on children's reading and language skills?** The cost of T2E+ was approximately $5.31 per child from July 2021 to December 2022.
- **(Add-on) How is growth in Ghanaian language reading skills associated with growth in English reading skills?** Improvement in the local language reading and language skills is strongly positively associated with improvements in the English language reading and language skills for both Basic 2 and Basic 3.

CONCLUSION AND RECOMMENDATIONS

At the cost of $5.31 per child, T2E+ effectively improved early-grade learners' oral reading skills in English and GLOI, as well as their English oral language skills. Having well-structured instructional materials, professional teacher training, and continual instructional support contributed to these achievements. Together, these results offer the Ghana Mission, the Government of Ghana, and other development partners several insights for policy and practice.

First, it is worth noting that the government has been implementing a multilingual education policy in public primary schools in the last decades. However, this policy has encountered numerous challenges in practice, and children's reading outcomes have stagnated. In this regard, the findings of this evaluation show that with adequate implementation support such as those included in T2E+, the multilingual policy *can* boost early-grade learners' English and GLOI reading outcomes. As such, the Government may consider expanding T2E+ beyond the 5,425 schools where it was initially implemented in collaboration with the Mission and other partners. Second, teachers across different school settings validated that the T2E+ curriculum is responsive to learner needs and the national primary curriculum. The Mission and other donors may consider publishing more of these materials and distributing them widely across Ghana. Third, several implementation supports are required as outlined above to ensure learners and teachers reap the maximal benefit of T2E+. Thus, expansion of T2E+ must be accompanied by these supports. The cost information provided in this report may assist the Mission and others in making informed decisions in this process.

INTRODUCTION

PROJECT BACKGROUND

Over the past few decades, Ghana has made remarkable progress in expanding children's access to primary education. For example, the net student enrollment rate increased from 61 to 91 percent between 1999 to 2015 (UNESCO Institute for Statistics, 2016). However, this achievement did not coincide with improvements in children's learning outcomes. In 2015, the Ghana Education Service (GES) conducted a national Early Grade Reading Assessment (EGRA) among a random sample of 7,311 grade 2 learners in public schools across all 16 regions of the country. The results showed that many children struggled with foundational reading skills and could not read with comprehension – whether in their mother-tongue (henceforth L1[1]) or in English (GES et al., 2016). This led the national government, donors, and non-governmental organizations to adopt improving children's literacy outcomes as a central policy and program focus. One relevant programmatic effort was the USAID-sponsored *Partnership for Learning* Activity, which implemented a nationwide Early Grade Reading (EGR) program in public primary schools from 2017 to 2019. The EGR program sought to improve reading performance for learners in kindergarten and basic grades 1 and 2[2] (B1 - B2) using phonics-based transitional bilingual education (USAID Ghana, 2019).

Previous impact evaluations showed that the EGR program successfully improved children's reading in both L1 and English (USAID et al., 2021; USAID Ghana, 2019). However, despite some positive outcomes, a large proportion of children supported by EGR could not read any words (USAID, 2019). After two years of intervention, the reading scores of many learners were below the national EGRA learning targets in Ghana. Additionally, various factors that enabled or hindered the impact of EGR were noted (USAID, 2019). Enabling factors included the availability of teaching and learning materials and strong teacher compliance with the EGR curriculum. Challenges included a mismatch between L1 and the instructional language at school and student/teacher absenteeism.

This report examines the Transition-to-English Plus Activity (T2E+), one program of the larger Partnership for Learning Activity (henceforth Learning) that integrates a national reading radio program (NRRP) and a more robust mother-tongue language education, while also enhancing implementation conditions. In order to understand the effectiveness of T2E+, USAID/Ghana commissioned UND and its

[1] L1 is the first language of the child. In Ghana there are 11 approved official Ghanaian Languages of instruction which are associated with the first language of the child in many schools.

[2] In Ghana, the equivalent of B1 and B2 is Grade 1 and Grade 2, respectively. The official entry age of children to B1 and B2 is 6 and 7 years, respectively. However, there are some instances where overage and/or underage children are enrolled in B1 and B2.

local partners, the University of Development Studies (UDS) in Ghana and the Resilient Africa Network (RAN) in Uganda, through SHARE to carry out an impact evaluation from November 2021 - December 2022.

EVALUATION PURPOSE AND AUDIENCE

The impact evaluation examined the *results*, *cost*, and *optimal implementation conditions* of T2E+ using a randomized controlled trial (RCT). SHARE randomly chose schools to receive the T2E+ interventions (treatment) along with schools that would wait to receive the T2E+ intervention (control) until after the evaluation in order to isolate for the specific effect of T2E+.

The information generated in this impact evaluation will assist the Ghana Ministry of Education (MoE), the GES, USAID/Ghana Mission, FHI360 (the T2E+ implementing partner), and other stakeholders as they seek to understand what is required to design and scale up an effective EGR program in public primary schools in Ghana. Ultimately, the T2E+ evaluation will help the Ghana Mission and other stakeholders with evidence-based policy and programming decision-making for the improvement of early grade learners' reading performance in Ghana.

OVERVIEW OF T2E+

The goal of T2E+ is to improve the reading and comprehension skills of KG2 – B4 students in both L1 and English. The activity was initially implemented at the school level from September 2021 - March 2023, with teacher training beginning three months prior in July 2021. The L1 of students should ideally match the Ghanaian Language of Instruction (GLOI) used in the school, however this is not always the case and this evaluation sought to understand the prevalence of this issue. T2E+ expands on the original T2E program and the NRRP by providing:

(1) radio reading lessons nationwide
(2) training, coaching, and mentoring for B1-B3 teachers and education personnel
(3) materials for pupils and caregivers
(4) a curriculum with scripted lessons, materials and related resources for teachers

The T2E+ curriculum is founded on the understanding that reading comprehension is a combination of word recognition as well as language/listening comprehension. This program, its services, curriculum, and materials focus on word recognition and reading for meaning. Word recognition focuses on enhancing learners' ability to work with or manipulate sounds in a spoken language (i.e. phonological awareness), the matching of sounds with individual or grouped letters (i.e. phonics), fluency, writing, and print concepts. Reading for meaning focuses on the meaning of a given word, which involves vocabulary, fluency, comprehension, writing, and print concepts. (*See Annex I for the full results framework and Activity description.*)

Classroom-level instruction for T2E+ commenced in mid-September 2021. The first three months of T2E+ instructions were focused on L1 reading skills including phonological awareness, fluency, writing, print concepts, oral language, and comprehension. English reading instructions were integrated in January 2022 alongside the GLOI instruction, with one hour of English lessons and 30 minutes of local language lessons each school day. The evaluation period of this impact evaluation ended in December 2022, and thus this report does not contain information on any implementation activities for the three months of the T2E+ activity extension (January - March 2023).

EVALUATION QUESTIONS

To achieve the goals of the T2E+ impact evaluation, SHARE investigated the effectiveness, cost, and implication conditions of T2E+ program. The following questions are addressed in this report:

- Q1: How did T2E+ affect children's reading and language skills?
- Q2: Did the effects of T2E+ differ by child gender?
- Q3: What factors contribute to the implementation process of T2E+ in different school settings?
- Q4: What is the average per-leaner cost of T2E+ for its effect on children's reading and language skills?
- (Add-on): How is growth in Ghanaian language reading skills associated with growth in English reading skills?

METHODOLOGY & DESIGN

The evaluation applied a mixed methods research design. The results of both quantitative and qualitative research methods were collected, analyzed, and combined to address research questions. The SHARE team also analyzed various aspects of costs involved in designing and implementing the T2E+ Activity during the evaluation period of November 2021 to December 2022 to address question 4. We detail each research strand below.

A RANDOMIZED CONTROLLED TRIAL (RCT) STUDY

For the quantitative strand, the SHARE team employed a randomized controlled trial (RCT) design, using one treatment and one control group. The treatment group refers to a sample of schools and learners that received T2E+ during the evaluation period. The control group refers to a sample of schools and learners that were placed on a control waitlist while the impact evaluation was ongoing, but who received T2E+ support at the end of the activity.

Schools sampled for the evaluation were not included in the T2E Pilot program, Learning's EGR program, or GALOP schools[3]. The implementation of T2E+ was staggered across schools so that some schools received the interventions earlier and others later. In consultation with the Ghana Ministry of Education

[3] The Ghana Accountability for Learning Outcomes Project (GALOP) is a five year project funded by the World Bank targeting the 10,000 lowest performing public primary schools with the ultimate aim of improving learning outcomes. GALOP intervention overlapped with the Ghana T2E impact evaluation. See this link for more info: https://moe.gov.gh/index.php/gallop/

(MOE), SHARE randomly selected 200 schools for the evaluation from the 3,127 of schools enrolled in the T2E+ program: 100 from those who received the intervention first (treatment schools) and 100 schools from those still to receive the intervention later (control schools). See Figure A1 (Annex 2) for a visual of the evaluation sampling strategy. To ensure the effects of T2E+ could be assessed by child gender, we sampled an equal number of boys and girls. Lastly, as detailed in Table 1, a total of 4,352 students were assessed at baseline and 3,559 at endline.

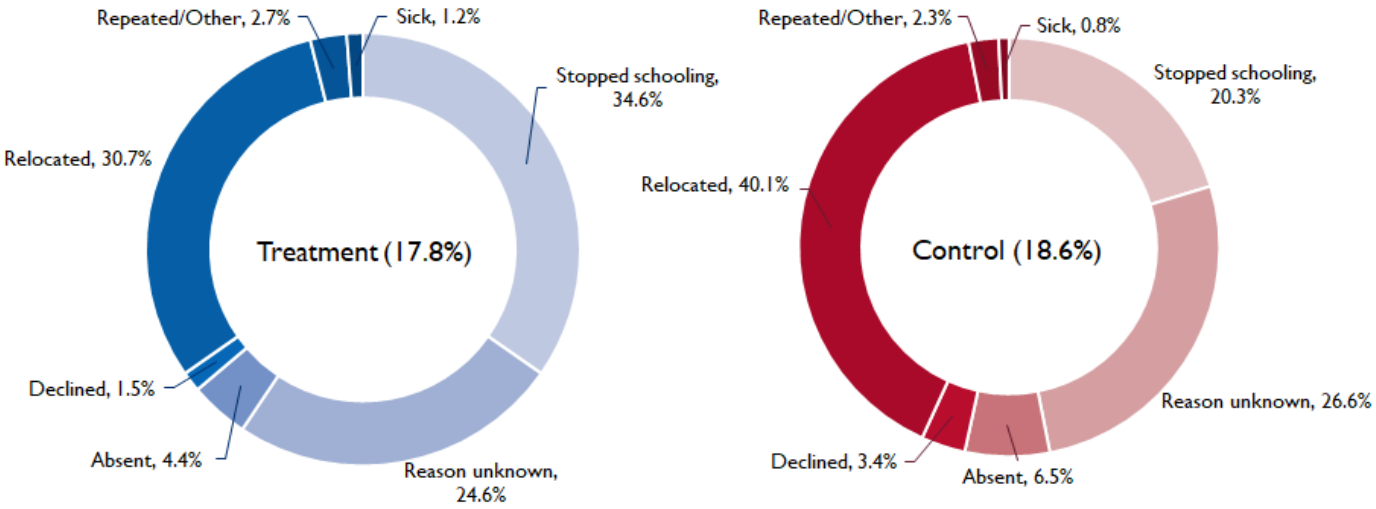
Table 1: Sample size summaries detailing number of pupil interviews and the overall endline attrition rate for the RCT

	Baseline (N=4,352)		Endline (N=3,559)		Attrition (Total N=739, 18%)		
	Control	Treatment	Control	Treatment	Control	Treatment	All Groups
Basic 2 Students	1094	1080	856	839	238 (21.8%)	241 (22.3%)	479 (22%)
Basic 3 Students	1091	1087	922	942	169 (15.1%)	145 (13.3%)	314 (14.4%)

The difference between the number of students at baseline and endline represents students that could not be located and assessed at endline due to absenteeism, relocation of pupils to other communities, or other causes, as detailed in Figure 1 (following page). After referencing studies with similar populations in Ghana which cite attrition rates ranging from 12% - 34%[4], the study team anticipated this challenge and allowed for a loss of up to 20% of baseline students in our design. Thus, the 18.2% of students lost to attrition is at the lower end of the range and the study had more than the required number of students needed to detect the impact of T2E+ when collecting data at endline.

[4] USAID, Ghana Numeracy Pilot Impact Evaluation 2017 Baseline Report; Wolf, S. et. al, Developing and Testing Supply- and Demand-side Interventions to Improve Kindergarten Educational Quality in Ghana 2017; UKAid, Making Ghanaian Girls Great (MGCubed) Endline Report 2021; Wolf, S. Year 3 Follow-Up of the "Quality Preschool for Ghana" Interventions on Child Development 2019.

Figure 1: Attrition patterns in treatment and control groups



Lastly, the RCT design requires that at baseline, children in the treatment schools are similar to those in the control schools in terms of their background characteristics and performance of reading and language skills. This is to ensure that comparisons between treatment and control are comparing 'apples to apples.' Tables A1 and A2 (Annex 4) in the appendix show this to be true. As a result, any differences in performance at the endline are attributable T2E+.

A DESCRIPTIVE QUALITATIVE STUDY

To understand the factors that impacted T2E+, we used semi-structured interviews and focus groups to capture the experiences of teachers, head teachers, parents, district education officials, MoE officials, and civil society organizations. The respondent categories detailed in Table 2 (following page) include:

- School Actors**:** teachers, curriculum leads, head teachers, the School Management Committee (SMC) chair, and the School Improvement Support Officer (SISO) with representation across grades and regions in both treatment and control schools.
- Community Actors: parents whose children benefited from T2E+ from a subset of six treatment schools with representation across regions.
- System-level Actors: District Directors of Education or their representatives (representing the local government perspective), staff from the MoE and its agencies (representing the national government perspective), and civil society organizations.

Table 2: Summary of Interviews and Focus Groups Conducted

Respondent Categories	Method	Number	Male	Female	Total Respondents
School-level actors	FGD	24	63	44	107
Community-level actors	FGD	6	14	14	28
District-level actors	Interview	10	8	2	10
National-level actors	Interview	2	2	0	2
CSOs	Interview	3	3	0	3
Total		**45**	**90**	**60**	**150**

PROCEDURE

SURVEYS, FOCUS GROUPS, AND INTERVIEWS

To ensure all members of the data collection team followed the procedures specified in the data collection plan, enumerators took part in a comprehensive training where they reviewed field procedures, pilot-tested data collection instruments, and practiced using the instruments under supervision. Throughout data collection, supervisors conducted daily debriefs with enumerators and selectively observed data collection to ensure adherence to quality standards. See Annex 2 for a more detailed description of field procedures.

COST DATA

Cost data was reported directly from the Implementing Partner (IP) on a quarterly basis from July 2021 through December 2022. The IP followed USAID cost reporting guidance. Standard cost reporting includes three required elements:

- Financial reports: all expenditures are reported according to the cost categories selected from USAID's standard list of education cost categories.
- Contributions reports: documentation of all contributions from government and non-government stakeholders.
- Intervention details: quarterly or annual reports on the details of key components of the activity, including details of the dosage at the beneficiary level, and details of outputs and outcomes.

ANALYSES

STUDENT ASSESSMENTS

To assess the effects of T2E+, the SHARE team used a linear regression model to compare the changes in EGRA and ELM scores between baseline and endline for children who received the T2E+ intervention and children who did not.[5] The team used the same approach to assess the effects of T2E+ by child gender. Finally, the team assessed the relation between GLOI reading scores and English reading scores using regression analysis after taking various background traits into account.

FOCUS GROUPS AND INTERVIEWS

Interviews and focus groups were transcribed word for word and checked for accuracy, and were then coded and analyzed to identify recurring themes across respondent groups. To ensure consistency in how different analysts coded the data, the team assessed the level of agreement between analysts and found an inter-coder reliability rate of 92%, indicating strong consistency across analysts.

COST ANALYSIS[6]

Quarterly cost data was compiled to offer a total cost summary for the entire activity period of July 2021 to December 2022. Cost data was compiled for both direct expenditures and monetized contributions from the host government. This compiled data was then analyzed to assess a total cost of implementation by each activity component, as well as the full cost. The full cost is the implementation cost plus the cost of "doing business" with USAID. The cost of "doing business" with USAID includes the general operations, management, and reporting costs associated with managing a USAID funded award. Direct expenditures were categorized by cost category or activity component by the IP. Where categorizations were omitted or not standardized, the cost analysis team made assumptions regarding the categorization of costs to the appropriate activity component. Cost data was analyzed in terms of cost economy, cost efficiency, and cost effectiveness.[7]

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[5] Linear regression in this case allows us to explore the relationship between receiving T2E+ and having better EGRA outcomes.

[6] Walls, Elena, Caitlin Tulloch, and Christine Harris-Van Keuren. 2021. Cost Analysis Guidance for USAID-Funded Education Activities, second edition. Washington, DC: United States Agency for International Development. https://www.edu-links.org/resources/usaid-cost-measurement

[7] **Cost economy:** analysis of the financial costs of an activity, including the monetized contributions from outside sources. The cost economy analysis includes the direct expenditures of USAID, through the IP, and direct contributions from the Government of Ghana (GOG) to program activities. The costs do not reflect any of the infrastructure costs required to implement the program, such as teacher salaries, school installations, etc. Costs in this cost economy analysis are presented in two ways: total cost and full cost. The *Total Cost* is the implementation cost of the specific activity component (e.g.,

LIMITATIONS

There are a few potential threats to this T2E+ impact evaluation. Typically, in an impact evaluation, the baseline analysis would assess the outcomes of interest *prior to* the start of the program. However, the T2E+ baseline assessment commenced in November 2021, about three months after the start of the program in schools in September 2021. The early phase of the T2E+ curriculum offered intensive local language instructions. The treatment group may have gained some learning in this area as a result. If this was true, the effects of T2E+ may be underestimated at the endline, meaning a true growth of the treatment group may have been larger had the baseline assessment occurred earlier. It is also important to note that our initial evaluation questions did not plan to measure T2E+ effects by different subgroups, other than the child's gender. As a result, with the exception of having an equal number of boys and girls, the sample sizes for each subgroup were not always equal; thus, the results of subgroups other than gender should not be treated with the same degree of certainty. Also, the findings of the T2E+ impact evaluation are generalizable only to the 3,127 schools in our sampling frame. It is also worth noting that the World Bank's GALOP supports 10,000 of the most poorly performing public primary schools (World Bank, 2019). Thus, the 3,127 T2E+ schools may be more advantaged than the GALOP schools, though we do not have data to empirically test this assumption. Finally, our sample did not include private schools and so our results cannot be generalized to private schools.

Assessments and Evaluations). The *Full Cost* is the implementation cost plus the cost of "doing business" with USAID for each activity component.

Cost efficiency: the measure of the ratio of the output produced to the costs incurred. In this cost analysis, the unit of analysis for the output produced is the number of in-service educator training days. For this cost efficiency analysis, costs incurred were limited to the costs directly associated with the development and implementation of the In-Service Educator Training component of T2E+. The number of teacher days in training was calculated by summing the number of teachers trained in each training session times the number of days trained.

Cost effectiveness: the ratio of the cost of an intervention to the measured change in outcome. In this analysis, the unit of analysis is the cost per student to achieve the measured impact in oral reading fluency. To determine the cost effectiveness, only the cost categories which had a direct impact on the treatment group of students were used in the calculation.

FINDINGS AND CONCLUSIONS

Q1: HOW DID T2E+ AFFECT CHILDREN'S READING AND LANGUAGE SKILLS?

MAIN EFFECTS

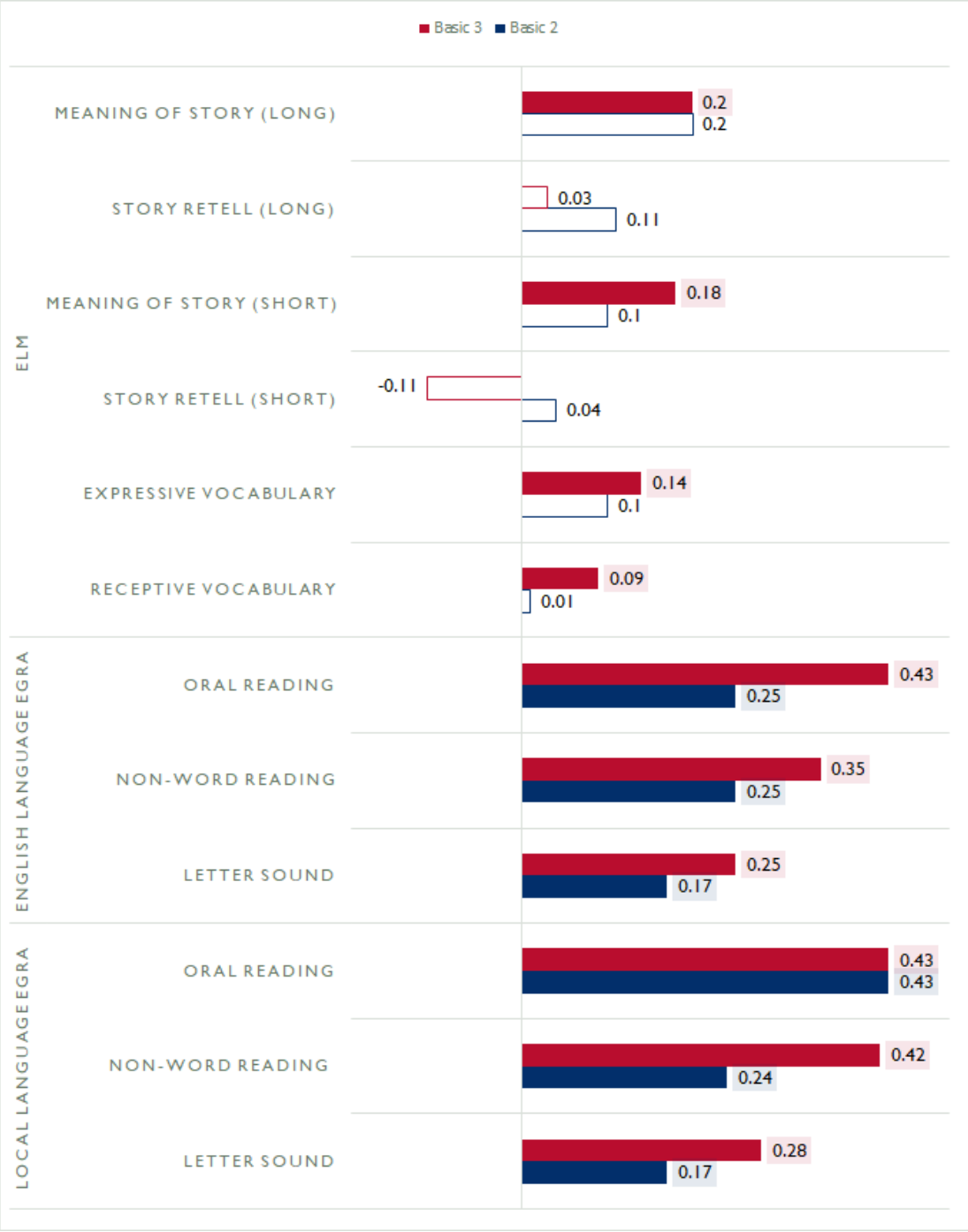
T2E+ had significant positive impacts on children's reading and language skills outcomes. T2E+ improved children's ability to read in English and in GLOI for both grades, and improved some oral language skills in Basic 3 only. We detail these findings over the next few pages.

Overall, T2E+ improved the reading and language skills of children in Basic 2 in both English and the GLOI (as measured by EGRA), even though there were no meaningful improvements in oral language skills measured by ELM. For example, oral reading fluency scores indicate that the children in the treatment schools read 2.4 more words per minute (local language) and 2.59 more words per minute (English) compared to children in the control schools, which is a significant change.[8]

Additionally, T2E+ improved reading and language skills of children in Basic 3. Children in the treatment schools improved in both reading skills measured by EGRAs as well as all oral language skills measured by ELM, with the exception of story retelling of short and long stories. For example, for oral reading fluency, children in the treatment schools read 4 more words per minute and 6 more words per minute in the local language and English language respectively than children in the control schools. It is important to note that literature in this field suggests that effect sizes less than 0.3 are considered small while those from 0.3-0.4 and those greater than 0.4 are considered to be medium and high respectively. As a result, the effect sizes for the impact of T2E+ range from medium to large in both Basic 2 and Basic 3 for both the English and local language EGRAs.

[8] For detailed definitions of EGRA terms and subtasks, reference the glossary published by Early Grade Reading Barometer.

Figure 2: Basic 2 & Basic 3 Treatment Effects in EGRA & ELM



EFFECTS ON PERCENT OF CHILDREN WITH ZERO SCORES

Children in our sample were at varying levels of reading and language ability. In this section, we explore this heterogeneity in learner ability level and assess how T2E+ impacted children who scored zero in the various assessments. In general, children who score zero are those who are not able to read a single

letter or word or could not comprehend what they read in the various subtasks. As such, these children represent those who would struggle the most among all. It is important to stress that at baseline, the percentage of children who scored zero was similar between treatment and control schools so any differences in the reduction at the endline is attributable to T2E+. For full regression results, see Table A3 (Annex 4).

The results show that for both Basic 2 and Basic 3, T2E+ led to significant reductions in the percentage of children who had zero scores for both English and local language reading skills as measured by EGRA. Reduction rates from baseline to endline range from 30.6% in the English letter sound identification (from 74.6% to 44%) and 0.1% in the English ELM vocabulary subtests (from 0.1% to 0%). (Please note that very few children scored zero for the vocabulary tests at baseline so the numeric reduction appears small.) In Basic 3, there were also significant reductions. Reduction rates range from 24% in the English letter sound identification (from 52% to 28%) and 0.1% in the English ELM vocabulary subtests (from 0.1% to 0%). Figures A4 - A7 (Annex 4) graphically present zero-score percentages at baseline and endline for Basic 2 and Basic 3 across all EGRA and ELM subsets.

EFFECTS ON PERCENTAGE OF CHILDREN MEETING EGRA BENCHMARKS

This section further explores the effects of T2E+, focusing on children who meet Ghana's national EGRA benchmarks. As mentioned above, children in our sample were at varying reading and language levels. Children who scored higher than the national EGRA benchmarks would present those who demonstrate grade level expectations and thus decent academic progress. The national benchmarks are minimum reading standards for the various EGRA components in both English language and local Language. For Ghana, children who read 40 correct letter sounds per minute, 25 correct invented words per minute, and 40 correct words per minute for reading fluency are considered a grade-level appropriate reader in the local language. For English, these benchmark scores are 35, 20 and 45 respectively. There are no national benchmarks for the oral language skills as measured by the ELM. It should be noted that at baseline, there were no significant differences between the children scoring at or above the national benchmarks between children in the treatment schools and those in the control schools.

Figures 3 and 4 show that T2E+ improved the percentage of children who scored at or above the national benchmarks for the various reading skills in English and local language as measured by EGRA, especially for children in Basic 3. For instance, in Basic 3, 20% of students in treatment schools were above or at the national benchmark in oral reading fluency in English language, compared with 15% for children in the control schools. Note that the percentages of children reaching the minimum national reading standards are quite low for both Basic 2 and Basic 3.

Figure 3: Change over time in children scoring at or above national benchmarks, by EGRA and ELM Sub-task in Basic 2 at Endline

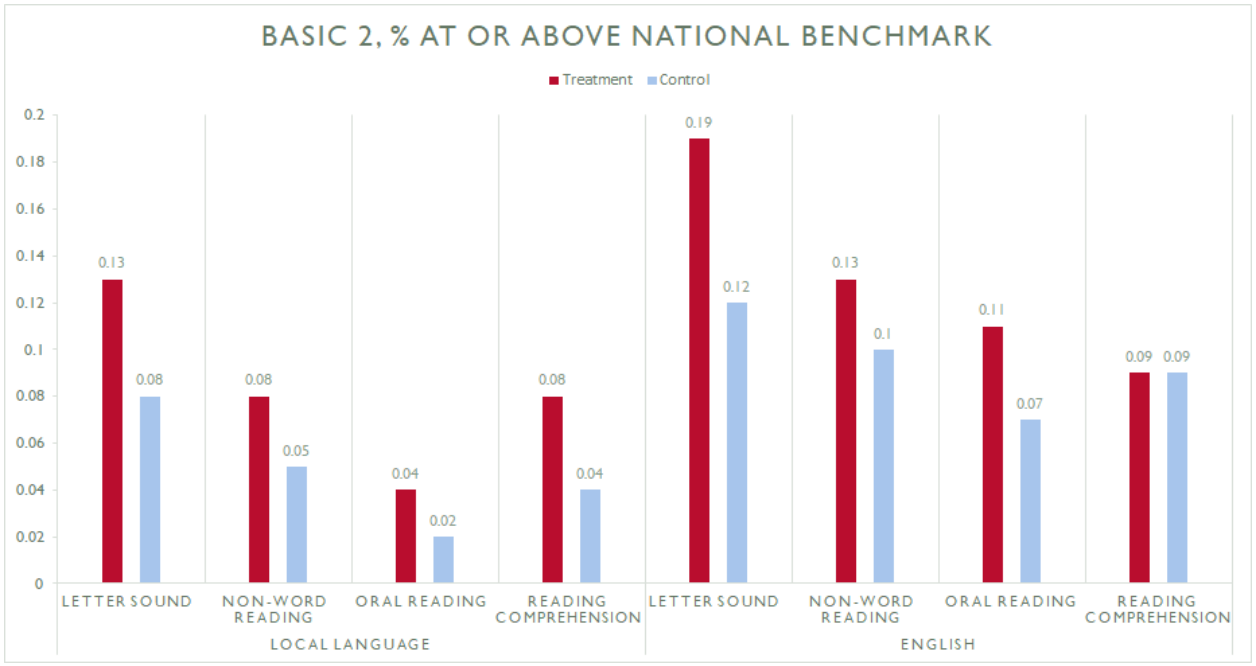
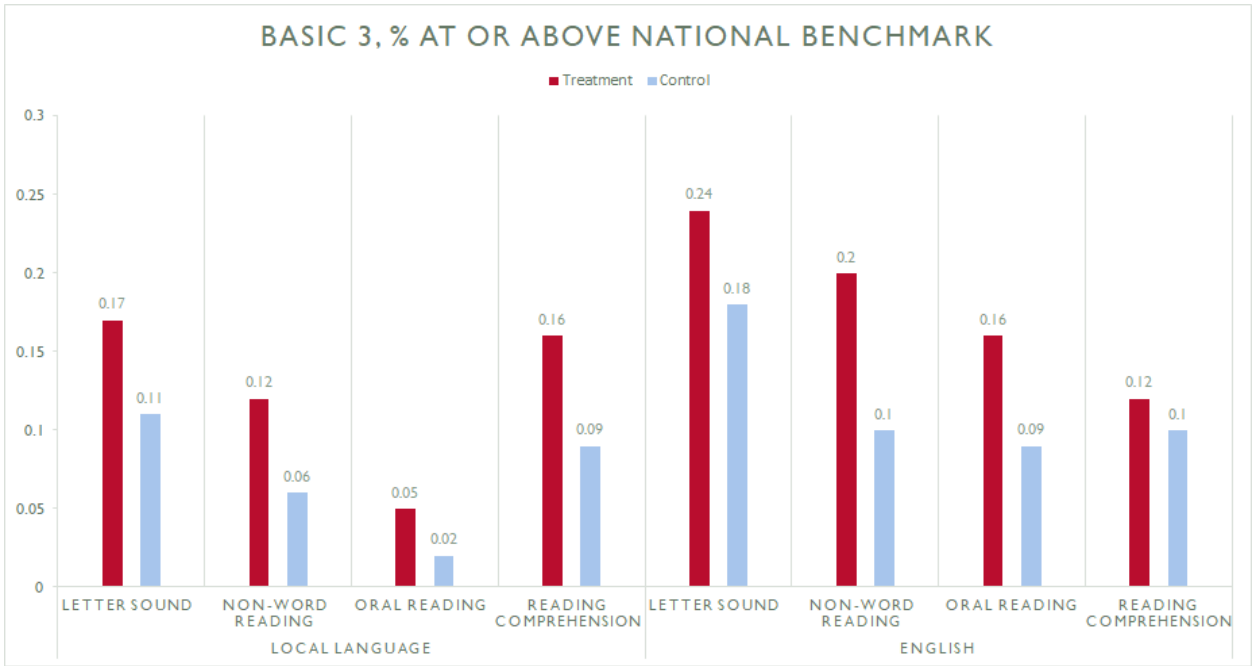


Figure 4: Change over time in children scoring at or above national benchmarks, by EGRA and ELM Sub-task in Basic 3 at Endline



Q2: DID THE EFFECTS OF T2E+ DIFFER BY CHILD GENDER?

T2E+ had no differential effects by child gender except that girls outperform boys in non-word reading by 2 words per minute in B2 while boys marginally outperform girls in inference making in B3. Together, these statistics mean boys and girls equally benefited from it. See Table A4 (Annex 4) for full regression results. We also assessed whether the effects of T2E+ differed by location (rural or urban) and family socioeconomic status (high or low), besides gender. The results are presented in Table A5 (Annex 4). The effect did not differ by location or socioeconomic status, indicating that the positive effects of T2E+ is non-discriminatory to all children regardless of background.

Q3: WHAT FACTORS CONTRIBUTED TO THE IMPLEMENTATION OF T2E+?

This section presents the results of the qualitative arm of the evaluation. Results from interviews with teachers, system-level actors, and community members showed that four key factors facilitated the effective implementation of the T2E+ program at the school and classroom levels: (1) T2E+ Curriculum Design, (2) Teacher Training, (3) Coaching and Mentorship, and (4) Learner Performance Monitoring.

T2E+ CURRICULUM DESIGN

Stakeholders indicated that the design of the T2E+ curriculum was beneficial because it was well-structured and presented learning materials systematically and sequentially, thereby demystifying the teaching of reading. The T2E+ curriculum materials, such as the teacher's guide, student workbooks, and student compendium, are aligned with the national curriculum and the needs of learners. Unlike the non-T2E+ schools, where teaching and learning materials were generally reported to be inadequate, teachers and district education officials indicated that the T2E+ materials were learner-friendly, as they contained information such as pictures and illustrations that enhanced the enthusiasm of learners in the classroom. Teachers indicated that the comprehensive nature of the materials supplied to them enabled them to effectively teach their reading lessons in the classroom with ease. In focus group discussions, teachers said that students learn best when they are able to follow along and record, in sequential order, what they notice.

"When you follow it sequentially, your students will be able to understand. Because you are not to skip any lesson, we follow every bit of the guide for easy understanding so if you ask learners any questions, they will be able to give you the right answers. So, the children were also excited. Because when children participate in the lessons and then whatever you ask them, they are able to give you correct answers, they are even happy themselves."

— Teacher, Cape Coast, 2022

Apart from teachers, district education officials also observed that both the availability and content of the T2E+ materials were highly beneficial to teaching and learning because they enabled teachers to deliver their lessons more effectively and children became excited to use the materials during learning. A district education official said providing high-quality materials bolsters student success.

"I think the key driver of success of the T2E+ program is the learning materials…. Had it not been for the materials, it would not have been effective…the materials are made available and very accessible, it has made the program very effective."

— District Actor, Bawku Municipal, 2022

TEACHER TRAINING

The second implementation condition that contributed to learning outcomes was teacher training. Teachers received three days of intensive training and an additional three days of follow-up training to build their capacity on how to use the T2E+ curriculum materials to teach reading. Teachers reported that the training was interactive and included numerous hands-on activities, such as demonstrations, role-playing, and a variety of innovative instructional strategies that demystified teaching language in the classroom and made learning enjoyable. According to teachers, prior to the implementation of the T2E+ program, teachers were using ineffective and inefficient teaching methods to teach reading. However, they learned more innovative and state-of-the-art approaches to teaching language in the classroom. Such innovative approaches include conducting diagnostic assessments to identify students' strengths and weaknesses and then using the assessment results to guide lesson delivery to build on the strengths of

the students as well as address their weaknesses. During focus group discussions, teachers said that professional development training helped them focus on students' starting points at the beginning of the school year.

> "The training received during the T2E+ teacher training changed my view on how the teaching is done…especially, how you do the assessment. On your first day you have to know the levels of your students, so you do the baseline. After you have done the baseline assessment, you would get to know the level of each of the pupils in the class and you put them into groups. Then you provide them with remediation."
>
> — Teacher, Birim North, 2022

MENTORSHIP AND COACHING

The third implementation condition that impacted teaching and learning was the mentorship and coaching aspect of the T2E+ program. Teachers interviewed indicated that they received regular one-on-one coaching and mentorship support from headteachers, curriculum leads, and School Improvement Support Officers (SISOs). Through the coaching sessions, teachers received feedback from their mentors and had the opportunity to clarify difficult content and methodologies. In addition to the mentorship and coaching, teachers shared learning experiences during a weekly professional learning circle session. This provided a platform to address any implementation bottlenecks that arose during the implementation of the program in a classroom setting. According to the majority of teachers, the mentorship and coaching aspects of the program were helpful in providing alternative pathways for knowledge sharing and on-the-job learning. This approach has greatly impacted their knowledge and skills in teaching reading.

> "Formerly, there was nothing like coaching to guide teachers but currently, due to the implementation of the T2E+ and coaching teachers are able to upgrade themselves in the teaching and teaching environment."
>
> — Teacher, Wassa East, 2022

LEARNER PERFORMANCE MONITORING

Finally, a majority of teachers reported that project-related performance monitoring, such as the administration of the Annual Status of Education Report (ASER) assessment complemented by written assessments and routine monitoring visits by district, project staff, and national level actors, impacted learning outcomes. First, student monitoring using the ASER assessment tool and written assessments provided opportunities for teachers to identify the strengths and weaknesses of students and areas where students needed remediation. This approach enabled teachers to differentiate teaching in the classroom by providing targeted instruction to students that are lagging in class as well as those that require more challenging tasks to meet their learning needs. In addition, reports on the ASER assessment were uploaded on a dashboard where teachers could visualize and make data-driven decisions about the performance and remediation required for their learners.

> "Under T2E+, every child is important. You have to make sure that the entire class understands you and that every child benefits. At the end of it all you have the ASER to check whatever you are doing. The ASER is going to indicate the level at which every child is. [. . .] So, you have to come back and do your remediation. So, in short, every child matters. So, when you are teaching in class with regards to T2E+, you don't teach a few good pupils."
>
> — Teacher, Assin South District, 2022

Routine monitoring by district officials and the T2E+ project implementation team motivated teachers to comply with the program curriculum. According to one of the national actors, monitors provided targeted feedback, and some of them inspired teachers by providing positive feedback and encouraging remarks, which pushed them to put forward their best efforts. A national officer interviewed observed the following:

> "We monitor the program at all levels where at times you go and check whether the materials they say they will deliver to the schools have been delivered. So, we have three levels of monitoring; the one in the classroom itself and the one when you are doing the training for the teachers, and you have the one which is called the backstop checking. We provide feedback to teachers and encourage them to implement the program very well."
>
> — National-level Actor, 2022

Q4: WHAT IS THE AVERAGE PER-LEANER COST OF T2E+?

In the education sector, resources are limited and priorities are competing. This section provides the USAID Mission in Ghana and the Government of Ghana with data on various aspects of the cost of T2E+ implementation that correspond to the effects presented above. The hope is that this will guide future decisions around program scalability and sustainability. This data was generated with support from Implementing Partner colleagues and others. It is important to note that the overall duration of T2E+ (from September 2021 to March 2023 at the school level) was longer than the duration of SHARE's impact evaluation. However, because this analysis links the effects detected by this impact evaluation and the cost of T2E+, the cost analysis is limited to the time of the evaluation period (i.e. July 2021 to Dec 2022). All costs are estimated in 2021 US dollars.

COST ECONOMY

For this cost analysis and all subsequent analyses, all costs have been estimated to the nearest dollar amount. The Activity Costs only include the direct expenditures of USAID and direct contributions from the Government of Ghana (GOG) to program activities. Direct expenditures were reported in current USD values for the time period reported (July 2021-December 2022). Monetized contributions were reported in current Ghanaian cedis (GHS) values for the time period reported (July 2021-December 2022) and converted to 2021 USD values (1 USD = 5.8 GHS) using the most recent conversion data available at the time of analysis through the World Bank DataBank World Development Indicators[9]. The costs are incremental, intervention-related costs only and do not include costs of "business as usual" programming.

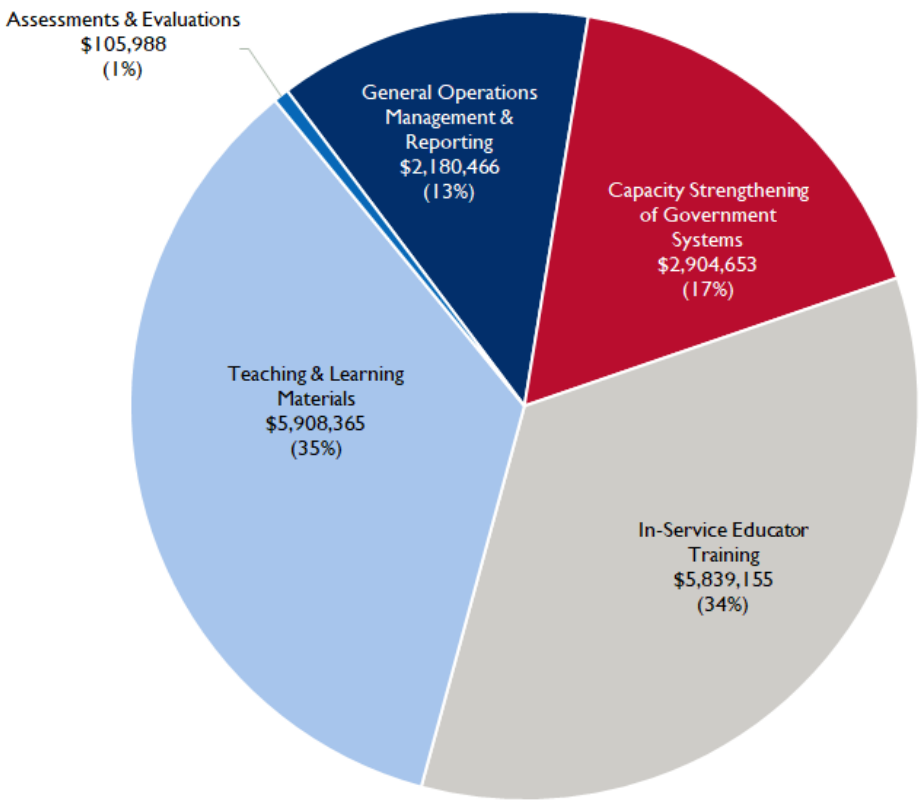
During the evaluation period of July 2021 - December 2022, the total cost of the T2E+ activity was $16,938,627. This total can be broken into various implementation components (cost categories) of the activity per Table 12 and Figure 14 shown below. The two largest cost components were the In-Service Educator Training (IR 1.2) and Teaching and Learning Materials (IR 1.1) categories, with total costs of $5,839,155 and $5,908,365 respectively. Of the $5,908,365 invested in Teaching and Learning Materials, $364,270 was invested in the development and implementation of the supplementary radio program materials (IR 2.2) and broadcast (IR 2.1). The third largest cost component was Capacity Strengthening of Government (IR 3.2) with an investment of $2,904,653. The smallest investment was made in Assessments and Evaluations IR 3.1) with a total cost of $105,988.

[9] DataBank World Development Indicators are found at https://databank.worldbank.org/reports.aspx?source=2&series=PA.NUS.FCRF

Table 3: Cost Categories of T2E+ Implementation

Cost Category	Total (USD)[10]
General Operations, Management, and Reporting	$2,180,466
Assessments and Evaluations	$105,988
Capacity Strengthening of Government Systems	$2,904,653
In-Service Educator Training	$5,839,155
Teaching and Learning Materials	$5,908,365
TOTAL	**$16,938,627**

Figure 5: Cost Categories of T2E+ Implementation as % of Total Cost

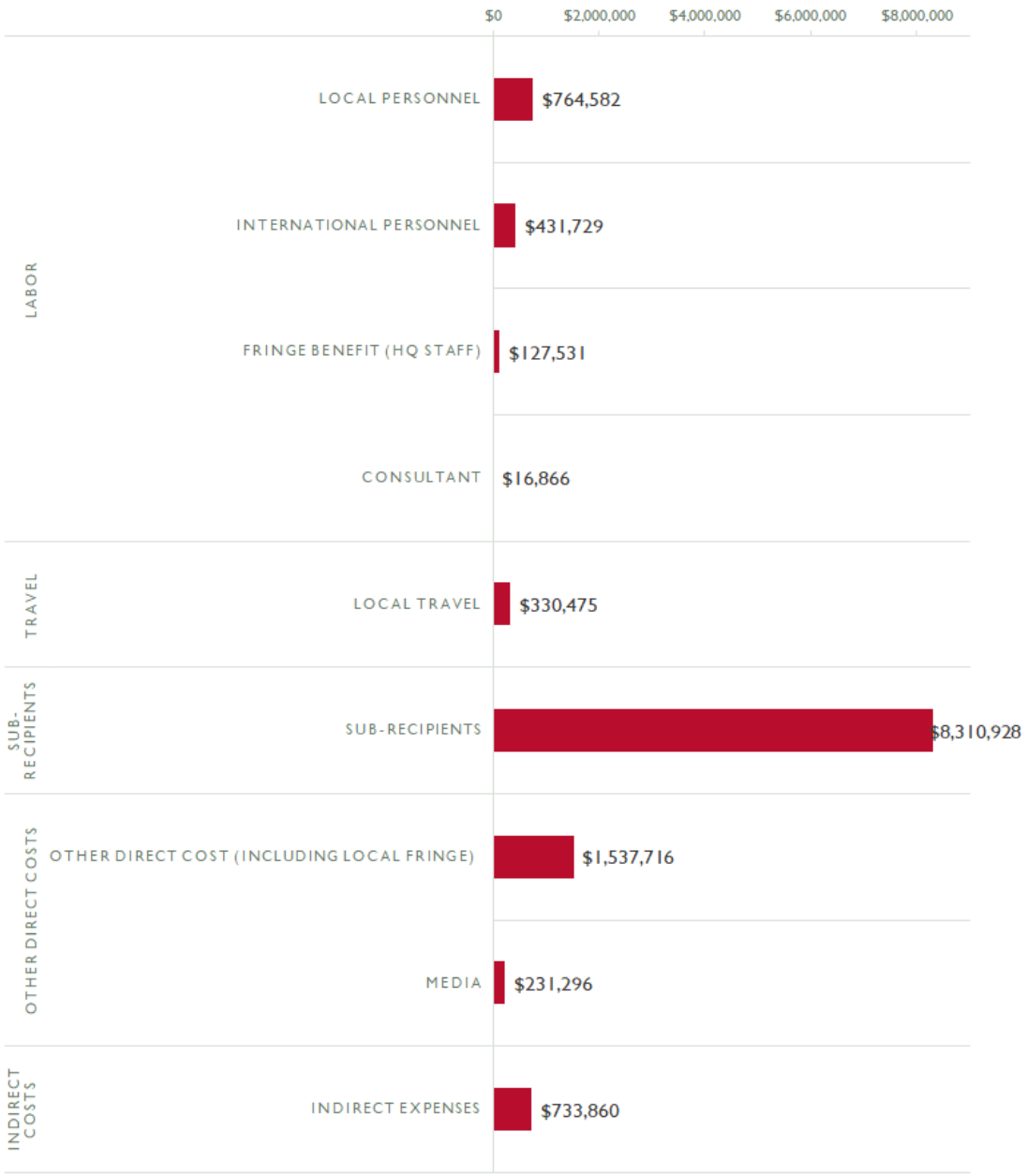


[10] Totals expressed in 2021 real USD values. There is no adjustment for inflation given that the latest data for inflation rates is to 2021 USD.

FACTORS INFLUENCING COSTS OF T2E+

The total cost of the T2E+ activity was $16,938,627. Of the total cost, $12,485,725 were in direct expenditures and $4,452,902 in monetized contributions. When looking at the major cost drivers of the T2E+ activity, we will be considering direct expenditures only, as they have been categorized into standardized cost ingredients. Direct expenditures include, but are not limited to, local and international personnel costs, fringe benefits, travel, equipment, supplies, sub-recipient costs, media, other direct costs, and indirect costs. The primary cost driver (66.57%) of direct expenditures in the T2E+ implementation is in sub-recipient expenses showing the prioritization of the localization of the activity through direct implementation through local partner organizations.

Figure 6: Comparison of Total Direct Expenditures by Standardized Cost Categories/Cost Ingredients



COST EFFICIENCY

Of particular interest in this evaluation is the average per teacher cost of T2E+ for its effect on learners' oral reading fluency in GLOI and in English. The educator training model consisted of 2 trainings, 3 days each, or 6 teacher training days. The average per-teacher training day cost was $6.73, or $40.37, for the full training program of 6 training days. This value reflects the cost of implementing the T2E+ educator training model that the Government of Ghana (GOG) or future implementers would expect to incur if they were to replicate the training model. It does not include the cost of developing the educator training model or the cost of "doing business" with USAID (General Operations, Management, and Reporting), however Table 14 below does present a calculation that includes the cost of "doing business" with USAID for the purposes of computing total cost estimates for similar future USAID projects.

Table 4: Recurring Cost Per Teacher for T2E+ Training Model

Relevant Actor	Recurring Cost per Teacher Training Day	T2E+ Educator Training Model	Cost Per Teacher of T2E+ Training Model
GOG	$6.73	6 days	$40.37
USAID Ghana *(inclusive of USAID cost of doing business)*	$7.72	6 days	$46.34

COST EFFECTIVENESS

To determine the cost-effectiveness, only the cost categories which had a direct impact on the treatment group of students were used in the calculation. These categories are limited to the development and implementation of in-service educator training and the development, production, and distribution of teaching and learning materials. All other cost categories have been excluded in the case of the radio instruction broadcasting.

The average per-child cost for the effects of T2E+ was $5.31. This includes $2.62/child for developing and distributing teaching and learning materials and $2.69/child for developing and conducting in-service educator training. The average cost per-child for the treatment effects of T2E+ was calculated by totaling the components of the treatment implementation of T2E+. The treatment components are the in-service education training and the teaching and learning materials. All other costs (general operation, management, and reporting, assessments and evaluations, and capacity strengthening of government systems) were excluded from this calculation. The total treatment component costs were then divided by the total number of students treated during the T2E+ implementation period.

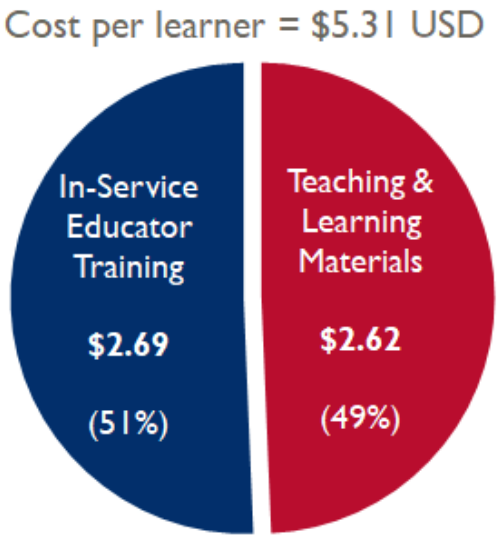
The **cost of "doing business" with USAID increases this per-child cost by $0.79 to $6.10**, which may be more relevant for USAID/Ghana to consider for future potential projects**.** This calculation is done in the same manner as the average per-child cost, however, the treatment component costs include a proportional distribution of the general operations, management and reporting costs to represent their full cost as implemented under USAID operational, management and reporting requirements.

Table 5: Average Per Child Cost for the Measured Effect of T2E+

Cost Category	Total (USD)
General Operations, Management, and Reporting	$2,180,466
Assessments and Evaluations	$105,988
Capacity Strengthening of Government Systems	$2,904,653
In-Service Educator Training*	$5,839,155
Teaching and Learning Materials*	$5,908,365
TOTAL	**$16,938,627**

*Average Per Child Cost includes costs for *In-Service Educator Training* and *Teaching and Learning Materials* only, as the activities that were exclusive to the treatment group of students. The breakdown of these categories is shown in greater detail in Figure 9.

Figure 7: Average Per Child Cost Breakdown by Category



Q5: HOW DOES GROWTH

IN GLOI READING SKILLS RELATE TO GROWTH IN ENGLISH READING SKILLS?

Table 9 below shows how children's performance in local language EGRA affects their performance on the English language EGRA at endline for B2 and B3. The results show that improvement in the local language reading and language skills is strongly positively associated with improvements in the English language reading and language skills for both Basic 2 and Basic 3. For instance, for both Basic 2 and Basic 3, identifying ten additional letter sounds correctly in the local language is associated with identifying 7 more letter sounds correctly in the English language. Also, being able to read one more word per minute in oral reading fluency in the local language is associated with reading 1.2 more words per minute in the English language oral reading fluency.

Table 6: GLOI reading scores predicting English reading scores

	Basic 2		Basic 3	
	Local language score	p-value	Local language score	p-value
Letter sound	0.72	0.00	0.68	0.00
Non-word	0.86	0.00	0.82	0.00
Oral reading	1.26	0.00	1.21	0.00

RECOMMENDATIONS

Stakeholders, including teachers, district officials, and national-level actors, indicated that the Transition-to-English Plus (T2E+) program curriculum, teacher training, mentorship and coaching, and program monitoring contributed substantially to the learning outcomes in T2E+ treated schools. The T2E+ curriculum was pivotal in providing teachers with systematic learning materials for both teaching and learning. Despite the positive implementation conditions described in sections above, stakeholders have identified three aspects of the project that need to be enhanced:

- **Increase quantity of books:** While teachers acknowledged the availability of books in the T2E+ classrooms, some teachers wished they could obtain additional books for students who had to share books due to supply shortages.

- **Simplify curriculum materials:** Teachers believed that, despite the comprehensiveness and quality of the curriculum materials, the **content of the materials could be reduced** to make space for the purposeful repetition of content for slow learners. Teachers reported that the curriculum's content was too dense and highly structured, leaving them little room to adapt to the learning requirements of disadvantaged children. In order to meet their weekly or term goals, teachers were compelled to rush through their curriculum.

- **Reduce distance and time for training travel:** Finally, teachers reported that the distance to training centers was very far, and because the training was non-residential, they were required to commute long distances daily to the workshop location, making it extremely challenging to arrive on time. In addition, they had to travel through the night to reach their stations after the workshop closed.

FOR DONORS, DEVELOPMENT PARTNERS, AND THE GOVERNMENT OF GHANA

Most early-grade learners in Ghana are not learning at grade level. Effective literacy interventions are imperative for addressing this challenge. In this regard, the findings of this evaluation demonstrate that a transitional multilingual education model such as T2E+ is a viable policy solution to enhance children's oral language and reading outcomes in English and in the Ghanaian Language of Instruction (GLOI).

Over the years, the Government of Ghana has been implementing a multilingual education policy in public primary schools (USAID, 2019). This policy has encountered numerous implementation

challenges, which often feed into doubts about the effect of the multilingual education policy (USAID, 2019; Anyidoho, 2018). However, this study has demonstrated that multilingual education has the potential to enhance reading outcomes among early graders when supported and implemented well. T2E+ therefore serves as a foundation from which the Ministry of Education (MOE) can strengthen language education in Ghana. As a result, SHARE suggests the following next steps for the donor and development community at large:

- **Extend the pilot to a larger range of schools:** Piloting this activity to other public schools in Ghana, outside of the 5,400 highest performing ones where the original T2E program was implemented will complement the Ghana Accountability for Learning Outcomes Project (GALOP) program and help the Government of Ghana and its development partners understand **how best to improve learning outcomes in primary schools that face a potentially broader array of challenges**. Since teachers in the project implementation schools have validated that the T2E+ curriculum is responsive to learner needs and the national curriculum, this presents a pathway for improving child literacy in other contexts within Ghana, but this should be tested before further scaling in less known contexts.

- **Piloting with care:** Piloting T2E+ in other contexts should be done **sequentially and adaptively**. This could be achieved through a phased teacher training approach commensurate with provision of Teaching and Learning Materials (TLM). Teachers validated that the T2E+ curriculum is responsive to learner needs and the national curriculum. This presents a pathway for the Mission and other donors to collaborate with the Government to publish more of these materials and distribute them widely across Ghana.

- **Assisting systems to increase chances of sustainability and enhancement of performance monitoring:** Several implementation supports are required to ensure learners and teachers reap the maximal benefit of the T2E+ Activity. These include **continual monitoring of student progress and school operation, participatory and application-oriented teacher training, and regular provision of instructional coaching and mentorship to teachers.** This may require leveraging the lessons learned from the T2E+ performance monitoring approaches, and additional support for the MOE to institutionalize accountability mechanisms at the schools, district and regional levels to ensure use of monitoring data to support teaching and learning improvements in schools.

- **Leverage existing Teaching and Learning Materials (TLMs)s:** The MOE and Ghana Education Service (GES) should take full advantage of the existing T2E+ TLMs and teacher training programming to scale-up the T2E program. Since instructional materials have already

been developed for the T2E+ program and they are available for use, the MOE should consider reproducing them and supplying them to all public schools in Ghana.

- **Continue investing in school personnel:** Since the T2E+ program has started to strengthen the capacity of many teachers and District Teacher Support Teams (DTSTs) across the country, the MOE and the GES should continue expanding these efforts and leverage these resources to **conduct regular in-service education and training for teachers in addition to Administrators** to improve their capacity to deliver the language of instruction policy in primary schools system. These in-service trainings could be done through entrenching mechanisms of Continuous Professional Development (CPD).

- **Integrate more regular learner assessments:** Performance monitoring through assessments, including the Annual Status of Education Report (ASER) assessment tool, and written assessments have proven to be effective in providing information for remediation and differentiated teaching. The MOE should consider **including these learner assessments into the school curriculum to enable** teachers to conduct regular assessments of their students and to provide targeted instruction when needed. To enable teachers to obtain the full benefit of the assessment, the MOE and GES could adapt the dashboard developed under the T2E+ program to support the ASER assessment in providing performance information to teachers and education stakeholders.

- **Expand training to pre-service teacher formation:** The MOE can use the lessons learned from the T2E+ program to **improve teacher preparation at the Colleges of Education** to enable pre-service teachers to acquire adequate skills in the use of the phonics-based approach to teaching reading. This will improve the ability of newly trained teachers to teach reading more effectively using the T2E+ methodologies.

- **Develop teaching and learning materials for other local languages:** This study offers empirical evidence on how a multilingual language education can improve reading in English. As such, it will be prudent for the MOE to review the language of instruction policy and make conscious efforts to increase the number of local languages that have written materials to expand the benefit of the language of instruction policy to all Ghanaians.

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ANNEXES

ANNEX 1: EVALUATION STATEMENT OF WORK

SUMMARY INFORMATION

Strategy/Project/Activity Name	USAID/Partnership for Education - Learning Activity
USAID Office	USAID Ghana
Implementer(s)	FHI 360
Cooperative Agreement/Contract #	Cooperative Agreement AID-641-A-15-00004
Total Estimated Ceiling of the Evaluated Project/Activity (TEC)	$92,000,000
Life of Strategy/Project/Activity	July 2021 - December 2022
Active Geographic Regions	National
Development Objective(s) (DOs)	Development Objective 2: Quality services delivered with accountability
External or internal evaluation?	External

EVALUATION TEAM COMPOSITION

The SHARE team will bring in its regional sub-awardee, the ResilientAfrica Network (RAN) which covers Sub-Saharan Africa, and their accompanying partner in Ghana, the University for Development Studies (UDS) Ghana. UDS Ghana has already identified a strong team of education experts with experience in conducting EGRAs as well as qualitative research methods. This assessment could be particularly delicate given the letter sound recognition (the sounds of the letters vs the "name" of the letter) inherent in EGRAs in English and possibly even more so should we determine the need to apply EGRA in multiple languages. The UDS team will assemble research team members and enumerators who can bring perspectives across genders and different ethnic groups. Enumerators will be recruited such that they are able to speak the local languages needed for the areas where the research will be carried out. Both RAN and UDS will support the research design process, development and validation of the assessment tools, identification and training of enumeration staff, preliminary data collection and quality assurance, data cleaning, and analysis. SHARE will also bring on a researcher to support the analysis of the costing data in support of RQ3. The data to be analyzed will be provided by USAID's local implementing partner. The research efforts will be spearheaded by SHARE's Technical Advisor, Dr. Jeongmin Lee at the University of Notre Dame with substantial experience in leading program impact evaluations in education in low resource environments. Dr. Lee will oversee the research design process, tool identification, data quality assurance, analysis, and presentation of findings.

Planned Baseline Evaluation Schedule

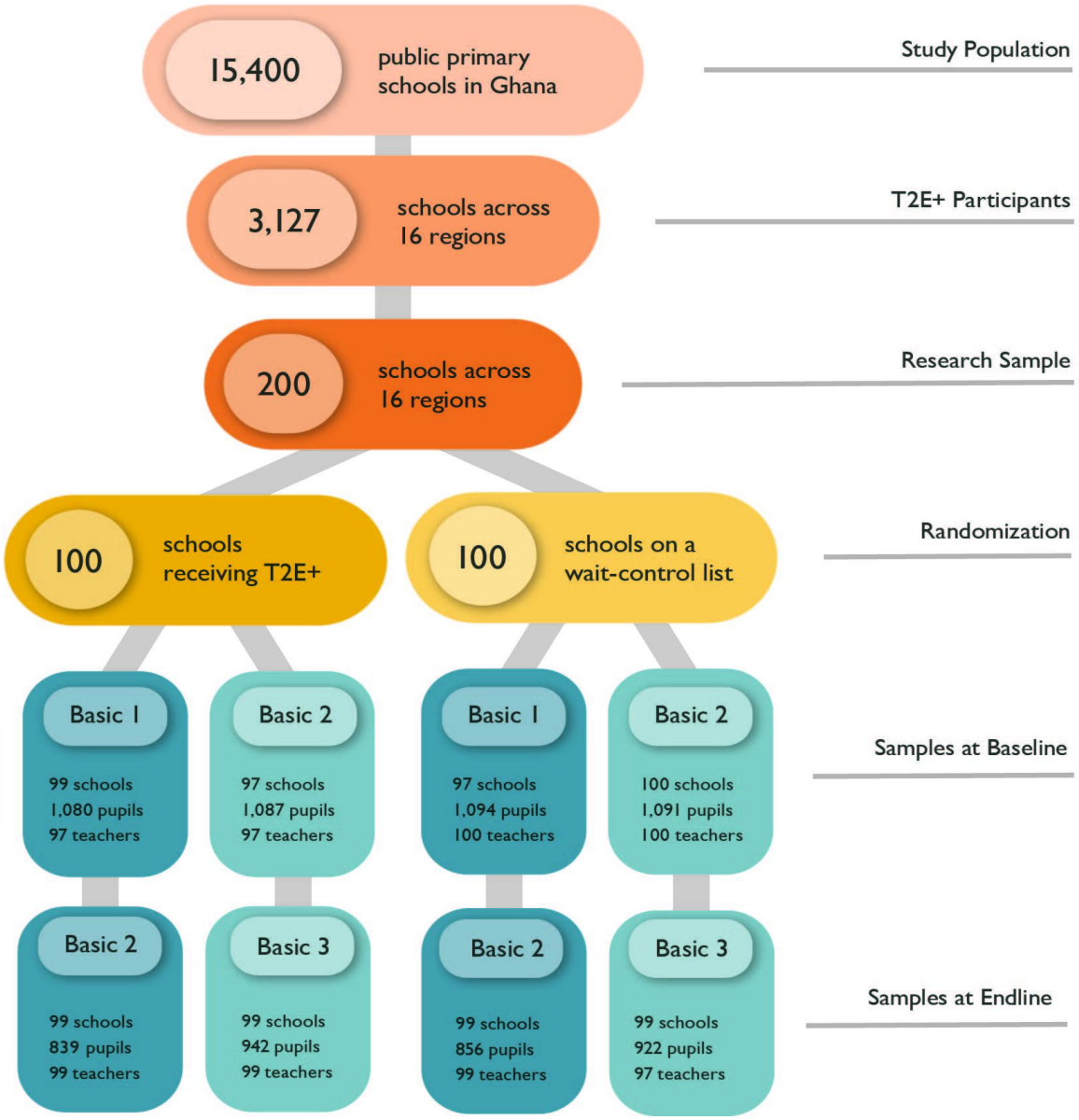
Date or Duration	Proposed Activities	Important Considerations
7/5 - 8/11	Subawarding and Preparation of the evaluation design	Will depend in part on duration to make subawards
8/12/21 - 8/18/21	USAID review of the evaluation design	Based on availability of Mission personnel
8/19/21 - 8/25/21	Inception Report	
8/26/21 - 9/3/21	Develop research tools	EGRA tool for different grades and qualitative screeners
9/6/21 - 9/10/21	USAID review of research tools	Note U.S. Labor Day Holiday
9/13/21 - 10/1/21	Institutional Review Board	Will be carried out within University of Notre Dame and with Ghana national Institutional Review Board
10/18/21- 10/22/21	Enumerator Training	To be timed just before start of data collection
1101/21 - 12/03/21	Data collection	Approximately 100 treatment + 100 control schools, 3 grades for each school and 15 students per grade; additional qualitative across treatment areas
12/6/21 - 01/21/22	Data analysis	Analysis of over 9,000 EGRAs and additional qualitative research
02/25/22	Presentation of preliminary findings and recommendations development	
03/02/22	Final Presentation	
02/11/22 - 03/04	Report writing	
03/7/22 - 3/18/22	USAID review of draft report	Consider lengthening based on availability of US personnel during this period.
3/21/22 - 4/30/22	Incorporate USAID comments and prepare final report	Duration allows for an additional review by USAID Ghana Mission if needed.
5/30/22	Submit dataset(s) to Development Data Library	
5/30/22	Submit final report to Development Experience Clearinghouse	

Estimated Level Of Effort In Days By Position

Position	Pre-paration	Travel to/from Country	In-Country Data Collection	Analysis and Presentation of Findings	Total LOE in days
UND Team Lead *(Education evaluation specialists)*	40		4	42	86
Additional SHARE Support	20		10	45	75
Regional education team (RAN)	50			50	50
Additional regional support staff (RAN)	100	18	30	80	228
Ghana Team Lead (UDS)	40		30	30	100
Ghana education experts (UDS)	50		30	60	140
Ghana Statistician	20			50	70
Ghana Evaluation Coordinator (UDS)	40		60		100
Ghana Administrator (UDS)	40			60	100
Totals	**400**	**18**	**164**	**417**	**949**

ANNEX 2: RESEARCH PROCESS

FIGURE A1: SAMPLING RANDOMIZATION PROCEDURE



DESIGN

This study uses a sequential mixed-methods research design in which the quantitative strand of the research is conducted prior to the qualitative strand of the research that is built on the findings from the quantitative strand. The quantitative strand addresses RQs 1, 2 and 4. Specifically, RQ1 estimates the average treatment effects of T2E+ via a cluster randomized controlled trial study with a treatment group and a control group. RQ2 estimates the cost of different elements of T2E+ interventions via a cost analysis. RQ3 examines factors affecting program effectiveness quantitatively via a regression analysis as well as qualitatively via interviews with teachers, parents, and other system-level actors in Ghana's primary education system. RQ4 examines the association between growth in local language reading skills and English reading skills via a regression analysis. Finally, results from the quantitative and qualitative strands are brought together at the stage of interpretation to generate higher level research and practice implications regarding the study purpose. Over the next few pages, we illustrate methods used in each of the evaluation questions summarized above.

QUANTITATIVE STRAND

The effect of the T2E program (Q1): The T2E+ Activity is implemented in grades KG2 to B3. Among these grades, the proposed T2E+ evaluation involves learners in B1 and B2. The school is the unit of treatment assignment, and different schools are randomly assigned to one of the following two treatment conditions: a treatment group or a control group. Schools in the treatment group will receive a full cycle of the T2E+ Activity from September 2021. Schools in the control group will be precluded from the T2E+ Activity while the present evaluation is taking place. These schools may retain a regular government primary curriculum. The child is the unit of outcome assessment. We initially planned to sample and assess a group of 4,800 learners in B1 and B2 across 100 treatment and 100 control schools at baseline and re-assess 18 months later at endline. Learners' oral language and reading outcomes are compared between the T2E schools and the control schools to assess the average treatment effects of the T2E program. Note that students who were evaluated at baseline (B1 and B2) advanced to B2 and B3 at endline (i.e., students assessed in B1 at baseline are the same students assessed in B2 at endline).

The cost of the T2E program (Q2): Given competing priorities and scarce resources in the education sector in Ghana, policymakers and donors can benefit from evidence not only about the effects of reading interventions such as the T2E program, but also about their costs. To provide such information, this study follows the 2021 USAID's Cost Analysis Guidance, analyzes the costs of different elements of the T2E program such as material provision, teacher training, coaching and monitoring, and estimates an average cost per beneficiary.

Factors affecting program effectiveness (Q3 – Quantitative): Curriculum interventions are inevitably influenced by local adaptation and contextual dynamics such as teacher buy-in, intervention compliance, language attitudes, implementation support from head teachers, or other institutional conditions such as class sizes or teacher-student ratios (Fixsen et al., 2009; Kam et al., 2003). We will examine contextual factors that may affect program outcomes in different school settings via a regression analysis.

The association between growth in local language reading skills and growth in English reading skills (Q4): To explore the relationship between local language reading skills and English reading skills, we employ a regression analysis. It is important to note that the statistical relationship analyzed in this particular research question is not causal but correlational. Hence, results should not warrant that growth in local language reading skills causes growth in English skills.

QUALITATIVE STRAND

Factors affecting program effectiveness (Q3 - Qualitative): Beside the quantitative investigation of factors affecting program effectiveness, we examined factors key program stakeholders, such as teachers, head teachers, curriculum leads, and School Improvement Support Officers and other government officials such as Assistant Directors of Supervision perceive to be supportive of and barriers to program effectiveness via a qualitative interview analysis.

MEASURES

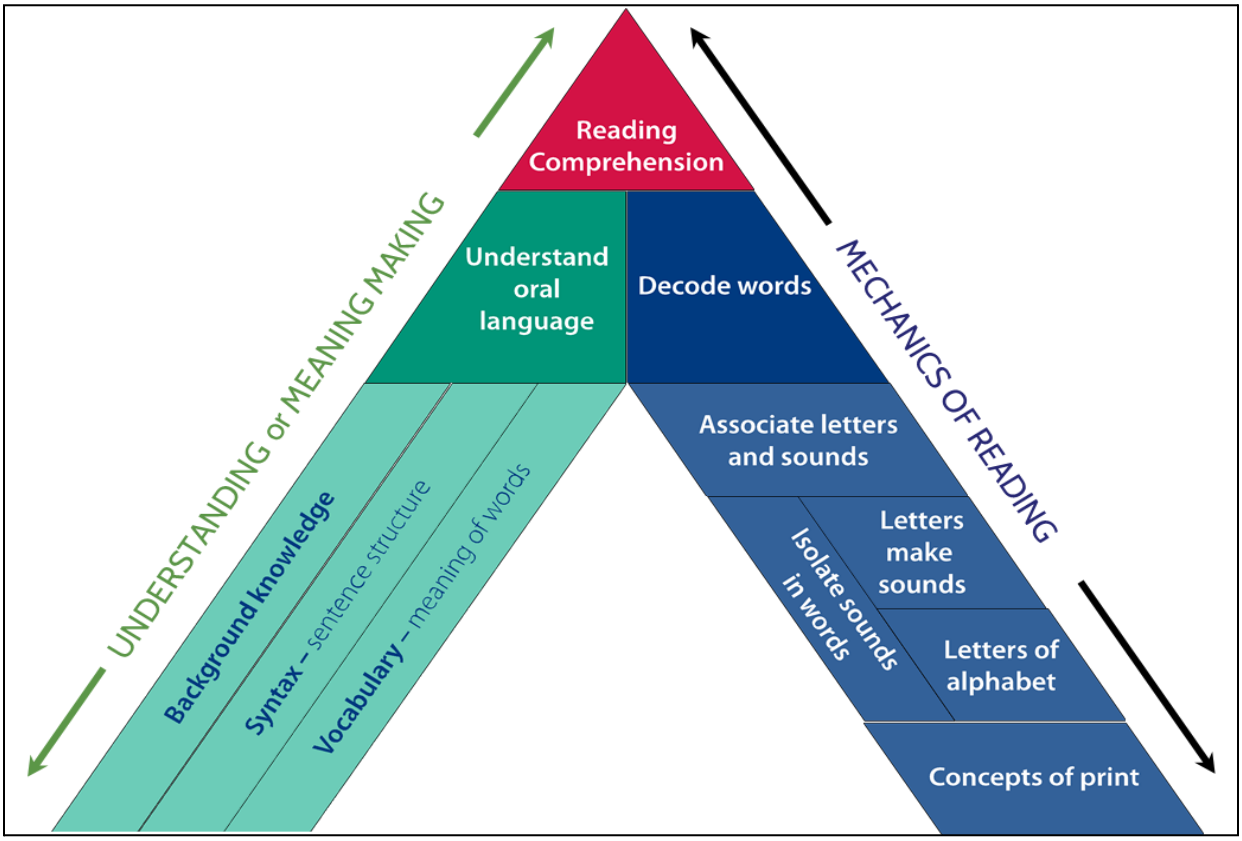
QUANTITATIVE STRAND

We used a survey questionnaire to gather information on children's background characteristics, including gender, age, the language they speak the most at home, and reading interactions within the family. To assess children's language and reading competencies, we used EGRA and USAID's Expressive Language Module (ELM). EGRA is a standardized assessment that measures children's foundational reading skills. Using EGRA, the SHARE team assessed three skills: (1) letter-sound identification—the ability to accurately read letters and letter names, (2) non-word reading—the ability to accurately decode invented or made-up words, and (3) oral reading fluency—the ability to read words with speed and accuracy. Each child was assessed on EGRA in English and in one of the Ghanaian Education System (GES) -approved local languages.

ELM is a performance-based language assessment that measures how well children speak and understand a specific language that is being assessed through EGRA, in this case English. Using ELM, the SHARE team assessed four language skills: (1) receptive vocabulary—the ability to understand a set of words and choose a corresponding image for each word, (2) expressive vocabulary—the ability to describe an image

in a proper English word, (3) story re-telling—the ability to understand a short or relatively long story read aloud and repeat the story in one's own words, and (4) story inference—the ability to draw conclusions or inferences about a short or relatively long story read aloud. The inclusion of ELM recognizes that children's oral language ability (as measured by the four skills in our evaluation) is a critical building block of reading comprehension (Dickinson & Porche, 2011; Resnick & Snow, 2009). As such, the four language skills measured by ELM in conjunction with the three decoding-focused reading skills measured in EGRA can jointly paint a more holistic picture of how children in the T2E+ Activity learn to read. In **Figure A2**, we visually illustrate how oral language skills and decoding skills are the two fundamentals of reading comprehension. Appendices V and VII provide more details on EGRA, ELM, and the resulting data.

Figure A2. A framework for cognitive foundations of learning to read. The Figure is adapted from Advancing Research, Improving Education. (2022). The Cognitive Foundations of Learning to Read: A Framework. https://sedl.org/reading/framework/



QUALITATIVE STRAND

School Actors: School actors were teachers, headteachers, SISO's and PTA/SMC members. SHARE used focus groups to solicit information from these school actors. The focus groups were developed by the evaluation team to enable the team to obtain information on implementation conditions at the school level and classroom level and to understand how these conditions impact teaching and learning in the classroom. This tool solicited information on approaches to implementing language education, teachers' views about the T2E+ program, learner response to the T2E+ program, teacher training, coaching, and mentorship, and T2E+ implementation practices.

Community Actors: The community-level focus group tools were designed by the evaluation team to elicit information from community members, including parents and PTA executives, on family and child language learning at home, children's language learning at school, parents' views about the T2E+ program, and parent support for language education at the school.

System Level Actors: At the system-level, key informant interviews were held with system-level actors such as district directors of education or their representatives, MOE officials, Ghana Education Service (GES) officials, National Council for Curriculum and Assessment (NaCCA) officials, National Teachers Council (NTC) officials, and Civil Society Organization(CSO) officials. The system-level interview solicited information on teacher preparation and deployment to schools, the T2E+ curriculum and teaching approaches, child language learning, performance monitoring and recommendations on how to improve or scale up the T2E+ program.

DATA COLLECTION

QUANTITATIVE STRAND

At baseline, a five-day residential training was conducted for the field team made up of 47 assessors, 6 supervisors and 3 coordinators on October 18-21, 2021 at Kumasi, Ghana. The training consisted of three days of classroom-based training and a one-day field-based pilot where enumerators had the opportunity to conduct the assessment in non-sampled schools. This field pilot provided enumerators the opportunity to practice with children and teachers and provided the assessment team the opportunity to finalize the data collection tools utilizing lessons learned from the field pilot. Because of the long delay between the training and start of field work, a one-day refresher training was conducted for on 28th, 29th and 30th October respectively for enumerators based on three zonal divisions of the field teams. Data collection took place on November 1 - December 4, 2021.

At endline, a total of 47 assessors and supervisors, mostly recruited from those who participated in the baseline exercise, were given a four-day residential training in Kumasi between October 26-29, 2022. To minimize attrition, the team carried out an effective community entry and engagement process, provided training to the field research team on strategies for identifying missed pupils, and generated a mop-up plan to guide teams on how to review missing data and schedule interview visits. Logistical support for field revisits and a monitoring system to track reasons for missingness were put in place.

QUALITATIVE STRAND

A total of 24 researchers, including the qualitative research lead, 3 supervisors, and 21 research assistants, were recruited from a pool of experienced researchers and research assistants who had at least two years of experience conducting key informant interviews, focus groups, and research ethics with communities and high-level government officials. The researchers underwent a four-day training on how to administer semi-structured interviews and how to conduct and facilitate focus groups. Training for the researchers was conducted on October 26-29, 2022. The training included a one-day field pilot

where the researchers had the opportunity to pilot the tools in a subset of schools in the Kumasi Metropolis. To ensure that the data collected was of good quality, field supervisors, the qualitative lead researcher, and the UDS project coordinator carried out spot checks and held daily debriefs with research assistants to examine what went well, challenges encountered, and strategies to mitigate the challenges. All interviews were audiotaped with consent from the interviewees.

COST DATA

Cost data was submitted to USAID by the Implementing Partner (IP) on a quarterly basis from July 2021 through December 2022. Cost data was reported in terms of direct expenditures by the IP as well as monetized contributions by the host government, the Government of Ghana. Cost data was reported against the following cost categories: Labor, Travel, Equipment and Supplies, Sub-recipients, Other Direct Costs, and Indirect Costs. Cost data was reported in US Dollars (USD) for direct expenditures and Ghanaian Cedis (GHS) for monetized contributions from the host government. Costs reported in GHS were converted to USD using the 2021 official exchange rate as reported in the World Bank World Development Indicators. Cost data submission varied from quarter to quarter in terms of format, but was always submitted as either an Excel spreadsheet or a PDF document. Below are definitions to several cost measurement terms that were applied throughout the evaluation:

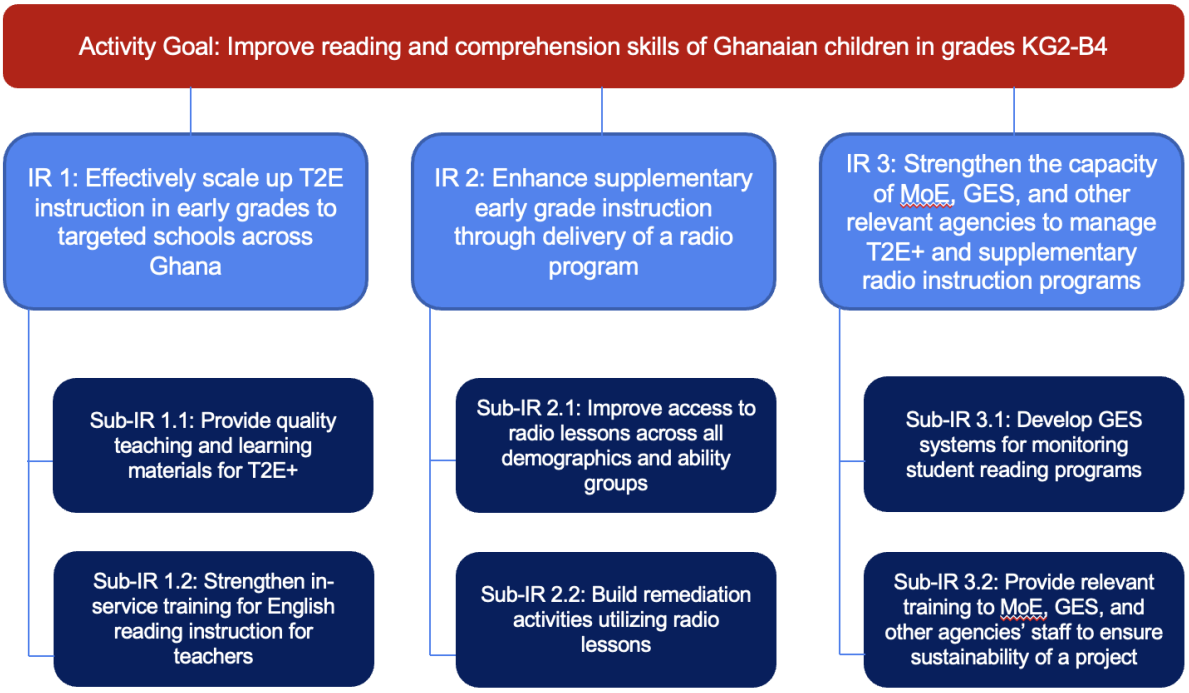
- **Cost economy:** analysis of the financial costs of an activity, including the monetized contributions from outside sources. The cost economy analysis includes the direct expenditures of USAID, through the IP, and direct contributions from the Government of Ghana (GOG) to program activities. The costs do not reflect any of the infrastructure costs required to implement the program, such as teacher salaries, school installations, etc. Costs in this cost economy analysis are presented in two ways: total cost and full cost. The Total Cost is the implementation cost of the specific activity component (e.g. Assessments and Evaluations). The Full Cost is the implementation cost plus the cost of "doing business" with USAID for each activity component. (e.g. In-Service Educator Training).

- **Cost efficiency**: the measure of the ratio of the output produced to the costs incurred. In this cost analysis, the unit of analysis for the output produced is the number of in-service educator training days. For this cost efficiency analysis, costs incurred were limited to the costs directly associated with the development and implementation of the In-Service Educator Training component of the T2E+ Activity. The number of teacher days in training was calculated by summing the number of teachers trained in each training session times the number of days trained.

- **Cost effectiveness**: the ratio of the cost of an intervention to the measured change in outcome. In this analysis, the unit of analysis is the cost per student to achieve the measured impact in oral reading fluency. To determine the cost effectiveness, only the cost categories which had a direct impact on the treatment group of students were used in the calculation.

ANNEX 3: DESCRIPTION OF FULL T2E+ ACTIVITY

Figure A3: T2E+ Results Framework



IR 1 – EFFECTIVELY SCALE UP T2E INSTRUCTION IN EARLY GRADES TO TARGETED SCHOOLS ACROSS GHANA

The first IR focuses on effectively scaling up T2E instruction in early grades to targeted schools across Ghana. T2E+ now includes 5,425 schools in 257 districts across all 16 regions of Ghana, and reaches over 22,000 teachers and more than 800,000 learners in B1-3.

Under IR1, there were two training sessions for teachers, with three days for each session. The first training focused on the use of Ghanaian language as the major language of instruction, whereas the second focused on the use of English as the medium of instruction. Teachers who were unable to attend the training sessions received refresher training. This foundational training prepared them to make use of the numerous and varied Teaching and Learning Materials (TLMs) provided through T2E+. The TLMs provided included:

- A curriculum with scripted lesson plans and an instruction schedule
- Teacher guides in GLOI and English

- Textbooks and activity books for students in GLOI and English
- Supplementary readers for students' personal use
- USB pen drives with copies of the radio reading lessons

In addition to these materials, teachers also had access to supplementary materials designed to provide additional support to students. For example, teachers received training in how to engage and instruct learners with specific disabilities. The English materials were also available in braille. Teachers utilized the results of the Annual Status of Education Report (ASER), a simple assessment tool for understanding a student's current reading level, to guide their use of targeted remediation activities.

In addition to training and materials, the teachers are also surrounded by a robust support network. At the school level, curriculum leads, head teachers, and/or assistant headteachers served as coaches and provided a number of services. These coaches regularly observed teachers and provided feedback and guidance based on their observations. At the same time, teachers participated in a biweekly Professional Learning Circle (PLC) with coaches, during which they discussed implementation and challenges related to T2E+. Further support is provided at the district and project level (under IR 3).

Classroom-level instruction for T2E+ commenced in mid-September 2021. The first three months of T2E+ instructions were focused on L1 reading skills including phonological awareness, fluency, writing, print concepts, oral language, and comprehension. English reading instructions were integrated in January 2022 alongside the GLOI instruction, with one hour of English lessons and 30 minutes of local language lessons each school day.

IR 2 – ENHANCE SUPPLEMENTARY EARLY-GRADE INSTRUCTION THROUGH THE DELIVERY OF RADIO PROGRAM

IR 2 is a continuation of the NRRP to provide further access to radio lessons across Ghana. These lessons provide opportunities for all learners across the country to encounter meaningful and pedagogically sound reading instruction. This includes remedial radio activities guided by the ASER assessment. The pen drives provided to teachers allow access to these materials in the classroom as well.

IR 3 – STRENGTHEN THE CAPACITY OF MOE, GES, AND OTHER RELEVANT AGENCIES TO MANAGE T2E+ AND SUPPLEMENTARY RADIO PROGRAMS

Under the third IR, a further series of support systems are provided to aid teachers as they implement T2E+. At the district level, School Improvement Support Officers (SISOs), National Core Trainers, and District Teacher Support Teams work to monitor and improve the implementation of T2E+ across all districts. They provide coaching and mentorship alongside school-level coaches, as well as provide higher support. SISOs in particular support IR 3 through a monitoring plan to use data to track the progress of implementation and address achievement gaps to improve pupil learning. These SISOs are trained in the use of T2E+ teaching and learning materials, coaching, and monitoring. They monitor the fidelity of T2E+ implementation through school visits, phone surveys, and community visits. The data they collect is sent to a GES server for rapid analysis and visualization. SISOs can then present the data to schools and districts so they can create action plans. At the national level, a working group for T2E+ also reviews the data for monitoring the overall progress of implementation and designing interventions where necessary.

ANNEX 4: STATISTICAL COMPARISON OF BACKGROUND CHARACTERISTICS AND EGRA/ELM SCORE TABLES

BALANCE OF BACKGROUND CHARACTERISTICS

Table A1 provides a comparison of the characteristics of children in treatment and control schools in B2 and B3, respectively, after accounting for attrition. The data shows that the two groups were balanced in terms of demographic, socioeconomic, and home learning environment characteristics in both B2 and B3. For Basic 2, the average age of children was 8.1 years, and the average number of school absences reported was 0.6 days in the past week. The gender distribution was equal between boys and girls, and 65% spoke the same language at home and in school. Additionally, 26% reported their parents reading to them at home, and 7% attended a school with a library. For Basic 3, the pattern is nearly the same with the pattern observed for Basic 2 except that the average age of children was 9.2 years and the absenteeism rate was slightly higher than Basic 2.

Table A1: Balance test of child characteristics at endline after attrition

Characteristics	Basic 2				Basic 3			
	Treatment (T)	Control (C)	Difference (T – C)	Balanced? (✔ = yes, ✗ = no)	Treatment (T)	Control (C)	Difference (T – C)	Balanced? (✔ = yes, ✗ = no)
Individual characteristics								
Age in years	7.99	8.18	-0.19	✔	9.19	9.28	-0.09	✔
Girl	0.50	0.49	0.01	✔	0.51	0.49	0.01	✔
Physically disabled	0.05	0.07	-0.02	✔	0.09	0.10	-0.01	✔
LOI-Child-Teacher mismatch	0.67	0.64	0.02	✔	0.67	0.66	0.01	✔
Days absent last week	1.60	1.65	-0.04	✔	1.79	1.71	0.08	✔
Ate before coming to school	0.77	0.79	-0.02	✔	0.78	0.74	0.04	✔
Family environments								
Family's SES*	-0.09	0.06	-0.14	✔	-0.05	0.07	-0.12	✔
Home reading resources*	0.09	0.07	0.02	✔	-0.07	-0.09	0.01	✔
Parents read to the child	0.26	0.26	0.00	✔	0.23	0.28	-0.05	✔
Siblings read to the child	0.43	0.43	-0.01	✔	0.40	0.47	-0.07	✔
School/community environments								
Teachers use English outside classroom	0.77	0.82	-0.05	✔	0.74	0.83	-0.09	✔
People use English in community	0.33	0.33	0.00	✔	0.32	0.37	-0.05	✔

Urban school	0.27	0.33	-0.06	✔	0.26	0.32	-0.06	✔
School has a library	0.09	0.04	0.05	✔	0.10	0.05	0.05	✔
Weekly lesson hours for reading	4.73	5.34	-0.61	✔	4.87	5.21	-0.34	✔

BALANCE IN LANGUAGE AND READING OUTCOMES

Table A2 presents balance tests on baseline EGRA and ELM scores. These tests are important to confirm that the children in the treatment schools and those in the control schools were at similar levels of performance at baseline so that any differences in their endline scores may be attributed to the T2E+ interventions. For Basic 2, the children in treatment schools had similar scores on the various assessments at baseline. Of the 12 individual subtasks, there were no statistically significant differences between the two groups of schools except for the letter sound identification on the local language EGRA. The performances were largely similar between children in treatment and control schools for Basic 3 too except that children in the treatment schools performed better in letter sound identification and non-word reading in the local language EGRA and letter sound identification in the English language EGRA.

Table A2: Basic 2 & 3 Baseline Balance in Test Scores After Attrition

Outcome		Basic 2				Basic 3			
		Treatment (T)	Control (C)	Difference (T – C)	Balanced? (✔ = yes, ✗ = no)	Treatment (T)	Control (C)	Difference (T – C)	Balanced? (✔ = yes, ✗ = no)
EGRA: Early Grade Reading Assessment	***Local Languages***								
	Letter-sound identification	18.7	15.0	3.7 *	✗	25.4	19.4	6.0**	✗
	Non-words reading	2.4	2.2	0.2	✔	5.0	3.7	1.3*	✗
	Oral reading fluency	2.1	2.1	0.0	✔	5.2	4.0	1.2	✔
	English								
	Letter-sound identification	21.9	20.1	1.8	✔	28.0	24.3	3.4*	✗
	Non-words reading	2.8	3.0	-0.2	✔	5.8	5.2	0.6	✔
	Oral reading fluency	4.5	5.3	-0.8	✔	9.5	9.5	0.0	✔
ELM: Expressive Language Module	***English***	Treatment (T)	Control (C)	Difference (T – C)	Balanced? (✔ = yes, ✗ = no)	Treatment (T)	Control (C)	Difference (T – C)	Balanced? (✔ = yes, ✗ = no)
	Receptive vocabulary	8.6	8.7	-0.1	✔	9.1	9.0	0.1	✔
	Expressive vocabulary	15.2	15.3	-0.1	✔	16.4	16.4	0.0	✔

	Short story retelling	1.2	1.1	-0.1	✔	1.3	1.3	0.0	✔
	Short story inference	0.2	0.2	0.0	✔	0.3	0.3	0.0	✔
	Long story retelling	1.0	0.9	0.1	✔	1.0	1.0	0.0	✔
	Long story inference	0.1	0.2	-0.1	✔	0.2	0.2	0.0	✔

EFFECTS ON CHILDREN WHO SCORE ZEROS AND AT/ABOVE BENCHMARKS

Table A3: Effect on children with zero scores and children who scored at or above national benchmarks at endline

Characteristics	Basic 2				Basic 3			
	Treatment (T)	Control (C)	Difference (T – C)	p-value	Treatment (T)	Control (C)	Difference (T – C)	p-value
PANEL A: PERCENT OF STUDENTS WITH ZERO SCORES								
EGRA local language								
Letter sound identification	12.5%	18.1%	-5.6%	0.05	6.5%	14.3%	-7.8%***	0.00
Non-word reading	53.2%	62.4%	-9.2%*	0.01	37.1%	51.3%	-14.2%***	0.00
Oral reading fluency	49.9%	61.4%	-11.4***	0.00	34.6%	51.4%	-16.8%***	0.00
EGRA English language								
Letter round identification	6.3%	9.8%	-3.5%	0.10	2.9%	7.2%	-4.3%***	0.00
Non-word reading	44.4%	49.4%	-5.0%	0.05	28.0%	40.7%	-12.7%***	0.00
Oral reading fluency	27.2%	28.1%	-0.9%	0.63	14.7%	17.4%	-2.7%	0.11
ELM: English								
Receptive vocabulary	0.4%	0.4%	0.0%	0.88	0.0%	0.1%	-0.1%	0.30
Expressive vocabulary	0.0%	0.5%	-0.5%	0.50	0.0%	0.2%	-0.2%	0.16
Short story retell	23.5%	24.1%	-0.6%	0.88	27.3%	21.6%	5.7%	0.88
Short story meaning	64.7%	69.5%	-4.8%**	0.03	57.4%	64.6%	-7.2%*	0.02
Long story retell	16.8%	19.0%	-2.2%	0.30	10.7%	11.3%	-0.6%	0.40
Long story meaning	73.9%	78.6%	-4.7%	0.12	67.7%	73.4%	-5.7%*	0.02
PANEL B: PERCENT AT OR ABOVE NATIONAL BENCHMARK								
EGRA local language								
Letter round identification	23.7%	16.2%	7.5%*	0.02	42.4%	24.7%	17.6%***	0.00
Non-word reading	9.8%	6.2%	3.6%	0.05	15.8%	8.5%	7.3%***	0.00
Oral reading fluency	4.4%	1.9%	2.5%*	0.01	7.0%	3.2%	3.9%*	0.01
EGRA English language								
Letter round identification	38.3%	31.7%	6.6%*	0.02	56.1%	43.1%	12.9%***	0.00
Non-word reading	16.4%	13.7%	2.7%	0.14	27.9%	18.8%	9.1%***	0.00
Oral reading fluency	12.7%	9.2%	3.5%*	0.04	20.1%	14.8%	5.4%***	0.00

Notes: Tables reports regression results that control for the following baseline covariates: age, gender, indicator for having a disability, number of days a child was absent from school in the last week, whether the child ate before coming to school, indicators variables for being high SES, high HLE, parents reading to the child, sibling reading to the child, English being spoken at school, match between the child's language and language of instruction in school, English being spoken in the community, school location in an urban area, school having a library, class size and the number of hours dedicated to reading in the school. BF p-value refers to Bonferroni-corrected p-values. *** p<0.001, ** p<0.01, p<0.05 based on BF values. Standard errors were clustered at the school level.

PERCENTAGES OF CHILDREN WITH SCORE ZEROS

Figure A4 below graphically presents the percentages of children who score zero at baseline on EGRA and ELM tests between treatment and control schools for Basic 2. Figure A5 provides the same information at endline.

Figure A4: Baseline percentage of children with zero scores in Basic 2

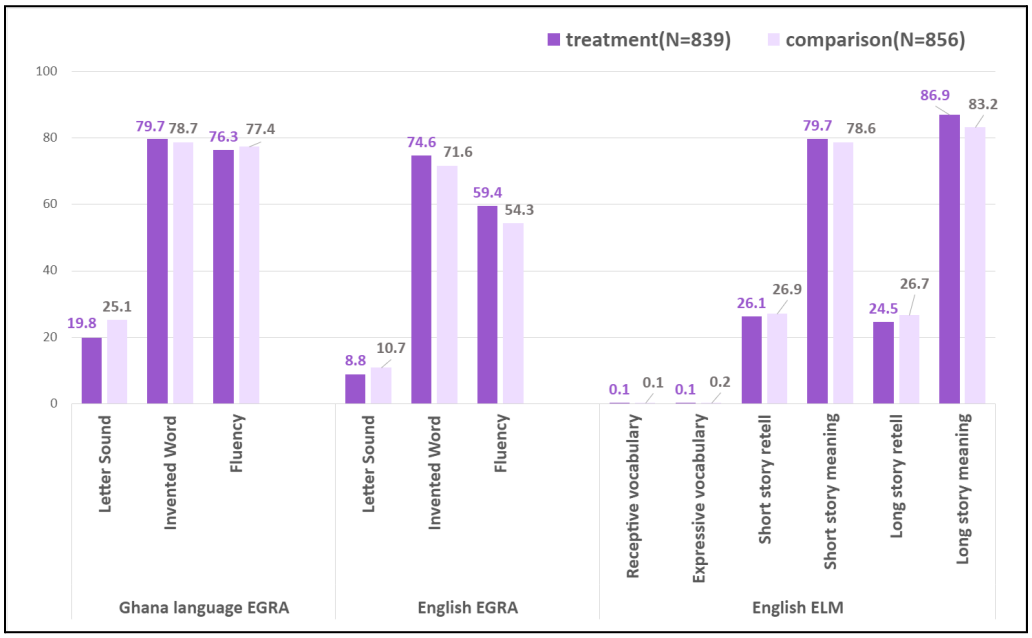


Figure A5: Endline percentage of children with zero scores in Basic 2

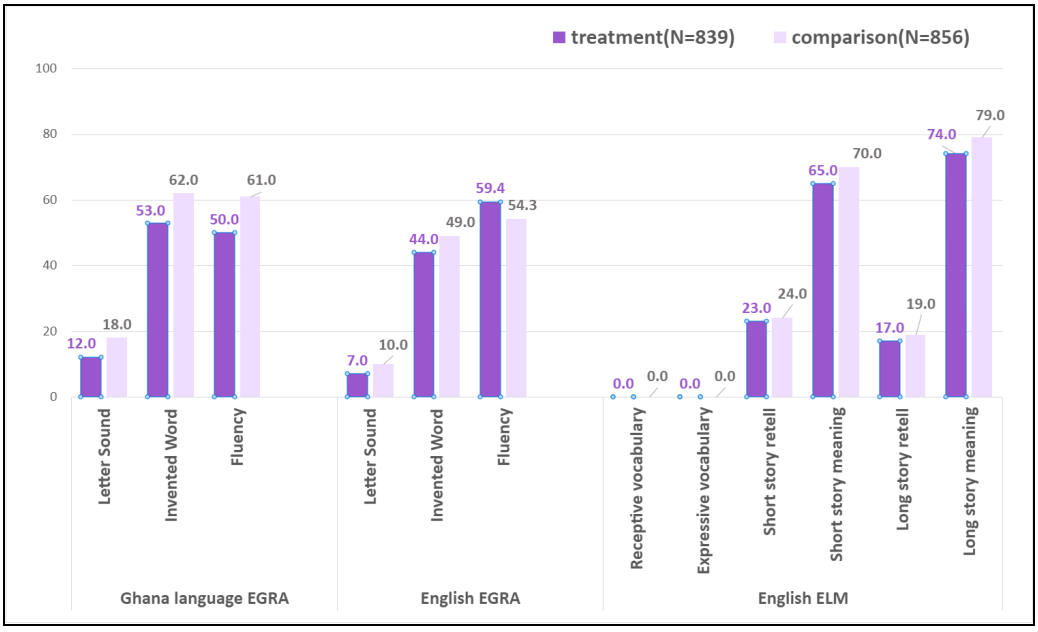


Figure A6 below graphically presents the percentages of children who score zero at baseline on EGRA and ELM tests between treatment and control schools for Basic 3. Figure A7 provides the same information at endline.

Figure A6: Baseline percentage of children with zero scores in Basic 3

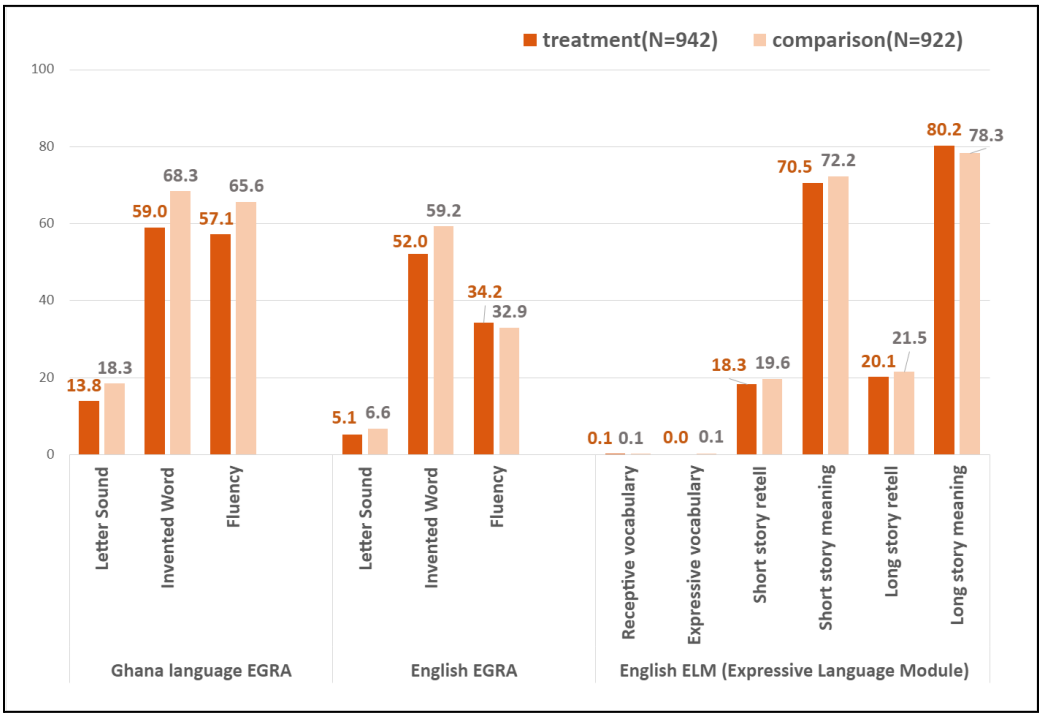
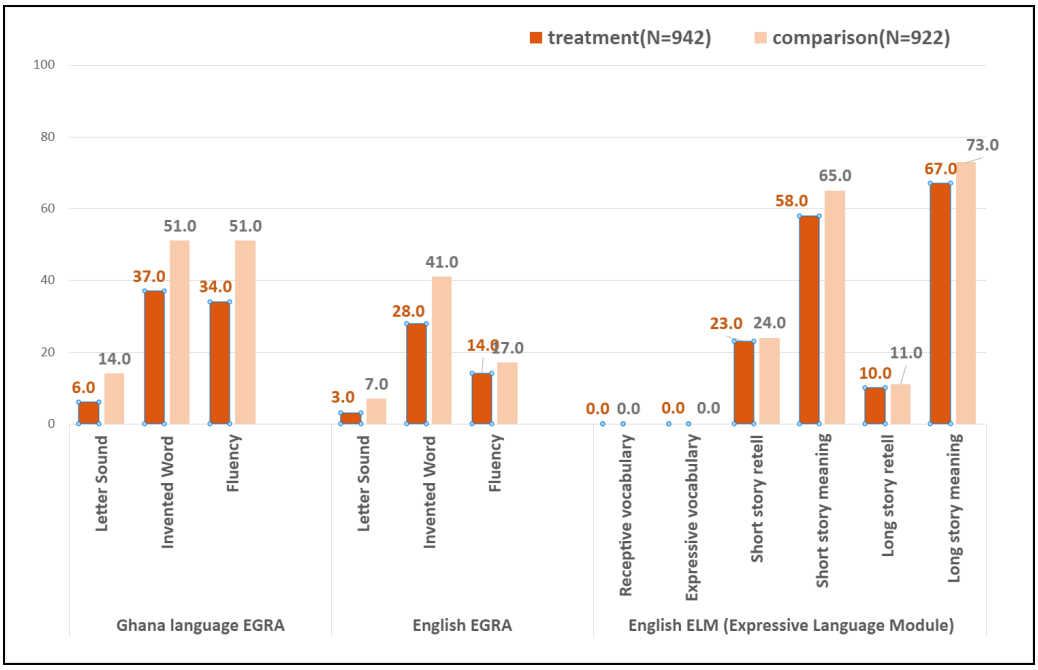


Figure A7: Endline percentage of children with zero scores in Basic 3



DIFFERENTIAL EFFECTS BY SUBGROUPS

Table A4: Differential Effect of T2E+ by gender

	BASIC 2		BASIC 3	
	Girls - Boys	P-value	Girls - Boys	P-value
Ghanaian Language EGRA				
Letter Sound	-0.04	0.98	-1.67	0.31
Non-word Reading	0.90	0.23	-0.56	0.51
Oral Reading	0.50	0.58	-0.77	0.43
English Language EGRA				
Letter Sound	0.12	0.94	-1.81	0.24
Non-word Reading	1.57**	0.04	-0.44	0.61
Oral Reading	1.55	0.30	0.57	0.70
English Language ELM				
Receptive Vocabulary	-0.15	0.19	0.08	0.36
Expressive Vocabulary	-0.10	0.71	-0.23	0.31
Story retell (short)	-0.05	0.56	-0.04	0.64
Meaning of Story (short)	-0.01	0.85	0.01	0.78
Story retell (long)	0.08	0.16	-0.03	0.64
Meaning of Story (long)	0.01	0.76	-0.09**	0.02

Notes: Statistical significance is marked as *p<.05 **p<.01 *** p<.001.Table reports regressions results that include interaction terms of a dummy variable for being in treatment school and a dummy variable for being in a girl. Standard errors are clustered at the school level.

Table A5: Differential Effect of T2E+ by location and household socioeconomic status

	BY LOCATION (URBAN VS RURAL)				BY SES (HIGH VS LOW)			
	BASIC 2		BASIC 3		BASIC 2		BASIC 3	
	Urban - Rural	P-value	Urban - Rural	P-value	High - Low	P-value	High - Low	P-value
Ghanaian Language EGRA								
Letter Sound	1.98	0.53	-1.22	0.66	-0.34	0.86	0.97	0.63
Non-word Reading	-0.82	0.56	-0.77	0.60	0.19	0.81	0.97	0.33
Oral Reading	0.64	0.71	2.92	0.07	1.35	0.22	0.83	0.46
English Language EGRA								
Letter Sound	2.53	0.40	-4.19	0.13	1.07	0.59	-1.27	0.52
Non-word Reading	-0.67	0.68	-0.33	0.82	0.15	0.88	0.22	0.83
Oral Reading	2.97	0.31	4.83	0.11	0.09	0.96	4.49*	0.01
English Language ELM								
Receptive Vocabulary	0.17	0.32	-0.14	0.25	-0.09	0.65	-0.13	0.40
Expressive Vocabulary	-0.48	0.31	-0.27	0.49	-0.32	0.44	-0.14	0.72
Story retell (short)	-0.17	0.44	-0.74*	0.02	-0.10	0.59	-0.26	0.10
Meaning of Story (short)	-0.16*	0.02	-0.09	0.23	-0.04	0.41	-0.01	0.85
Story retell (long)	-0.05	0.77	-0.09	0.40	-0.10	0.27	-0.03	0.65
Meaning of Story (long)	0.01	0.89	0.02	0.84	0.01	0.88	-0.01	0.84

Notes: Statistical significance is marked as *p<.05 **p<.01 *** p<.001. Table reports regressions results that include interaction terms of a dummy variable for being in treatment school and a dummy variable for being in a girl. All regressions include a full set of covariates. Standard errors are clustered at the school level.

ANNEX 5: INFORMED CONSENT AND DATA COLLECTION INSTRUMENTS

GHANA ATOMIC ENERGY COMMISSION

RADIOLOGICAL AND MEDICAL SCIENCES RESEARCH INSTITUTE (RAMSRI)

Ethical Review Committee (ERC)

PUPIL ASSENT SCRIPT

Section A- BACKGROUND INFORMATION

Title of Study:	Supporting Holistic and Actionable Research in Education (SHARE) Ghana T2E Impact Evaluation
Principal Investigator:	Jeongmin Lee, Research Technical Advisor
Certified Protocol Number	

My name is _____. I am working with a study for the Ghana Education Service. We are trying to understand how children learn to read. Yours is one of the schools we have chosen to help us. We would like your help in this process too. However, you do not have to participate in the study if you do not want to.

I will ask you some questions in English/Local Language and show you some letters, words, and short stories that I want you to answer in English/Local Language. This is NOT a test and it will not affect your grades in school. Nobody at your school will know how you do.

I also have some questions about your reading classes. I will also ask some questions about which languages you use and some things about your family back at home. This should take 30 minutes or less.

We will NEVER share your name or your answers with anyone who is not participating in the study.

I repeat, you do not need to participate in this study if you do not want to. If there are any questions you do not want to answer after we have already started, you can choose not to answer them. Can we start?

GHANA ATOMIC ENERGY COMMISSION

RADIOLOGICAL AND MEDICAL SCIENCES RESEARCH INSTITUTE (RAMSRI)

Ethical Review Committee (ERC)

PROTOCOL CONSENT FORM

Section A- BACKGROUND INFORMATION

Title of Study:	›porting Holistic and Actionable Research in Education (SHARE) Ghana T2E Impact Evaluation
Principal Investigator:	Jeongmin Lee, Research Technical Advisor
Certified Protocol Number	

Section B– CONSENT TO PARTICIPATE IN RESEARCH

General Information about Research

- State clearly the purpose of the study in easily-understood words (avoid the use of jargons and technical language).
- Indicate the expected duration that will be required of participants in the study.
- Give a description of the procedures/methods to be followed and the identification of any procedures which are experimental and what the participant(s) is supposed to do.

Benefits/Risk of the study

Indicate specifically the benefits and risks associated with the study. Include all physical, social and psychological risk and benefits anticipated.

Confidentiality

- Describe the extent to which confidentiality of records identifying the participants will be maintained.
- Indicate all groups that may have direct access to the research records at any particular time. Thus they sign or thumb print a written consent form, the participant or their representative is authorizing such access.

Compensation

- State clearly if there are any compensation packages either in cash or kind available for participants who participate in the study.
- The exact amount or gift to be given must be clearly spelt out.
- The conditions for receiving the package and when it will be made should also be indicated (usually compensation should be given at the end of the study)

Withdrawal from Study

- State that participation is voluntary and participants may withdraw at any time without any penalty.
- More specifically, state that the participant will not be adversely affected if he/she declines to participate or later stops participating.
- Provide assurance that the participant or the participant's legal representative will be informed in a timely manner if information becomes available that may be relevant to the participant's willingness to continue participation or withdraw.
- Any circumstances and/or reasons under which the participant's participation may be terminated should be stated clearly.

Contact for Additional Information

- This statement should indicate whom to contact for answers to any questions about the research and whom to contact in case of research-related injury.
- Names, addresses and telephone numbers (including mobile numbers) should be made accessible to all participants.
- If you have any issues on your rights as a participant you can contact the address below:
  Administrator, Radiological and Medical Sciences Research Institute's Ethical Review Committee
  Ghana Atomic Energy Commission
  P. O. Box LG 80
  Legon – Accra
  Tel: +233200402735 –or 0303968932
  Email: tishjon@yahoo.com / tishjon2@gmail.com

Section C- VOLUNTEER AGREEMENT

"I have read or have had someone read all of the above, asked questions, received answers regarding participation in this study, and am willing to give consent for me, my child/ward to participate in this study. I will not have waived any of my rights by signing this consent form. Upon signing this consent form, I will receive a copy for my personal records."

_____

Name of Volunteer

_____

_____

Signature or Mark of volunteer Date

If volunteers cannot read the form themselves, a witness must sign here:

I was present while the benefits, risks and procedures were read to the volunteer. All questions were answered and the volunteer has agreed to take part in the research.

_____

Name of witness

_____

_____

Signature of witness Date

I certify that the nature and purpose, the potential benefits, and possible risks associated with participating in this research have been explained to the above individual.

_____

Name of Person who obtained Consent

_____

_____

Signature of Person who obtained Consent Date

GHANA ATOMIC ENERGY COMMISSION

RADIOLOGICAL AND MEDICAL SCIENCES RESEARCH INSTITUTE (RAMSRI)

Ethical Review Committee (ERC)

PROTOCOL CONSENT FORM – **IN LOCO PARENTIS**

Section A- BACKGROUND INFORMATION

Title of Study:	Supporting Holistic and Actionable Research in Education (SHARE) Ghana T2E Impact Evaluation
Principal Investigator:	Jeongmin Lee, Research Technical Advisor
Certified Protocol Number	

Section B– CONSENT TO PARTICIPATE IN RESEARCH

General Information *About* Research

My name is _____, and I am from the University for Development Studies (UDS) Ghana, a public University in Ghana, a partner of SHARE, University of Notre Dame funded by the United States Agency for International Development (USAID)'s mission in Ghana for the Ghana T2E Impact Evaluation. We are conducting research to assess the impact of the Ghana Transition to English Activity which supports children, teachers and schools to develop reading and comprehension skills at an early stage of education across 100 districts of Ghana. The results of this study will be used by the Ghana Education Service and USAID to inform future programs aimed at helping children in Ghana become good readers. This school is among 200 schools across the 16 regions of Ghana, selected to take part in this study through a process of statistical sampling for baseline.

Should you agree for your school to participate, this will involve a verbal interview with you and brief learning assessments and interviews with a group of B1 and B2 pupils. Specifically, ten (12) P1 pupils, making up of 6 girls and 6 boys and twelve (12) P2 making up of 6 girls and 6 boys are to be randomly selected from a B1 and B 2 classrooms, ideally that of the same B1 and B2 teacher that was selected last year.

Since children in this school are under your care during school hours, we are asking for your consent for their participation, on behalf of the children's parents. If you agree to allow the children to participate, they will be asked to take Early Grade Reading assessments, Expressive Language Module Assessment and Child background survey in the Ghanaian language of instruction as well as in English. The learning assessments will provide us with information on their literacy abilities in the local language as well as English. In addition, we will ask some questions about attendance, languages spoken, reading habits, and household assets. The assessments should take about 40 minutes per pupil to complete and will take place at school during regular

school hours as the school schedule allows. All data collection activities at this school should be completed within approximately 4 hours.

Benefits/*Risks* of the *Study*

There are no direct benefits to you for participating in the study, however, information collected in this study may benefit this and other schools in the future by improving early grade reading programming. Additionally, there are no known risks associated with this study, other than time lost from the classroom, which is expected to be no more than 40 minutes per pupil. To ease the disruption of class time that this might cause, the team will try to engage students for the assessments at a time convenient with their class schedules.

Confidentiality

Every effort will be made to keep any information collected about yourself, children, teachers, and this school strictly confidential. To keep information about participants safe, each member of the research staff has signed a confidentiality agreement prior to conducting any data collection tasks. Any papers or electronic data with personal identifying information will be stored on password-protected electronic devices or in a locked room and no person outside of the research team will have access to this information. Upon conclusion of the study, all personal identifying information will be destroyed.

Compensation

There is no compensation provided for participating in this study. There is no direct benefit to children in your school for taking part in the study.

Withdrawal from Study

You and each of the pupils involved in this study can choose not to participate at all or to leave the study at any time, without penalty. Regardless of your or any child's decision to participate in the research or not, there will be no negative consequences.

Contact for Additional Information

If you have any questions regarding this interview or this research project in general, please contact the SHARE local implementing Institution through Dr. Dennis Chirawurah, Phone No. 0243507505

Your Rights as a Participant

This research has been reviewed and approved by the Radiological and Medical Science Research Institute of Atomic Energy Commission. If you have any issues on your rights as a participant, you can contact the Ethical Review Committee office between the hours of 8am-4:30pm through the telephone number or address provided below:

Administrator, Radiological and Medical Sciences Research Institute's Ethical Review Committee
Ghana Atomic Energy Commission
P. O. Box LG 80
Legon – Accra
Tel: +233200402735 or 0303968932
Email: tishjon@yahoo.com / tishjon2@gmail.com

Section C - VOLUNTEER AGREEMENT

"The above document describing the benefits, risks, and procedures for the research titled "Ghana Early Grade Reading Impact Evaluation" has been read and explained to me. I have been given an opportunity to have any questions about the research answered to my satisfaction. I voluntarily agree to allow the children in my school to participate in this study provided they verbally assent to do so. I will not have waived any of the rights of children in my school by signing this consent form. Upon signing this consent form, I will receive a copy of the form for my personal records."

Head Teacher's Name	Head Teacher's Signature	Date

STATEMENT OF PERSON OBTAINING INFORMED CONSENT:

I certify that the nature and purpose, the potential benefits, and possible risks associated with participating in this research have been explained to the above individual.

Name of Person Obtaining Informed Consent	Signature of Person Obtaining Informed Consent	Date

Please provide one signed copy of this form to the Head Teacher and retain one copy for ILC Africa's records.

Child background survey

Section 1: Location and IDs

1. Date (dd/mm/yy): _____

2. Assessor name: _____

3. Assessor code: _____

4. Region (name and code): _____

5. District (name and code): _____

6. School (name and code): _____

Section 2: Child profile

7. Child name (family name + given name) _____

8. Gender
    1) Boy
    2) Girl

9. How old are you? (In years)

10. Which grade are you in?
    1) Basic 1
    2) Basic 2

11. Did you eat before coming to school today?
    1) Yes
    2) No

12. In the last week, how many days were you absent from school?
    1) Never
    2) 1 day
    3) 2 days
    4) 3 days
    5) 4 days
    6) Entire week

Section 3: Family and home profile

13. In your home, does your family have...?
    - Radio
      1) Yes [ ] 2) No [ ]
    - Mobile phone
      1) Yes [ ] 2) No [ ]
    - Television
      1) Yes [ ] 2) No [ ]
    - Electricity
      1) Yes [ ] 2) No [ ]
    - Refrigerator
      1) Yes [ ] 2) No [ ]
    - Bicycle
      1) Yes [ ] 2) No [ ]

- Motorbike
  1) Yes [ ] 2) No [ ]

- Toilet
  1) Yes [ ] 2) No [ ]

14. In your home, do you have….?
    - Newspaper
      1) Yes [ ] 2) No [ ]

    - Magazine
      1) Yes [ ] 2) No [ ]

    - Textbook
      1) Yes [ ] 2) No [ ]

    - Story books
      1) Yes [ ] 2) No [ ]

    - Comic books
      1) Yes [ ] 2) No [ ]

    - Religious books
      1) Yes [ ] 2) No [ ]

Section 4: Language profile

15. What is the language you most often speak at home? (Select only one)
    1) English
    2) Akuapem Twi
    3) Asante Twi
    4) Dagaare
    5) Dagbani
    6) Dangme
    7) Ewe
    8) Ga
    9) Gonja
    10) Gurene
    11) Fante
    12) Kasem
    13) Nzema
    14) Other language

16. (*If the child chose 'other language') Specify:_____

17. Do other adults in your school teach or speak to you in English outside the classroom?

1) Yes 2) No

Section 5: Reading behavior

18. Who do you live with? (Select all that apply)

1) Parents/Guardians
2) Siblings (e.g., sister(s), brother(s)
3) Other members (e.g., grandma, grandpa)

19. (For each person the child names): In this last week, did your (Selected Family Member) read to you?

1) Yes 2) No

EGRA (e.g., Akuapem Twi)

Sub-test 1. ORAL VOCABULARY	**Page 1**	
Eyinom yɛ nneɛma ahorow bi mfonini.Mepa wo kyɛw, bɔ ade biara din wɔ Borɔfo kasa mu. [point to the bird] Sɛ ebia: Eyi yɛ "bird" mfonini. Sɛ wuhu saa mfonini yi a, ka asɛmfua "bird". Here are pictures of some objects. Please tell me the name of each object in English. For example, [point to the bird], this is a picture of a bird. When you see this picture, you say the word "bird." **Ma me ne wo nyɛ bi nhwɛ:Bɔ saa ade yi din wɔ Borɔfo kasa mu. [point to the dog]** Let's practice. Tell me the name of this object [point to the dog]. ✓**Mo.Eyi yɛ "dog".** Good. That is a dog. ✗[point to the dog] **Eyi yɛ "dog". Bɔ saa ade yi din wɔ Borɔfo kasa mu.** This is a dog. Tell me the name of this object in English. **Sɛ wudu mfonini a wunnim ne din so a, kɔ nea edi so no so.Fa wo nsateaa si mfonini a edi kan no so.**If you come to a picture that you do not know, go on to the next picture. Put your finger on the first picture. **Woayɛ krado? Ma yemfi ase.**Ready? Let's Begin. book | frog | plane | duck trousers | monkey | banana | flower		If a child hesitates for 3 SECONDS, go on to the next word. If the child does not provide a single correct response on the first line (4 items), say "Thank you!", discontinue this subtask, check the box at the bottom, and go on to the next subtask. If the child does not respond in English, stop the child and ask him/her to respond in English – do this only once, and after that mark any non-English responses as incorrect.
Exercise discontinued because the child had no correct answers in the first line		

Mo! Woayɛ ade. Yɛnkɔ ɔfa a edi so no so. Good effort! Let's go on to the next section.

Sub-test2. LETTER SOUND IDENTIFICATION	**Page 2**	60 seconds
🗣 **Wɔakyerɛw Borɔfo kasa nkyerɛwde wɔ saa kratafa yi so. Mepa wo kyɛw, ka nkyerɛwde yi nnyigyei dodow biara a wubetumi wɔ Borɔfo kasa mu. Ɛnyɛ wɔn din na mmom wɔn nnyigyei.** Here is a page full of letters of the ENGLISH alphabet. Please tell me the SOUNDS of as many letters of the alphabet as you can. Not their names, but their sounds. [point to the letter T] **Nhwɛso. Akyerɛwde yi mu nnyigyei ne /t/.** For example, the sound of this letter is /t/. [point to the letter M] **Afei yenni dwuma no. Ka nnyigyei a wote fi saa akyerɛwde yi mu.** Let's practice: Tell me the sound of this letter. ✓🗣 **Eye, woatwa, ɛyɛ [m] nnyigyei** Good, the sound of this letter is /m/. ✗🗣 **Nnyigyei no ne /m/.** The sound of this letter is /m/. [point to the letter S] **Bɔ foforo bio. Ka akyerɛwde yi nnyigyei kyerɛ me.** Now let us try another one. Tell me the sound of this letter. ✓🗣 **Eye, woatwa, nnyigyei no yɛ /s/.** Good, the sound of this letter is /s/. ✗🗣 **Nnyigyei a efi akyerɛwde yi mu no ne /s/.** The sound of this letter is /s/. [point to first letter] **Minya ka se 'Fi Ase' a, fi ase wɔ ha na wie krataa no so de nyinaa.Fa wo nsa si akyerɛwde no so na bɔ nne nnyigyei no dennennen.Wudu akyerɛwde bi so na wunnim ne nnyigyei no a, kɔ akyerɛwde foforo so.Fa wo nsateaa si akyerɛwde a edi kan no soMetumi afi ase? Hyɛ ase.** When I say "Begin," start here and go across the page. Point to each letter and tell me the sound of that letter in a loud voice. Read as quickly and carefully as you can. If you come to a letter you do not know, go on to the next letter. Put your finger on the first letter. Ready? Begin.	Start the timer when the child reads the first letter. ➲ If a child hesitates or stops on a letter for 3 SECONDS, point to the next letter and say "Go on" If the child does not respond in English, stop the child and ask him/her to respond in English – do this only once, and after that mark any non-English responses as incorrect. ✋ When the timer reaches 0, say "stop." ✋ If the child does not provide a single correct response on the first line (10 items), say "Thank you!", discontinue this subtask, check the box at the bottom, and go on to the next subtask.

✍ (/) Mark any incorrect letters with a slash
(Ø) Circle self-corrections if you already marked the letter incorrect
( ]) Mark the final letter read with a bracket

Examples: t m s

1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	
o	T	i	A	E	N	e	E	r	t	*(10)*
o	s	L	o	S	R	L	S	n	s	*(20)*
R	t	M	a	e	D	A	c	m	A	*(30)*
I	y	i	p	R	E	s	N	U	w	*(40)*
e	k	E	t	i	R	g	I	b	S	*(50)*
S	Z	n	e	c	s	a	i	O	n	*(60)*
N	d	r	M	A	u	E	a	I	d	*(70)*
s	D	f	r	I	J	P	T	Y	W	*(80)*
B	V	a	F	T	h	p	G	K	M	*(90)*
X	E	f	Q	O	H	I	r	I	T	*(100)*

✍ Time remaining on stopwatch at completion (number of SECONDS)	
✍ Exercise discontinued because the child had no correct answers in the first line	

Mo! Woayɛ ade. Yɛnkɔ ɔfa a edi so no so. Good effort! Let's go on to the next section.

Sub-test3. NON-WORD READING	**Page 3**	60 seconds
🗣 **Eyinom yɛ nsɛmfua bi a wɔahyehyɛ no Borɔfo kasa mu. Mepɛ sɛ wokenkan dodow biara a wubetumi. Ɛnsopɛle na mmom kenkan.** Here are some made-up words in ENGLISH. I would like you to read as many as you can. Do not spell the words, but read them. [point to the word "ut"]**Sɛ ebia saa asɛmfua yi yɛ 'ut'.** For example, this made-up word is: "ut". [point to the word "dif"]**Yɛnsɔ bi nhwɛ: Mesrɛ wo kan asɛmfua yi.** Let's practice: Please read this word. ✓🗣 **Mo, Asɛmfua yi yɛ 'dif'.** Good, This made-up word is "dif." ✗🗣 **Saa asɛmfua yi yɛ 'dif'.** This made-up word is "dif." [point to the word "mab"]**Afei san kenkan foforo bio: mesrɛ wo kenkan asɛmfua yi.** Now let us try another one. Please read this word. ✓🗣 **Mo, asɛmfua yi yɛ "mab."** Good, This made-up word is "mab." ✗🗣 **Asɛmfua yi yɛ "mab."** This made-up word is "mab." [point to first word] **Meka sɛ "Fi Ase" a, fi ase wɔ ha na kenkan kɔ saa ara.Fa wo nsateaa si asɛmfua biara so na ka no den.Bɔ mmɔden kenkan no yiye ne ntɛmntɛm.Wudu asɛmfua bi so na wunnim ne nnyigyei no a, kɔ asɛmfua foforo so.Fa wo nsateaa si asɛmfua a edi kan no so.Metumi afi ase? Hyɛ ase.** When I say "Begin," start here [point to first word] and read across the page [point]. Point to each word and read it in a loud voice. Read as quickly and carefully as you can. If you come to a word you do not know, go on to the next word. Put your finger on the first word. Ready? Begin.	Start the timer when the child reads the first word. ➲If a child hesitates or stops on a letter for 3 SECONDS, point to the next word and say "Go on" If the child does not respond in English, stop the child and ask him/her to respond in English – do this only once, and after that mark any non-English responses as incorrect. ✋When the timer reaches 0, say "stop." ✋If the child does not provide a single correct response on the first line (5 items), say "Thank you!", discontinue this subtask, check the box at the bottom, and go on to the next subtask.

✍ (/) Mark any incorrect words with a slash
(Ø) Circle self-corrections if you already marked the word incorrect
( ]) Mark the final word read with a bracket

Examples: ut dif mab

1	*2*	*3*	*4*	*5*	
dit	fut	lus	leb	gak	*(5)*
huz	jod	lek	tob	kib	*(10)*
reg	san	nom	rop	hig	*(15)*
tup	nad	wix	ral	nep	*(20)*
sim	tat	yod	lut	sig	*(25)*
nup	sen	en	kad	mon	*(30)*
taw	lew	zuv	sal	paf	*(35)*
gof	vom	riz	ved	kag	*(40)*
beb	et	maz	ver	kol	*(45)*
lim	tib	dov	yag	lef	*(50)*

✍ Time remaining on stopwatch at completion (number of SECONDS)	
✍ Exercise discontinued because the child had no correct answers in the first line	

Mo! Woayɛ ade. Yɛnkɔ ɔfa a edi so no so. Good effort! Let's go on to the next section.

Sub-test 4a. ORAL READING PASSAGE	60 seconds	Sub-test 4b: READING COMPREHENSION
Page 4 Show the child the sheet in the student stimulus booklet as you read the instructions.	If a child hesitates or stops on a letter for 3 SECONDS, say "Go on"	**X**After the child is finished reading, REMOVE the passage from in front of the child. Ask the child only the questions related to the text read. A child must read all the text that corresponds with a given question. If the child does not provide a response to a question after 10 seconds, mark "no response" and continue to the next question. Do not repeat the question.
Abasem tiawa bi ni. Mepɛ sɛ wokenkan no dennennen, ne ntɛmntɛm ma me.Wokenkan wie a, mebisabisa nsɛm bi afa nea woakenkan no ho.Meka sɛ "Fi Ase" a kenkan abasɛm no sɛnea wubetumi biara.Wudu asɛmfua bi so na wunnim a, kɔ asɛmfua foforo so.Fa wo nsateaa si asɛmfua a edi kan no so.Metumi afi ase? Hyɛ ase. Here is a short story. I want you to read it aloud, quickly but carefully. When you finish, I will ask you some questions about what you have read. When I say "Begin," read the story as best as you can. If you come to a word you do not know, go on to the next word. Put your finger on the first word. Ready? Begin.	If the child does not provide a single correct word before the word in a box, say "Thank you!", discontinue this subtask and check the box at the bottom. Do not ask any comprehension questions.	**Afei mebisabisa wo nsɛm kakra afa abasɛm a wokenkan no ho.Bɔ mmɔden sɛ wubeyiyi nsɛmmisa no ano sɛnea wubetumi.Wubetumi de kasa biara a wopɛ ayiyi nsɛmmisa no ano.** Now I am going to ask you a few questions about the story you just read. Try to answer the questions as well as you can. You can provide your answers in whichever language you prefer.
(/) Mark any incorrect letters with a slash (Ø) Circle self-corrections if you already marked the letter incorrect ( ]) Mark the final letter read with a bracket	If a child says "I don't know," mark as incorrect.	(✓) 1 = Correct (✓) 0 = Incorrect (✓) . = No response.

		Questions [Answers]			
There is no doctor in the village where Ama lives. Father is **sick**.	13	**Who is sick?** [Father]	1	0	.
Ama says that when she grows up she will be a **doctor**.	25	**What does Ama want to be when she grows up?** [a doctor]	1	0	.
She will help people who are sick like **father**.	35	**Why does Ama want to be a doctor?** [to help people / to help people who are sick]	1	0	.
Kojo wants to be a teacher. He will teach boys and girls to be **healthy**.	46	**What will Kojo teach boys and girls?** [to be healthy]	1	0	.
Father smiles. He is happy with both of his **children**.	56	**Why is father happy with his children?** [they want to be doctors / they want to help people]	1	0	.

Time remaining on stopwatch at completion (number of SECONDS)	
Exercise discontinued: the child had no correct answers in the first line	

Mo! Woayɛ ade. Yɛnkɔ ɔfa a edi so no so. Good effort! Let's go on to the next section.

Sub-test 5. LISTENING COMPREHENSION	🕮X			🕐 X
🗣 **Merebɛkenkan abasɛm tiawa bi baako pɛ dennennen akyerɛ wo, na mabisabisa wo nsɛm kakra afa ho.Mesrɛ wo tie no yiye na bua nsɛmmisa no sɛnea wubetumi biara.Wubetumi de kasa biara a wopɛ ayiyi nsɛmmisa no ano.Metumi afi ase? Yemfi ase.** I am going to read you a short story aloud ONCE and then ask you some questions. Please listen carefully and answer the questions as best as you can. You can answer the questions in whichever language you prefer. Ready? Let's begin.				Remove the pupil stimuli booklet from the child's view. Do not allow the child to look at the passage or the questions. If a child says "I don't know," mark as incorrect.
(✓) 1 = Correct (✓) 0 = Incorrect (✓) . = No response.				
Issa was very sad. He lost his grandfather's sheep. He could not go to look for them. Grandfather came to look for them. Soon he returned with the sheep. Issa is smiling now.				
Why was Issa sad? [he lost his sheep; he could not go to look for his sheep]	1	0	.	
Who went to look for the sheep? [Grandfather]	1	0	.	
Why is Issa smiling now? [Grandfather returned with his sheep; his sheep are back; Grandfather found the sheep]	1	0	.	

Mo! Woayɛ ade. Yɛnkɔ ɔfa a edi so no so. Good effort! Let's go on to the next section.

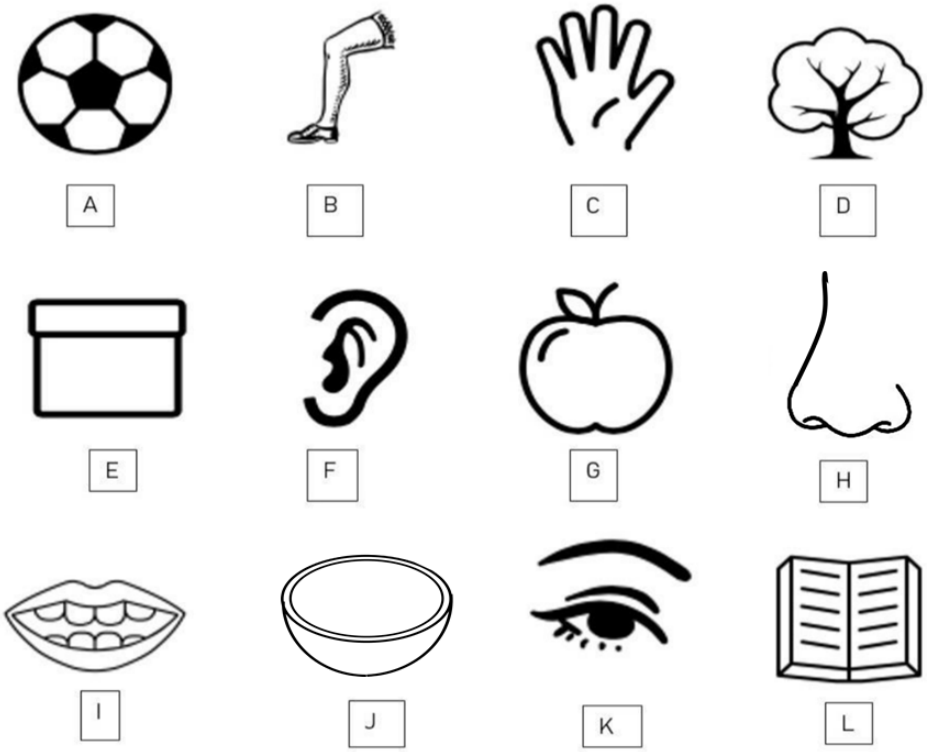
ELM English

Subtask 1: Receptive Vocabulary

Q1	🔊 **Say in English "Show me an ear"**	SCORE
	(Correct) Student identifies the word in English	1
	(Incorrect) Student cannot identify the word	0
	No response	999
Q2	🔊 **Say in English "Show me a nose"**	SCORE
	(Correct) Student identifies the word in English	1
	(Incorrect) Student cannot identify the word	0
	No response	999
Q3	🔊 **Say in English "Show me a leg"**	SCORE
	(Correct) Student identifies the word in English	1
	(Incorrect) Student cannot identify the word	0
	No response	999
Q4	🔊 **Say in English "Show me a hand"**	SCORE
	(Correct) Student identifies the word in English	1
	(Incorrect) Student cannot identify the word	0
	No response	999
Q5	🔊 **Say in English "Show me a ball"**	SCORE
	(Correct) Student identifies the word in English	1
	(Incorrect) Student cannot identify the word	0
	No response	999
Q6	🔊 **Say in English "Show me a box"**	SCORE
	(Correct) Student identifies the word in English	1
	(Incorrect) Student cannot identify the word	0
	No response	999
Q7	🔊 **Say in English "Show me an apple"**	SCORE
	(Correct) Student identifies the word in English	1
	(Incorrect) Student cannot identify the word	0
	No response	999
Q8	🔊 **Say in English "Show me a book"**	SCORE
	(Correct) Student identifies the word in English	1
	(Incorrect) Student cannot identify the word	0
	No response	999
Q9	🔊 **Say in English "Show me an eye"**	SCORE
	(Correct) Student identifies the word in English	1

	(Incorrect) Student cannot identify the word	0
	No response	999
Q10	🔊 **Say in English "Show me a tree"**	SCORE
	(Correct) Student identifies the word in English	1
	(Incorrect) Student cannot identify the word	0
	No response	999

Receptive Vocabulary Images



Subtask 2: Expressive Vocabulary

Q1	🔊 **Point to the teacher and ask the student in English "Who is this?"**	SCORE
	(Correct) Student may say a proper response in English (e.g., Madam, teacher, lady, woman, girl etc)	2
	(Partially correct) Student may say a proper response not in English but in another language	1
	(Incorrect) Student cannot an appropriate word	0
	No response	999
Q1-A	Specify the response provided by the children: _____	
Q2	🔊 **Point to the book and ask the student in English "What is this?"**	SCORE
	(Correct) Student may say a proper response in English (e.g., book, notebook, reader, or other)	2
	(Partially correct) Student may say a proper response not in English but in another language	1
	(Incorrect) Student cannot an appropriate word	0
	No response	999
Q2-A	Specify the response provided by the children: _____	
Q3	🔊 **Point to the window frame and ask the student in English "What is this?"**	SCORE
	(Correct) Student may say a proper response in English (e.g., window, window frame, glass, or other)	2
	(Partially correct) Student may say a proper response not in English but in another language	1
	(Incorrect) Student cannot an appropriate word	0
	No response	999
Q3-A	Specify the response provided by the children: _____	
Q4	🔊 **Point to the children and ask the student in English "Who are they?"**	SCORE
	(Correct) Student may say a proper response in English (e.g., children, kids, students, pupils, or other)	2
	(Partially correct) Student may say a proper response not in English but in another language	1
	(Incorrect) Student cannot an appropriate word	0
	No response	999
Q4-A	Specify the response provided by the children: _____	
Q5	🔊 **Point to the teacher's left hand and ask in English "What is the teacher holding?"**	SCORE

	(Correct) Student may say a proper response in English (e.g., chalk, pencil, pen, or other)	2
	(Partially correct) Student may say a proper response not in English but in another language	1
	(Incorrect) Student cannot an appropriate word	0
	No response	999
Q5-A	Specify the response provided by the children: _____	
Q6	🔊 **Point to the desk and ask the student in English "What is this?"**	SCORE
	(Correct) Student may say a proper response in English (e.g., desk, table, workspace, or other)	2
	(Partially correct) Student may say a proper response not in English but in another language	1
	(Incorrect) Student cannot an appropriate word	0
	No response	999
Q6-A	Specify the response provided by the children: _____	
Q7	🔊 **Point to the teacher's left hand, and ask in English "What is the teacher doing?"**	SCORE
	(Correct) Student may say a proper response in English (e.g., teaching, writing, reading, listening, looking, watching, holding, or other)	2
	(Partially correct) Student may say a proper response not in English but in another language	1
	(Incorrect) Student cannot an appropriate word	0
	No response	999
Q7-A	Specify the response provided by the children: _____	
Q8	🔊 **Point to the children outside the window, and ask in English "What are these children doing?"**	SCORE
	(Correct) Student may say a proper response in English (e.g., playing, running, kicking, having recess, playing football, having fun, being healthy, practicing sport, or other)	2
	(Partially correct) Student may say a proper response not in English but in another language	1
	(Incorrect) Student cannot an appropriate word	0
	No response	999
Q8-A	Specify the response provided by the children: _____	
Q9	🔊 **Point to the students in the classroom, and ask in English "What are they doing?"**	SCORE
	(Correct) Student may say a proper response in English (e.g., learning, studying, listening, watching, sitting, or other)	2

	(Partially correct) Student may say a proper response not in English but in another language	1
	(Incorrect) Student cannot an appropriate word	0
	No response	999
Q9-A	Specify the response provided by the children: _____	
Q10	🔊 **Point to the student with the book, and ask in English "What is she doing?"**	SCORE
	(Correct) Student may say a proper response in English (e.g., reading, following, following along, listening, learning, studying, or other)	2
	(Partially correct) Student may say a proper response not in English but in another language	1
	(Incorrect) Student cannot an appropriate word	0
	No response	999
Q10-A	Specify the response provided by the children: _____	

Expressive Vocabulary Image

Subtask 3: Story Retell

PRACTICE QUESTION 🔊**Read aloud in English: "This is a story about a girl named Sara. Sara looked at the green bowl in her hands and felt sad. The bowl was her grandmother's."**	PART I - RE-TELLING	
	SCORING: Score based on the best response provided by the child in retelling of the story. In scoring, only include responses that make sense in relation to the story.	SCORE
	Correct: Sara had a green bowl. It made her sad. It was her grandmother's bowl.	3
	Partially correct: Sara is sad. She has a bowl.	2
	Minimally correct: Any words from the story.	1
	Incorrect: People, objects, or events not listed in the story	0
	No response	999
	PART 2 - Ask the question: "Why do you think Sara is sad?"	
	Correct: Child gives an inferential conclusion to the story by identifying characters and causal connections.	1
	Incorrect: Child cannot explain the meaning of the story using characters or connections.	0
	No response	999
STORY 1:	PART I - RE-TELLING	

🔊**Read aloud in English: "The grass and leaves were dry. Rabbit went looking for food. She saw fire in the bush. Rabbit jumped and ran. She yelled for help. Help! Help! Rabbit begins to cry. "**	**SCORING**: Score based on the best response provided by the child in retelling of the story. In scoring, only include responses that make sense in relation to the story.	SCORE
	Correct: Child retells the story plot with beginning, middle, and end.	3
	Partially correct: Child retells story events but out of logical narrative order or missing key information.	2
	Minimally correct: Child lists one or more people, objects, and events from the story.	1
	Incorrect: People, objects, or events not listed in the story	0
	No response	999
	PART 2 - Ask the question: "Why is the Rabbit crying?"	
	Correct: Child gives an inferential conclusion to the story by identifying characters and causal connections.	1
	Incorrect: Child cannot explain the meaning of the story using characters or connections.	0
	No response	999
STORY 2 🔊**Read aloud in English: "The animals in the zoo wanted to go outside and explore. One early morning, the villagers set off for work. Some were on their way to the farm. Others were going to the local market. Suddenly, animals from the zoo were in the road. The children were smiling as the animals walked down the road enjoying the sun. The adults were frightened but the animals were gentle. Soon the animals walked back to the zoo. A new lock was put on the gate**	PART1 - RE-TELLING	
	SCORING: Score based on the best response provided by the child in retelling of the story. In scoring, only include responses that make sense in relation to the story.	SCORE
	Correct: Child retells the story plot with beginning, middle, and end.	3
	Partially correct: Child retells story events but out of logical narrative order or missing key information.	2
	Minimally correct: Child lists one or more people, objects, and events from the story.	1
	Incorrect: People, objects, or events not listed in the story	0
	No response	999
	PART 2 - "Why did the adults put on a new lock on the gate?"	

by the adults."	**Correct:** Child gives an inferential conclusion to the story by identifying characters and causal connections.	1
	Incorrect: Child cannot explain the meaning of the story using characters or connections.	0
	No response	999

Teacher Survey

1. Date (dd/mm/yy): _____

2. Assessor name: _____

3. Assessor code: _____

4. Region (name and code):

5. District (name and code):

6. School (name and code):

7. Teacher's first name: _____

8. Teachers' family name: _____

9. Gender: 1) Male [ ] 2) Female [ ]

10. How old are you? (in years) _____

11. How long have you been a teacher? (in years) _____

12. What is the highest level of teaching certificate you have?

13. Which grade are you currently teaching?

14. How many "boys" are enrolled in your class? (in number) _____

15. How many "girls" are enrolled in your class? (in number) _____

17. What is the approved Ghanaian language of instruction at your school?

1) Akuapem Twi
2) Asante Twi
3) Dagaare
4) Dagbani
5) Dangme
6) Ewe
7) Ga
8) Gonja
9) Gurene
10) Fante

11) Kasem
12) Nzema

18. How confident do you feel about teaching children in (the selected language)?
1) Very confident
2) Somewhat confident
3) Not very confident
4) Not at all confident

Head Teacher Survey

1. Region name: _____

2. School name: _____

3. 3. Which urbanicity category best describes your school?
○ Urban school [ ]
○ Rural school [ ]

4. How many teachers work in your school? : _____

5. How many boys and girls are enrolled in KG2?
○ Boys: _____
○ Girls:_____

6. How many boys and girls are enrolled in Basic 1?
○ Boys: _____
○ Girls:_____

7. How many boys and girls are enrolled in Basic 2?
○ Boys: _____
○ Girls:_____

8. How many sessions per week are dedicated to reading/language in Basic 1?:
9. How many sessions per week are dedicated to reading/language in Basic 2?:

10. Does your school have a school library where children can read and/or rent books?
○ Yes
○ No

11. What is the language of instruction that is being actually used in your school?

ANNEX 6: RESEARCH APPROVALS

In-country IRB in Ghana

RADIOLOGICAL AND MEDICAL SCIENCES RESEARCH INSTITUTE

In case of reply, number and date of this letter should be quoted.
Our Ref.: RAMS/RPT/SF.43/345

Your Ref.: .....

Telephone: + 233-303-968-932
Fax: + 233-302-400-807
email: ramsri.gaec@gmail.com
website: www.gaecgh.org

Ghana Atomic Energy Commission
P.O. Box LG 80
Legon – Accra

Date: 27th October, 2021

ETHICAL CLEARANCE

ID No: **RAMS/ERCP/SS/01/2021**

The Ethical Review Committee of the Radiological and Medical Sciences Research Institute reviewed your amended proposed Study Protocol titled: **"Supporting Holistic and Actionable Research In Education (Share) Ghana T2e Impact Evaluation" (RAMS/ERCP/SS/02/2021)**

Project Coordinator:

This approval requires that you submit the final full review to the Ethical Review Committee (ERC) at the completion of the study. The Ethical Review Committee may observe or cause to be observed procedures and records of the study during and after implementation.

Please note that any modification of the project must be submitted to the Ethical Review Committee for review and approval before its implementation.

You are also required to report all serious adverse events related to this study to the Ethical Review Committee within seven days verbally and fourteen days in writing.

You are requested to inform the Ethical Review Committee and your mother Organization before any publication of the research findings.

Please always quote the protocol identification number in all future correspondence in relation to this protocol.

Signed .....
Prof. George Obeng Adjei
Chairman RAMSRI ERC

University of Notre Dame IRB

Office of Research Compliance
840 Grace Hall
Notre Dame, , IN eprotocol
TEL: (574) 631-1461
E-mail:compliance@nd.edu

NOTICE OF APPROVAL FOR EXEMPT HUMAN SUBJECT RESEARCH

DATE: October 29, 2021

TO:

FROM: Hall, Matthew, PhD, Exempt Review
PROTOCOL TITLE: SHARE Learning-T2E Impact Evaluation
FUNDING SOURCE: None
PROTOCOL NUMBER: 21-09-6778
Approval Date: October 29, 2021 Expiration Date: N/A

The Institutional Review Board (IRB) has reviewed your proposed amendment to the research protocol entitled: SHARE Learning-T2E Impact Evaluation

The amendment has been reviewed and determined to not affect the research 's exempt status. Exemption means that all research activities described in the protocol fall under one or more of the exemption categories specified by the Federal regulations (45 CFR 46.101).

Exempt status does not, however, lessen the ethical obligations to subjects articulated in the Belmont Report and in disciplinary codes of professional conduct. Thus, depending on the circumstances, investigators performing exempt studies may need to make provisions to obtain informed consent, protect confidentiality, minimize risks and address problems or complaints.

Modifications to the research activities could result in the research no longer falling under exempt status. Therefore, if you wish to modify the research activities, check with Notre Dame Research Compliance at 574-631-1461 or by email at compliance@nd.edu

This approval is issued under the University of Notre Dame 's Federal Wide Assurance (FWA00002462) with the Office for Human Research Protections.

If you have any questions, comments, complaints or concerns or wish to provide input, please do not hesitate to contact Notre Dame Research Compliance at 574-631-1461 or by email at compliance@nd.edu

Hall, Matthew, PhD

Office of Research Compliance

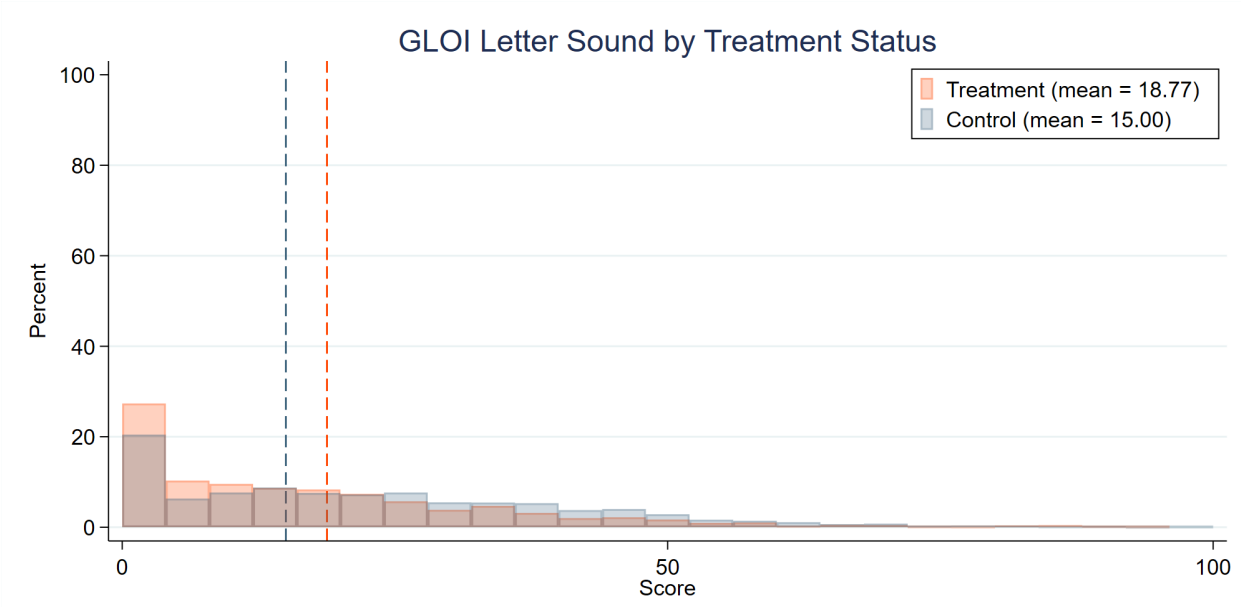
Review Type: EXEMPT
IRB Number: FWA 00002462 exp 4/1/2020

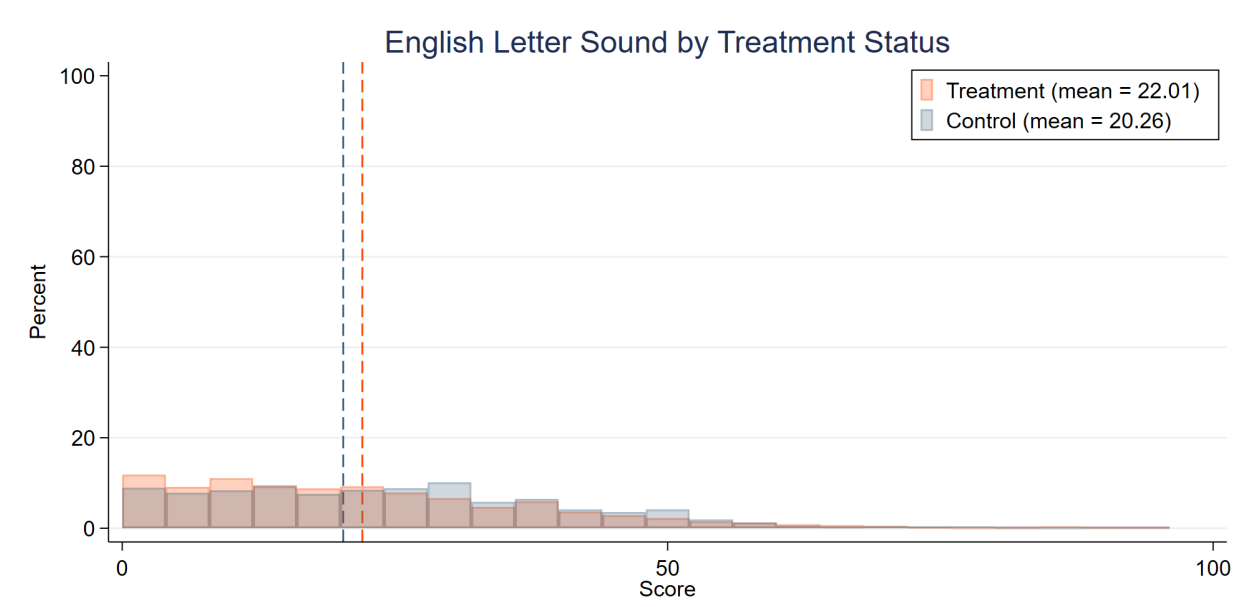
Exempt Category:

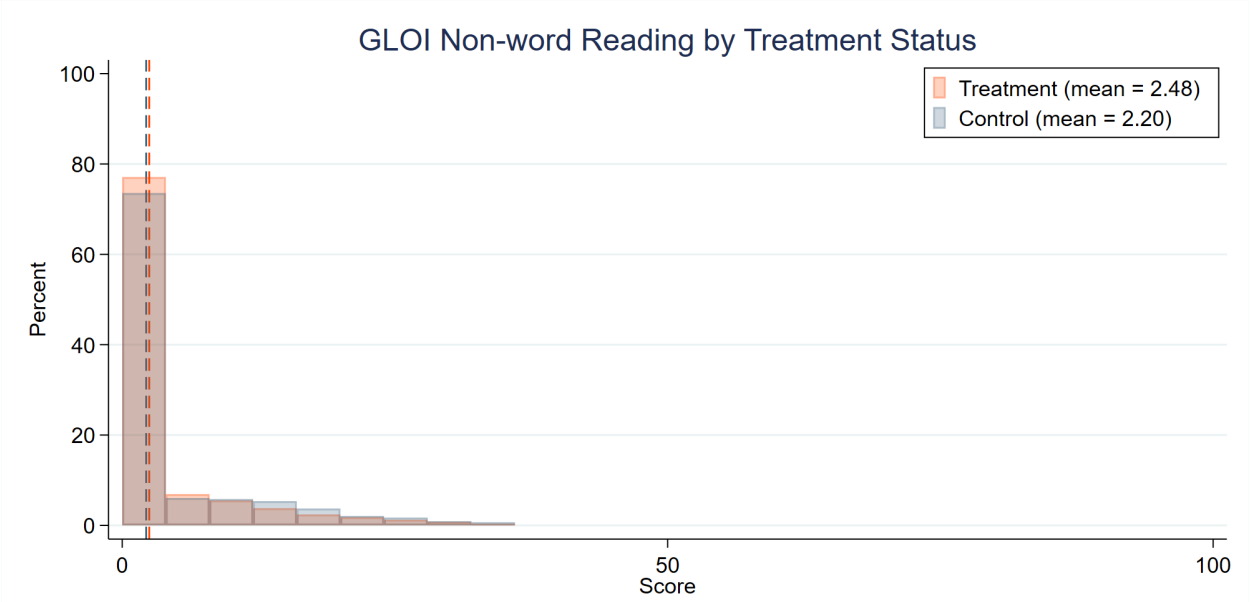
Date of Approval: October 29, 2021

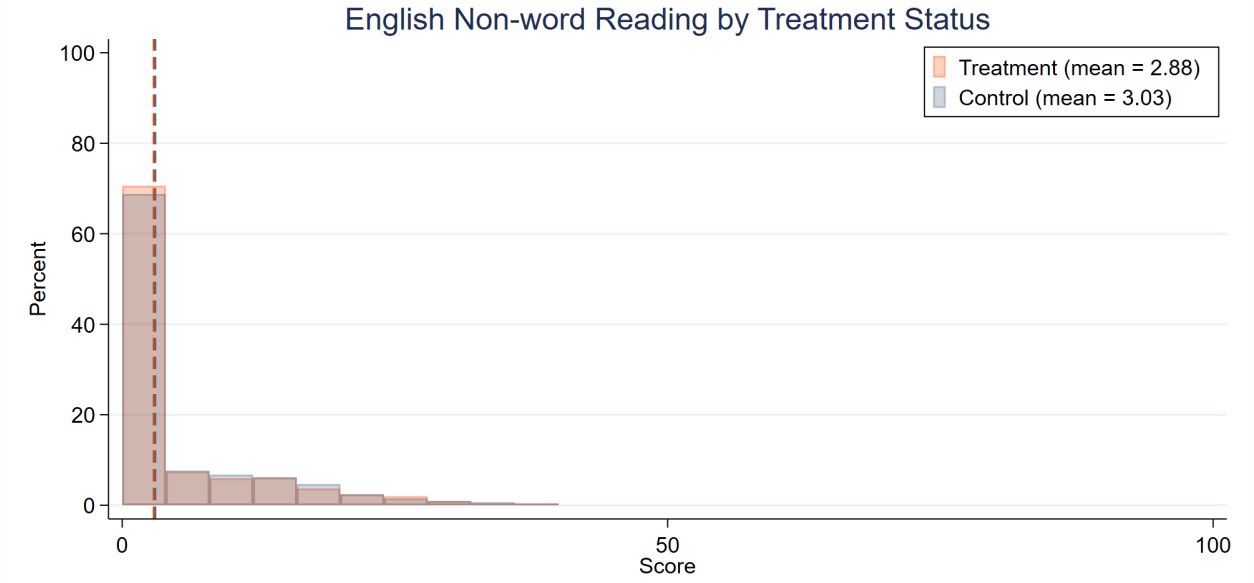
ANNEX 7 : ADDITIONAL ANALYSES

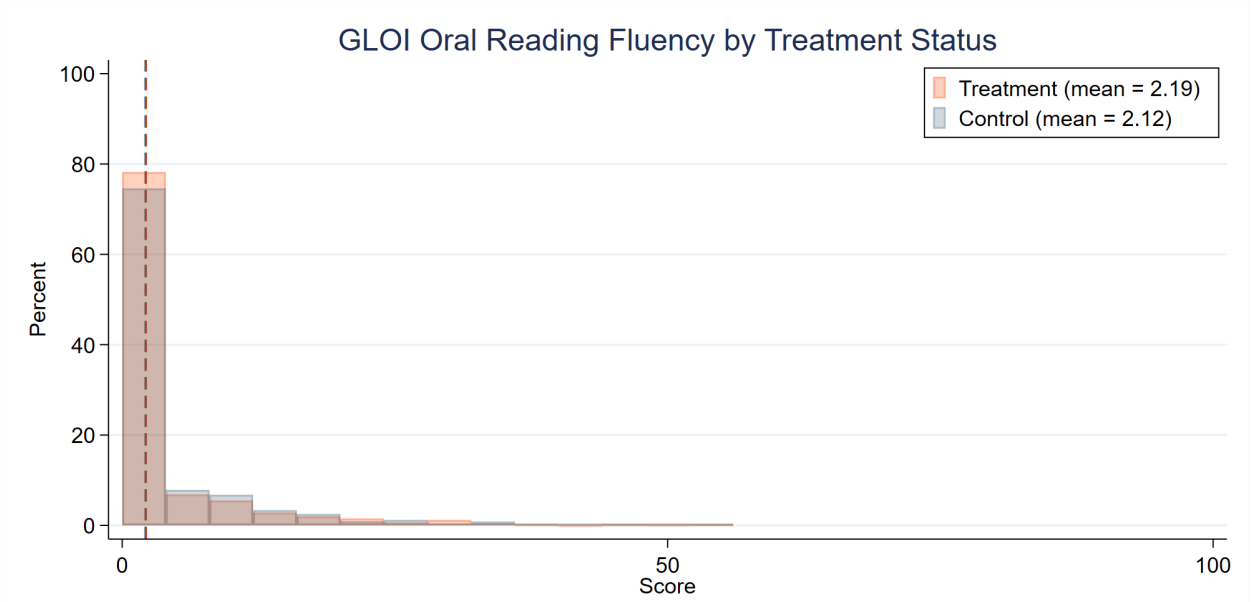
EGRA Subtests Score Distribution – Basic 1

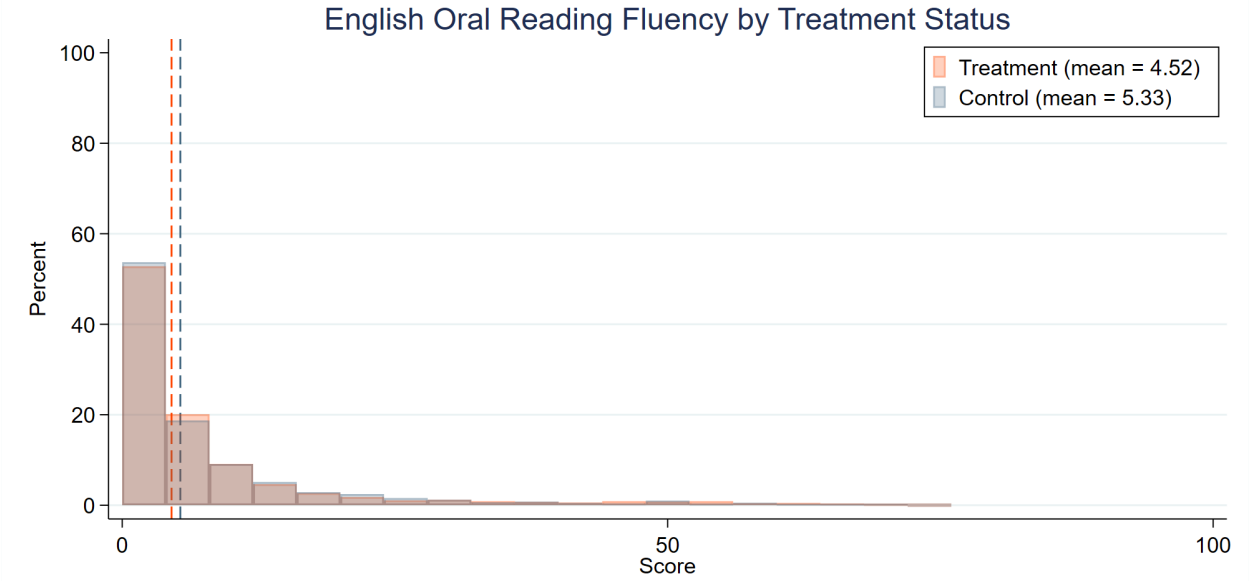




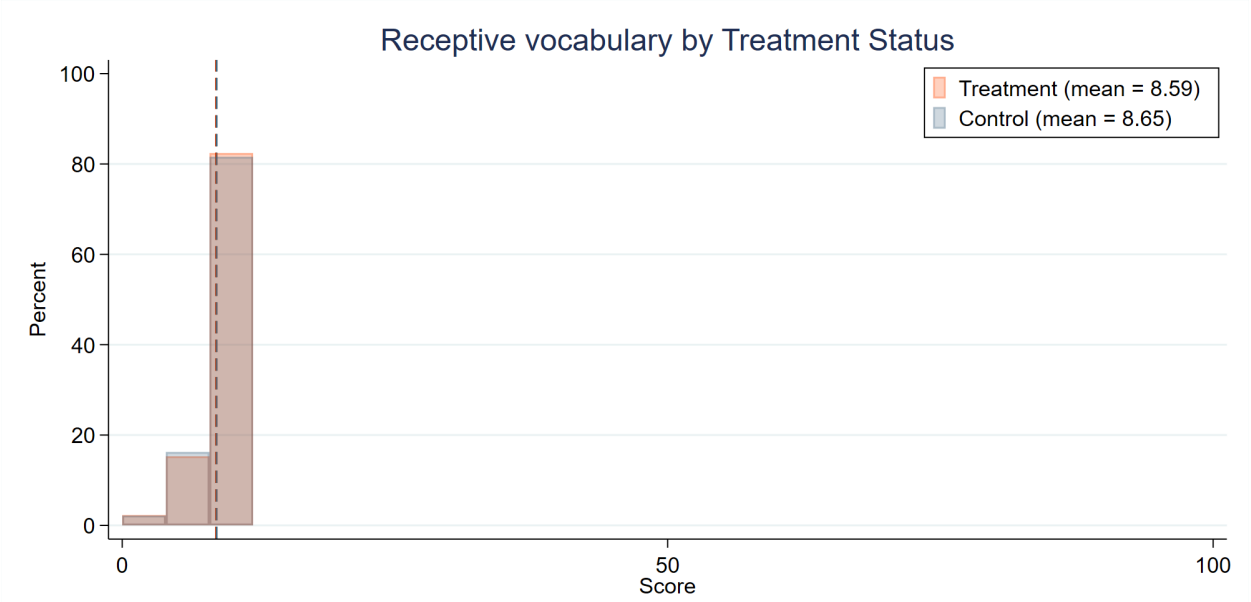

GLOI Non-word Reading by Treatment Status
Treatment (mean = 2.48)
Control (mean = 2.20)
Percent
100
80
60
40
20
0
0
50
100
Score

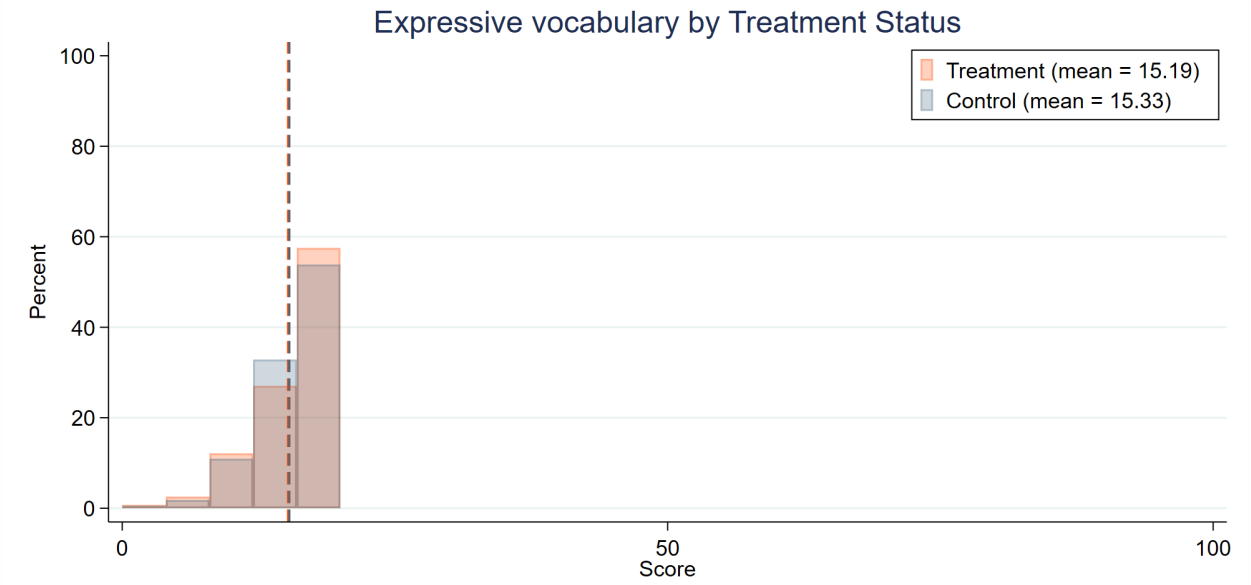

English Non-word Reading by Treatment Status
Treatment (mean = 2.88)
Control (mean = 3.03)
Percent
100
80
60
40
20
0
0
50
100
Score

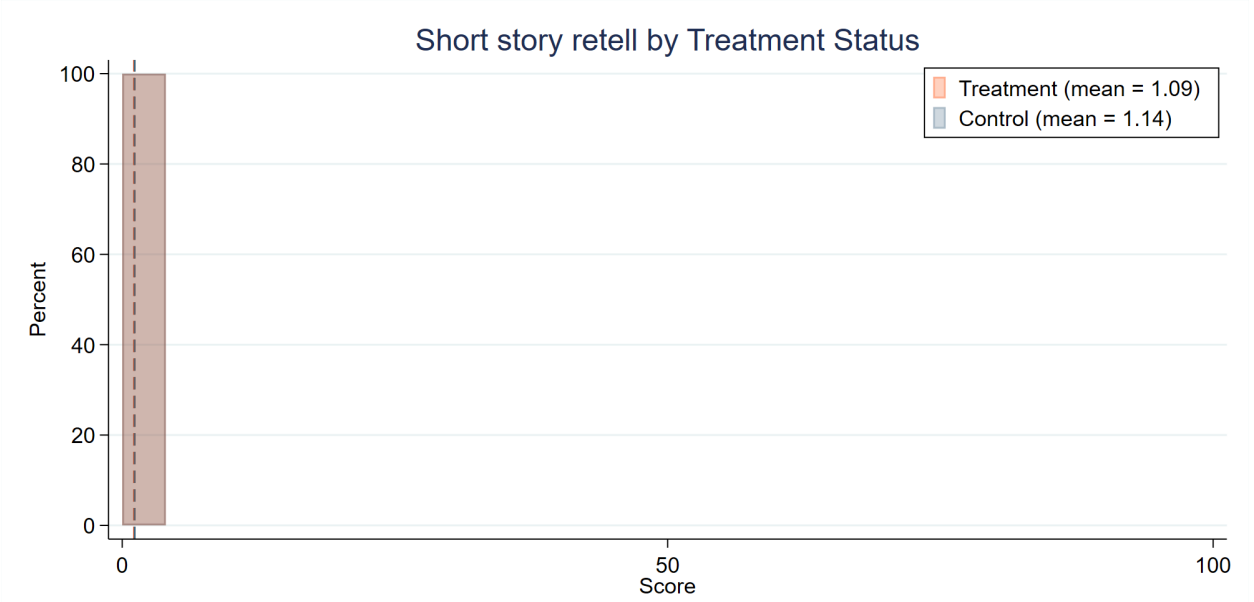


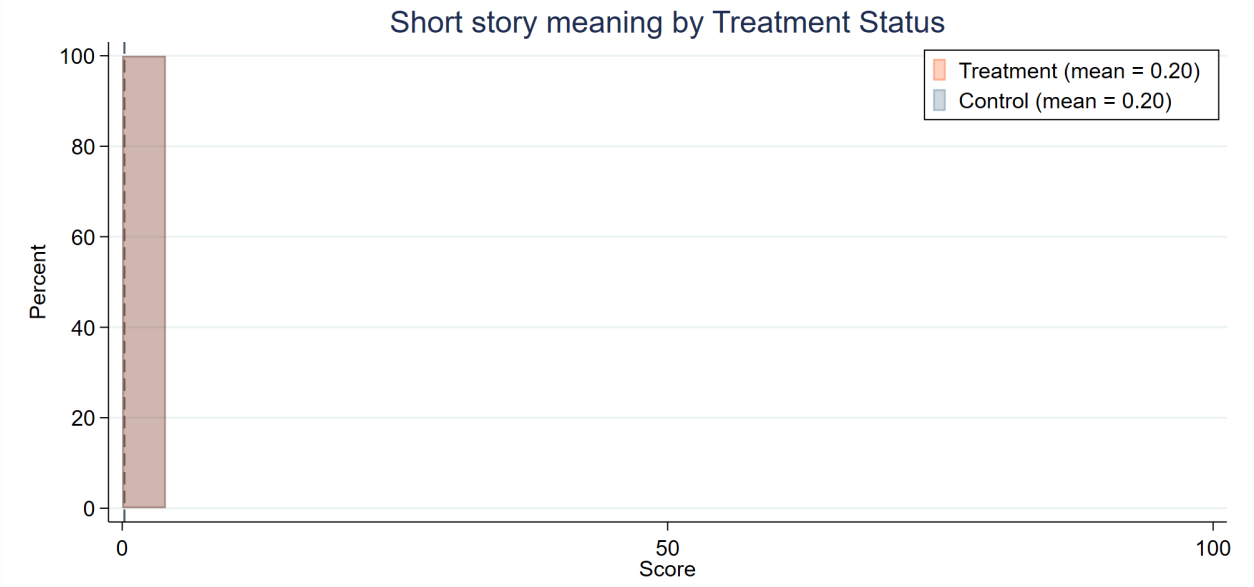


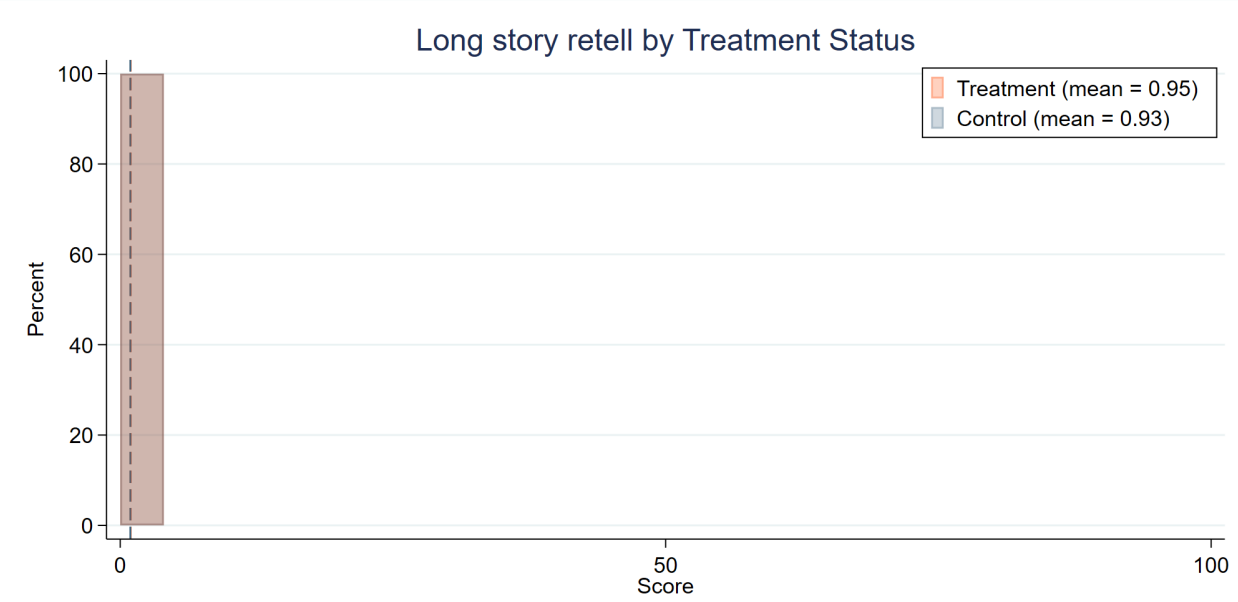
ELM Subtests Score Distribution – Basic 1

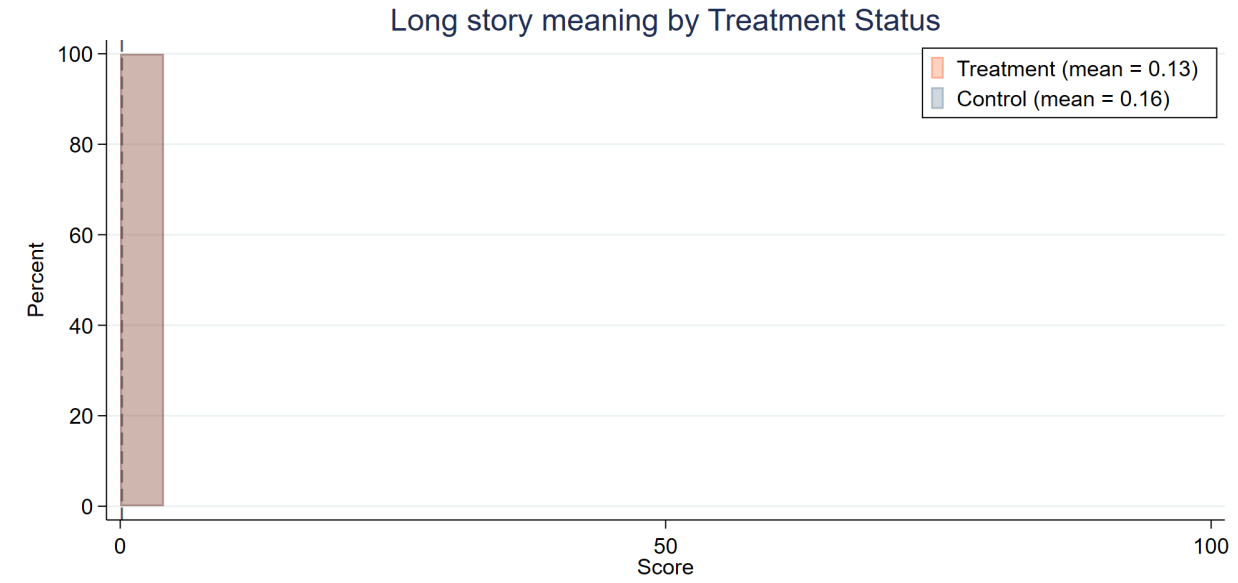

Receptive vocabulary by Treatment Status
Treatment (mean = 8.59)
Control (mean = 8.65)
Percent
100
80
60
40
20
0
0
50
100
Score


Expressive vocabulary by Treatment Status
Treatment (mean = 15.19)
Control (mean = 15.33)
Percent
100
80
60
40
20
0
0
50
100
Score

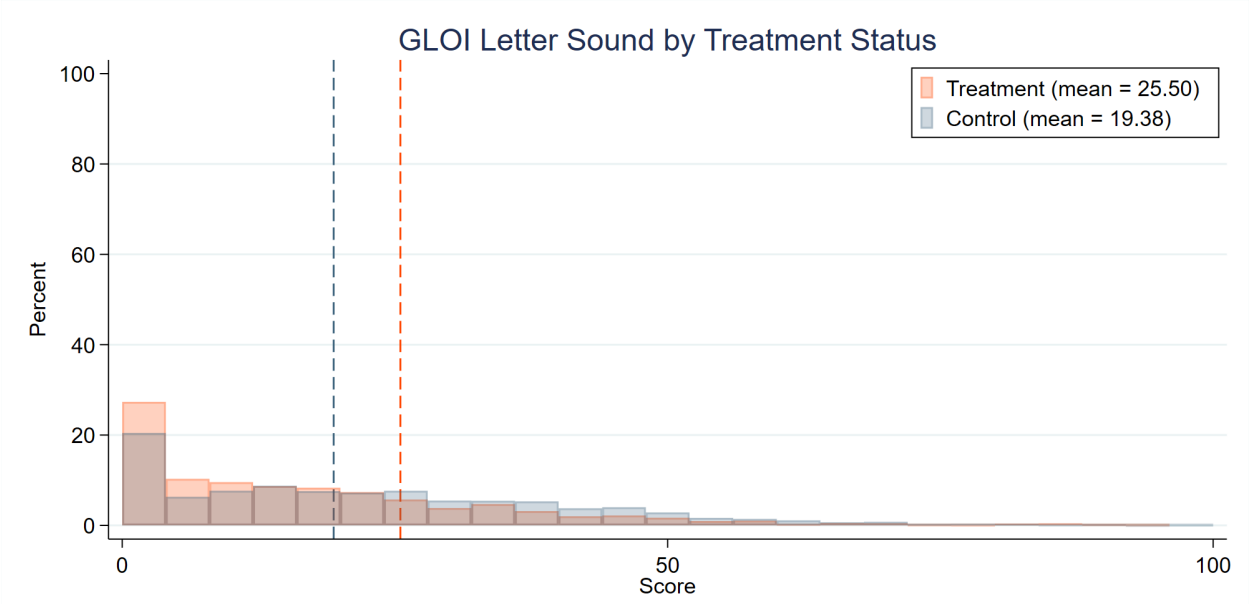

Short story retell by Treatment Status
Treatment (mean = 1.09)
Control (mean = 1.14)
Percent
100
80
60
40
20
0
0
50
100
Score

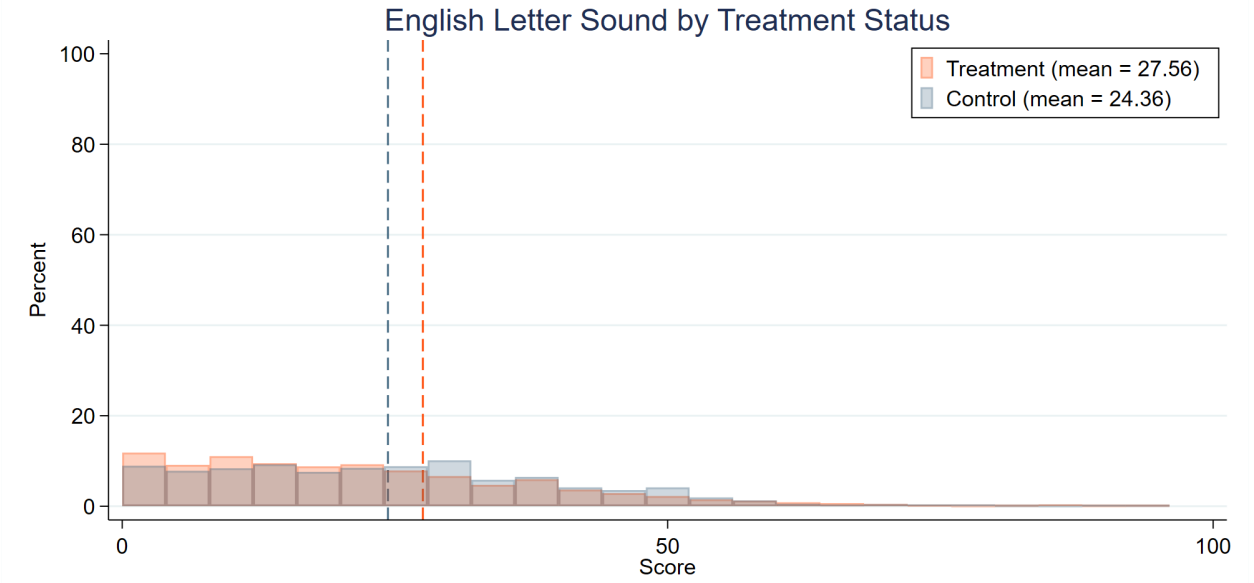

Short story meaning by Treatment Status
Treatment (mean = 0.20)
Control (mean = 0.20)
Percent
100
80
60
40
20
0
0
50
100
Score

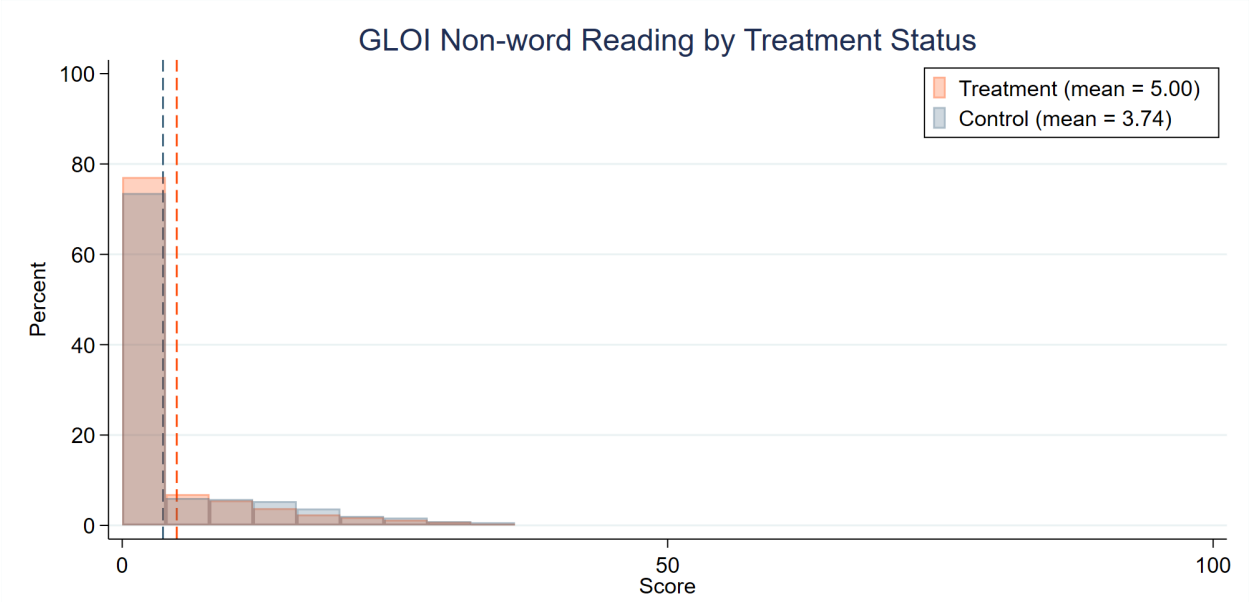


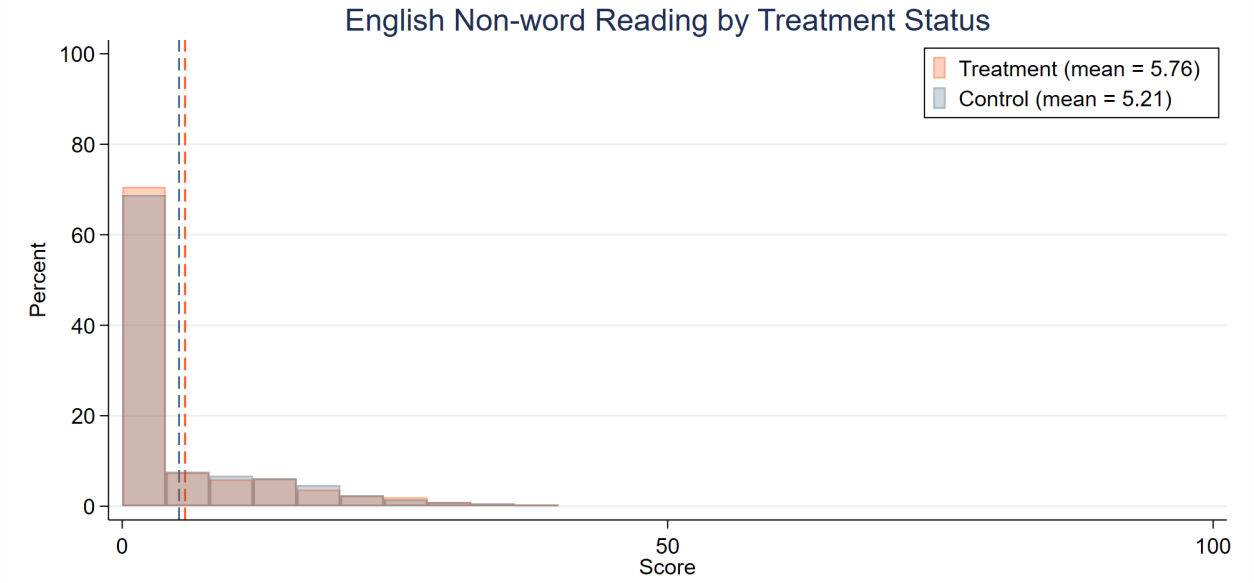


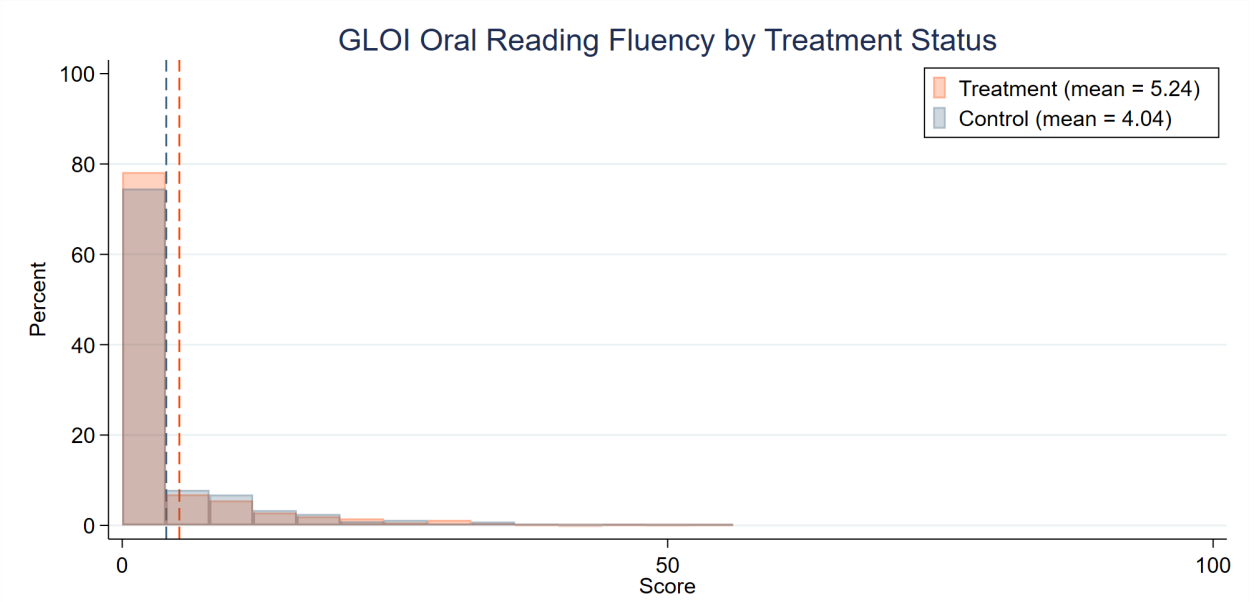
EGRA Subtests Score Distribution – Basic 2

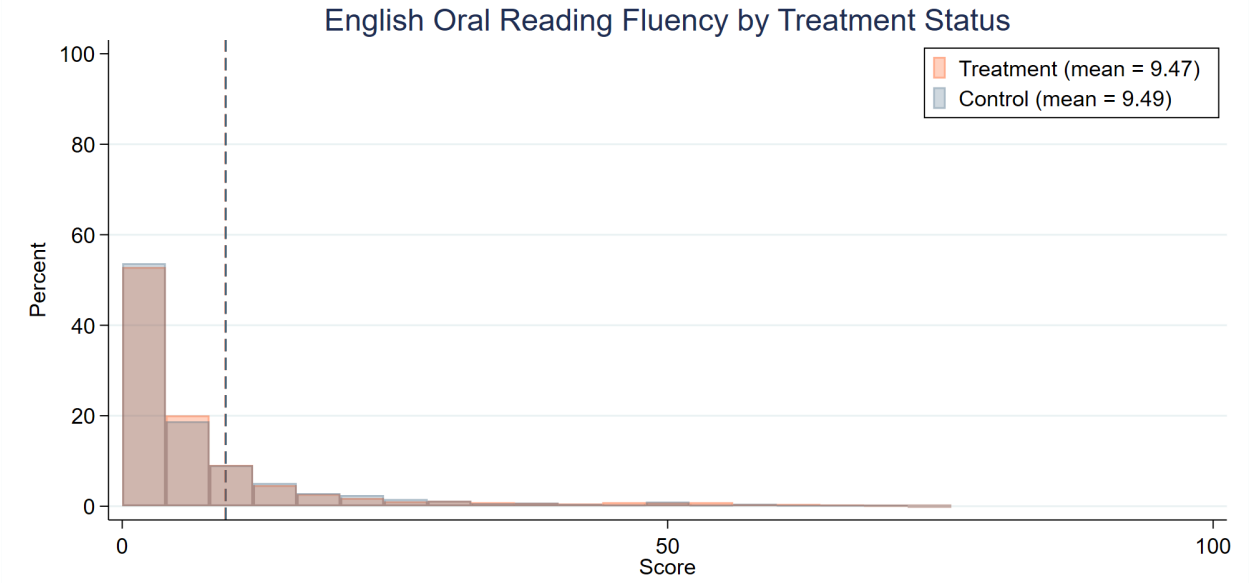

GLOI Letter Sound by Treatment Status
Treatment (mean = 25.50)
Control (mean = 19.38)
Percent
100
80
60
40
20
0
0
50
100
Score


English Letter Sound by Treatment Status
Treatment (mean = 27.56)
Control (mean = 24.36)
Percent
100
80
60
40
20
0
0
50
100
Score

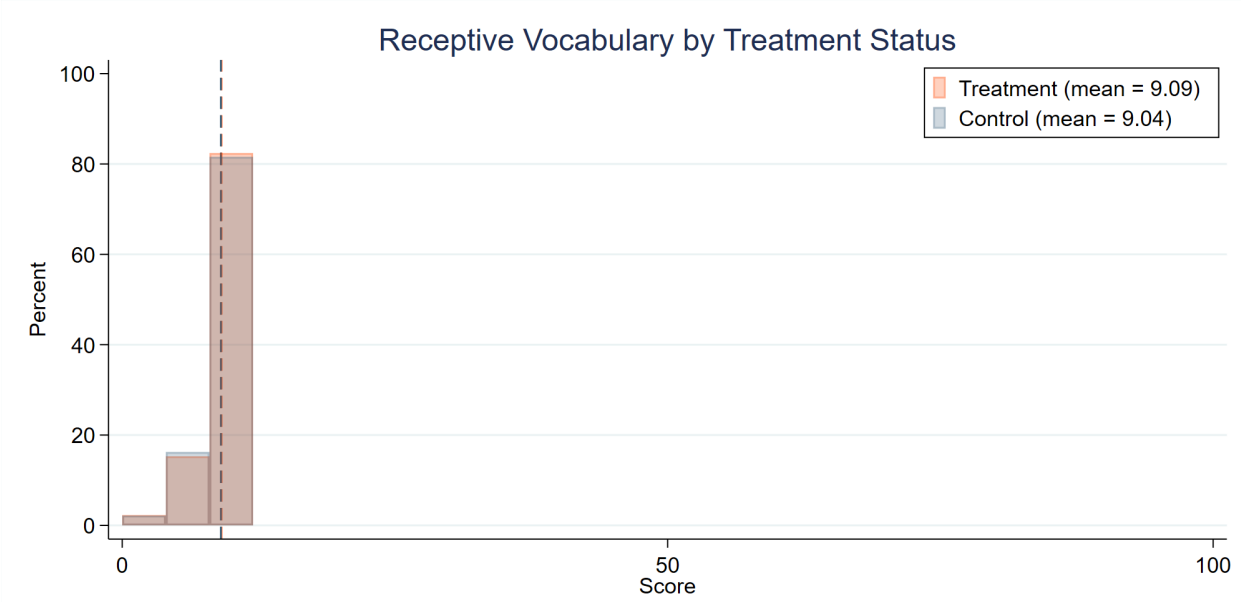

GLOI Non-word Reading by Treatment Status
Treatment (mean = 5.00)
Control (mean = 3.74)
Percent
0
20
40
60
80
100
0
50
100
Score

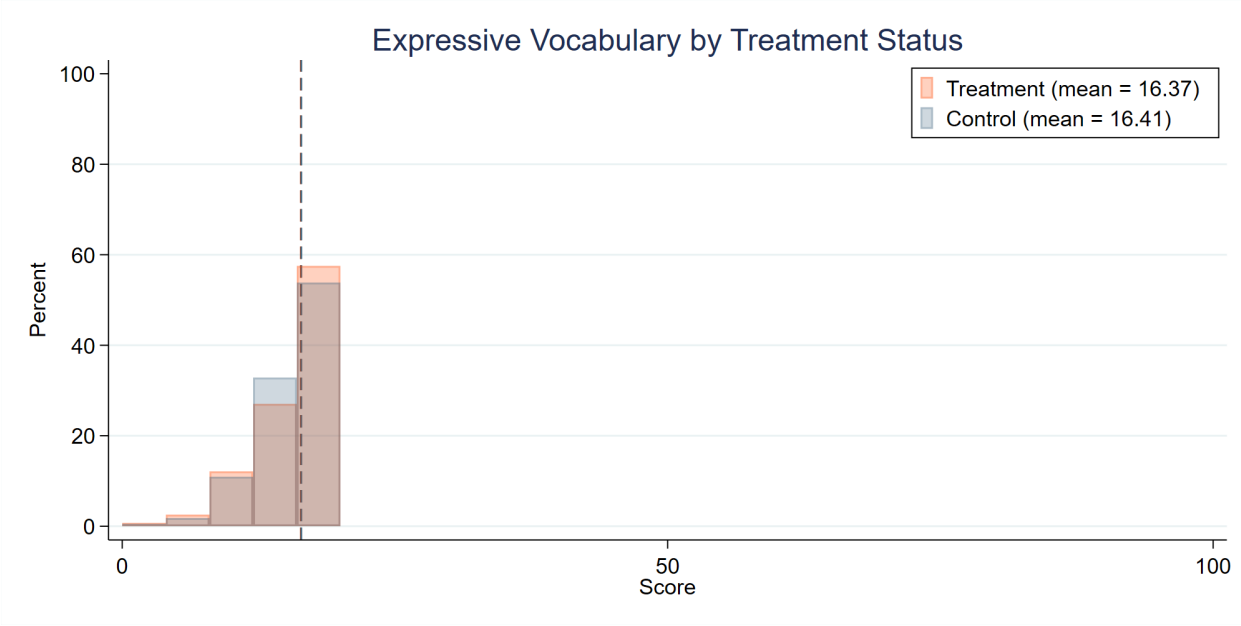

English Non-word Reading by Treatment Status
Treatment (mean = 5.76)
Control (mean = 5.21)
Percent
0
20
40
60
80
100
0
50
100
Score

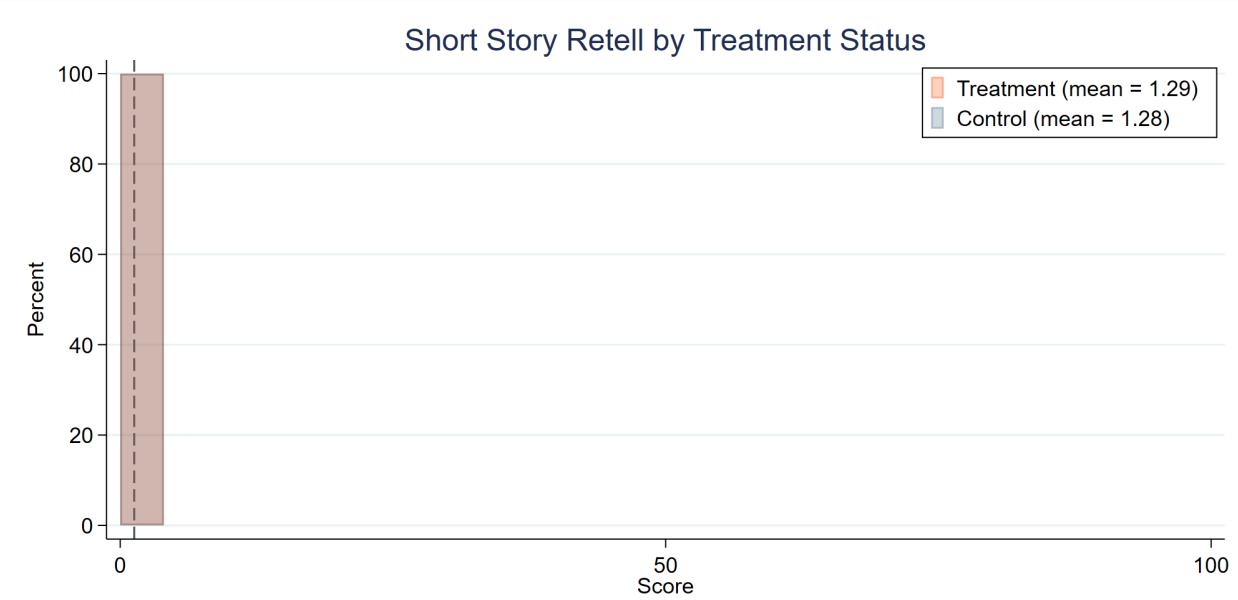


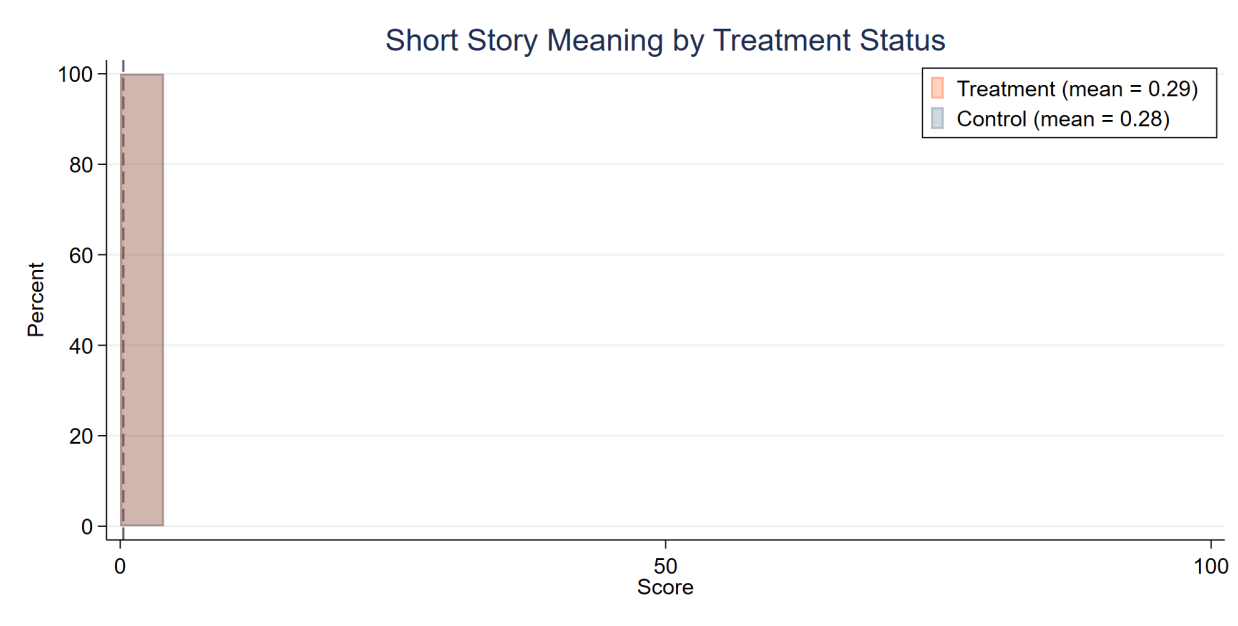


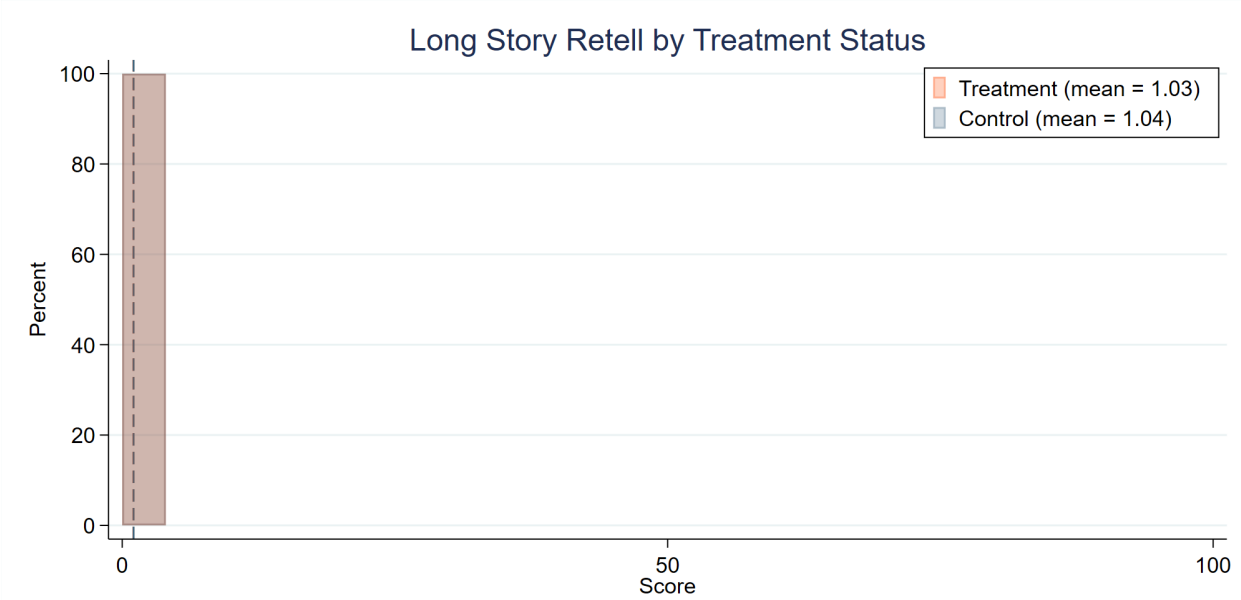
ELM Subtests Score Distribution – Basic 2

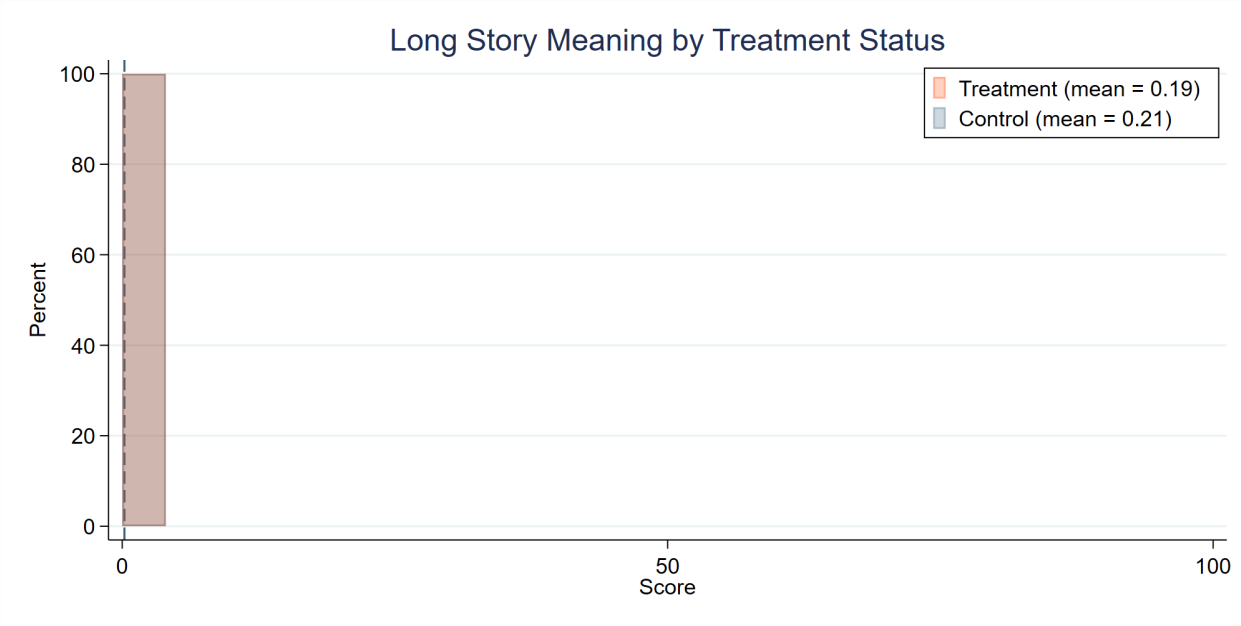

Receptive Vocabulary by Treatment Status
Treatment (mean = 9.09)
Control (mean = 9.04)
Percent
100
80
60
40
20
0
0
50
100
Score


Expressive Vocabulary by Treatment Status
Treatment (mean = 16.37)
Control (mean = 16.41)
Percent
100
80
60
40
20
0
0
50
100
Score


Short Story Retell by Treatment Status
Treatment (mean = 1.29)
Control (mean = 1.28)
Percent
100
80
60
40
20
0
0
50
100
Score


Short Story Meaning by Treatment Status
Treatment (mean = 0.29)
Control (mean = 0.28)
Percent
100
80
60
40
20
0
0
50
100
Score


Long Story Retell by Treatment Status
Treatment (mean = 1.03)
Control (mean = 1.04)
Percent
100
80
60
40
20
0
0
50
100
Score


Long Story Meaning by Treatment Status
Treatment (mean = 0.19)
Control (mean = 0.21)
Percent
100
80
60
40
20
0
0
50
100
Score