African Population and Health Research Center
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Education & Youth Empowerment Unit

Developing Readers Study: Designing a Structured Remediation Approach to Support Developing Readers in Primary Schools in Kenya

Evaluation Report for the Design Phase

2024

Contributors:

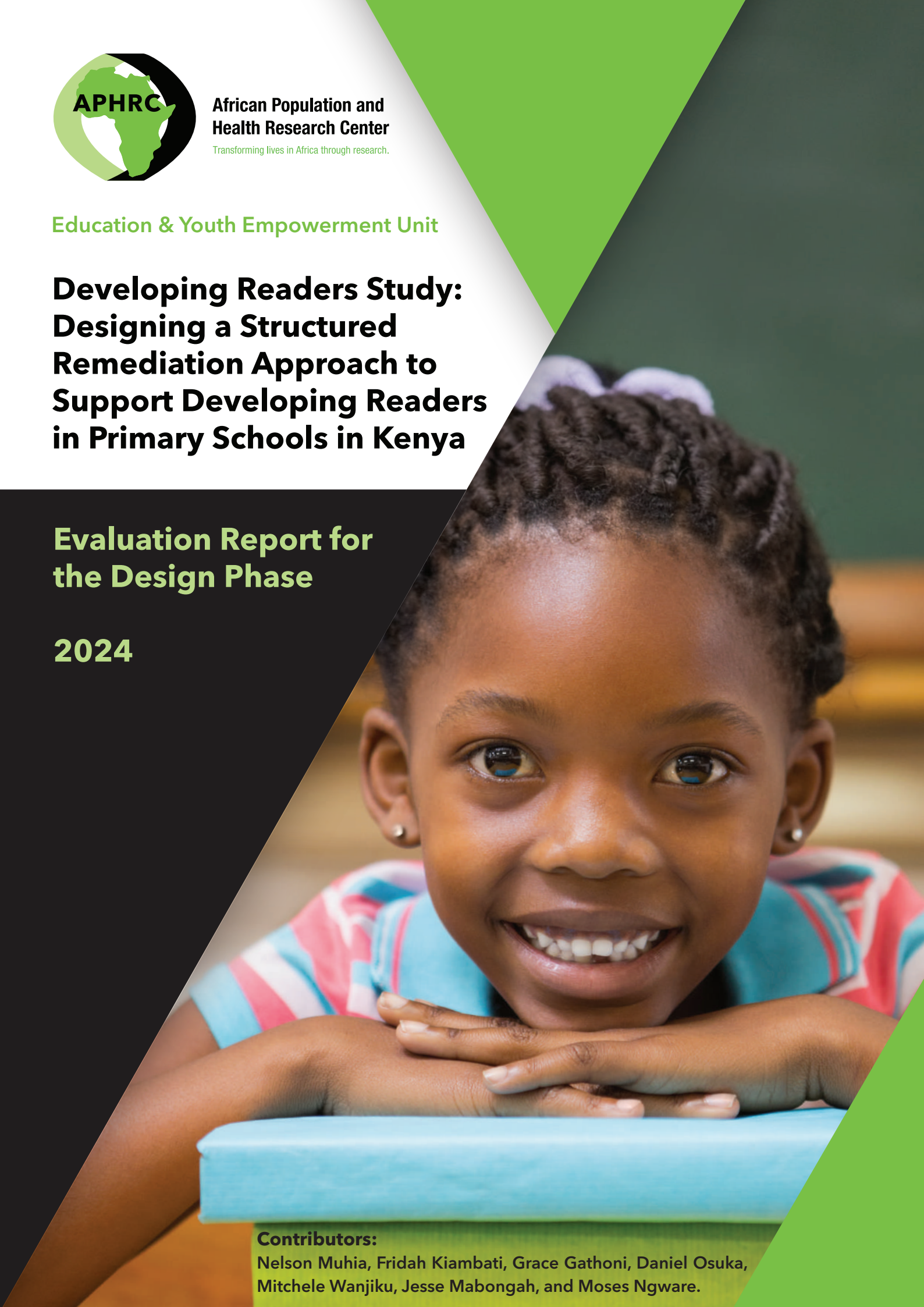Nelson Muhia, Fridah Kiambati, Grace Gathoni, Daniel Osuka, Mitchele Wanjiku, Jesse Mabongah, and Moses Ngware.

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ABBREVIATIONS

APHRC	African Population and Health Research Center
CLNPM	Correct Letter Names Per Minute
CLSPM	Correct Letter Sounds Per Minute
CNWPM	Correct Non-Words Per Minute
CSPM	Correct Syllables Per Minute
CWPM	Correct Words Per Minute
CSO	Curriculum Support Officer
DRP	Developing Readers Program
EGRA	Early Grade Reading Assessment
ESRC	Ethical and Scientific Review Committee
IQR	Interquartile Range
IRR	Inter-Rater Reliability
KNEC	Kenya National Examination Council
KICD	Kenya Institute of Curriculum Development
MoE	Ministry of Education
NACOSTI	National Commission for Science, Technology, and Innovation
QASO	Quality Assurance and Standards Officer
RTI	Response to Intervention
SD	Standard Deviation
ToT	Training of Trainers
TSC	Teacher Service Commission

ACKNOWLEDGMENT

EXECUTIVE SUMMARY

Over the years, educational stakeholders in Kenya – teachers, bilateral donors, the Ministry of Education (MoE) and its agencies, and non-governmental and charitable organizations – have made concerted efforts to improve literacy outcomes among early-grade learners. Despite the efforts, current data shows that large populations of learners are reading below grade level and there are knowledge gaps in using evidence-based practices to help developing[1] readers in early grades. There is limited empirical evidence on interventions to support students at risk of reading difficulties who are likely to have fallen further behind due to pre-existing barriers and challenges presented by the COVID-19 pandemic among other contributors.

The **overall objective** of this study is to design and pilot an intervention to improve literacy skills among early-grade (primary grade 2 and 3) learners at risk of reading failure. The study aims to provide policy-relevant evidence on how support for struggling readers can be formally and systematically incorporated into the structure and functioning of school timetables, education systems, policy guidelines, and implementation with high fidelity. It is anticipated that such support would lead to improvements in learning outcomes. This report highlights key achievements realized during the design phase in Kiambu County as well as the key evaluation findings, lessons learnt, and challenges. The report also discusses the key aspects of the developing readers program that could have explained its success in supporting learners with reading difficulties and recommendations to improve the intervention.

Specific Objectives

1. Adapt and model an evidence-based structured pedagogical approach for supporting struggling readers in early grades.
2. Build teacher capacity on effective evidence-based structured pedagogical approaches for supporting struggling readers.
3. Establish the effectiveness of the structured, intensive, evidence-based tier two and tier three interventions on struggling readers' literacy outcomes in English and Kiswahili.
4. Establish the contexts/conditions that enhance uptake and/or inhibit the modeling and success of the structured intervention.
5. Establish pathways/mechanisms for the structured intervention to be mainstreamed in the existing government/MoE/curriculum implementation structures.

Research Questions

In order to achieve the specific objectives, this study sought to answer the following research questions:
1. What is the causal effect of structured literacy intervention in Kiswahili on the literacy component skills in Kiswahili among grade 2 and 3 students at risk of reading failure?
2. What is the causal effect of structured literacy intervention in English on the literacy component skills in English among grade 2 and 3 students at risk of reading failure?
3. What are the pathways/mechanisms/strategies for effectively mainstreaming structured literacy intervention to support at-risk students within the existing government/MOE/curriculum implementation structures?
4. What contexts/conditions enhance uptake and/or inhibit the modelling and success of the structured intervention?

Summary of Key Findings

1. Of the 920 learners enrolled in the 13-week remedial sessions at baseline, 847 (92%) were successfully reached at the endline. There were no gender differences in the response rate, with 92% of the targeted female and male learners reached at endline.
2. The proportion of learners with reading difficulties reduced from baseline to endline. The learners in the non-reader category reduced from 43.3% to 18.9%; those in the beginner category from 23.1% to 20.8%; and those in the intermediate category from 33.5% to 22.8%.
3. About 37% (318) of learners who previously had reading difficulties graduated to emergent and fluent categories at the end of the intervention, meaning that they would no longer require remedial intervention.

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1. Refers to learners who experience various levels of reading difficulties.

4. At endline, there were proportionately more learners in grade 4 categorized as non-readers and beginners compared to grade 3. The majority of grade 3 learners were in the emergent level (39.3%), followed by intermediate (23.8%), beginner (18.9%), and non-reader categories (17.8%). On the other hand, the majority of grade 4 learners were emergent readers (34%), followed by beginner (23.9%), intermediate (21.1%) and non-reader categories (20.8%).

5. There were relatively more boys than girls in all the modules at the endline, similar to what was observed at the baseline, that is, 64.4% in the non-reader category, 59.1% in the intermediate category, 57.4% in the beginner category, and 52.2% in the emergent category.

6. About 58.9% of learners in the non-reader category at baseline progressed to the subsequent levels after 13 weeks of remedial sessions. Further, about 70.4% of learners in module 2 progressed to the intermediate (32.7%) and emergent (37.8%) categories. Lastly, about 71.5% of learners in module 3 progressed to the emergent level. Only two students in module 3 progressed to the fluent category.

7. Learners in module 3 recorded higher scores in all the subtasks compared to learners in modules 2 and 1. The largest mean differences between modules 3 and 1 were in syllable knowledge (20.4), oral reading passage (16.4), and letter sound knowledge (15.4). On the other hand, the largest mean differences between learners in modules 3 and 2 were in syllable reading (8.1), oral passage reading (7.3), and letter sound knowledge (5.9).

8. In terms of grade, grade 3 learners (grade 2 at baseline) scored higher than grade 4 learners (grade 3 at baseline) in all the subtasks except for listening comprehension and vocabulary.

9. In terms of gender, generally girls performed better than boys in almost all the subtasks except for listening comprehension. The largest mean difference between girls and boys was from the oral reading passage (2.1), syllable knowledge (2.1), and letter sound knowledge (1.8). The differences were however statistically significant only for syllable knowledge (p=0.023) and oral reading passage (p=0.005).

10. Whereas the magnitude in the mean differences for all the subtasks between baseline and endline was relatively small, the mean differences were statistically different with a p-value<0.05, meaning learners performed significantly better at endline compared to baseline.

11. Results of the home contextual factors showed that:
    - 74.5% of the learners spoke Gikuyu (the native language of the catchment area) at home, followed by Kiswahili (52.1%) and English (14.3%)
    - 73.2% and 67.3% of the learners had English and Kiswahili materials to read at home respectively.
    - 75.2% of the learners had someone who read stories aloud to them at home
    - 86.5% of the learners read stories at home

12. Results of the school contextual factors showed that:
    - 93.3% and 75.1% of the learners spoke Kiswahili and English at school respectively.
    - 85.4% of the learners practiced reading aloud to their teacher or other pupils
    - 83.2% of the learners practiced silent reading in school
    - 86.8% of the learners were assigned reading exercises by their teachers to practice at home.
    - 75.1% of the learners either sometimes (58.3%) or every day (21.4%) read on their own.
    - 65.6% and 70.5% of the learners stated that they rarely or never missed school respectively.

13. Findings of the individual contextual factors indicated that the 3 main illnesses experienced by learners were:
    - Coughing continuously (10.5%)
    - Vision problems (10.2%)
    - Abdominal problems (7.2%)

14. An analysis of the association between the home, school, and individual contextual factors and the learner subtask performance indicated that:
    - Reading stories at home was significantly associated with the number of correct words read per minute, the number of correct invented (non-words) read per minute, and the number of correct syllables read per minute.
    - Practicing silent reading at school was significantly associated with accuracy in listening comprehension.

15. Findings from the classroom observations showed that:
    - In 74% of the total observations made, teachers gave feedback about correct and incorrect responses in a manner that encouraged further effort to the learners in both English and Kiswahili lessons
    - In 89.3% of the lessons observed, teachers generally praised the learners when they tried hard and/or gave

the correct response thus reinforcing positive behavior.

- 83.3% of teachers observed provided formative feedback and encouraged the learner to try again when a learner either gave the wrong response or did not respond at all.
- The proportion of teachers who gave feedback for both correct and incorrect responses in a manner that encouraged further effort increased from 71% in weeks 1-3 to 91% in weeks 8-13.
- The proportion of teachers who praised learners when they tried hard or gave the correct response increased from 89% in weeks 1-3 to 100% in weeks 8-13.
- The proportion of teachers who provided formative feedback and encouraged the learner to try again, when the learner either gave the wrong response or did not respond at all increased from 80% in weeks 1-3 to 91% in weeks 8-13.
- 92.9% of the teachers used I do, 85.9% used we do and 92.9% used you do. A majority of the teachers (88%) followed the correct order of the DIM model – I do, we do, and you do.
- In 79.8% of the lessons observed, teachers covered all the intended content, and only 11.9% skipped some sections.
- 94% of the teachers were observed to either follow the DRP lesson guide very closely (48%) or closely follow without referring to the DRP lesson guide all the time (46%).
- Majority of the teachers either used a perky pace most of the time (64.3%) or sometimes (33.3%) during the sessions.
- The most common learner actions observed across the lessons were listening to the teacher (21.2%), working in small groups and in pairs (15.3%), and answering questions (13.7%).
- The proportion of lesson time the teachers focused on the whole class reduced from 60% in weeks 1-3 to 37% in weeks 8-13, while the focus on individual learners increased from 10% in weeks 1-3 to 20% in weeks 8-13.

16. Results of the teachers' reflections on the delivery of the remedial intervention highlighted that:
- Teachers felt that the most difficult concepts to support learners in were text reading, word reading, letter and sound name, and comprehension in order of difficulty.
- On text reading, teachers felt that learners who were already having challenges with word reading found it difficult to progress to text reading and that some of the learning activities such as the reading marathon were difficult to implement in classes that had a large number of learners.
- On word reading, teachers felt that it took a lot of time to prepare support materials, that there was not enough time allocated to support activities such as the word race, and that learners who had challenges with syllable reading also had challenges with word reading.
- On comprehension, teachers felt that the two key challenges faced by learners were answering questions from the story and retelling the story.

17. Results from the teacher knowledge and attitude assessment on foundational literacy showed that:
- At baseline, 81.5% of teachers felt that regular observation and coaching by CSOs/QASOs and head teachers distracted them from doing their job effectively. There was a shift at endline with more teachers (55.6%) feeling that lesson observation and coaching by CSOs/QASOs were not distractors.
- At baseline only 18.5% of teachers agreed that remediation support for students with reading difficulties should start as early as first grade, compared to 98.6% at endline.

Key Lessons Learnt

1. Engaging government offices/authorities early to get approvals and permits required minimizes delays in getting approvals.
2. Involving relevant stakeholders right from the material development and validation stage enhances the development of quality resources and buy-in.
3. It was useful to meet the education stakeholders in person for a deeper understanding and to clarify questions about the study.
4. Administration of the Early Grade Learning Assessment (EGRA) takes a long time to complete. Using a revised version of the EGRA tool with fewer items would reduce the amount of time used.
5. Activity-based training was effective. The trainers modelled the activities and gave an opportunity to the teachers

to practice in their small groups.

6. Conducting teachers' training during the school holidays worked well since teachers were available and is within the TSC policy.
7. Involvement of CSOs and QASOs in teacher training, teacher coaching/support and classroom observations was useful since they are in touch with what happens at the county, sub-county, zone, and school levels and it falls within their mandate.
8. Regular support and supervision of teachers by CSOs, and QASOs through classroom observations and spot checks by the APHRC team helped to ensure fidelity of implementation. As a result of this support-supervision mechanisms, all the scheduled remedial sessions were completed,
9. Preparation of lesson observation notes and sharing via WhatsApp by CSOs and QASOs helped monitor progress and document lessons learned.
10. Cluster meetings were a good opportunity to get teachers' feedback on the implementation, share and learn from each other, and get support from CSOs and QASOs.

Key Study Challenges

1. The start of intervention activities was delayed from May 2023 (the second term) to September 2023 (the third term) due to the longer than anticipated process of developing intervention materials and obtaining the required approvals from the Ministry of Education and Teachers Service Commission.
2. The intervention activities in the third term were shortened by the need to allow learners to sit for their end-of-year exams and pave the way for the long school holiday in November and December when National examinations are also undertaken. As a result, 7 out of the planned 13 weeks of remedial sessions were held in September and October with the remaining 6 weeks continuing in January to mid-March in 2024.
3. The change in the project timelines meant that learners who were in grade 3 in 2023 progressed to grade 4 in 2024. As a result, teachers had the difficult task of persuading learners who progressed to grade 4 to continue with the remedial sessions, since they felt that the intervention was intended for lower primary learners yet they had now progressed to upper primary.

1. INTRODUCTION

Statistics indicate that globally, 53 percent of 10-year-olds in low and middle-income countries cannot read and understand a simple story, with the situation getting dire for sub-Saharan Africa at about 87 percent (UNICEF, 2022). In Kenya, a recent report on the status of foundational literacy and numeracy showed that 2 in 10 class 8 learners and 3 in 10 grade 6 learners could not meet expectations in reading a grade 3 appropriate English text (Usawa Agenda, 2023). This means that many children from low-income households in SSA are at risk of reading failure or difficulties if targeted interventions to support emergent literacy development are not provided urgently. Proposed intervention strategies that could improve learning outcomes of foundational literacy skills, reduce the number of non-readers, mitigate the learning loss for vulnerable student populations including providing targeted instruction to a child's level, introducing structured pedagogy programs, and providing reading resources. A targeted instruction approach includes using structured lesson plans, access to the teacher and learner books, teacher training, professional development, and instructional support (Angrist et al., 2021).

One such intervention is the Response to Intervention approach (RTI). This approach involves early identification of learners with reading difficulties and then providing them with intensive tiered targeted intervention based on learners' needs while monitoring their progress (Arias-Gundín & García Llamazares, 2021). Tier one instruction encompasses the general instruction given to all learners in a classroom. Tier two or three instruction is more intensive for learners not responding to interventions in the general education setting. Learners at risk of reading difficulties receive structured instruction in small groups that target their specific needs. Effective implementation of RTI requires system-wide participation of school administrators, teachers, and education stakeholders at the national and sub-national levels (Spear-Swerling, 2015). To strengthen learners' reading skills, RTI can be adapted as part of the regular education system in lower-middle-income countries (LMIC) to improve literacy outcomes.

There is limited evidence of effective structured intervention models for supporting early-grade learners in SSA contexts at risk of reading failure. The SSA contexts where significantly high percentages of learners have reading difficulties are different from the high-income countries in terms of available resources, educational infrastructures, learning materials, the language of instruction, and learning materials. It is critical to examine how the mechanisms of the RTI can be implemented with high fidelity in low-income contexts to strengthen learner reading skills and support the large proportion of learners at risk of reading failure. Empirical evidence indicates that learners with reading difficulties who receive tier 2 (small group) and 3 (individualized) instruction made significant gains in word identification, phonemic decoding, word reading fluency, and reading comprehension (Denton et al., 2013; Vernon-Feagans et al., 2018). In smaller groups, learners have opportunities to engage in learning activities, whereas teachers can effectively differentiate instruction to meet their learning needs.

Plausible challenges anticipated with implementing RTI in SSA contexts include large numbers of learners per school with poor reading profiles, inadequate supply of adequately trained teachers, students from very poor socio-economic backgrounds, and under-developed oral language skills in the instructional languages, and lack of adequate and quality teaching and learning materials. Given the contextual and qualitative differences and challenges of implementing RTI, it is critical to adapt and modify RTI to suit SSA contexts (Arias-Gundín & García Llamazares, 2021).

To alleviate the learning crisis in Kenya and ensure equity and inclusivity in learning, Response to Intervention (RTI) approaches must be adopted as part of the regular education system. Teachers using RTI approaches provide learners with targeted support and monitor their progress. There is a need for capacity development that equips teachers with effective reading instructional strategies.

Building on Existing Literacy Programs in Kenya

We recognize and value the concerted efforts by educational stakeholders – teachers, donors, the Ministry of Education, and non-governmental and charitable organizations – to improve literacy outcomes among early-grade learners in Kenya. For instance, the Tusome early grade reading activity sought to design and implement a remedial reading program targeting grade 3 learners who were struggling to acquire the foundational skills for reading. The remedial program focused on teaching English letter sounds and simple word reading, with one lesson per week devoted to

vocabulary, connected-text reading, and comprehension (USAID, 2023a). Findings from the TUSOME midline report indicated an increase in the number of fluent and emergent readers in English from 12% to 27%, with the portion of non-readers reducing from 38% to 12%. In Kiswahili, non-readers in grade two reduced from 43% to 19%, while fluent readers increased from 4% to 12% (Republic of Kenya, 2017). In the end-line report, findings showed that in English, only 14% of grade 1 pupils were emergent readers, and 13.5% were fluent readers; in grade 2, 35% were emergent readers, and 18% were fluent readers in English (USAID, 2020).

Another similar literacy program led by the Ministry of Education and implemented by RTI International, covering 547 formal public schools and low-cost private schools was the Primary Math and Reading (PRIMR) study. The endline evaluation for the study showed that learners in the treatment schools identified 47.0 correct letters per minute (clpm) correctly, compared to 25.7 letters per minute among the control pupils. In addition, the reading comprehension scores were more than twice as high in PRIMR (21.1%) as they were in control schools (9.8%) in Class 1 (USAID, 2014).

Foundational Literacy Gaps

Whereas research evidence on the impact of literacy interventions in low and middle-income countries points to positive effects across various literacy outcomes (Kim et al., 2020), there is still a large proportion of learners who do not develop foundational reading skills and thus are at risk of reading failure (UNICEF, 2022; Usawa Agenda, 2023). The prolonged school closures due to COVID-19 also exacerbated the low literacy outcomes. Moreover, the distance learning solutions that were implemented during the school closures to ensure learning continuity were limited in reach, particularly among learners from poor households and those living in rural areas (Rodriguez et al., 2021). School closures also had a negative effect on vulnerable learners living in poverty as they did not have learning resources and literacy support at home to augment their skills instruction (Moscoviz & Evans, 2022). Research reports indicate that there were significant learning losses between 2019 and 2021 in Kenya with a considerable increase in non-readers in grades 1 and 2 (USAID, 2023b).

In addition, a review of past and existing foundational literacy interventions highlights that the interventions do not use differentiated approaches and thus could exclude learners with reading difficulties. Further, the review shows that learners need targeted instruction – explicit, systematic instruction with an increase in intensity across tiers – to improve their literacy skills. Therefore, it is critical to generate empirical evidence on effective targeted intervention for early-grade students at risk of reading failure to inform policy and practice.

2. STUDY APPROVALS AND RESEARCH PERMITS AND INCEPTION

Ethics Approval and Research Permit

The study protocol was approved by the AMREF Ethics and Scientific Review Committee on May 23, 2023. A research permit from the National Commission for Science, Technology, and Innovation (NACOSTI) was granted on June 17, 2023. In addition, the Ministry of Education approved access to the sampled schools in Kiambu, Laikipia, Nairobi, and Embu Counties for the duration of the study. The county education offices issued additional approvals to confirm their support for the study and to allow the research team to access and implement the design phase in the 15 sampled schools and for the schools and teachers to participate in the intervention activities. The ethics approval renewal of the study protocol was issued on June 19, 2024.

Inception Meeting

The team held inception meetings with the Kenya Institute of Curriculum Development (KICD), and the Directorate of Policy Partnership and East African Community Affairs within MoE. In the meetings, the study goals, objectives, and design of the Developing Readers Program were presented to stakeholders, followed by discussions, feedback, and input on the study structure, gaps, and challenges of reading difficulties among early-grade learners in Kenya. A key outcome of the inception was that the stakeholders agreed to be study collaborators. More unstructured meetings were held with potential key partners and/or stakeholders including but not limited to the Tusome team (MoE & RTI), TSC officers at the head office, and literacy experts.

3. THE DEVELOPING READERS PROGRAM (DRP)

The developing readers program (DRP) is an early-grade remedial intervention targeting grade 2 and 3 learners with reading difficulties. The remedial intervention builds on the response-to-intervention approach where learners that are not responding to the whole class instruction are identified using standardized English and Kiswahili assessments – Early Grade Reading Assessment (EGRA) and placed in small homogeneous groups according to the reading proficiency for support. Whereas the main remedial intervention is meant to be covered over 25 weeks (about two school terms), the design phase in Kiambu County was structured to take 13 weeks. The main aim of the design phase was to allow the team to design the intervention resources and more importantly, learn and make necessary adjustments to the intervention before scaling up. The design phase targeted 920 learners in grades 2 and 3 and 60 early-grade teachers in 15 schools.

School Selection

The key inclusion criteria were schools with an enrolment of at least 40 learners in the target grades (2 & 3), and sub-counties with at least 10 schools. The total number of sub-counties in Kiambu County was 15 – for the design phase. We selected the sub-counties with at least ten schools that met inclusion criteria, summing up to ten sub-counties. We applied random selection criteria from these ten sub-counties by using random numbers to select three sub-counties for the design phase, namely Kiambu, Limuru, and Thika West. We requested information regarding the education zone[2] classification from these sub-counties from the County Director of Education's office at the county level. All zones from the three sub-counties were put in the same 'basket' from where we selected three zones (based on logistics and resource availability) with at least ten schools that fit the inclusion criteria - namely Tigoni, Limuru, and Ndumberi zones. From these zones, we randomly selected five schools in each zone, giving us 15 schools for the trial/model development phase.

Learner Screening and Grouping

The baseline evaluation of learners in grades 2 and 3 was conducted from July 18 to August 9, 2023. This was preceded by the training of enumerators that took place from July 13 to 17, 2023. The screening was done using the English and Kiswahili Early Grade Reading Assessments (EGRA). Out of the 2805 learners that were screened at baseline in Kiambu County, 920 (33%) learners were found to have reading difficulties. Of the learners with reading difficulties, 410 (45%) were found to be non-readers meaning that they were not able to read any words correctly in 1 minute, 212 (23%) were beginners having read 1-9 correct words per minute, and 298 (32%) were intermediate readers having read 10-16 correct words per minute. The learners with reading difficulties were then placed into the remedial support groups according to their reading proficiencies, that is, module 1 for non-readers, module 2 for beginning readers, and module 3 for intermediate readers as shown on *Table 1* and *Figure 1*. The selected fluency benchmarks were below the grade 1 and grade 2 emergent low benchmarks as defined by the Kenya National Examination Council (KNEC) (USAID, 2021).

Table 1: Reading fluency benchmarks used for categorization in DRP

Modules: Categories	Number of words
Module 1: Zero readers	0 correct words per minute
Module 2: Beginning readers	1 - 9 correct words per minute
Module 3: Intermediate readers	10 - 16 correct words per minute
Emergent readers	17-44 correct words per minute
Fluent readers	>44 correct words per minute

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2. Used by MoE to group schools within same geographical area for purposes of receiving MoE administrative services, such as support from Curriculum Support Officers.

Percentage (%) of learners in each reading category at baseline

Category	Percentage
Non-readers	14.6
Beginners	7.6
Intermediate	10.6
Emergent	53.2
Fluent	14.1
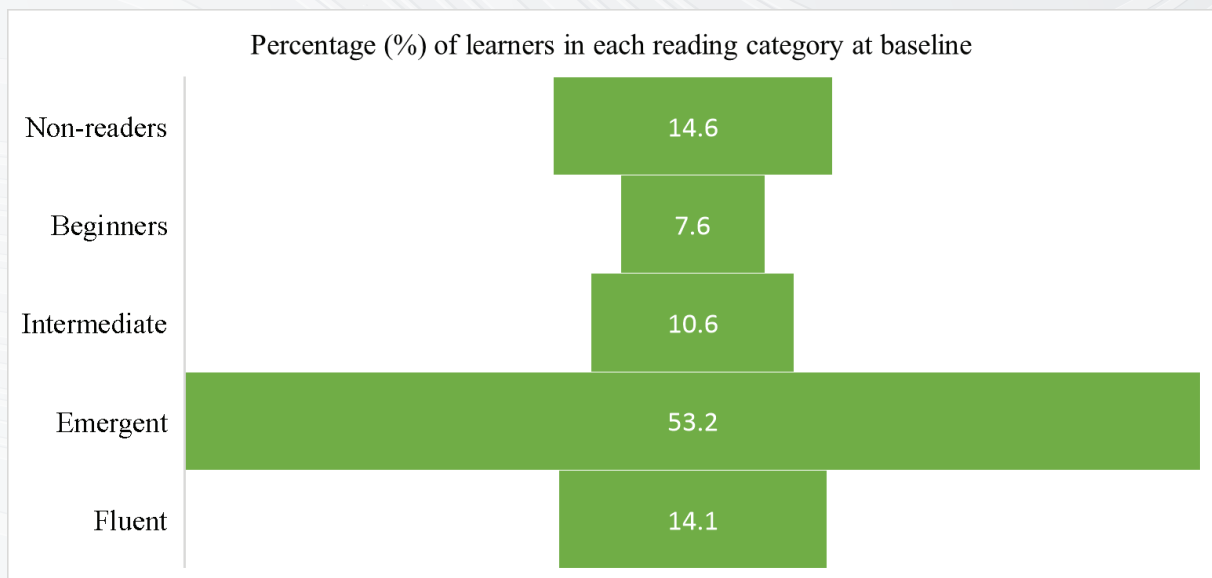
Figure 1: Percentage of screened learners in each of the reading categories at baseline

Kiswahili was used as the grouping language because it is a more familiar language or a pseudo-mother tongue for many learners. Evidence indicates that learners from Kenya had better reading comprehension in Kiswahili, which is more familiar than English in the Kenyan context (Piper et al., 2016). The screening also highlighted that there were significantly more male learners with reading difficulties in all the modules compared to female learners *(Figure 2)*.
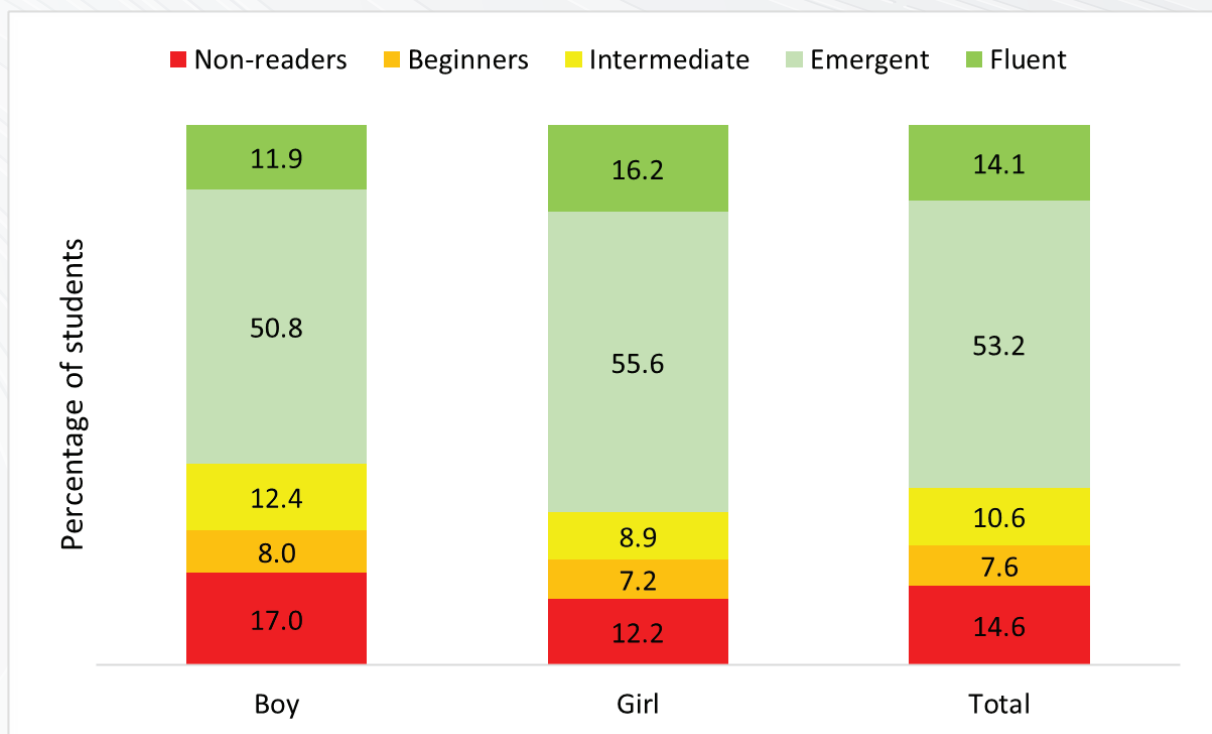
Figure 2: Proportion of male and female learners with reading difficulties in each of the modules at baseline

Learner and Teacher Distribution

The number of teachers delivering the intervention ranged between 3 and 6 depending on the number of learners in a school to enhance the provision of more intensive support to the learners within the modules. In addition, the modules with more than 20 learners were split into two groups, contingent on the availability of lower-grade teachers in a school. *Table 2* highlights the distribution of learners and teachers in the various modules.

Table 2: Distribution of learners and teachers per module in the target schools

School Name	Total Number of Learners per School	Number of learners per module			Number of teachers per module		
		Module 1	Module 2	Module 3	Module 1	Module 2	Module 3
School 1	77	32	21	24	2	1	1
School 2	47	5	13	29	1	1	2
School 3	22	9	3	10	1	1	1
School 4	42	23	8	11	2	1	1
School 5	45	14	6	25	1	1	2
School 6	88	31	27	30	2	2	2
School 7	58	23	16	19	1	1	1
School 8	91	54	18	19	3	1	1
School 9	47	16	13	18	1	1	1
School 10	65	32	14	19	2	1	1
School 11	80	52	15	13	3	1	1
School 12	53	27	10	16	2	1	1
School 13	37	15	8	14	1	1	1
School 14	73	29	20	24	2	1	1
School 15	95	48	20	27	2	1	1
Total	**920**	**410**	**212**	**298**	**26**	**16**	**18**

Intervention Material Development

The development of intervention materials took place between April and August 2023. It was done by a team that included researchers, literacy experts (some who developed the Tusome materials), practicing teachers, Curriculum Support Officers (CSO), and Quality Assurance and Standards Officers (QASO). Government officers participated in various stages of the material development. The material development process was iterative as the team continuously sought to improve the quality of the materials. The team held four workshops and continuous remote meetings to brainstorm, adapt, review, and revise the intervention materials to meet the learning needs of the learners in the three remedial instructional modules. The following intervention materials[3] were developed or adapted, reviewed, and revised.

- **English and Kiswahili Scope and Sequence/Content Summary:** Outlines the contents of the component skills of reading to be covered in the remedial program.
- **English and Kiswahili Lesson Guides:** The learning activities and skills taught in the English and Kiswahili DRP remedial intervention are highlighted in **Table 3.**

Table 3: Literacy activities and skills taught in the DRP intervention sessions

Literacy Activities*	Target Skill
Catch the ball	Oral language development
Make a story	Oral language development
Remember the story	Oral language development
Snail talk	Phonological awareness
I spy with my little ears	Phonological awareness
Game of cards	Letter name and sound recognition
Bean bag	Letter name and sound recognition
Letterbox	Letter name and sound recognition
Word race	Alphabetic principle
Syllable box (Kiswahili only)	Alphabetic principle
Vocabulary word box	Vocabulary
Sentence Reading	Text reading fluency
Text reading marathon	Text reading fluency
Reading against oneself	Text reading fluency
Questioning	Reading comprehension
Retelling	Reading comprehension

*Notes: Activities in English and Kiswahili were the same.

- **Teacher Training Manual:** Provides a general overview of the response to the intervention framework, guidelines, and activities on how to teach foundational literacy skills in English and Kiswahili to learners falling behind. It includes content on providing targeted support to learners through extensive tiered and explicit teaching using fun activities, progress monitoring assessment, differentiated instruction, and formative feedback strategies.
- **Training of Trainer Manual:** Provides a general overview of the response to the intervention framework, provides guidelines and activities on how to teach foundational literacy skills in English and Kiswahili to learners falling behind through extensive tiered, explicit teaching, using fun activities, progress monitoring assessment, differentiated instruction, and feedback strategies. It also provided guidelines on best practices for facilitation.
- **English and Kiswahili Biweekly Assessment, Tracker, and Stimuli:** Contains the biweekly learner assessments administered by the teacher. The purpose is to check learning progress and use the data to regroup learners and redesign instruction. The booklet includes an assessment tracker where each learner's scores are recorded. The learner stimuli contain the tasks for the different component skills that the learner is assessed on.
- **English and Kiswahili Homework Packets:** Short activities aligned with the instructional content handed to children at the end of each week for reading and writing practice with the support of parents and guardians.

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3. Soft copies are available on request.

- **Headteacher Sensitization Manual:** A summary of the DRP program detailing the roles of the head teachers in supporting the DRP program.

- **Lesson Plan Template:** Provides a lesson plan template to help the teacher plan for instruction by organizing the instructional content for each lesson. The teacher records details of the week, lesson number, subskill, activity, content focus, materials, page on content summary, lesson guide, and learners' book.

Validation of Intervention Materials

A validation workshop of the intervention material was held on June 21 to 23, 2023. The event was attended by research and curriculum officers from KICD, the Ministry of Education (Directorate of Policy and Partnerships and East African Affairs and Directorate of Quality Assurance and Standards), Curriculum Support Officers, Quality Assurance and Standards Officers, and lower primary teachers. In small groups based on language (English and Kiswahili), the workshop participants reviewed the alignment of the intervention materials to the goals and objective(s) of the study, suitability for learners with reading difficulties, practicality in the classrooms, and alignment with the tenets of the Competence Based Curriculum (CBC). The process entailed reading, discussing, deliberating, revising, capturing comments on the documents for further action, and pointing out areas that need further improvement. At the end of the three-day workshop, the materials were endorsed for use in the DRP intervention.

School Mobilization

The research team reached out to the head teachers of the 15 sampled schools to provide information about the study. Together with the relevant County QASO, who was the focal person for the study in a zone, the team mobilized and sensitized the sub-county QASOs for the targeted zones. During the school visits, the research team presented relevant documentation for the schools, including the study concept note, research permits, permission letters, and the head teacher consent forms. The head teachers were also briefed on the anticipated research activities.

Training of Trainers

The training of trainers was held on 7th to 11th August 2023. The training was attended by 25 participants: 2 national-level Ministry of Education officers from the Directorate of Quality and Assurance and Standards and the Directorate of Policy, Partnerships, and East African Community Affairs, 4 Curriculum Support Officers, 4 Quality Assurance, and Standards Officers, 7 head teachers from Kiambu County, 5 literacy experts, and 3 APHRC researchers. The objective of the training was to build the capacity of master trainers - CSOs and QASOs - on the Response to Intervention instructional approach, the use of differentiated instructional strategies to support the learning needs of early-grade learners at risk of reading failure, pedagogical strategies for supporting developing readers, use of assessments to inform instruction and use of assessment data to regroup learners. The metalinguistic games utilized in DRP to teach the component skills of reading were introduced. During the training, the participants simulated teaching the activities in the English and Kiswahili lesson guides to their peers. Each participant had multiple opportunities to practice teaching the activities to the whole group or in small groups. The teaching sessions were followed by self-reflection and feedback from the facilitators and the participants. The participants were exposed to a range of materials prepared and validated for use in the intervention, including lesson guides, teacher training manuals, assessment guides, learner stimuli, and homework packets. Participants were encouraged to ask questions or seek clarification throughout the training sessions. During the training, the team also thoroughly reviewed the materials, and revisions were implemented accordingly.

Teacher Training

The teacher-training workshop was held on August 14 to 18, 2023, and targeted 55 grade 1 to 3 teachers teaching English and Kiswahili language activities in the sampled schools. In each school, three or four early-grade teachers were nominated to participate in the training and the intervention depending on the number of learners identified to have reading difficulties. An additional 5 teachers were trained in September to provide support to the large number of learners (especially in module 1) in schools with larger class sizes. The training was facilitated by the CSOs and QASOs in partnership with APHRC researchers. Before the training, teachers completed a knowledge, skills and attitude survey that gauged their knowledge, skills, and perceptions about supporting learners with reading difficulties. Key findings from the survey are presented in section 4 of the report. The training introduced the overview of the developing read-

ers' program. Teachers were trained on the response to intervention instructional approach, differentiated instructional strategies to support the learning needs of learners with reading difficulties, and pedagogical strategies for supporting developing readers. The trainers introduced metalinguistic games and exercises for teaching different component reading skills, assessments to inform instruction, and using assessment data to regroup learners. During the training, the teachers worked in small groups to review the steps of teaching the metalinguistic games and exercises using their lesson guide. Teachers simulated teaching the activities in the English and Kiswahili lesson guides to their peers. The teaching sessions were followed by self-reflection on what they did well and how they would improve teaching the activity the next time. Other teachers and the facilitators provided more feedback on areas of strength and those that need further improvement. All the participants got multiple opportunities to practice teaching the activities to peers in small groups. The participants were guided on using the different materials for DRP lesson guides, the scope and sequence, the lesson plan template, the assessment booklet, the assessment tracker, learner stimuli, and the homework packets. Participants were encouraged to ask questions or seek clarification throughout the training sessions. Each teacher was given instructional materials, a lesson guide, an assessment booklet, and the learner's assessment stimuli.

Headteacher Induction Workshop

The head teachers of the 15 sampled schools attended a one-day induction meeting on August 14, 2023. The workshop was to sensitize them about DRP and their role in supporting the DRP program, including supporting teachers in the schools to determine the appropriate time for the remedial lessons, providing space/classrooms for instruction, providing materials that teachers may need, sensitizing parents on their children's participation in DRP, and supervision of the program.

DRP Remedial Activities

The DRP intervention activities began in the third term of the academic calendar in September 2023. In the first week, the research team did callbacks to complete the baseline assessments in select schools. In addition, the head teachers conducted internal meetings within schools to determine the allocation of instructional time for the remedial lessons, allocation of rooms for the classes, and sensitize the teachers about the DRP program and appointment of the champion teachers. The head teachers also organized school meetings of parents of children selected to participate in the remedial program to sensitize them on the role of parental engagement, their support with the homework packets, and the creation of a reading culture at home. The remedial program instruction in the 15 schools began on September 4th, 2023. Schools selected different periods, to carry out the remedial sessions depending on their school calendar and availability of classrooms (0700-0800hrs; 1330-1400hrs; 1430-1500hrs; 1420-1450hrs; 1540-1610hrs; and 1620-1650hrs). Remedial sessions in the Kiambu design phase ended in mid-March 2024. The total hours covered by each teacher was 32.5 hours during the 13-week intervention period, that is 2.5 hours per week, meaning that teachers covered all 5 remedial sessions (3 English and 2 Kiswahili) per week, each lasting 30 minutes as planned.

Bi-Weekly Assessments

Teachers administered progress-monitoring assessments in all the schools every two weeks in English and every three weeks in Kiswahili. The assessments were administered to every child, and the outcomes were recorded on the assessment tracker. Teachers were sensitized on using the assessments formatively to track learner progress and identify areas where learners needed more support. Table 4 shows the skills assessed during the bi-weekly assessments in each of the modules.

Table 4: Skills assessed during the bi-weekly assessments in each module

Module	Assessment 1 Lesson 6	Assessment 2 Lesson 12	Assessment 3 Lesson 18	Assessment 4 Lesson 24	Assessment 5 Lesson 30
Zero readers (Module 1)	• Letter name and sound • Reading vocabulary	• Letter name and sound • Reading vocabulary	• Letter name and sound • Reading Syllables • Reading vocabulary	• Letter name and sound • Reading Syllables • Reading vocabulary	• Letter name and sound • Reading vocabulary • Oral reading (short sentences)
Beginning readers (Module 2)	• Letter name and sound • Reading Syllables • Reading vocabulary	• Reading vocabulary • Reading comprehension (60 seconds -timed activity)	• Letter name and letters sound • Reading vocabulary	• Reading vocabulary • Reading comprehension (60 seconds -timed activity)	• Reading comprehension
Intermediate readers (Module 3)	• Letter name and letters sound • Reading vocabulary	• Reading vocabulary • Reading comprehension	• Letter name and sound • Oral Reading (60 seconds -timed activity) • Reading vocabulary	• Reading comprehension	• Reading vocabulary (60 seconds -timed activity) • Reading comprehension

Weekly Lesson Reflection Form

All the teachers completed one lesson reflection for the English lesson and one for Kiswahili every week. To encourage reflective teaching, the teachers reflect on the specific English and Kiswahili lessons they taught that week, the use of the gradual release model, whether learners understood the concept taught, whether students got multiple opportunities to practice what they learned, whether the steps of the activities were clear, areas that needed revision, and additional support they would require.

School Support Visits

The Curriculum Support Officers, Quality Assurance and Standards Officers, literacy experts, and the research team conducted weekly school visits to support teachers. During the school visits, the support team observed class sessions and completed the electronic classroom observation tool. A debrief session with the teachers in the school was then held to provide feedback and support to enhance the implementation of the intervention. The feedback to the teachers was done on the day of the support visit, with crosscutting issues noted and communicated to the rest of the teachers through their WhatsApp wall. A report of the support visits was also compiled and shared with the project team for review. Key findings from the classroom observations are highlighted in the study evaluation section.

Zonal Cluster Meetings

Two cluster meetings were held on October 17, 2023, and March 22, 2024, where teachers reflected on what was working well in the implementation, challenges that teachers and students were facing, areas in the Kiswahili and English lessons that needed revisions, specific support teachers need from CSOs and QASOs, and suggestions for improving DRP.

Changes in Proposed and Actual Intervention Activities

Table 5 provides a summary of the changes in proposed and actual intervention activities during the Kiambu design phase, as well as the reasons that informed the changes.

Table 5: Developing readers program proposed and actual intervention activities

Proposed intervention activities	Actual intervention activities	Reasons for the changes
The intervention period for the Kiambu design phase was scheduled for May 2023 - November 2023 during the second and third terms.	• Intervention activities took place from September 2023 – March 2024 for 13 weeks, during the third term in 2023 and the first term in 2024. • The intervention activities took a break during the long school holiday from November – December 2023.	• Development of intervention materials and getting the necessary approvals from the Ministry of Education and Teachers Service Commission took longer than expected. The approval from MoE was provided in June and material development and printing ended in July, and therefore the ToT and teacher training could only be done in August 2023. • The change also meant that the targeted grades 2 and 3 learners progressed to grades 3 and 4 respectively in 2024.
3 English and 2 Kiswahili remedial sessions were scheduled for 30 minutes each per week.	No change	
Existing grades 1 and 2 competence-based curriculum materials to be used as content sources to provide support.	No change	
Schools decide the time to hold the intervention sessions (early morning or afternoon).	No change	
Grades 2 and 3 were targeted for the remedial intervention	No change	
Internship and Board of Management (BoM) teachers from the TSC placed in the schools to deliver the intervention.	In-service teachers in lower primary (grades 1-3) engaged to deliver the intervention.	Using in-service teachers reduces the attrition rate from the program compared to internship and BoM teachers, whose internship period is 12 months in a school.
15 internship teachers were targeted to deliver the intervention.	60 teachers trained to deliver the intervention.	The need for additional teachers was informed by the need to have 1 teacher supporting a module and the large number of learners, especially in module 1. The number of teachers per school ranged between 3 and 5 depending on the number of learners in the various modules.

Proposed intervention activities	Actual intervention activities	Reasons for the changes
Remedial intervention delivered to small homogenous groups (similar reading profiles) of 10 – 15 learners.	The group sizes varied from 3-27 learners in the various schools.	The large number of learners coupled with few numbers of teachers in the lower grades in some of the schools resulted in some of the groups having more than 15 learners as proposed.
Curriculum Support Officers (CSOs) to provide support to teachers (training and supervision)	Curriculum Support Officers (CSOs) and Quality Assurance and Standards (QASOs) provided support to teachers	The need to include QASOs was informed by an inadequate number of CSOs in the sub-counties. The arrangement worked well since CSOs and QASOs are mandated to ensure quality teaching and learning in schools.

4. ENDLINE EVALUATION OF THE KIAMBU DESIGN PHASE

Endline Training and Data Collection

A four-day training of enumerators was conducted from April 29 to May 3 2024. This involved training on the Kiswahili EGRA assessment tool, and institutional and teacher questionnaires. Enumerators were taken through the research ethics, study purpose, study tools, and administering the study tools on SurveyCTO. To ensure quality and consistency, the enumerators participated in role plays, mock interviews, and an Inter-rater reliability (IRR) test. At the end of the training, the IRR score was 93.8%.

The mobilization of the 15 schools for endline data collection was conducted before the visits where the headteachers were informed of the planned endline activities, provided consent, and confirmed the appointments. Data collection was conducted from May 16 to May 31, 2024. As part of the data quality checks the supervisory team conducted spot checks and supported the enumerators by giving feedback during the debriefing sessions at the end of the day. In addition, these debriefing meetings allowed the enumerators to communicate any areas of concern and receive clarifications and ways forward. Each enumerator was required to upload all the completed questionnaires at the end of each day, this enabled the data analyst to check the number and completeness of the assessments done.

Response Rates at Endline

Table 6 shows the learner response rates at the endline. Of the 920 learners enrolled in the 13-week remedial sessions at baseline, 847 (92%) were successfully reached at the endline. There were no gender differences in the response rate, with 92% of the targeted female and male learners reached at endline. The main reason for non-response by learners at the endline was transfer out of the target intervention schools.

Table 6: Learner response rates at endline

Module	Targeted learners	Learners reached	% Reached
Module1	410	367	90%
Module2	212	196	92%
Module3	298	284	95%
Total	920	847	92%

Categorization of Learners at Endline

Since the Kiswahili EGRA assessment was used to identify and categorize learners with reading difficulties, the same assessment was administered to the same learners at the endline to assess the effects of DRP on their reading proficiencies. At baseline, the learners were in grades 2 and 3 in 2023 while at endline the learners had progressed to grades 3 and 4. Taking into consideration the 847 learners that were successfully followed up at the endline and using the oral reading fluency scores of the number of words that learners were able to read per minute (cwpm), the results showed a reduction in the number of learners with reading difficulties from baseline. At endline, the status was as follows: 18.9% of the learners were not able to read any correct words, 20.8% read between 1-9 correct words, 22.8% read between 10-16 words, 37.3% read between 17-44 words, and 0.2% read more than 44 words. The graduation of 318 students to the emergent and fluent levels was particularly a key indicator of the effectiveness of the DRP remedial sessions. See *Figure 3.*
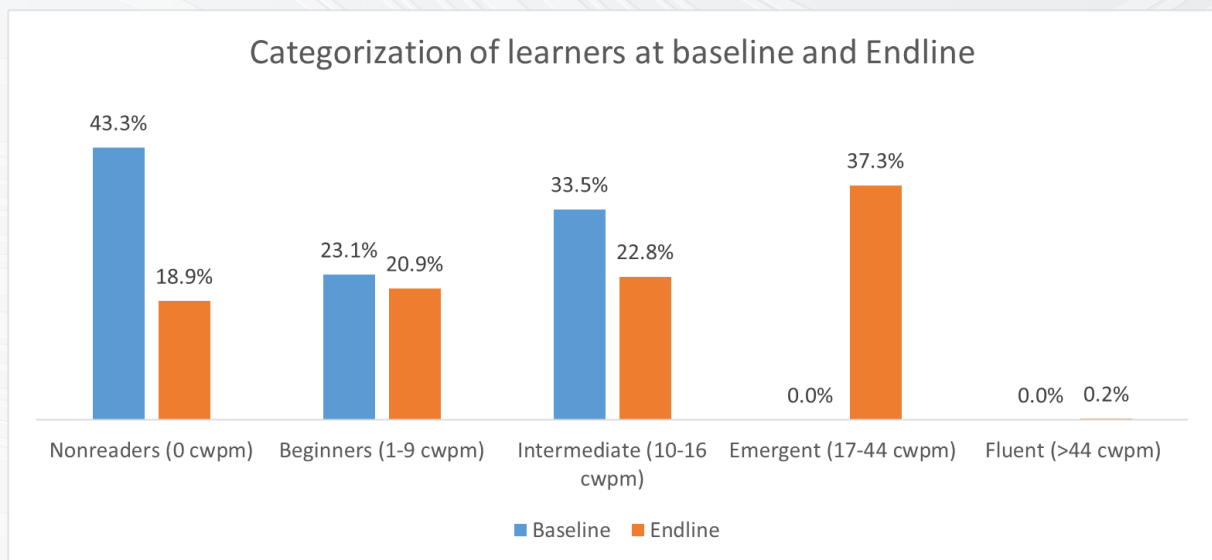
Figure 3: Categorization of learners at baseline and endline

The endline results also indicated that of the 529 learners in grade 3, the majority (39.3%) were in the emergent level, followed by intermediate (23.8%), beginner (18.9%) and non-reader categories (17.8%). On the other hand, of the 318 learners in grade 4 at endline, the majority (34%) were emergent readers, followed by beginner (23.9%), intermediate (21.1%) and non-reader categories (20.8%). These results mean that within the grades, there were proportionately more learners in grade 4 categorized as non-readers and beginners compared to grade 3. See *Table 7.*

Table 7: Categorization of learners by grade

	Baseline			Endline		
	Grade 2 (n= 529)	Grade 3 (n=318)	All (N=847)	Grade 3 (n= 529)	Grade 4 (n=318)	All (N=847)
Reading Category	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Non-readers	228 (43.1)	139 (43.7)	367 (43.3)	94 (17.8)	66 (20.8)	160 (18.9)
Beginners	120 (22.7)	76 (23.9)	196 (23.1)	100 (18.9)	76 (23.9)	176 (20.9)
Intermediate	181 (34.2)	103 (32.4)	284 (33.5)	126 (23.8)	67 (21.1)	193(22.8)
Emergent	-	-	-	208 (39.3)	108 (34.0)	316 (37.3)
Fluent	-	-	-	1 (0.2)	1(0.3)	2 (0.2)
Total	**-**	**-**	**-**	**529 (100)**	**318 (100)**	**847 (100)**

The categorization of learners by gender showed that there were relatively more boys than girls in all the modules at the endline, similar to what was observed at the baseline. The largest proportion of boys was in the non-reader category at 64.4%, followed by the intermediate category (59.1%), then the beginner category (57.4%), and emergent (52.2%). In addition, within the gender categories, the largest proportion of boys and girls were in the emergent category, at 34.1% and 41.6% respectively. See *Table 8.*

Table 8: Categorization of learners by gender

	Baseline			Endline		
	Boy (n=484)	Girl (n=363)	Total (n=847)	Boy (n = 484)	Girl (n =363)	Total (n=847)
Reading Category	n (%)	n (%)	n (%)	n (%)	n (%)	N (%)
Non-readers	214(44.2)	153(42.2)	367(43.3)	103 (21.3)	57(15.7)	160 (18.9)
Beginners	102(21.1)	94(25.9)	196(23.1)	101 (20.9)	75 (20.7)	176 (20.8)
Intermediate	168(34.7)	116(32.0)	284(33.5)	114 (23.6)	79 (21.8)	193 (22.8)
Emergent	-	-	-	165 (34.1)	151(41.6)	316(37.3)
Fluent	-	-	-	1(0.2)	1(0.3)	2(0.2)
Total	**484 (100)**	**363 (100)**	**847 (100)**	**484 (100)**	**363 (100)**	**847 (100)**

Learner Progression in and Between the Reading Categories

Further analysis to examine the proportion of learners that remained or progressed to subsequent modules showed that after 13 weeks of remedial sessions, 41.4% of learners that had been categorized as non-readers at baseline remained at that level, with 32.4%, 15.5%, and 10.6% progressing to the beginner, intermediate and emergent levels, respectively. These results mean that about 58.9% of learners in the non-reader category progressed to the subsequent levels. On the other hand, 25.5% of learners categorized as module 2 (reading between 1-9 cwpm) remained at that level while the majority (70.4%) progressed to the intermediate (32.7%) and emergent (37.8%) categories. About 4.1% (8 students) of the learners in module 2 fell back into the non-reader category. Lastly, about 71.5% of learners in module 3 progressed to the emergent level, with 25.4% remaining at the same level and 2.5% falling back to the beginner level. Only two students in module 3 progressed to the fluent category. The detailed analysis is shown in *Table 9.*

Table 9: Learner module progression from baseline to endline

	Baseline Reading Category			
Endline Reading Category	Module 1	Module 2	Module 3	Total
Non-readers (n)	152	8	0	160
%	41.4	4.1	0	18.9
Beginners (n)	119	50	7	176
%	32.4	25.5	2.5	20.8
Intermediate (n)	57	64	72	193
%	15.53	32.7	25.4	22.8
Emergent (n)	39	74	203	316
%	10.6	37.8	71.5	37.3
Fluent (n)	0	0	2	2
%	0	0	0.7	0.2
Total (n)	**367**	**196**	**284**	**847**
%	**100**	**100**	**100**	**100**

Learner Subtask Scores by Module and Grade

The variables used to assess the learners' reading ability in Kiswahili at endline were letter name knowledge, measured by correct letter names per minute; letter sound knowledge, measured by correct letter sounds per minute; syllable knowledge, measured by correct syllables per minute; invented words (non-words) decoding, measured by correct invented words read per minute; oral reading passage, measured by the correct number of words read in the passage per minute; reading comprehension, measured by the number of correct questions answered from the passage; listening comprehension, measured by the number of correct questions answered from the passage read to the learner; and vocabulary, measured by the correct number of picture names mentioned by the learner.

The endline results in *Table 10* showed that on average, learners in module 3 recorded higher scores in all the subtasks compared to learners in modules 2 and 1. This was expected considering that module 3 learners had a higher reading proficiency compared to the other modules. When comparing the performance of module 3 to module 1, the largest mean differences were in syllable knowledge (20.4), oral reading passage (16.4), and letter sound knowledge (15.4). On the other hand, the lowest mean difference between the two modules was in vocabulary (0.3). The mean score differences between modules 3 and 2 showed that the largest differences were in syllable reading (8.1), oral passage reading (7.3), and letter sound knowledge (5.9). The lowest differences were in vocabulary (0.2) and listening comprehension (0.3). The reading comprehension scores were not generated for comparison between the grade and modules, since they were subjective to the number of words that each learner was able to read. In other words, the number of comprehension questions was dependent on the number of words the learners were able to read in the passage, and thus challenging to derive mean scores.

In terms of grade level, grade 3 learners (grade 2 at baseline) scored higher than grade 4 learners (grade 3 at baseline) in all the subtasks except for listening comprehension and vocabulary.

Table 10: Learner subtask endline scores by grade and module

	Grade		Module		
	Grade 3	Grade 4	Module 1	Module 2	Module 3
Letter name knowledge (clnpm)	21.8	20.7	15.5	23.7	27.2
Letter sound knowledge (clspm)	34.4	32.7	26.4	35.9	41.8
Syllable knowledge (cspm)	24.1	20.5	13.0	25.3	33.4
Invented words (non-words) (cnwpm)	9.4	7.2	4.2	9.8	13.3
Oral reading passage (cwpm)	13.9	12.4	5.7	14.8	22.1
Reading comprehension	-	-	-	-	-
Listening Comprehension (% accuracy out of 5 questions)	74.3	79.6	72.2	79.3	79.6
Vocabulary (correct picture names matched to 25 pictures)	21.7	22.3	21.8	21.9	22.1

Learner Subtask Scores by Gender

An analysis of the learner scores by gender *(Table 11)* revealed that, overall girls performed better than boys in almost all the subtasks except for listening comprehension. The largest mean difference between girls and boys was from the oral reading passage (2.1), syllable knowledge (2.1), and letter sound knowledge (1.8). There were relatively similar scores for vocabulary. However, a test of statistical significance showed that girls only performed better in syllable knowledge (p=0.023) and oral reading passage (p=0.005).

Table 11: Learner subtask scores by gender

	Means		Median		
	Boy (n = 484)	Girl (n =363)	Boy (n = 484)	Girl (n =363)	
Item	Mean (SD)	Mean (SD)	Median (IQR)	Median (IQR)	p-value
Letter name knowledge (clnpm)	20.6(0.6)	22.3(0.7)	19(11-29)	20(12-32)	0.053
Letter sound knowledge (clspm)	33.0(0.7)	34.8(0.9)	33(21-43)	34(24-45)	0.119
Syllable knowledge (cspm)	21.8(0.7)	23.9(0.7)	20(10-32)	24(14-34)	0.023
Invented words (non-words) (cnwpm)	8.4(0.3)	8.8(0.4)	8(1-13)	9(2-14)	0.284
Oral reading passage (cwpm)	12.4(0.5)	14.5(0.6)	13(1-20)	14(4-24)	0.005
Reading comprehension	-	-	-	-	-
Listening Comprehension (% accuracy out of 5 questions)	77	75.5	4(3-5)	4(3-5)	0.366
Vocabulary (correct picture names matched to 25 pictures)	21.9(0.7)	21.9 (0.7)	22(21-23)	22(21-23)	0.294

*IQR- interquartile range

School Subtask Scores

Table 12 shows the school differences in the sub-task scores. The scores ranged from 16.8-31 correct letter names per minute, 27.8-43 correct letter sounds per minute, 17.3-28.4 correct syllables per minute, 6.7-11.6 correct invented words per minute, 8.9-19.8 correct words per minute in the oral reading passage, 72%-89% accuracy in the listening comprehension, and 21.3-22.5 correct picture names matched. The largest difference was in letter and sound name knowledge, with the vocabulary activity having the smallest differences in the scores.

Table 12: School sub-task scores

	Letter name knowledge (clnpm)	Letter sound knowledge (clspm)	Syllable knowledge (cspm)	Invented words (non-words) (cnwpm)	Oral reading passage (cwpm)	Listening Comprehension (% accuracy out of 5 questions)	Vocabulary (correct picture names matched to 25 pictures)
School 1 (n=72)	19.7	36.6	23.7	9.7	13.9	72%	21.8
School 2 (n=44)	23.6	35.2	23.8	9.0	16.7	76%	21.5
School 3 (n=20)	20.3	43.0	23.4	7.7	14.0	89%	22.3
School 4 (n=40)	18.6	35.2	21.3	7.0	12.2	74%	22.4
School 5 (n=42)	24.6	41.3	28.1	9.8	14.5	86%	22.5
School 6 (n=86)	22.9	34.8	24.5	9.2	14.4	75%	21.5
School 7 (n=53)	31.0	39.1	28.4	10.6	15.7	74%	22.4
School 8 (n=86)	25.3	30.9	21.9	8.3	12.4	74%	21.9
School 9 (n=43)	19.4	39.1	26.6	11.6	19.8	86%	22.3
School 10 (n=60)	17.5	28.3	17.8	6.7	10.3	77%	22.2
School 11 (n=73)	19.7	29.6	17.3	7.3	8.9	77%	22.2
School 12 (n=50)	16.8	33.1	19.6	7.1	11.8	72%	21.3
School 13 (n=33)	17.3	27.8	20.8	7.4	13.4	80%	22.4
School 14 (n = 66)	20.7	31.1	24.6	8.3	13.1	78%	21.4
School 15 (n=79)	20.1	32.3	21.8	8.4	12.7	72%	21.8

Mean Differences in Learner Mean Scores between Baseline and Endline

Further analysis of the difference in the learner mean score in the various sub-tasks showed that whereas the magnitude in the mean differences between baseline and endline was relatively small, the mean differences were statistically different with a p-value<0.05 (Table 13). The results showed that the largest mean difference in general was in the oral reading passage (7.6) and letter name knowledge 7.5). These two sub-tasks also contributed to the largest mean differences in modules 1 and 3. In module 2, the largest mean differences were in oral reading passage (9.4 and syllable knowledge 9.3). A detailed analysis of the mean differences for all the learners and per module is shown in *Annex 2.*

Table 13: Mean differences in learner mean scores between baseline and endline

	Mean Diff (Endline-Baseline)			
	All Students (n=847)	Module 1 (n=367)	Module 2 (n=196)	Module 3 (n=284)
Letter name knowledge (clnpm)	7.5	6.4	8.2	8.2
Letter sound knowledge (clspm)	5.4	3.9	5.8	7.0
Syllable knowledge (cspm)	6.9	5.4	9.3	7.2
Invented words (non-words) (cnwpm)	4.1	3.2)	5.5	4.1
Oral reading passage (cwpm)	7.6	5.6	9.4	9.0
Listening Comprehension (% accuracy out of 5 questions)	0.6	0.7	0.7	0.4
Vocabulary (correct picture names matched to 25 pictures)	0.7	0.9	0.6	0.6

Home, School, and Individual Contextual Factors Influencing Literacy Outcomes

This study also sought to determine the home, school, and individual contextual background factors that may influence the learner outcomes in each of the subtasks. These contextual factors included the main language spoken at home and school, pre-primary school attendance, availability of English, Kiswahili and other language reading materials at home, the reading culture at home and school, school attendance, learners' health, and disability. See *Annex 1* for the detailed contextual factors.

In terms of home contextual factors, 74.5% of the learners reported that they mainly spoke *Gikuyu* at home which is the native language of the catchment area, followed by Kiswahili (52.1%) and English (14.3%). Further, 73.2% and 67.3% of learners reported having English and Kiswahili materials to read at home, with more boys and girls reporting the availability of materials for both languages. About 75.2% of the learners also stated having someone who reads stories aloud to them at home, with 86.5% stating that they read stories at home.

On the other hand, the results of the school contextual factors showed that 93.3% and 75.1% of the learners spoke Kiswahili and English at school respectively. In addition, 85.4% of the learners stated practicing reading aloud to their teacher or other pupils, 83.2% practiced silent reading in school, and 86.8% reported that their teacher assigned reading exercises to practice at home. Further, about 95.2% of the learners in the program reported attending pre-primary school, with proportionately more boys (96.3%) than girls (93.7%) reporting the same. A majority of the learners (75.1%) of the learners reported that other than the assignments provided by the schools, they either sometimes (58.3%) or every day (21.4%) read on their own. In terms of school attendance, 65.6% and 70.5% of the learners stated that they rarely or never miss school respectively.

Findings of the individual contextual factors indicated that the illnesses alluded to by the learners in general were coughing continuously (10.5%), vision problems (10.2%), and abdominal problems (7.2%). More girls than boys reported experiencing these three main illnesses. See *Figure 4.*
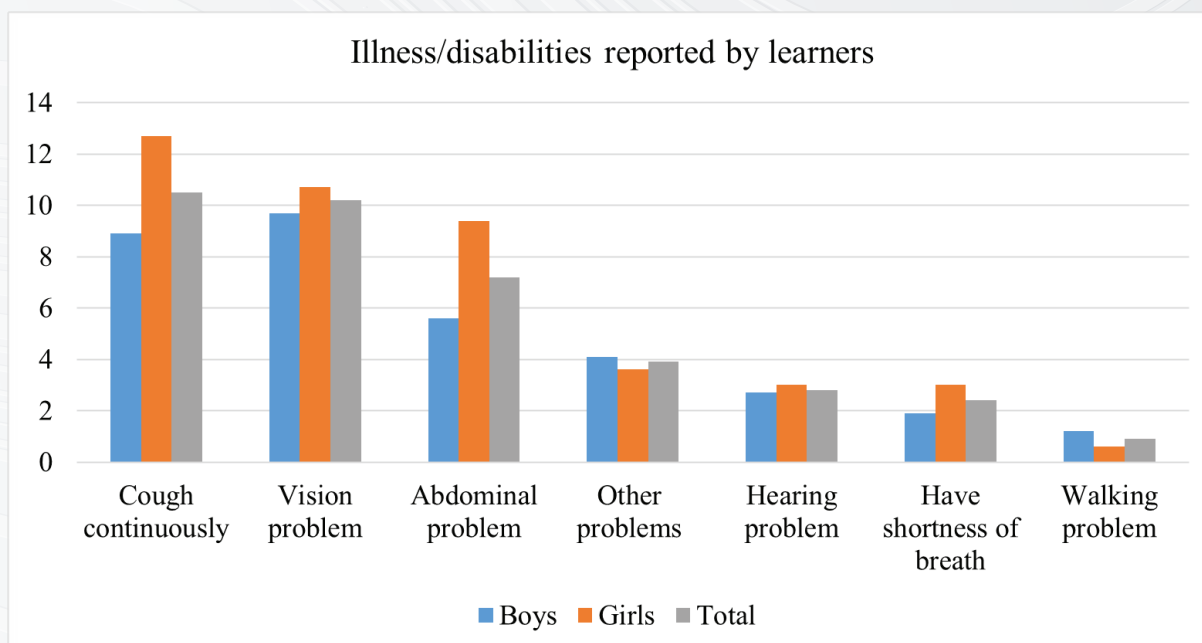
Figure 4: Proportion of illnesses/disabilities reported by learners

Further analysis of the various contextual factors and the learner subtask performance indicated that reading stories at home was significantly associated with the correct number of words read per minute, correct invented (non-words) read per minute, and correct syllables read per minute. In addition, practicing silent reading at school was significantly associated with accuracy in listening comprehension. No significant relationship was found between the other contextual factors and subtask performance. The detailed analysis of the association between learner performance and the home, school, and contextual background factors is shown in *Annex 1.*

Classroom Observation Findings

CSOs and QASOs made 85 classroom observations for 58 teachers over the implementation period of 13 weeks. On average, 7 observations were done every week. Each of the teachers was supported at least once. Specifically, 38 teachers were observed once while 20 teachers were observed more than once. For each school visit, one teacher was observed during lesson delivery and all the teachers implementing DRP in the school were supported by the visiting CSO/QASO.

The analysis of classroom observation data showed fidelity of implementation in terms of teachers adhering to the recommended intervention delivery strategies such as giving feedback, using the direct instruction model (DIM), using DRP materials, and using a perky pace. The analysis also highlights the observed changes in the various indicators from weeks 1-13.

Giving Feedback to Learners

In 74% of the total observations made, teachers gave feedback about correct and incorrect responses in a manner that encouraged further effort to the learners in both English and Kiswahili lessons (Figure 5). In addition, in 89.3% of the lessons observed, teachers generally praised the learners when they tried hard and/or gave the correct response thus reinforcing positive behavior. On the other hand, 83.3% of teachers observed provided formative feedback and encouraged the learner to try again when a learner either gave the wrong response or did not respond at all.
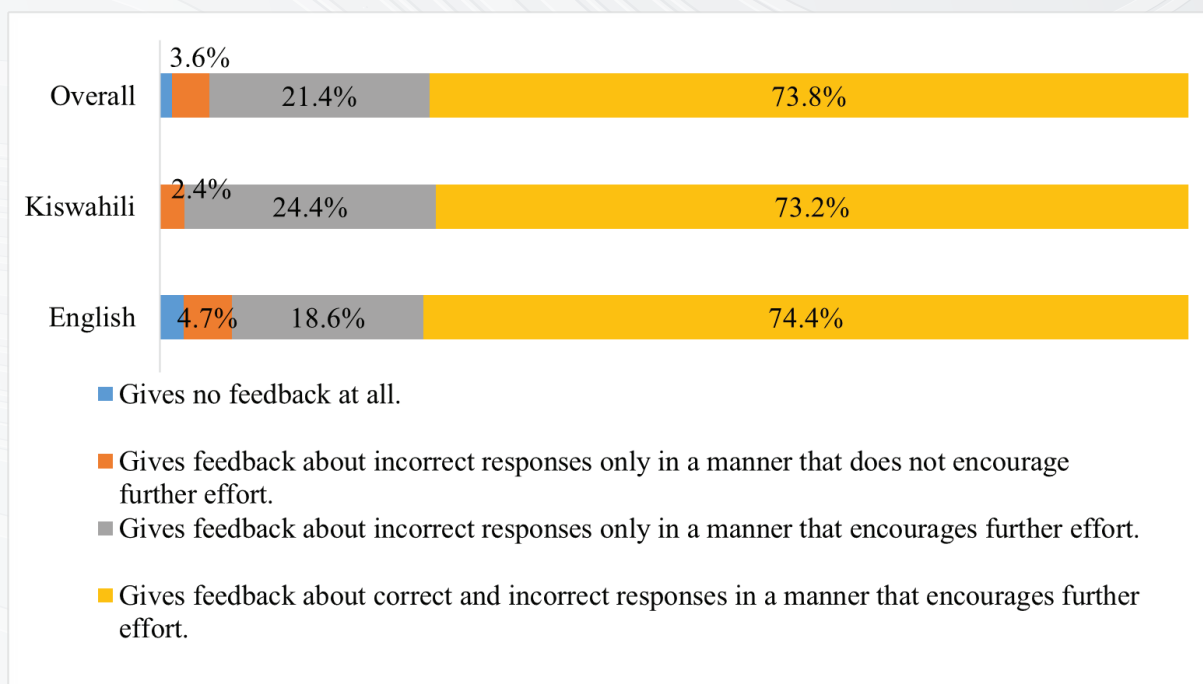
Figure 5: Common type of feedback provided to learners

Further analysis of the most common type of feedback provided to learners between weeks 1 and 13 showed that the proportion of teachers giving feedback for both correct and incorrect responses in a manner that encouraged further effort increased from 71% in weeks 1-3 to 91% in weeks 8-13. See *Figure 6.*
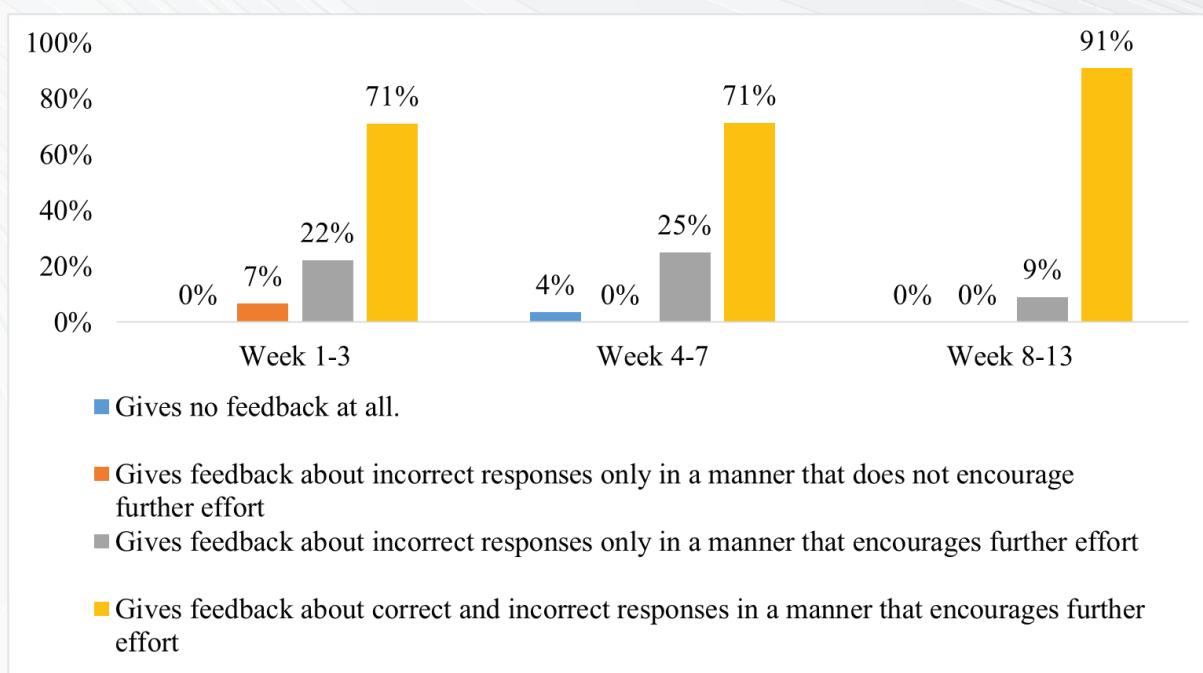
Figure 6: Common type of feedback provided to learners from weeks 1-13

In addition, the findings indicated that the proportion of teachers who praised learners when they tried hard or gave the correct response increased from 89% in weeks 1-3 to 100% in weeks 8-13. See *Figure 7.*
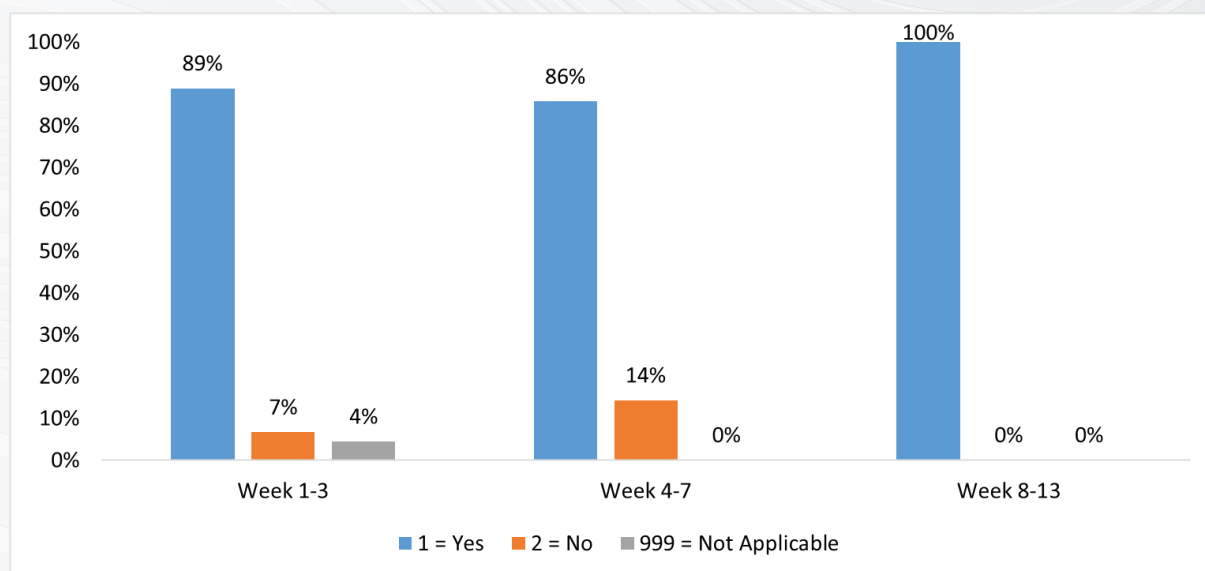
Figure 7: Praising learners when they tried hard and/or gave the correct response from weeks 1-13

Further, the findings revealed that the proportion of teachers who provided formative feedback and encouraged the learner to try again, when the learner either gave the wrong response or did not respond at all increased from 80% in weeks 1-3 to 91% in weeks 8-13. See *Figure 8.*
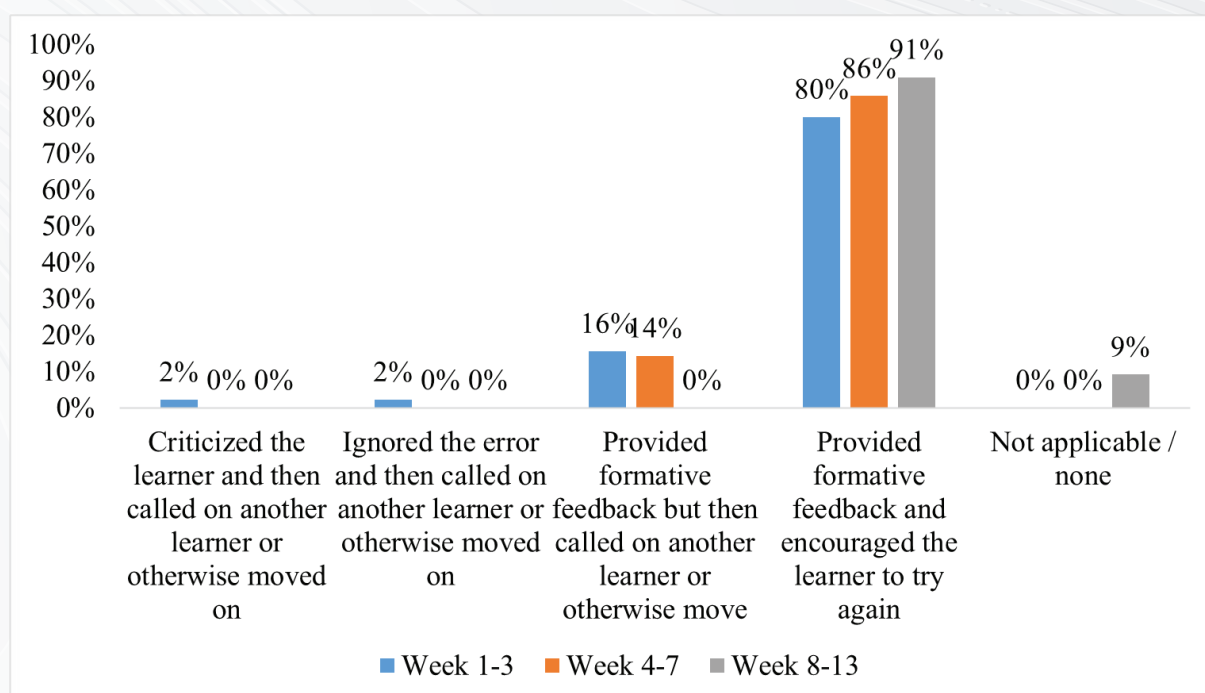
Figure 8: Teachers' feedback when a learner either gave the wrong response or did not respond at all from weeks 1-13

Use of the Direct Instruction Model (DIM)

Teachers demonstrated the use of all three components of the direct instructional model during their lessons. Of the observed lessons, 92.9% of the teachers used I do, 85.9% used we do and 92.9% used you do. In addition, a majority of the teachers (88%) followed the correct order of the DIM model i.e., first: I do, second: we do, third: you do. See *Figure 9.*
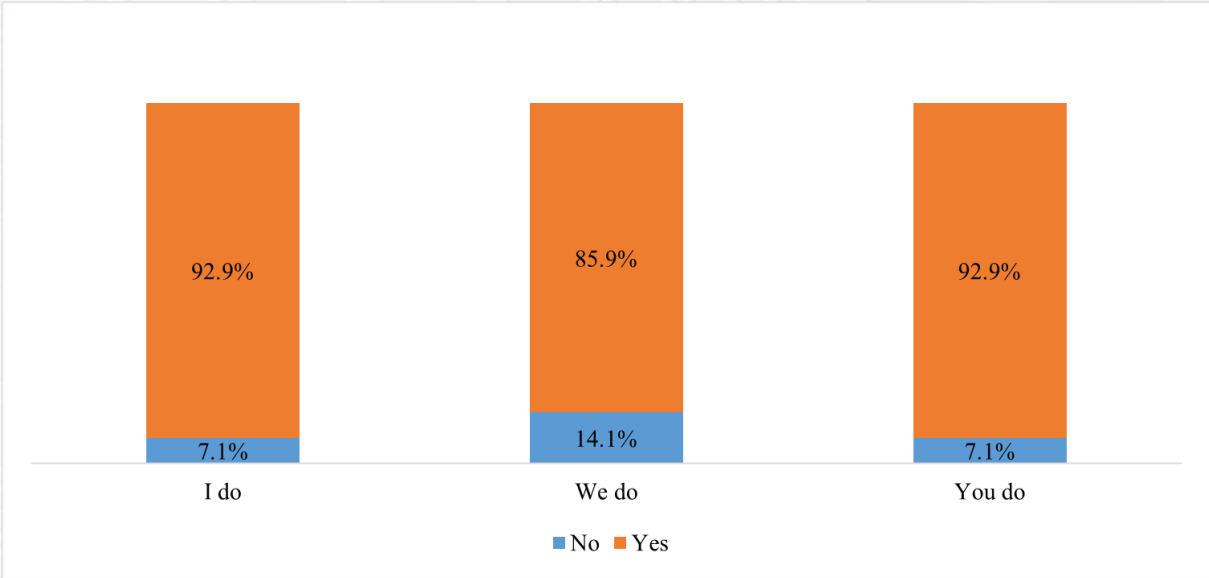
Figure 9: Teacher demonstration of the DIM

Further analysis showed that teachers consistently used the recommended order for the direct instruction model (DIM) between weeks 1-3 and 8-13. See *Figure 10.*
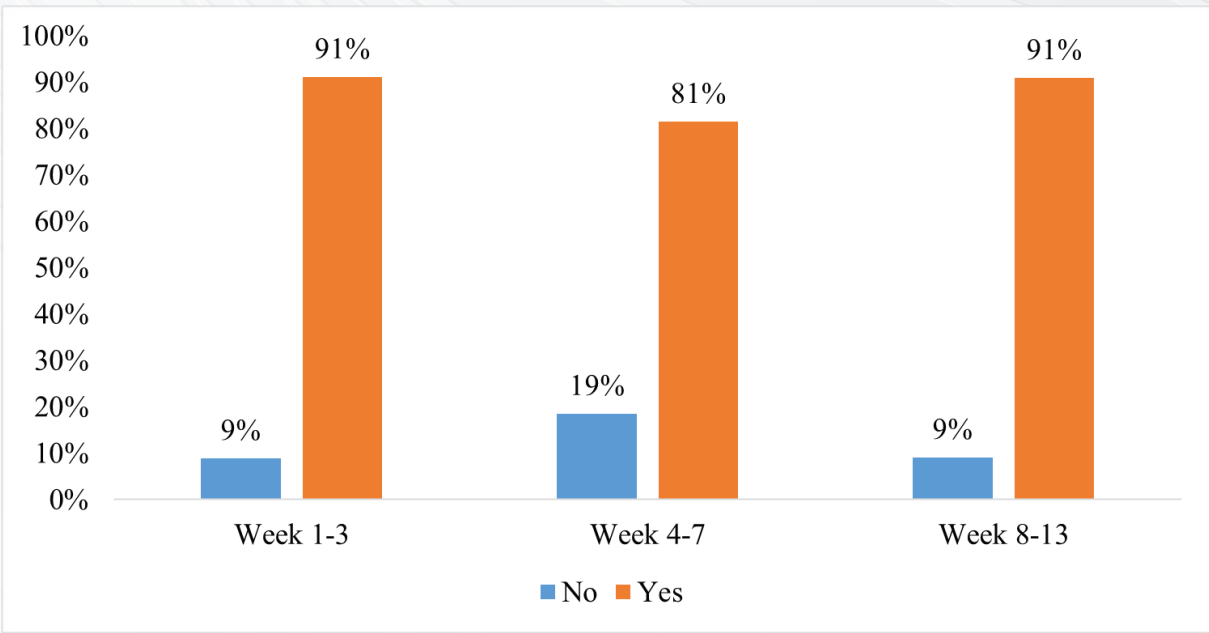
Figure 10: Teacher demonstration of the DIM from week 1-13

Use of DRP Materials

Most of the teachers followed the lesson guide for the lesson taught. In 79.8% of the lessons observed, teachers covered all the intended content, and only 11.9% skipped some sections. To minimize this further, immediate feedback was provided to the teachers on areas of improvement after every observed lesson. In addition, about 94% of the teachers were observed to either follow the DRP lesson guide very closely (48%) or closely follow without referring to the DRP lesson guide all the time (46%). However, about 6% of the teachers were found to teach content outside the DRP lesson guide. See *Figure 11.*

How well did the teacher cover the content of the Developing Readers Study in the lesson guide taught today?

- 1.2%
- 7.1%
- 11.9%
- 79.8%

- ■ All of the content was covered
- ■ S/he skipped some sections
- ■ The lesson was not followed for the most part
- ■ Other (specify):

How closely did the teacher follow the material in the Developing Readers lesson guide?

- 6.0%
- 47.6%
- 46.4%

- ■ Followed it very closely
- ■ Followed the lesson closely but did not refer to it all of the time
- ■ Other (e.g. Taught content outside lesson guide):

Figure 11: Coverage of developing readers study content

The findings further showed that the proportion of teachers who followed the materials in the developing readers lesson guide very closely, increased from 56% in weeks 1-3 to 73% in week 8-13. The proportion of teachers teaching content outside the DRP lesson guide also increased during this period, with 27% of teachers doing so in week 8-13. See *Figure 12.*

	Week 1-3	Week 4-7	Week 8-13
Followed it very closely	56%	25%	73%
Followed the lesson closely but did not refer to it all of the time	44%	68%	0%
Other	0%	7%	27%

- ■ Followed it very closely
- ■ Followed the lesson closely but did not refer to it all of the time
- ■ Other
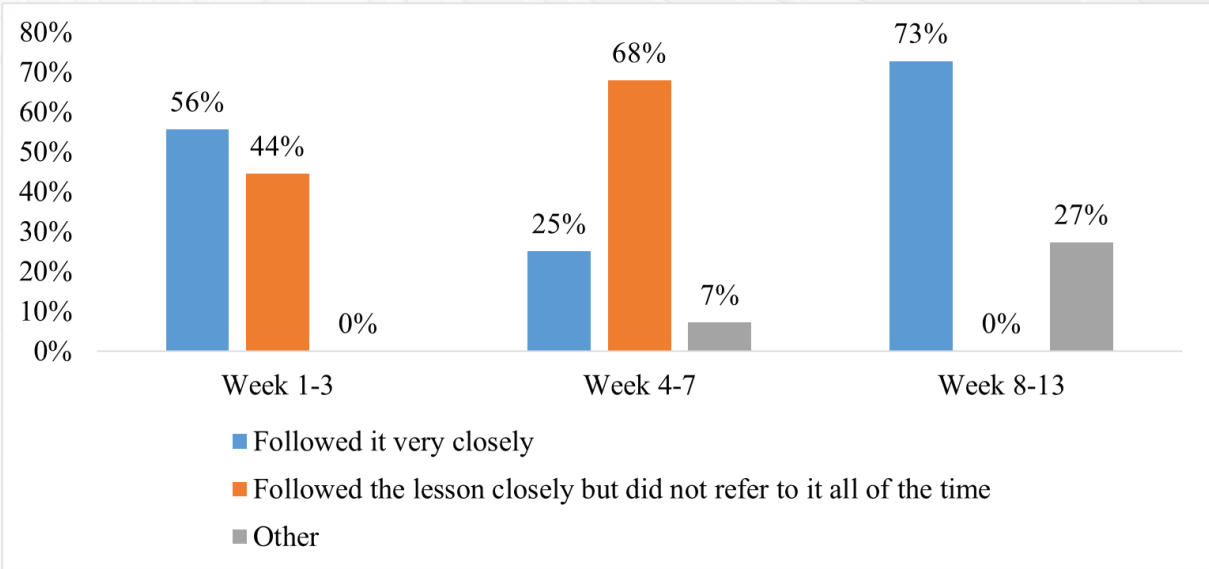
Figure 12: How closely the teacher followed the material in the Developing Readers lesson guide from weeks 1-13

Use of Perky Pace

A perky pace refers to delivering the lesson at a friendly pace for learners that is not too fast or too slow. It is meant to ensure that the teacher keeps pace with the majority of the learners in the classroom while taking into consideration that some learners move faster and other slower. The classroom observation results showed that the majority of the teachers used a perky pace most of the time, at 64.3% while 33.3% used a perky pace sometimes during the lesson and only 2.4% rarely used a perky pace. See *Figure 13.*
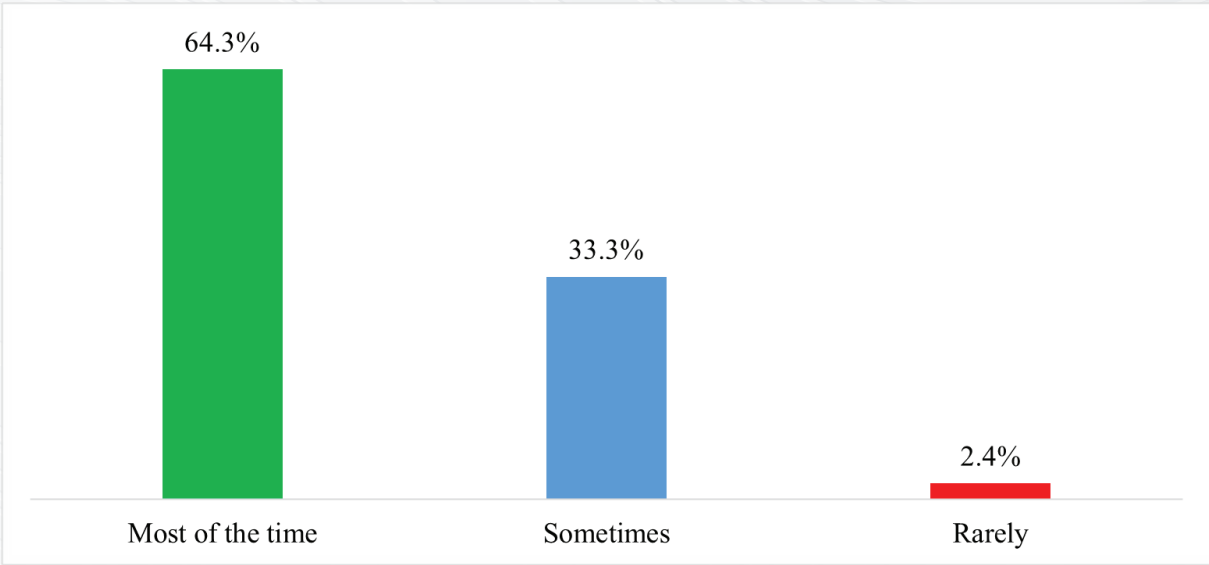
Figure 13: Use of a Perky Pace by the teachers

The findings also revealed that the proportion of teachers who used perky pace most of the time during the lesson, increased from 66.7% in weeks 1-3 to 72.7% in weeks 8-13. See *Figure 14.*
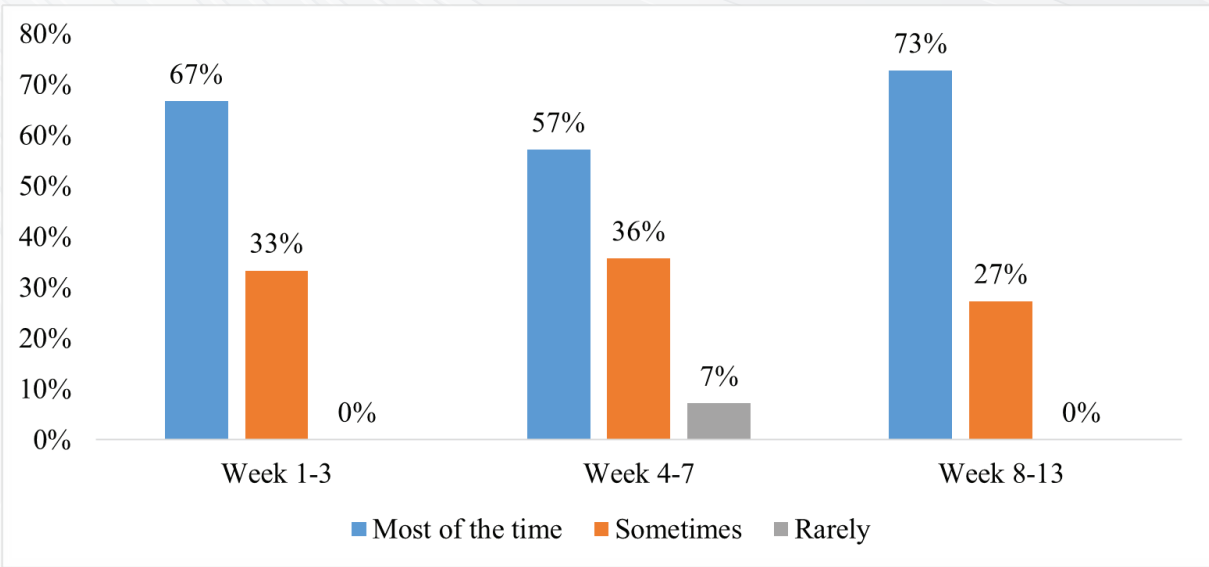
Figure 14: Use of a Perky Pace by the teachers in weeks 1-13

In addition to assessing adherence to the recommended remedial intervention strategies, the classroom observations also assessed the delivery of the intervention in terms of the actions and activities that took place during the sessions i.e. the teacher focus, instructional content covered, teacher actions, pupil actions, and the materials used. These were recorded as 3-minute lesson snapshots during the 30-minute remedial session. Key findings of the learner actions, teacher focus, and teacher actions are presented below.

Learner Actions

Learners were engaged in a variety of activities across the lesson based on the type of instruction content. The most common learner actions observed across the lessons were listening to the teacher, working in small groups and in pairs, and answering questions. It was only in 1.8% of the total observed instances that learners were off task. See *Figure 15.*

Learner action	Percentage
Sentence reading (all)	0.2%
Partner reading	0.2%
Silent reading	0.7%
Retelling	0.9%
Sentence reading (individual)	1.1%
Text reading (individual)	1.5%
Writing	1.8%
Off task/uninvolved	1.8%
Repeating/recitation	2.2%
Individual reading out	2.2%
syllable reading (individual)	2.7%
Text reading (all)	4.4%
syllable reading (all)	4.9%
Choral reading (all)	4.9%
Word reading (all)	6.4%
Word reading (individual)	6.9%
Making Sentences	7.1%
Answering questions	13.7%
Small group/pair work activity/whole group…	15.3%
Listening to the teacher	21.2%

Figure 15: Observed learner actions during the classroom observations

Teacher Focus

During the lesson implementation, teachers were either focused on the whole group, small group or on individual learners. In slightly more than half of the classroom observations made, the teacher's focus was on the whole group (58.5%) followed by a focus on small groups. One possible reason that could be attributed to the whole class focus as shared by the feedback shared by the CSOs and QASOs, is that teachers spent considerable time modeling the lesson activities to the whole group through the direct instruction model following the 'I do', 'we do' and 'you do'. This is however a key lesson learnt from the design phase, on the need to sensitize teachers on the importance of small group instruction in order to respond to learners need as recommended by the response to intervention approach. See *Figure 16.*
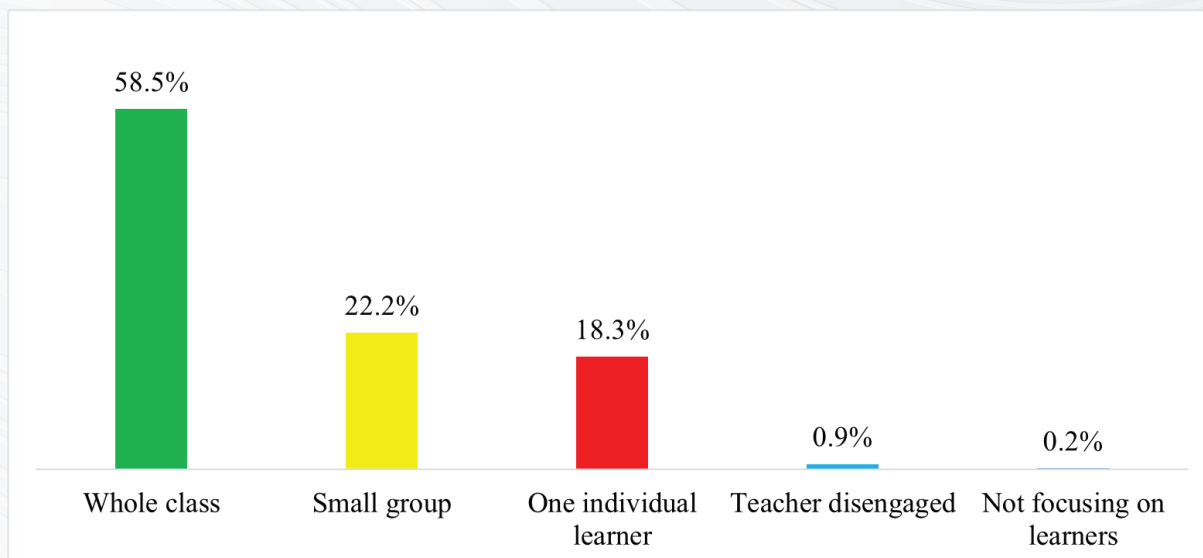
Figure 16: Teacher focus during the remedial sessions

The findings further revealed that the proportion of lesson time the teachers focused on the whole class reduced from 60% in weeks 1-3 to 37% in weeks 8-13. This is a positive change since learners struggling with reading would benefit more from small group and individual learner instruction. In addition, the results show that the proportion of lesson time used in individual learner focus increased from 10% in weeks 1-3 to 30% in weeks 8-13. See *Figure 17.*
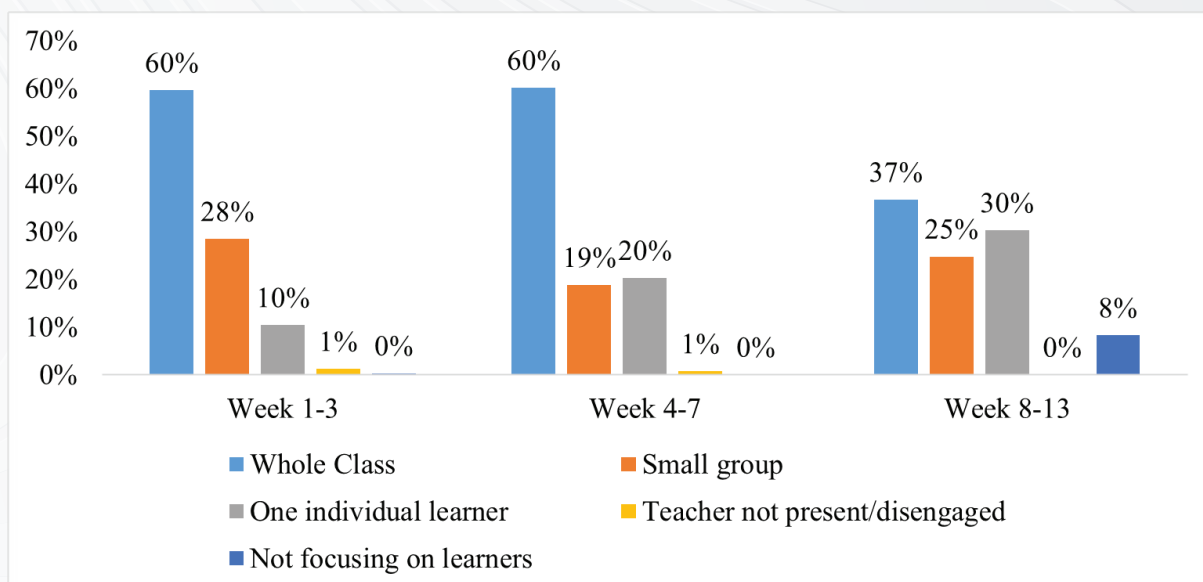
Figure 17: Teacher focus during the remedial sessions from weeks 1-13

Teacher Action

The teachers' actions were dependent on the learning activity going on during the classroom observations. The results showed a good blend of teacher actions during the sessions. The blend of teachers' actions indicated that teachers were implementing effective teaching strategies to enhance learner participation such as asking questions, explaining, giving feedback, reading, listening to learners, and monitoring learners. See *Figure 18*.
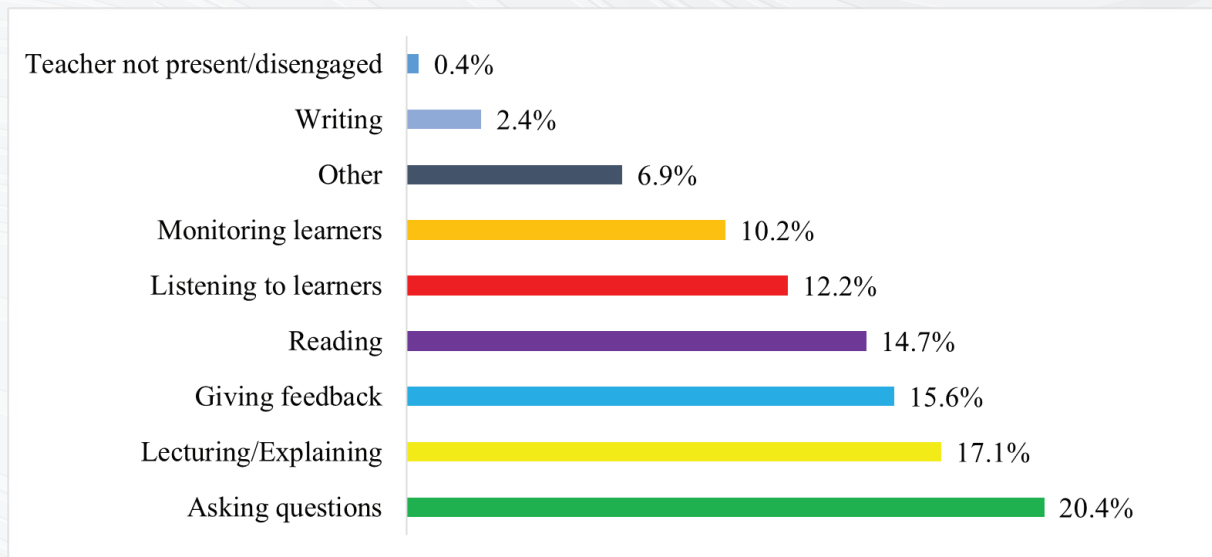
Figure 18: Observed teacher actions during the classroom observations

These classroom observation findings were also corroborated qualitatively by the summary reports provided by CSOs and QASOs. The reports highlighted that the use of DIM stood out among the best practices and that teachers who consistently used the DIM were recorded to have clear instructions in lesson delivery. Further, the formative feedback provided by most of the teachers allowed learners to understand the wrong/correct responses and reinforce learning. The reports also reiterated that the fidelity to adhere to the intervention script ensured the smooth flow of the lesson activities and the teaching of all the scheduled skills activities. Learner engagement through games, group work, and other learning experiences was also a positive highlight as it allowed learners to demonstrate the skills learned. The CSO and QASOs commended that majority of the teachers used simple, clear, and compelling lesson instructions that yielded effective classroom engagement. Below are some direct quotes from CSOS and QASOs on areas that were done well.

"Teacher followed the lesson guide accurately." "Linked previous lesson.", "Use of DIM most of the time.", "DIM was well implemented." "Consistently provided formative feedback.", "Gave formative feedback in most cases." "Consistently provided encouraging formative feedback." "Learners were well involved through the DIM." "Encouraged all learners' responses.

Teacher Reflections on the Delivery of the Remedial Intervention

Challenging Concepts to Teach

When asked about concepts they found difficult to support the learners in, teachers mentioned text reading, word reading, letter name and sound, and comprehension in order of difficulty as shown on Figure 19. The key challenge identified for text reading was that learners who were already having challenges with word reading found it difficult to progress to text reading. In addition, teachers highlighted that some of the learning activities such as the reading marathon were difficult to implement in classes that had a large number of learners. Three key challenges were identified by teachers as contributing to the difficulty in teaching word reading. Teachers felt that it took a lot of time to prepare support materials, that there was not enough time allocated to support activities such as the word race, and that learners who had challenges with syllable reading also had challenges with word reading. The two key challenges reported by teachers in supporting learners with comprehension were answering questions from the story and retelling of the story by learners.
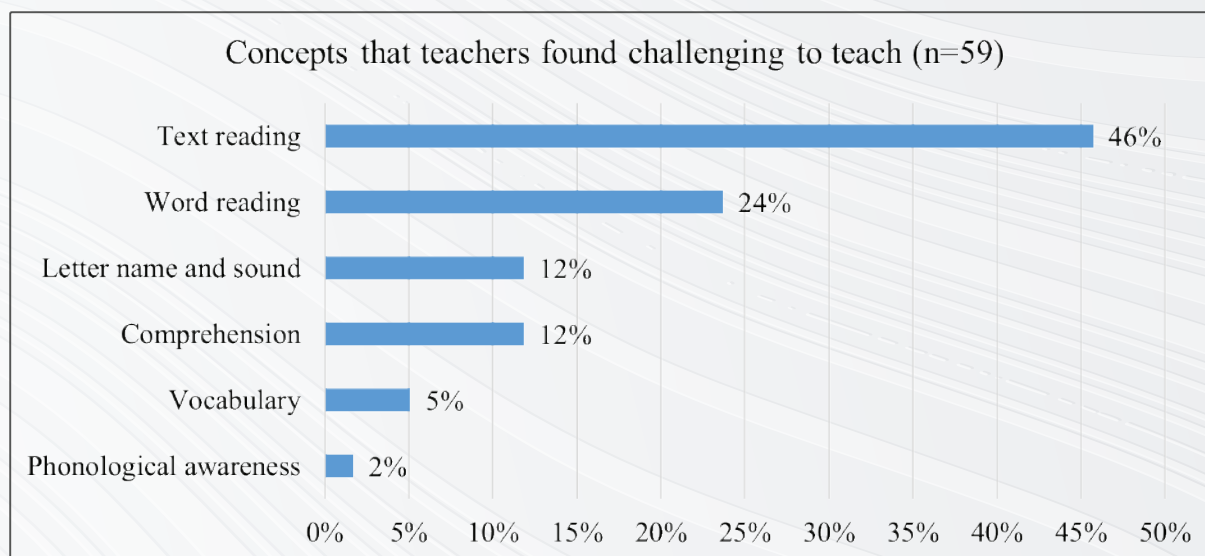
Figure 19: Teacher reflections on concepts that teachers found challenging to teach

Strategies to improve the teaching of challenging concepts

The teachers were also asked to reflect on the strategies that they used or would recommend to improve the teaching of the difficult topics they had reported. The teachers recommended three key strategies that they found effective in improving the teaching of letter names and sounds, that is, starting with sounds and then names, putting more emphasis on the letter names and sounds, and teaching the letter names and sounds separately. See *Figure 20.*
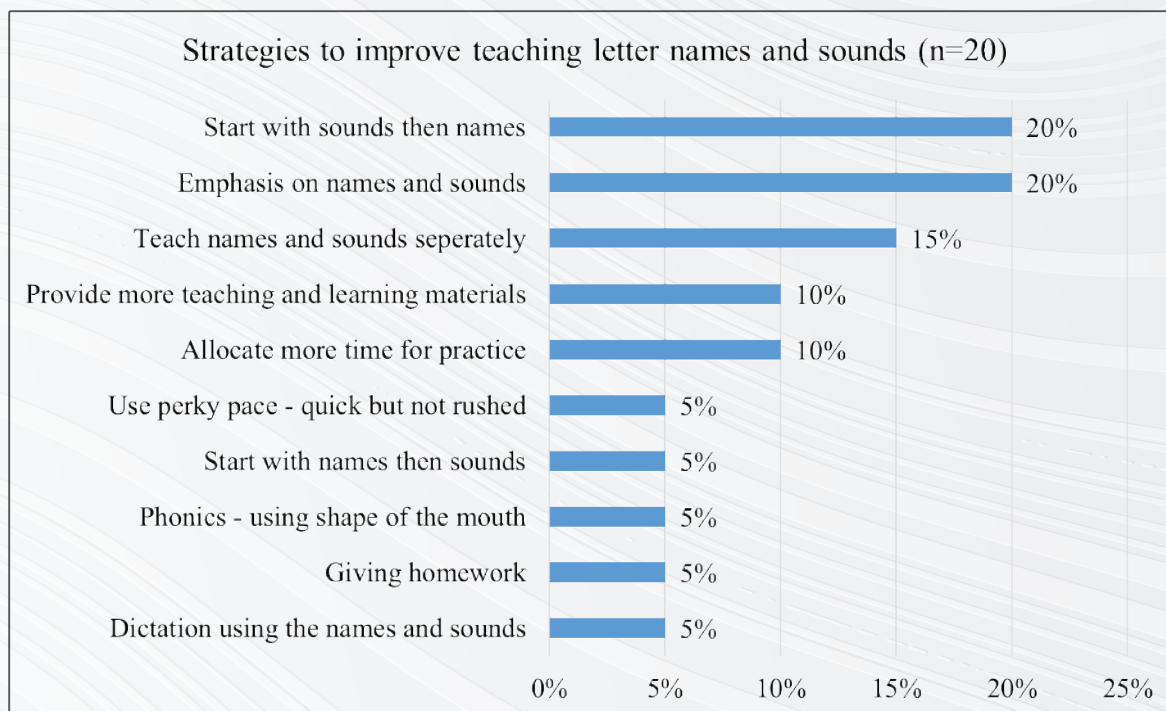
Figure 20: Recommended strategies to improve teaching letter names and sounds

For word reading, two key strategies stood out, that is putting more emphasis on syllable and sound reading. In other words, the teachers recognized the importance of phonological awareness – the ability to blend sounds to form words – in word reading and that learners cannot progress to word reading if they are not proficient in these foundational skills. See *Figure 21.*
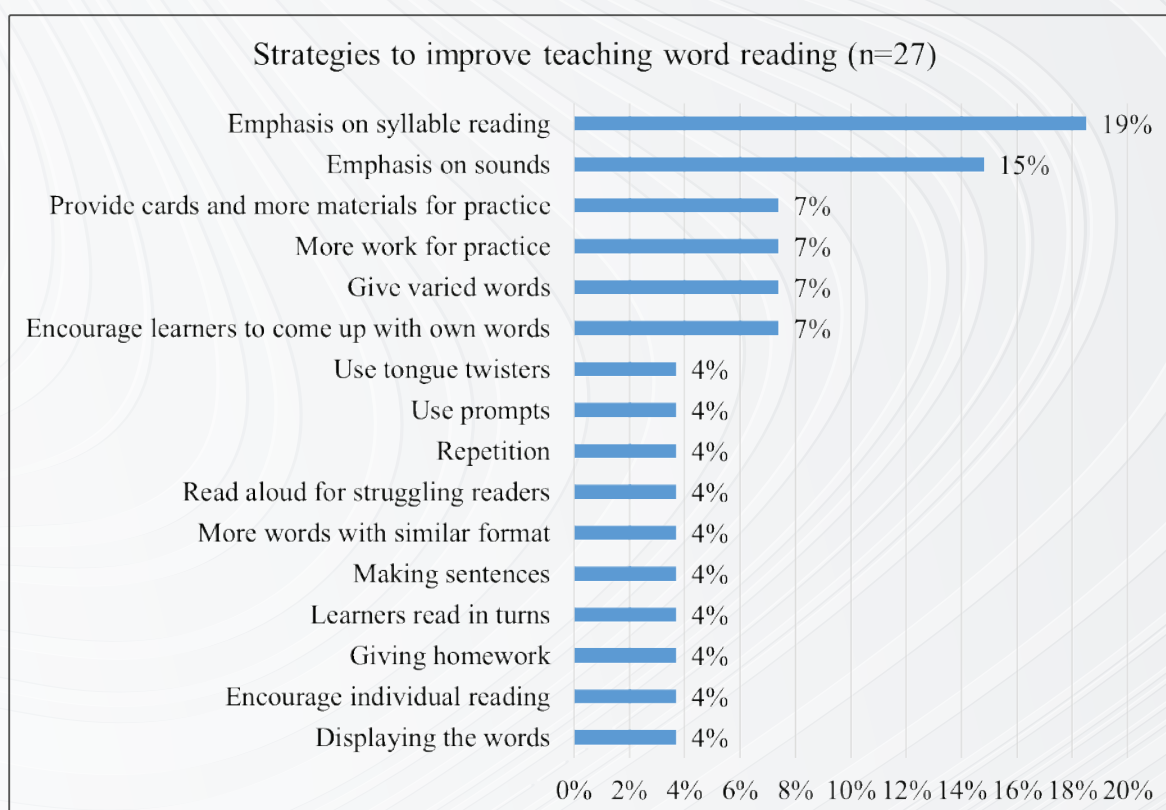
Figure 21: Recommended strategies to improve teaching word reading

Allocating more time for reading practice, providing more reading materials such story books, and assisting learners with difficult words were echoed by the teachers as key strategies to improve the teaching of text reading. Other strategies included the use of short stories, emphasis on letter sounds, and assisting learners to read individually. See *Figure 22.*

Strategies to improve teaching text reading (n=36)

Strategy	Percentage
Allocate more time for reading/practice	42%
More reading materials (e.g. story books)	8%
Help learners with difficult words	8%
Use short stories	6%
Emphasis on letter sounds	6%
Assist learners to read individually	6%
Whole class reading	3%
Varied texts	3%
Read per sentence	3%
Provide clear instructions	3%
Learners to assess each other	3%
Group reading	3%
Esnure learners can read syllables	3%
Ensure learners can read single words before…	3%
Correct mistakes	3%

Figure 22: Recommended strategies to improve teaching text reading

To improve comprehension, teachers recommended adding more time for the activity, using more short stories for learners to read, more practice opportunities, and assisting learners to read individually. See *Figure 23.*

Strategies to improve teaching comprehension (n=29)

Strategy	Percentage
Add more time for activity	24%
More short stories	14%
More practice	14%
Assist learners to read individually	14%
Stories/language should be at the learners'…	10%
Use diologic reading	7%
Guide learners how to get answers from the…	7%
Encourage learners to make sentences using…	7%
Asking oral questions	3%

Figure 23: Recommended strategies to improve teaching comprehension

Teacher Knowledge and Attitude Assessment on Foundational Literacy

Knowledge assessment was conducted for teachers to check their perceptions before the training and implementation of the developing readers program. A similar assessment was done to the same teachers at the end of 13 weeks of DRP implementation. The purpose of the knowledge assessment was to document any possible changes in the teacher's perceptions, knowledge, or attitudes regarding support for learners who are at risk of reading failure. 35 teachers responded to the knowledge assessment questionnaire at baseline while 55 teachers responded at the endline. During the analysis and reporting, the same teachers were followed at both baseline and endline.

Does regular observation and coaching by CSOs/QASOs and Head Teachers distract you from doing your job effectively?

Teachers' perceptions about lesson observation and coaching by curriculum support officers and quality assurance and standards officers changed positively as shown in Figure 24. At baseline, 81.5% of teachers felt that regular observation and coaching by CSOs/QASOs and head teachers distracted them from doing their job effectively. However, at endline, there was a shift with more teachers (55.6%) agreeing that lesson observation and coaching by CSOs/QASOs were not distractors. During DRP CSOs and QASOs conducted lesson observations and offered formative feedback and support in areas where the teacher was struggling.
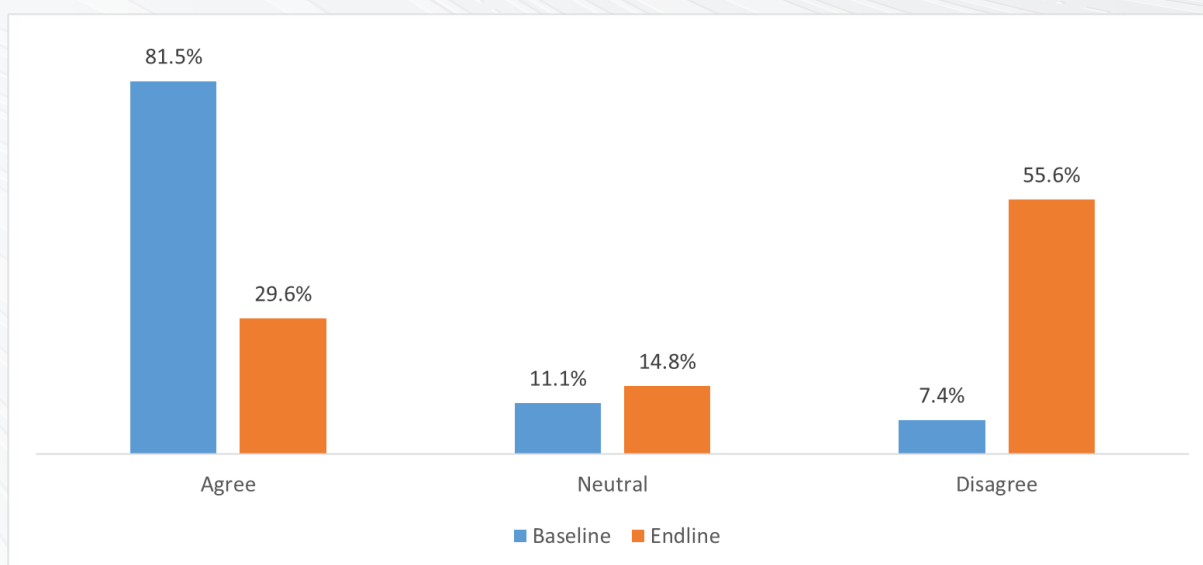
Figure 24: Teacher perceptions on whether regular observation and coaching by CSOs/QASOs and head teachers distracts them from doing their job.

Remediation plans to support students at risk of reading failure should start as early as first grade?

Regarding when remediation for learners struggling with reading should begin, at baseline only 18.5% of teachers agreed that remediation support for students with reading difficulties should start as early as first grade. However, at endline, teachers changed this notion, with a majority of them (98.6%) agreeing that remediation for learners with reading difficulties should start in early grades. See *Figure 25.*
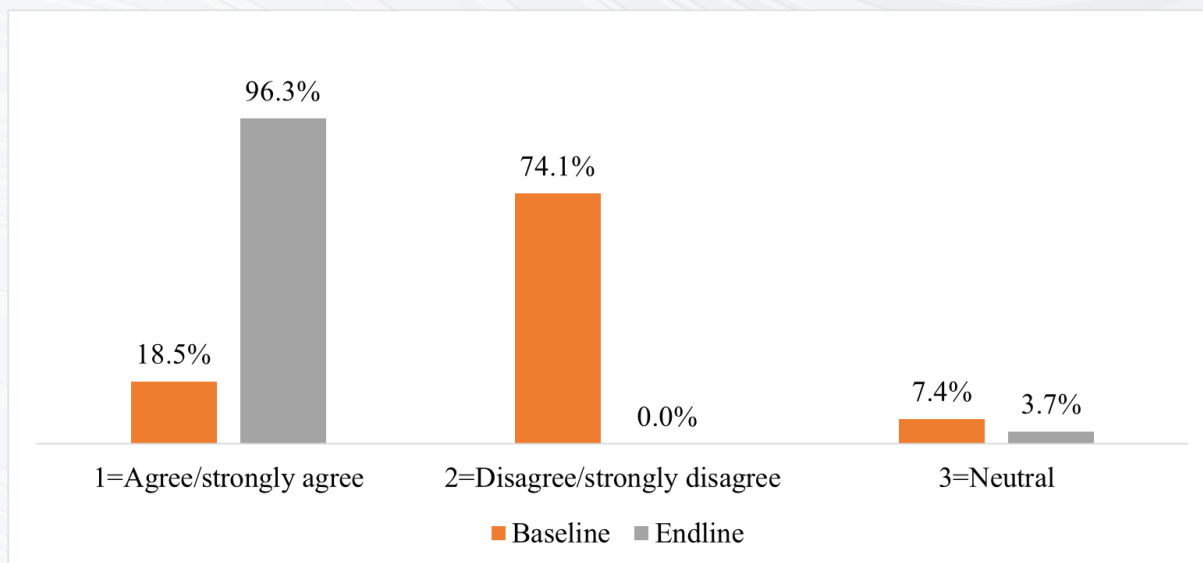
Figure 25: Teacher perceptions on whether remediation plans to support students at risk of reading failure should start as early as first grade.

Learners with disability cannot learn literacy skills by a certain age

Teachers' perceptions that learners with disabilities cannot learn literacy skills by a certain age changed from baseline to endline. At baseline, 100% of the teachers believed that learners with disabilities could not learn literacy skills by a certain age. However, at endline, this proportion reduced to 28.6%, with more teachers (60.7%) feeling that learners with disabilities can learn literacy skills. This could be attributed to the differentiated instruction practices that teachers were introduced to during the DRP training to support learners with disabilities such as blindness, low vision, hard of hearing, and learning difficulties. See *Figure 26.*
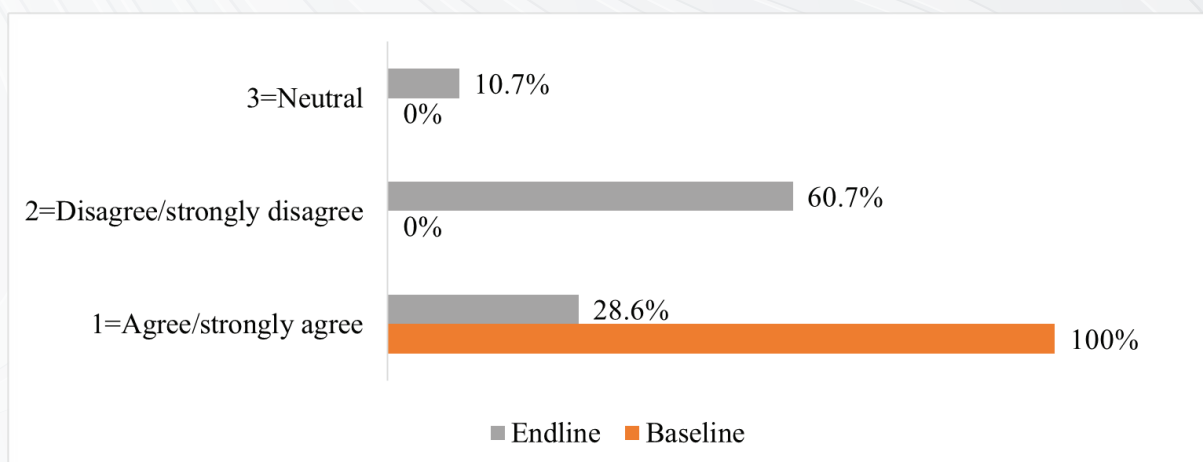
Figure 26: Teacher perceptions that learners with disabilities cannot learn literacy skills by a certain age

5. LESSONS LEARNED FROM THE DESIGN PHASE

A couple of lessons were learned in the developing readers program design phase. These lessons are important for the improvement of the program going forward and also for like-minded programs to consider to improve the implementation of their foundational literacy interventions.

- Engaging government offices/authorities early to get approvals and permits required to minimize delays in getting approvals e.g. from TSC.
- Involving relevant stakeholders right from the material development and validation stage enhances the development of quality resources and buy-in.
- Useful to meet the education stakeholders in person for a deeper understanding and to clarify questions about the study.
- Administration of the Early Grade Learning Assessment (EGRA) takes a long time to complete. The team is thus working on a revised version of the EGRA tool with fewer items.
- Activity-based training was effective. The trainers modeled the activities and gave an opportunity to the teachers to practice in their small groups.
- Conducting teachers' training during the school holidays worked well since teachers were available and within the TSC policy.
- Involvement of CSOs and QASOs was useful since they are in touch with what happens at the county, sub-county, zone, and school levels.
- Regular support supervision by CSOs, QASOs and the APHRC team through classroom observations and spot checks helped to ensure fidelity of implementation & adaptation. As a result of this support supervision mechanisms, all the scheduled remedial sessions were completed,
- Preparation of lesson observation notes and sharing via WhatsApp by CSOs and QASOs helped monitor progress and document lessons learned.
- Cluster meetings were a good opportunity to get teachers' feedback on the implementation, share and learn from each other, and get support from CSOs and QASOs.

Study Challenges

The start of intervention activities was delayed from May 2023 (the second term) to September 2023 (the third term) due to the longer than anticipated process of developing intervention materials and obtaining the required approvals from the Ministry of Education and Teachers Service Commission. The intervention activities in the third term were further shortened by the need to allow learners to sit for their end-of-year exams and pave the way for the long school holiday in November and December when National examinations are also undertaken. As a result, 7 out of the planned 13 weeks of remedial sessions were held in September and October with the remaining 6 weeks continuing in January to mid-March in 2024.

The change in the project timelines also meant that learners in grade 3 in 2023 progressed to grade 4 in 2024. As a result, teachers had the difficult task of persuading learners who progressed to grade 4 to continue with the remedial sessions, since they felt that the intervention was intended for lower primary learners yet they had now progressed to upper primary. To mitigate against this challenge, the study recommends beginning school-based intervention activities in the first term to allow for enough time to implement, monitor, and evaluate the activities.

6. DISCUSSION

The evaluation results of the design phase show that like in many other studies, the Response to Intervention (Gersten et al., 2020) approach that the Developing Readers Program adopted was effective in enhancing the reading proficiency of early-grade learners with reading difficulties. This was evident in learner progression in each of the modules – that is 58.9% of learners in module 1, 70.4% in module 2, and 71.5% in module 3 – to the subsequent categories. Studies however stipulate that for response to intervention approaches to be successful, they need to be well defined in terms of intervention activities, teacher training, fidelity of intervention, timelines, and benchmarks to measure learner progress (Dunn, 2010). In the case of DRP, all these aspects were taken into consideration. There was a structured scope and sequence and lesson plan for each of the modules, ToTs and teachers were rigorously trained on the delivery of the remedial intervention, the CSOs and QASOs ensured fidelity of intervention through support supervision visits to intervention teachers, and the EGRA was used as the standard benchmark to screen learners that had reading difficulties and gauge their progress after the 13-week remedial intervention.

The other aspect that could also explain the success of the DRP remedial intervention is the differentiated instruction approach where learners were categorized and supported according to their reading levels and not grade level. Each of the modules had specific learning activities contained in the lesson guides. The learner progress assessments were also module specific. This is in line with studies that have found that although teachers lack the capacity to implement differentiated instruction when this approach is used, students achieve significantly higher literacy scores (Puzio et al., 2020).

The DRP remedial intervention was also characterized by graduated learning activities to teach the various target skills, from letter name and sound, syllable knowledge, word reading, text reading, and comprehension. This approach is especially important to ensure that learners are first able to master the foundational skills as indicated in the literature. For instance, studies show that learners tend to be more engaged and have statistically higher gains if letter names and sounds are taught separately rather than in the context of storybook reading (Roberts et al., 2020).

The use of data driven decision making approaches to screen learners with reading difficulties, identify those not responding to the intervention, differentiate instruction, and monitor progress is a key aspect of the response to intervention approach (Buzhardt et al., 2020). Using a well-articulated assessment system like the standardized EGRA was thus a plus for the DRP intervention as it helped in screening and tracking the learner progress.

The hands-on approach for ToT and teacher training was also a key aspect that explains the success of the DRP intervention. During the trainings, participants simulated teaching the remedial activities to their peers whole or in small groups. The sessions also included self-reflection and feedback from the facilitators and the participants. This kind of hands-on approach has been shown to have the largest effect on teacher knowledge since they have the opportunity to apply their learned knowledge and skills under expert supervision and guidance (Hudson et al., 2021).

7. RECOMMENDATIONS

The fact that there was still a proportion of learners that did not respond to the DRP intervention by either remaining at the same reading level or falling back shows a need to define approaches to support these learners. As stipulated in the response to intervention approach, one way would be to have individualized support for learners (tier 3) who to do not respond to the small instruction. Deliberate efforts should also be taken to assess and have differentiated support for learners with special needs and disability to cater for their learning needs (Berkeley et al., 2020).

In addition to categorizing the learner progress data by gender, grade and module, it would also be important to consider the socio-economic status of learners with reading difficulties. Studies show that a higher proportion of learners requiring tier 2 and 3 support in the response to intervention modules tends to come from low-income contexts (Carta et al., 2014). This could also have contributed to the higher proportion of learners that were screened to have reading difficulties, especially in the non-reader category, at baseline. Closely related to this is the need to collect school background information that can help in explaining the differences in the sub-task scores between schools – this was a limitation of this study.

There is also a need to adopt gender-inclusive pedagogical approaches in supporting learners with reading difficulties. This is especially important considering that there were more male compared to female learners there were identified to have reading difficulties.

Whereas the EGRA was effective in screening and tracking learner progress pre and post the intervention, there is need to have an adapted shortened version of the tools to provide teachers with reliable data that they can easily make use of to make instructional decisions. This is especially important considering that one of the characteristics of a well-articulated assessment system is the ability to map learner progress over time as opposed to 'point-in-time performance' (Crawford, 2014).

In general, the allocation of more time for learners to be effectively supported and to practice the various skills, and the need to put more emphasis on the foundational skills were cross-cutting recommendations provided by teachers to improve on the delivery of the intervention. The allocation of sufficient instructional time was also recommended as a key strategy to ensure that the scheduled content was effectively covered in the Tusome program (USAID, 2020). This would consequently result in enhanced reading proficiency among learners. Considering that this remedial intervention is meant to be implemented within the normal school calendar which has already scheduled activities, there will be a need to review the number of activities that can be effectively delivered within the 30 minutes, but also review the actual activities to minimize the steps or time taken to teach them.

The reflections by teachers on the need to allocate more time and emphasize foundational skills such as letter names and sounds and syllable reading before advancing to word reading, text reading, and comprehension provide two vital insights. These reflections not only point to the importance of phonological awareness in supporting learners with reading difficulties but also to the need to focus on the learners with the most difficulties, that is, the zero readers so that they can catch-up and attain the expected foundational skills. This is consistent with the recommendation from the Tusome program that highlighted the need to implement remedial literacy programming for pupils in the "zero" and "beginner" reader categories (USAID, 2020).

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9. ANNEXES:

Annex 1: Analysis of the home, school and contextual background factors

Variable	Boy (n=484)		Girl (n= 363)		All Students (n= 847)	
	Freq.	%	Freq.	%	Freq.	%
Language spoken by family at home						
Kiswahili						
No	231	47.7	175	48.2	406	47.9
Yes	253	52.3	188	51.8	441	52.1
English						
No	406	83.9	320	88.2	726	85.7
Yes	78	16.1	43	11.8	121	14.3
Gikuyu						
No	123	25.4	93	25.6	216	25.5
Yes	361	74.6	270	74.4	631	74.5
Language learners speak at school						
Kiswahili						
No	35	7.2	22	6.1	57	6.7
Yes	449	92.8	341	93.9	790	93.3
English						
No	121	25	90	24.8	211	24.9
Yes	363	75	273	75.2	636	75.1
Gikuyu						
No	467	96.5	350	96.4	817	96.5
Yes	17	3.5	13	3.6	30	3.5
Did you go to school before grade 1 (nursery, pre-unit, baby class)?						
No	18	3.7	23	6.3	41	4.8
Yes	466	96.3	340	93.7	806	95.2
Do you have English books or other English reading materials at your home?						
No	111	22.9	116	32	227	26.8
Yes	373	77.1	247	68	620	73.2
Do you have Kiswahili books or other Kiswahili reading materials at your home?						
No	147	30.4	130	35.8	277	32.7
Yes	337	69.6	233	64.2	570	67.3
Do you have books or other reading materials in any other languages at your home?						
No	369	76.2	289	79.6	658	77.7
Yes	115	23.8	74	20.4	189	22.3
Does anyone read stories aloud to you at your home?						
No	120	24.8	90	24.8	210	24.8
Yes	364	75.2	273	75.2	637	75.2
Do you read stories at your home?						
No	64	13.2	50	13.8	114	13.5
Yes	420	86.8	313	86.2	733	86.5
Do you ever practice reading aloud to your teacher or to other pupils?						
No	72	14.9	52	14.3	124	14.6
Yes	412	85.1	311	85.7	723	85.4

Variable	Boy (n=484)		Girl (n= 363)		All Students (n= 847)	
	Freq.	%	Freq.	%	Freq.	%
Do you practice silent reading in school?						
No	83	17.1	59	16.3	142	16.8
Yes	401	82.9	304	83.7	705	83.2
Does your teacher assign reading for you to do at your home?						
No	71	14.7	41	11.3	112	13.2
Yes	413	85.3	322	88.7	735	86.8
Other than homework from school, how often do you read on your own at home?						
Every day	72	14.9	70	19.3	142	16.8
Some days	282	58.3	212	58.4	494	58.3
Rarely	111	22.9	70	19.3	181	21.4
Never	17	3.5	8	2.2	25	3
DK / no answer	2	0.4	3	0.8	5	0.6
How often are you absent from school?						
I rarely or never miss school	324	66.9	232	63.9	556	65.6
I sometimes miss school	149	30.8	121	33.3	270	31.9
I regularly miss school	11	2.3	8	2.2	19	2.2
DK / no answer	0	0	2	0.6	2	0.2
How often are you late to school?						
I am rarely or never late	358	74	239	65.8	597	70.5
I am sometimes late	107	22.1	97	26.7	204	24.1
I am regularly late to school	17	3.5	23	6.3	40	4.7
I rarely come to school on time	2	0.4	3	0.8	5	0.6
DK / no answer	0	0	1	0.3	1	0.1
Illnesses/Disabilities						
Hearing problem						
No	471	97.3	352	97	823	97.2
Yes	13	2.7	11	3	24	2.8
Vision problem						
No	437	90.3	324	89.3	761	89.8
Yes	47	9.7	39	10.7	86	10.2
Walking problem						
No	478	98.8	361	99.4	839	99.1
Yes	6	1.2	2	0.6	8	0.9
Abdominal problem						
No	457	94.4	329	90.6	786	92.8
Yes	27	5.6	34	9.4	61	7.2
Cough continuously						
No	441	91.1	317	87.3	758	89.5
Yes	43	8.9	46	12.7	89	10.5
Have shortness of breath						
No	475	98.1	352	97	827	97.6
Yes	9	1.9	11	3	20	2.4
Other problems						
No	464	95.9	350	96.4	814	96.1
Yes	20	4.1	13	3.6	33	3.9

Annex 2: Analysis of the mean differences in learner mean scores

All Students, (n=847)	Baseline	Endline	Endline-Baseline	
	Mean	Mean	Mean Diff	p-value
Item				
Letter name knowledge (clnpm)	13.8	21.3	(+7	0.000
Letter sound knowledge (clspm)	28.4	33.8	(+5.4	0.000
Syllable knowledge (cspm)	15.8	22.7	(+6.9	0.000
Invented words (non-words) (cnwpm)	4.5	8.5	(+4.1	0.000
Oral reading passage (cwpm)	5.7	13.3	(+7.6	0.000
Listening Comprehension (% accuracy out of 5 questions)	3.2	3.8	(+0.6	0.000
Vocabulary (correct picture names matched to 25 pictures)	21.2	21.9	(+0.7	0.000

Module 1, n=367	Baseline	Endline	Endline-Baseline	
	Mean	Mean	Mean Diff	p-value
Item				
Letter name knowledge (clnpm)	9.1	15.5	(+6.4	0.000
Letter sound knowledge (clspm)	22.5	26.4	(+3.9	0.000
Syllable knowledge (cspm)	7.7	13	(+5.4	0.000
Invented words (non-words) (cnwpm)	1	4.2	(+3.2	0.000
Oral reading passage (cwpm)	0.6	5.7	(+5.6	0.000
Listening Comprehension (% accuracy out of 5 questions)	2.9	3.6	(+0.7	0.000
Vocabulary (correct picture names matched to 25 pictures)	20.9	21.8	(+0.9	0.000

Module 2 (n=196)	Baseline	Endline	Endline-Baseline	
	Mean	Mean	Mean Diff	p-value
Item				
Letter name knowledge (clnpm)	15.4	23.6	(+8.2	0.000
Letter sound knowledge (clspm)	30.1	35.9	(+5.8	0.000
Syllable knowledge (cspm)	16	25.3	(+9.3	0.000
Invented words (non-words) (cnwpm)	4.3	9.8	(+5.5	0.000
Oral reading passage (cwpm)	5.5	14.8	(+9.4	0.000
Listening Comprehension (% accuracy out of 5 questions)	3.3	4	(+0.7	0.000
Vocabulary (correct picture names matched to 25 pictures)	21.3	21.9	(+0.6	0.000

Module 3, n=284	Baseline	Endline	Endline-Baseline	
	Mean	Mean	Mean Diff	p-value
Item				
Letter name knowledge (clnpm)	19.1	27.3	(+8.2	0.000
Letter sound knowledge (clspm)	34.9	41.8	(+7.0	0.000
Syllable knowledge (cspm)	26.2	33.4	(+7.2	0.000
Invented words (non-words) (cnwpm)	9.1	13.3	(+4.1	0.000
Oral reading passage (cwpm)	13.2	22.1	(+9.0	0.000
Listening Comprehension (% accuracy out of 5 questions)	3.6	4	(+0.4	0.000
Vocabulary (correct picture names matched to 25 pictures)	21.5	22.1	(+0.6	0.000

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