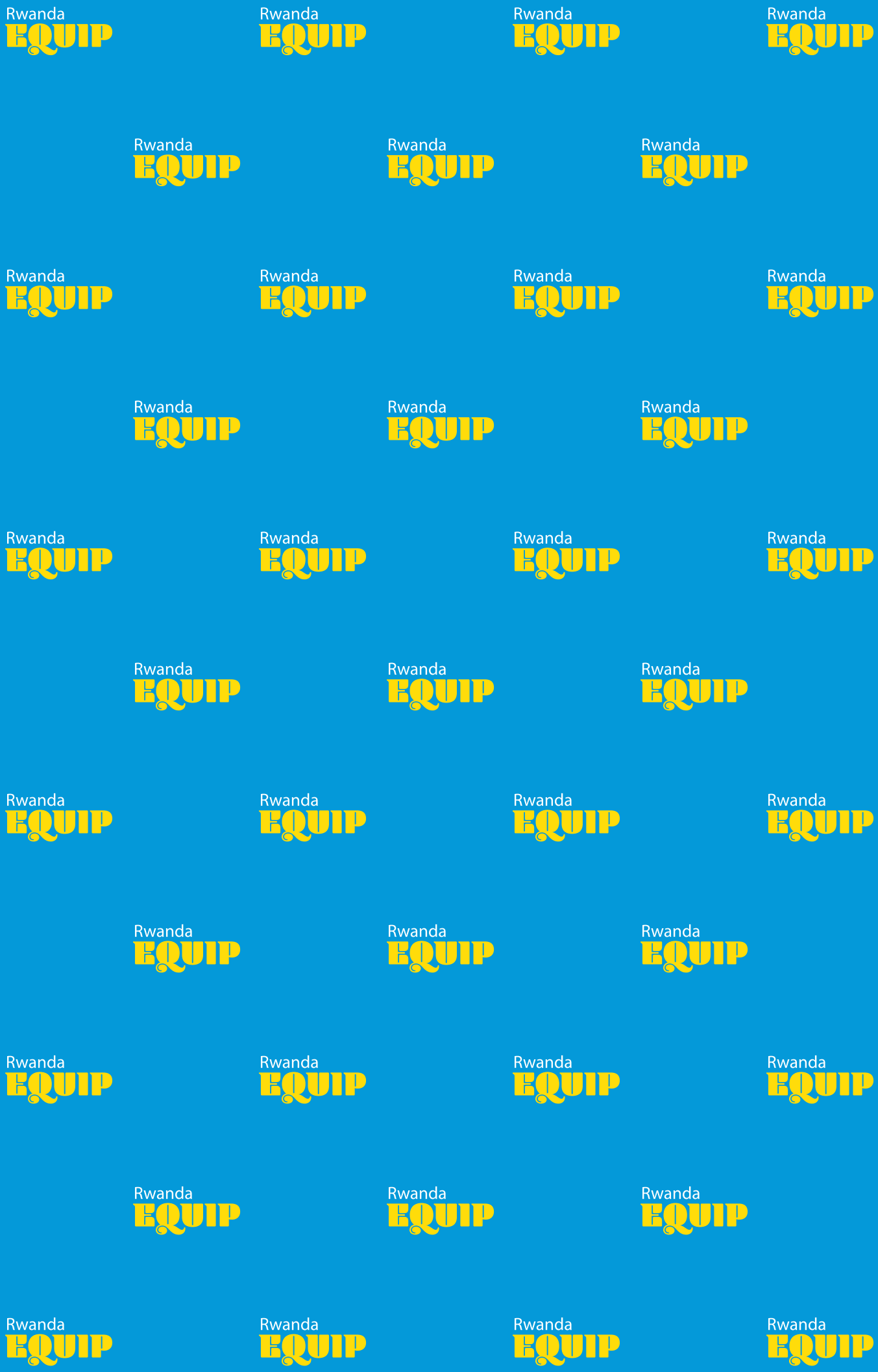
Rwanda EQUIP Education Quality Improvement Program

A Government of Rwanda Initiative

Can Data-Informed Management and Structured Pedagogy Improve Learning?

Evidence from public schools in Rwanda

Daniel Rodriguez-Segura, Philbert Rugwizangoga, Priscilla Lu


Rwanda
EQUIP

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With a Foreword by Managing Director of RwandaEQUIP, Clement Uwajeneza

May 2023

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Contents

I. Preamble

Acknowledgements

We would first like to thank the Ministry of Education (MINEDUC), the National Examination and School Inspection Authority (NESA), and the Rwanda Basic Education Board (REB) for their deep commitment to rigorous measurement and evaluation. This study would not be possible without their support.

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A foreword by the Managing Director of RwandaEQUIP, Clement Uwajeneza

Rwanda's Vision 2050 articulates the long-term strategic direction for "the Rwanda we want". Achieving these aspirations will require bold and decisive action. Human Development is one of the five pillars of Vision 2050 and the golden ticket to a better life. One of the priorities in this pillar includes universal access to high-quality education. Thus, Rwanda has put education at the centre of its development goals. The Education Sector Strategic Plan (ESSP), 2018/2019 – 2023/2024, recognises school readiness programmes and strong learning outcomes as vital foundations for the future of the educational system as it serves the needs of Rwandan children from all backgrounds.

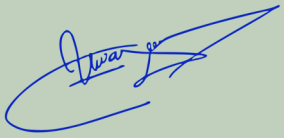
RwandaEQUIP (Rwanda Education Quality Improvement Programme) is the Government of Rwanda's transformative programme to make the country's basic education system globally competitive. The programme intends to do so by building on existing investments and policies set by the Government of Rwanda to deliver the last-mile solution that will improve the quality of education and instruction in public primary schools. The primary and direct beneficiaries of the project are public and government-subsidised pre-primary and primary schools, teachers, and all relevant school leaders. The programme places education at the heart of the community, empowering parents and community leaders to support the Government's transformative programme and build a brighter future for their country.

With a mission to strengthen the quality of education in 761 schools in all five provinces of Rwanda in 4 years, the programme launched its activities in January 2022, starting with 100 schools across 13 districts.

In its first year of implementation, the programme has shown its potential to transform Rwanda's basic education with tremendous achievements in literacy and numeracy, as evidenced in the present report. The report provides detailed insights into the RwandaEQUIP programme and its impact on the national education system. It also highlights areas of focus for the future.

This measurement and evaluation work, and the success of the RwandaEQUIP programme more broadly, would not have been possible without the support of the local leaders, head teachers, teachers, students, and the RwandaEQUIP Team. We highly appreciate this commitment.

We want to thank our country's leadership that can envision this programme's impact and endorse it. We also acknowledge partners and friends of the programme.



Clement Uwajeneza


Date: 3rd of March 2022
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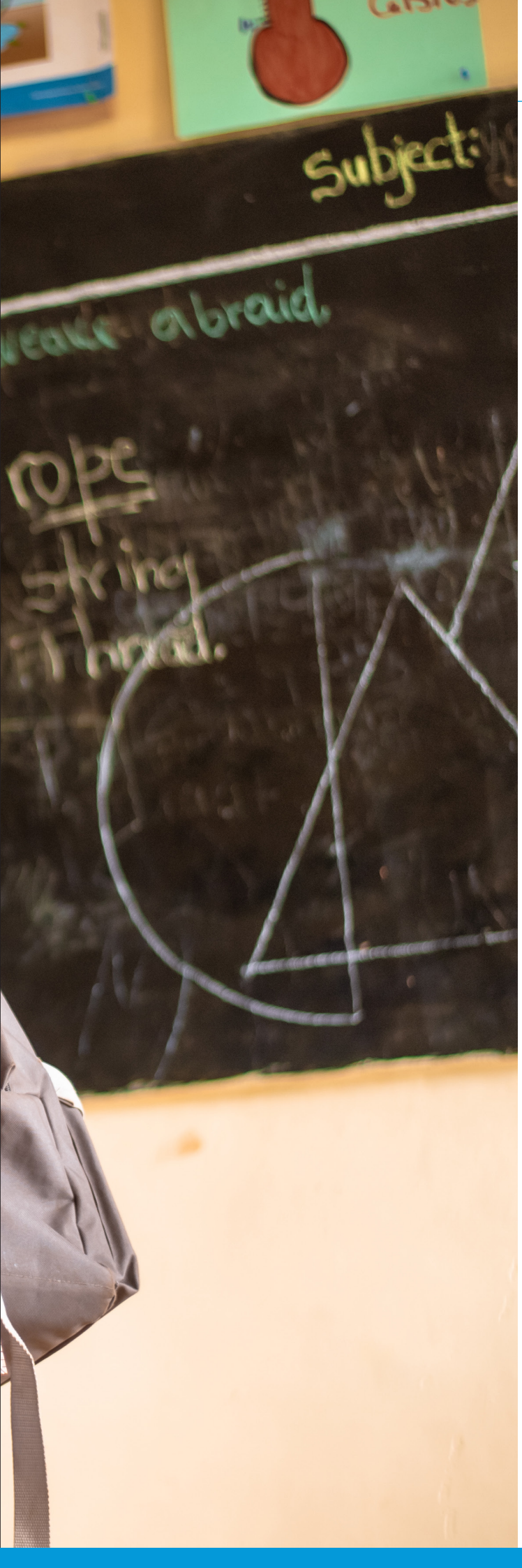


II. Executive Summary

The RwandaEQUIP programme is a government-led initiative aimed at delivering significant improvements in the learning outcomes of pupils in public and government-subsidised schools across Rwanda. The Government of Rwanda envisioned and developed the programme to simultaneously address the country's low learning levels and serve as a technical partner in implementing the government's English medium of instruction policy in primary grades. Therefore, RwandaEQUIP is tasked with delivering significant and sustainable improvements to the education sector by aligning with the government's vision for a strong educational system throughout the country.

The programme's technology-based platform provides holistic support for school management, classroom instruction, and pedagogical practices, and aims to deliver system-wide transformation across Rwanda. During its first year of operations, RwandaEQUIP reached over 130,000 pupils and 3,000 teachers across 100 schools in all five provinces. As of September 2022, the programme has expanded to serve an additional 150 schools, and will further expand to include an additional 511 schools throughout the country during the second half of 2023.

This Study

In parallel to the oversight activities by the Ministry of Education (MINEDUC) and the National Examination and School Inspection Authority (NESA), RwandaEQUIP carefully monitors programme performance goals, including strong instruction and improved learning outcomes for all pupils served by the RwandaEQUIP programme. This report presents the Measurement and Evaluation (M&E) impact evaluation for the first 17 weeks of the programme, February 2022 to June 2022. The methodological details of this study were co-designed and approved by different government entities such as NESA and MINEDUC (see Appendix 3). For the purposes of this report, an impact evaluation is defined as a study that assesses the change in outcomes that are caused by a particular project, programme, or policy (OECD[1], IADB[2]), and as such, multiple impact evaluation assessments can occur throughout the life cycle of a project (USAID[3]).

The progress achieved by the RwandaEQUIP programme is assessed using a methodology called "difference-in-differences" on a sample of 30 RwandaEQUIP ("treatment") schools and 30 comparison schools — which were selected before the rollout of the programme using "propensity score matching" — to ensure a close match between the comparison group and the RwandaEQUIP sample. Pupil performance is measured using a range of externally developed and validated assessments measuring foundational numeracy and literacy in both Kinyarwanda and English, which were selected in conjunction with education experts from NESA and MINEDUC during a three-day workshop in November, 2021. These same tools are used to report on the progress of the programme delivered by RwandaEQUIP. We also draw upon teacher observations, learning assessments for upper primary, administrative data on teacher and pupil attendance, and usage data on lesson completion rates. Rigorous methods and rich data sets provide credible estimates of RwandaEQUIP's impact on foundational learning, and on the broader educational ecosystem.

Very Large Gains in Both Foundational Kinyarwanda and English Literacy, as well as Numeracy, in Only 17 Weeks

Pupils in the RwandaEQUIP programme have been making remarkable progress in foundational Kinyarwanda and English literacy and numeracy in the first 17 weeks of the programme. RwandaEQUIP pupils learnt these skills much faster than comparison government-school pupils. Primary 1 pupils made strong gains in Kinyarwanda reading fluency — with learning gains of nearly 50% more than that of their comparison school peers' rate. Likewise, by the end of the first year, Primary 1 RwandaEQUIP pupils read English more fluently than Primary 2 pupils in comparison schools. This is noteworthy, given that RwandaEQUIP schools and comparison schools started at the same level of performance, and were similar in most observable dimensions.

These learning gains are particularly impressive given that the RwandaEQUIP programme more strictly enforced the Government of Rwanda's policy of English as the medium of instruction for these grades. Therefore, while the amount of instructional time in Kinyarwanda was effectively

[1]OECD: Organisation for Economic Co-operation and Development. (2006). Outline of Principles of Impact Evaluation. Retrieved from https://www.oecd.org/dac/evaluation/dcdndep/37671602.pdf

[2]IADB: Inter-American Development Bank. (n.d.) Impact Evaluation: Resources. Retrieved from https://www.iadb.org/en/topics-effectiveness-improving-lives/impact-evaluation

[3]USAID: U.S. Agency for International Development. (2018). Guide for planning long-term impact evaluations. Utilizing the Expertise of the Expanding the Reach of Impact Evaluation (ERIE) Program Consortium. Retrieved from https://pdf.usaid.gov/pdf_docs/PA00T9HJ.pdf

reduced — especially given the uneven compliance with the language policy in comparison schools — teachers in RwandaEQUIP schools got high-quality instructional support for both Kinyarwanda lessons and English language lessons, and as such, the average quality of instruction received by pupils in RwandaEQUIP schools increased. Ultimately, this improvement in pedagogical approaches in both languages, regardless of the medium of instruction or relative time allocation between languages, led to a significantly stronger performance of RwandaEQUIP pupils in Kinyarwanda and English relative to pupils in the comparison group. The programme's success in improving learning outcomes for pupils in both languages is a testament to the effectiveness of the pedagogical approaches adopted by the RwandaEQUIP programme, and its ability to work within the existing conditions of Rwandan schools.

Figure 2.1: Learning Gains in Reading Fluency Within 17 Weeks

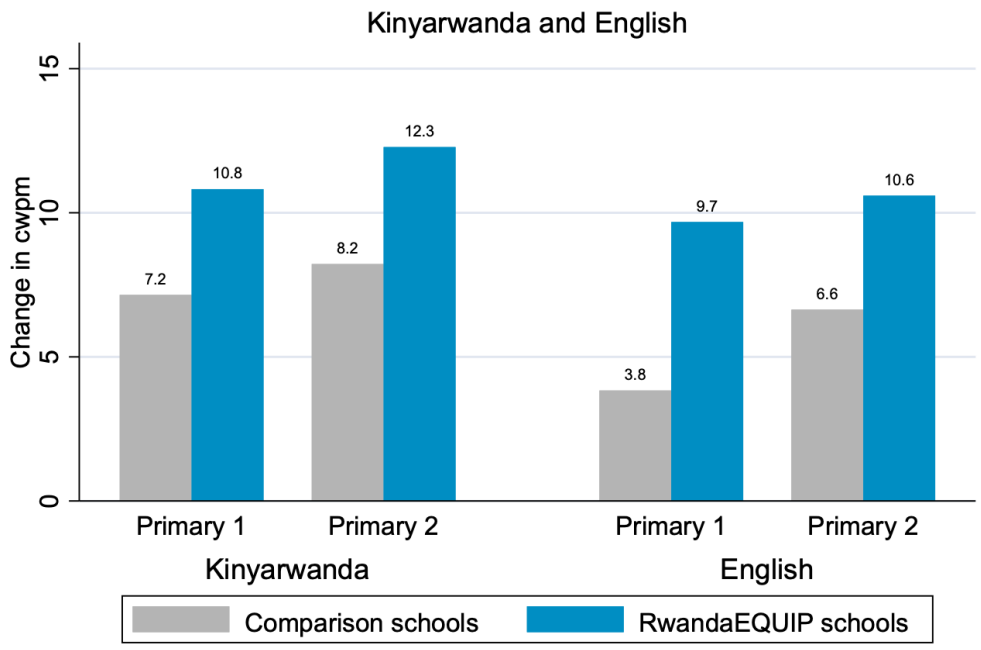
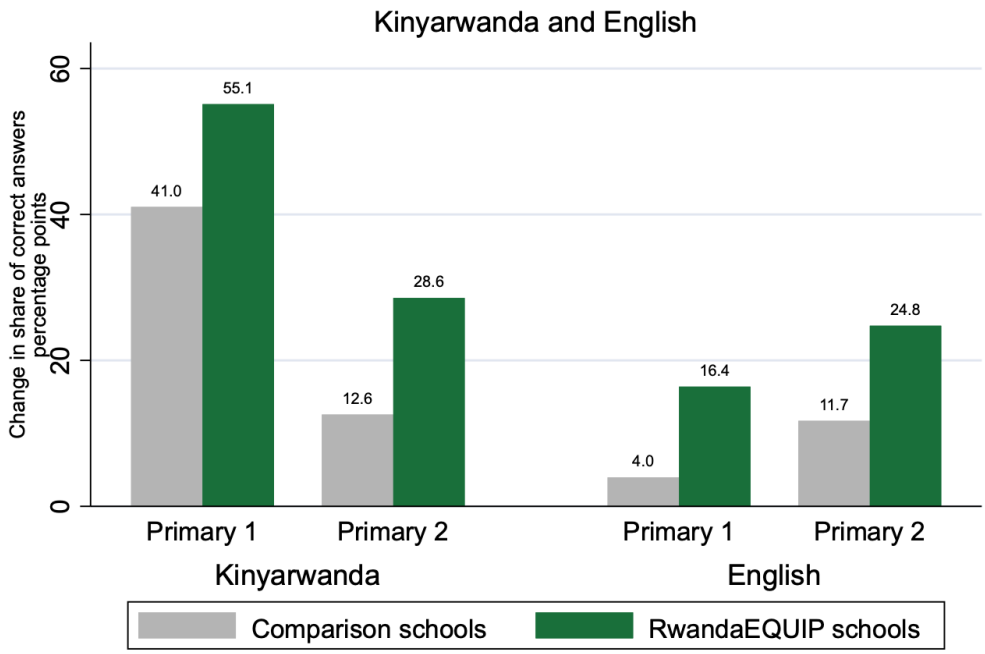


Figure 2.2: Learning Gains in Reading Comprehension Within 17 Weeks



As shown by Figure 2.1, in Kinyarwanda, P1 pupils performed 37% better than their peers, and P2–P3 pupils performed 35% better than their peers over the expected performance — a difference of almost 9 correct words per minute for P1 and 11.8 correct words per minute for P2–P3 over the comparison group. Figure 2.2 shows that RwandaEQUIP P1 pupils' reading fluency in English outpaced comparison pupils by improving 73% over the expected performance — that is, 4.8

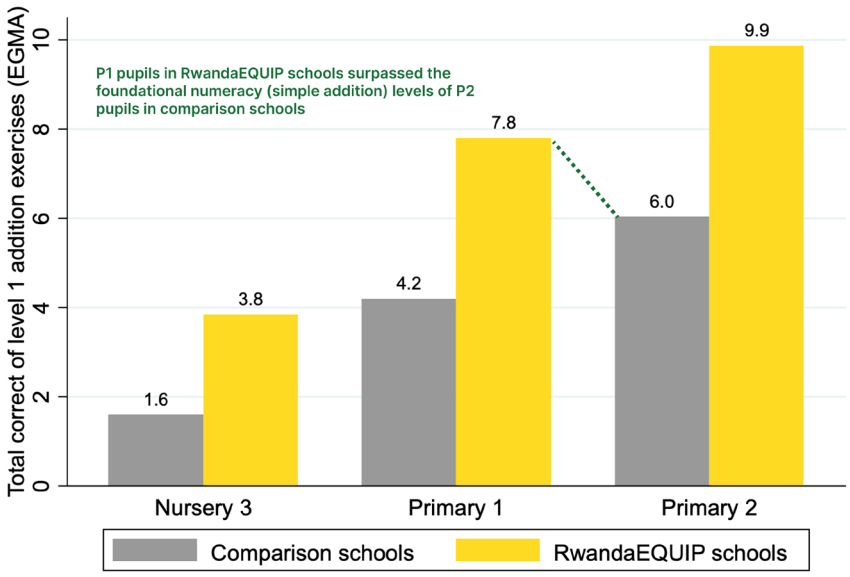
additional correct words per minute for Primary 1 and 2 combined, which is 73% higher than what it would have been without the programme[4]. Over this period, RwandaEQUIP P2 pupils' reading fluency in English outpaced comparison pupils by 75% over the expected performance — that is, 4.4 additional correct words per minute, relative to business-as-usual education. These improvements benefited pupils from a wide range of performance levels, as the programme also reduced the share of non-readers in Primary 1 by 11 percentage points in Kinyarwanda and 29 percentage points in English, relative to the progress achieved by pupils in comparison schools.

In Maths, we observe similarly sized gains. For example, RwandaEQUIP pupils were able to correctly solve more than 7.3 simple addition and 6.6 subtraction problems per minute — 75–85% better than comparison pupils' performance. At the start of the programme, Primary 1 pupils, at both RwandaEQUIP and comparison schools, were able to complete fewer than 3 addition problems per minute. After 17 weeks, RwandaEQUIP pupils more than doubled this rate (from 2.8 to 7.3), while the increase was much smaller for pupils in comparison schools (from 2.7 to 4.1). This is equivalent to 15 additional months of business-as-usual education delivered through the RwandaEQUIP programme in 17 weeks of teaching time[5].

[4]At baseline, pupils in comparison schools across both grades started at 1.6 cwpm, and RwandaEQUIP pupils at 1.2 cwpm. Pupils in comparison schools end the school year at 7.0 cwpm, which means that the expected, "business-as-usual" growth for pupils in RwandaEQUIP schools is 5.4 cwpm. In other words, pupils in RwandaEQUIP schools were expected to end at 6.6 cwpm absent the programme (1.2 cwpm at baseline + 5.4 cwpm of business-as-usual growth, benchmarked via the comparison group). Instead, they finished at 11.4 cwpm, which is 4.8 cwpm higher than their counterfactual absent the programme, and as such, they outperformed the status quo by 73% (4.8 cwpm/6.6 cwpm).

[5]The treatment effect of the RwandaEQUIP programme on level 1 addition problems in Primary 1 was 3.6 correct problems per minute (cppm). Throughout the study, the comparison group only grew 1.3 cppm over seventeen weeks. Therefore, we estimate that the RwandaEQUIP acceleration was 3 times the usual growth (3.6 cppm of treatment effect/1.3 cppm of business-as-usual growth). With a conversion rate of 1.3 cppm in seventeen weeks, the treatment effect of the RwandaEQUIP programme (3.6 cppm) is equivalent to 51 weeks of instruction.

Figure 2.3: Foundational Numeracy, End of the School Year



Consistently powerful gains can be seen across early grade Maths, Kinyarwanda, and English for pupils from Nursery through Primary 3. The average pupil in a RwandaEQUIP school would score among the top third of pupils in comparison schools.

This dramatic difference (0.39 SD) ranks close to the 90th percentile of international education interventions rigorously evaluated. In other words, very few interventions have achieved learning gains as large as the RwandaEQUIP programme, which is particularly remarkable given that this happened during the first 17 weeks of programme implementation. RwandaEQUIP also achieved significant gains on other fronts as well, including teachers' pedagogical practices, teacher attendance, lesson delivery, and stakeholder engagement.

> "Pupils in the RwandaEQUIP programme have been making remarkable progress in foundational Kinyarwanda and English literacy and numeracy in the first months of the programme."

In all, these gains signal a high return on investment for the Government of Rwanda. The programme's success ensures more children become proficient in foundational learning skills and beyond. Even so, not every pupil performs well, which suggests RwandaEQUIP still has room to continue to improve. Furthermore, we find certain areas for improvement within the programme and, as such, these recommendations are also described in this report.

In Numbers

50%

reduction in teacher absenteeism year-over-year for RwandaEQUIP teachers

One

additional year of English and Maths for RwandaEQUIP P1 pupils

Two

times fewer non-readers in English among RwandaEQUIP P1 pupils

Four

times increase in high-quality instructional time per day from the first five weeks to the last few weeks

Nine

additional correct words per minute in Kinyarwanda for RwandaEQUIP pupils in P1-P3

Programme Adoption

Although there were large and precisely estimated gains on average, programme adoption — that is, how well stakeholders on the ground adhered to the best practices of the RwandaEQUIP programme — was a strong moderator of the magnitude of the effects for different grades and regions. For instance, lesson completion rates in Kigali were consistently lower than in all other provinces throughout the first few months, and we correspondingly found Kigali to have the lowest learning gains of all provinces. It is estimated that, with stronger programme adoption among different sub groups of schools and stakeholders, the average effects on foundational Kinyarwanda and English literacy and numeracy would have been, in all likelihood, even larger. For instance, the average treatment effect in the three provinces with the highest rates of lesson delivery (Western, Northern, and Southern provinces) was 0.58 SD in numeracy and 0.52 SD in English literacy, relative to 0.39 SD for both subjects on average for the whole sample.

In Short…

Overall, the RwandaEQUIP programme was, by and large, a resounding success during its first 17 weeks of operation, as proven by the very large learning gains achieved within such a short period of time. These gains are evidencing the Government of Rwanda's mission to deliver high quality education that aligns with its vision for the educational system of the country. Despite its success, there are still large shares of pupils within the system who have not yet reached an appropriate level of proficiency on even the most foundational skills, highlighting the magnitude of the tasks ahead to ensure that every child in Rwanda has access to an education of the highest quality.

Main Findings

Extraordinarily large gains in foundational learning

The programme has had very large and positive effects on foundational Kinyarwanda and English literacy and numeracy outcomes in lower primary.

These gains in foundational learning are in the 90th percentile of the largest effects measured in similar studies in the international education field.

Teacher English fluency did not correlate with stronger gains as a result of the programme

This suggests that the RwandaEQUIP model can be an effective model to implement English-medium instruction even with relatively lower levels of teacher fluency.

It is likely that with significantly lower levels of fluency (below ~55 correct words per minute), teaching ability might be hindered and the impact of the programme muted to a certain extent.

The share of non-readers in Kinyarwanda and English was dramatically reduced in Primary 1

This boost among low-performing pupils in Primary 1 led to classes with more equal distributions of performance, potentially making future instruction even more effective for a larger number of children.

The programme did not affect the share of non-readers in other grades beyond what other government schools achieved.

The literacy gains for Primary 2 and 3 came from pupils higher up in the distribution of performance levels.

Higher order skills, especially in later grades, were harder to move — although programme adoption was significantly lower in upper primary

Reading comprehension in Primary 3 and Primary 6 learning outcomes consistently experienced thinner gains.

The specialist model led to significantly higher learning gains in Primary 6 numeracy

However, the specialist model did not affect RwandaEQUIP pupils' learning gains in literacy.

Regional differences in programme implementation explain regional differences in programme impact

The programme worked better in rural and peri-urban schools over urban schools.

Southern province schools had the best implementation and the most learning gains.

Kigali schools had the weakest programme implementation and the smallest learning gains.

There is significant evidence in favour of moving classroom instruction towards a single-shift model

This is both because of the larger gains experienced amongst pupils in single-shift classrooms, relative to those in the double shift-class model, and because the benefits of smaller classes do not offset the costs of lost learning time.

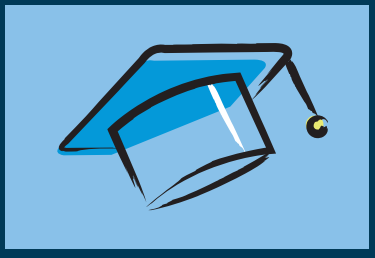
Therefore, the current evidence points to the fact that by moving more children to single-shift classrooms, the RwandaEQUIP programme could achieve larger gains — even if this means increasing the average class-size.

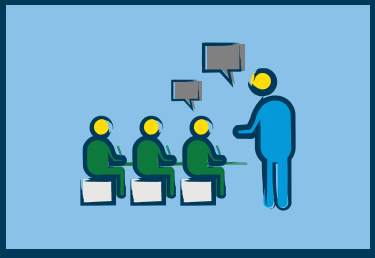
Teacher certification status had no effect on RwandaEQUIP pupils' learning gains

Pupils taught by teachers without formal certification performed equally well when compared to pupils taught by teachers with formal certification.

Boys and girls started the programme at similar levels of performance, and both groups benefited equally from the RwandaEQUIP programme

Boys and girls experienced similar gains from the programme. They also started from similar learning levels, implying that the programme mostly managed to maintain the existing gender parity in the learning outcomes.





III. The RwandaEQUIP Programme

Overview of the Programme

The Government of Rwanda has made the provision of quality public education a cornerstone of its promise to the nation and to Rwanda's youth. It has invested heavily in both the human and physical resources of the school through initiatives targeting teacher professional development, programme design, and technology integration. Yet, despite significant investments to strengthen teaching and learning across the country, learning outcomes remain extremely low. The majority of children are attending school, but are not learning the fundamental literacy and numeracy skills necessary to master the syllabus and realise their full potential in their future education and careers.

In response to these challenges, the Government of Rwanda put forth a bold vision to transform the quality of public education across the country. In January, 2022, it launched the Rwanda Education Quality Improvement Programme (RwandaEQUIP). RwandaEQUIP is a holistic, 360-degree programme strengthening all aspects of the public primary education system. It empowers school leaders and teachers to deliver life-changing education to each and every child in Rwanda.

RwandaEQUIP is anchored in 5 core pillars:

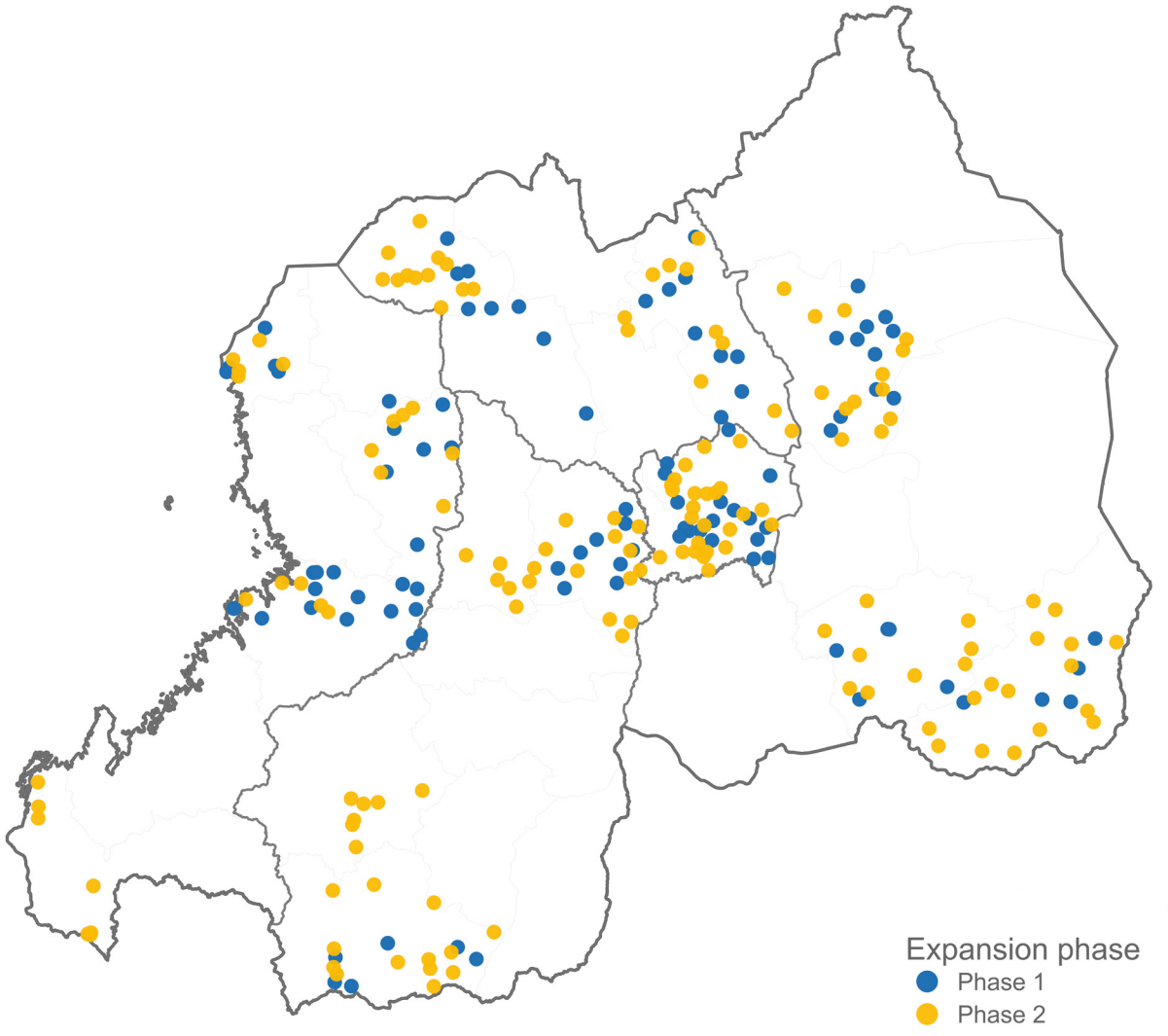
1. Scientifically-based learning materials aligned to the Rwandan curriculum
2. A technology-enabled instructional model
3. Data-driven training, coaching, and ongoing professional development
4. 360-degree support teams
5. Technology-driven monitoring and reporting

The programme has three central goals:

- To increase foundational literacy and numeracy proficiency
- To increase the percentage of Primary 6 pupils achieving combined division I to III in national examinations
- To train and coach teachers to use instructional practices that create learning-centric classrooms

During its first school year — the period during which this study was conducted — RwandaEQUIP was implemented in 100 schools from 13 districts across all five provinces of the country. In September 2022, the programme will begin its second phase of expansion to include an additional 150 schools. Upon completion of this second expansion, the programme was implemented in a total of 250 schools from 16 districts (Figure 3.1).

Figure 3.1: RwandaEQUIP Schools in Phase 1 & Phase 2



RwandaEQUIP will complete its third and final stage of expansion by September 2024. At this time, the programme will reach 761 schools.

Table 3.1: Schedule of RwandaEQUIP Programme Rollout

	Feb-June 2022	Sept-June 2023	Sept-June 2024
	Phase 1	Phase 2	Phase 3
Schools reached	100	250	761

Implementing the Pillars of the Programme

RwandaEQUIP drives pupil learning by providing school leaders and teachers with the tools and support they need to deliver a life-changing education to each and every pupil. Moreover, RwandaEQUIP also offers government and programme leaders visibility into the minute-by-minute experience of pupils, teachers, and schools. This digital and operational transparency ensures that leaders can work in close collaboration and make strategic, data-driven decisions to improve the quality of education on a system-wide scale. Importantly, RwandaEQUIP schools remain under the purview of MINEDUC. As such, they receive the same level of scrutiny and monitoring as do other public schools in Rwanda outside of the programme. The key difference is that public schools in the RwandaEQUIP programme receive the additional support provided by the programme.

Below, we highlight the core pillars that enable RwandaEQUIP to ensure high-quality learning in each and every classroom:

Scientifically-Based Learning Materials Aligned to the Rwandan Curriculum

One key pillar of RwandaEQUIP is the materials that teachers use to ensure that all pupils master the curriculum and build the necessary foundational literacy and numeracy skills to excel in their studies. RwandaEQUIP designs thousands of high-quality, syllabus-aligned teacher guides. Each teacher guide is based on thousands of hours of research and development on what works best to drive learning gains. These scientifically-based lessons provide the necessary structure and pedagogical support to lead a world-class lesson. This includes key lesson objectives, procedures for teaching new concepts, impactful and rigorous independent practice opportunities, and mechanisms for assessing learning. Each lesson is then observed in the classroom to ensure that there is a continuous cycle of improvement.

RwandaEQUIP also supplements core syllabus lessons with foundational literacy and numeracy programming. These lessons target the core skills necessary for pupils to meaningfully engage with and master the content in the national curriculum. In Rwanda, the vast majority of pupils trail far behind grade-level literacy and numeracy benchmarks. By investing in foundational literacy and numeracy, which are levelled according to actual learning levels as measured in schools, RwandaEQUIP aims to strengthen these critical key skills and close the gap between current learning levels and grade-level standards.


BRAZIL

The quality of instructional materials is constantly evaluated through several mechanisms. First, are pupils learning? Digital data collected via the teacher tablet provides visibility on pupil performance. This includes outcomes on continuous and comprehensive assessments. Second, RwandaEQUIP officers observe lessons each day, evaluating the quality of the design and opportunities for improvement. This continuous cycle of observation and iteration ensures that each and every lesson drives effective classroom instruction and contributes to optimised learning outcomes.

Technology-Enabled Instructional Model

RwandaEQUIP uses technology to enable this instructional model. Teacher guides are shared digitally with teachers through a teacher tablet. Lessons are organised by a digital timetable, which ensures that every minute of the school day maximises learning potential. When teachers assess learning outcomes, they also enter the data into their teacher tablet. The tablet, in turn, provides the teacher with the data and insights necessary to adjust their instruction based on the actual learning outcomes and patterns in their classroom.

Data-Driven Training, Coaching, and Ongoing Professional Development

High-quality instructional materials are not sufficient to transform teaching and learning in the classroom. Another key component of RwandaEQUIP is data-driven professional development programmes. This component begins with a 10-day in-person training programme provided to teachers and head teachers. RwandaEQUIP trained the first cohort of 3,042 teachers and head teachers in January 2022. Additional induction training sessions are scheduled at each expansion phase of the programme.

RwandaEQUIP induction training has three core objectives:

- To ensure that every teacher has the skills and knowledge to deliver lessons, manage a classroom, assess learning, and motivate pupils.
- To develop the mindset that every pupil can be successful, that high-quality instruction is possible and leads to improved learning outcomes, and that positive reinforcement (rather than corporal punishment) is the most effective tool to motivate pupils.
- To strengthen the communication strategies needed to engage with the school community and beyond.

A teacher's support does not end with induction training. RwandaEQUIP also provides continuous professional development for teachers. This professional development, delivered at the school level by a Schools Supervisor, reinforces core skills from induction training. It delivers training on new processes, skills and tools in the RwandaEQUIP programme.

Finally, RwandaEQUIP empowers school leaders to provide powerful coaching for their teachers. School leaders are equipped with tools and training to monitor performance and observe teachers. After each observation, school leaders deliver coaching sessions that celebrate areas of strength and target areas of growth. Coaching, alongside continuous professional development, ensures that every single teacher receives constant feedback and reinforcement of the skills that help them to become a stronger teacher.

360-Degree Support Teams

RwandaEQUIP knows that to be successful, systems must be put in place to ensure that all members of the school ecosystem deliver the programme with fidelity. A 360-degree support team ensures that at every school, all of the conditions are in place for learning. This includes operational factors (Is there a teacher assigned to every classroom? Does every teacher have a tablet?). It also includes performance indicators (What percentage of lessons are teachers delivering each day? Are teachers taking attendance for their classrooms?). A team of Schools Supervisors visits schools each week to ensure that these conditions are met. When issues surface, a support team responds in order to resolve these issues. This includes IT support, operational support, and other departments in place to ensure optimal conditions for learning.

Technology-Driven Monitoring and Reporting

The identification and resolution of school-based issues does not only occur during in-person visits. RwandaEQUIP tracks all core operational and performance drivers that contribute to learning outcomes. Digital tools transform this data in order to provide usable insights to school leaders, which, in turn, enables more effective school management and teacher coaching. This data is also used by RwandaEQUIP's 360-degree support team to identify challenges, resolve issues, support school leaders, and drive improvement at the school level. This data is also available for government and RwandaEQUIP leadership. These insights inform strategic decisions at the programme level and ensure that all key programme decisions are responsive to the reality of the school system as a whole.

The implementation of the RwandaEQUIP Programme, in numbers

Human Capital Development

- **2942** teachers trained
- **100** head teachers trained
- **70** schools supervisors trained

Technology Inputs

- **2942** teacher tablets distributed
- **100** head teacher smartphones distributed
- School Leader App, Spotlight, Instructional Leadership App

Teaching and Learning Material Inputs

- **4128** lesson guides created and adapted to the national curriculum
- **401,668** books distributed
- **24,810** supplementary books and other teaching materials distributed

School Management Improvement

- **1601** coaching sessions conducted by head teachers
- **16,294** routine daily checks by head teachers to ensure adequate programme implementation and teacher readiness
- **2173** supervisor visits or long calls to all **100** schools
- **3,399,834** pupil assessments printed and administered to all programme pupils

System-Wide Transformation Gains

Higher teacher, head teacher, and pupil attendance

Stronger Pedagogy

Learning gains in foundational literacy and numeracy

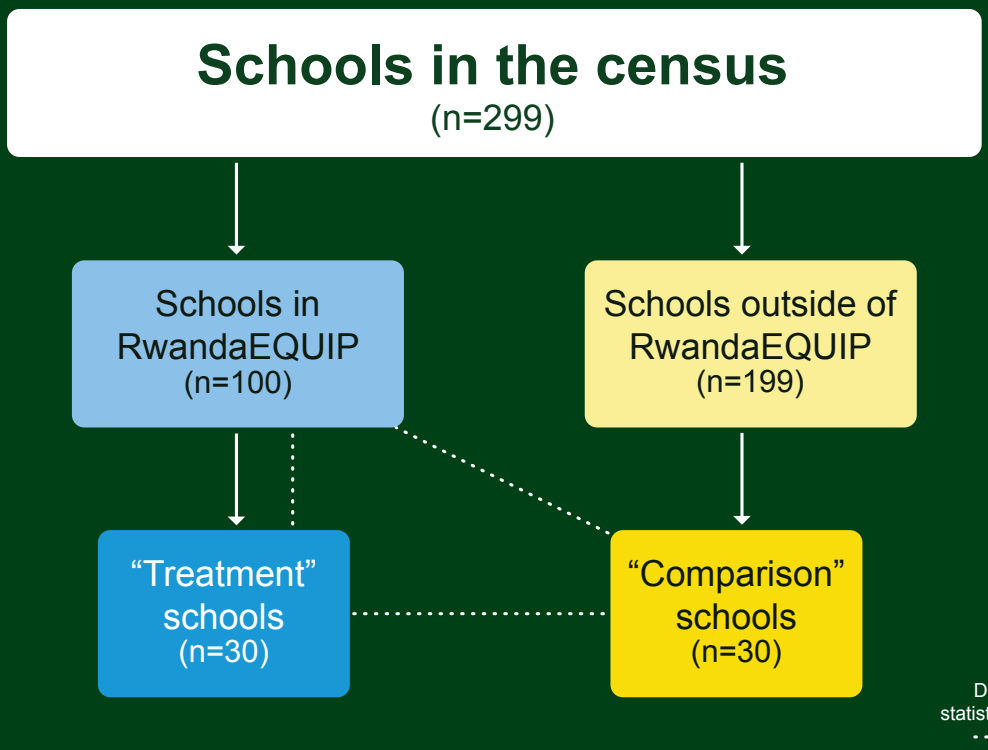
IV. Methodological Considerations for This Study

During the first year of the programme, the Measurement and Evaluation strategy relied on two pillars: (1) the tracking of progress observed in RwandaEQUIP schools, and (2) the benchmarking of these gains in light of other schools outside of the programme. To do this required following a strategy based on the careful monitoring of learning outcomes in 30 RwandaEQUIP schools from the initial cohort of 100 schools, and 30 additional schools where the programme did not roll out in Year 1, but which were included in a school census conducted by the programme several months before the first day of class. Within these 60 schools, data was collected at the start of the programme and also at the end-of-year check-in.

Sampling of Schools and Pupils

In selecting which particular schools would comprise the set of 60 schools for this study, there were three goals in mind. The aims were that (1) the subset of 30 treatment schools was representative of the broader set of 100 RwandaEQUIP schools, (2) the subset of 30 comparison schools closely resembled the 30 treatment schools in terms of school characteristics, so that they would be a reliable comparison, and (3) jointly, the 60 schools resembled the broader set of 100 RwandaEQUIP schools as much as possible, so that the estimated effects of the programme would be generalisable to the full set of 100 RwandaEQUIP schools in Year 1. These relationships are illustrated between the different subsets of schools below (Figure 4.1):

Figure 4.1: Schools in the Census

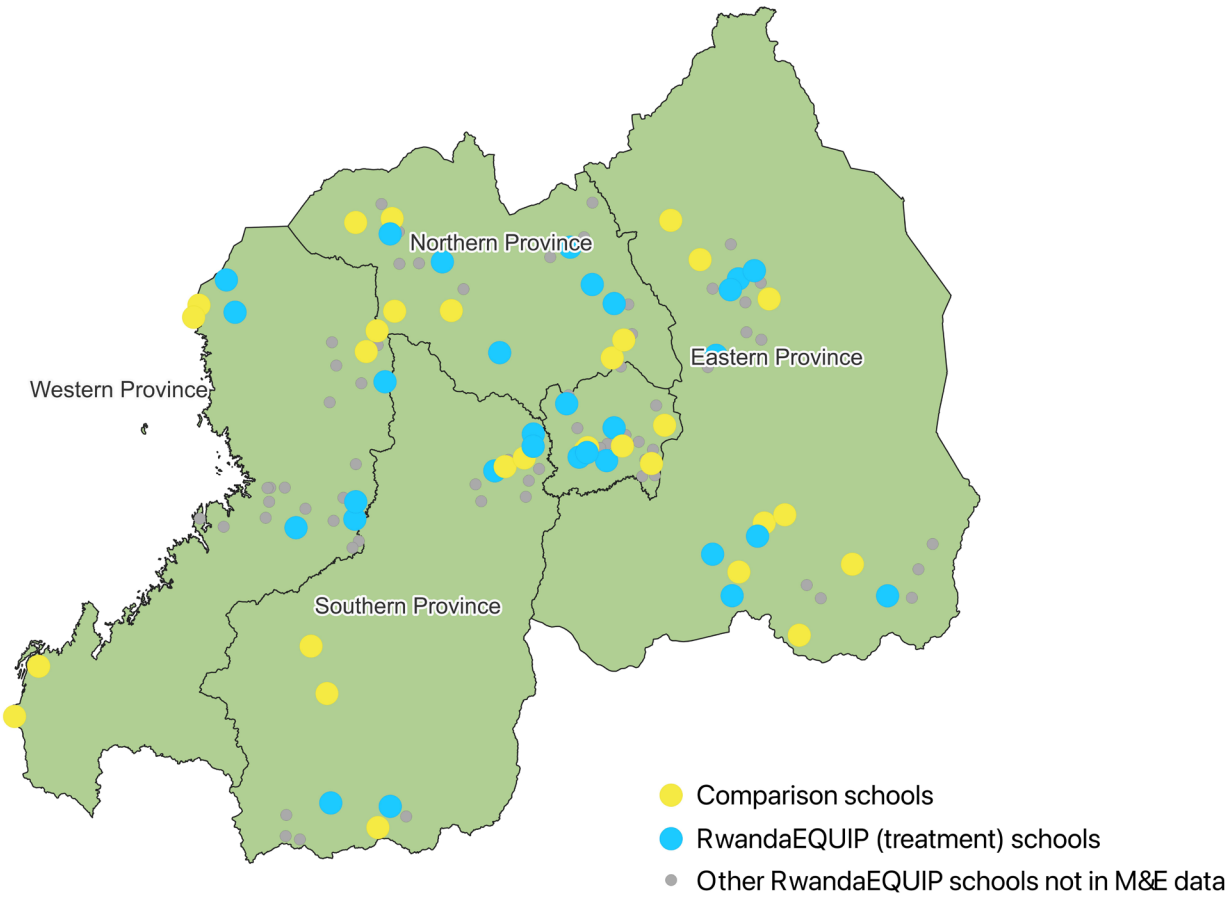


Selection of the Schools in This Study

To achieve the goal of finding a set of schools that allowed for tracking of the progress of the overall programme, a statistical methodology called “propensity score matching” was used. This methodology finds the pairs of treatment and comparison schools that are most similar to each other before the rollout of the programme. As such, what happened in the comparison schools throughout the school year on average serves as a strong predictor of what would have happened in treatment schools, had they not joined the programme.

To execute this methodology, we begin with the set of 299 schools included in the census. Based on twenty-seven school-level characteristics, like pupil counts, number of teachers, and whether early childhood grades are offered at the school, an indicator was created of how likely each school was to be selected into the subset of 100 RwandaEQUIP schools. Then, within each of the five provinces, pairs of schools with similar characteristics are created, as proxied by their likelihood of being selected into the RwandaEQUIP subset. Each pair has one RwandaEQUIP school and one non-RwandaEQUIP school, both of which are in the same province and share similar school-level characteristics. From the potential pool of eligible pairs of schools, 30 pairs of schools that are representative of the broader set of 100 schools are selected (see Appendix 2 for more details on the methodology used). We display the geographic distribution of the selected 60 schools below (Figure 4.2):

Figure 4.2



Random Selection of Pupils Within Each School

Within the 60 selected schools, we sampled 15 pupils per grade level for each assessment, across Nursery, Primary 1, Primary 2, Primary 3, and Primary 6. We also ensured that the gender representation reflects that of the school for each grade. Among the grades and classes of interest, pupils were randomly sampled. This random selection of pupils ensures that the sample is representative of the overall class and population of interest at the school. Since these schools were representative of the 100 RwandaEQUIP schools, randomly selecting pupils allows for a set of children in the sample that is representative of all pupils in the RwandaEQUIP programme.

Learning Assessments Used

To obtain a comprehensive view of pupil performance under the RwandaEQUIP programme, the M&E plan for Year 1 draws from several assessments measuring numeracy, literacy, and content-knowledge of other areas. These assessments were selected and reviewed during a three-day workshop from November 17–19, 2021 in consultation with nine education experts from the National Examination and School Inspection Authority (NESA), and the Ministry of Education (MINEDUC), which was represented by DG Christophe Ngengiyaremye (see Appendix 3). In this section, the five main assessments relied on are outlined.

First, the Early Grade Reading Assessment and Early Grade Mathematics Assessment (EGRA/EGMA) are used to measure the foundational (English) literacy and numeracy skills of pupils. These tools were developed by the Research Triangle Institute (RTI) in conjunction with USAID, and have been used by education ministries and multilateral agencies around the world. The EGRA component of the study focuses on writing and reading skills in the English language. The EGMA component captures skills in numeracy and operations, and geometric figures (shapes), in conformity with guidelines from the national mathematics curriculum. EGRA and EGMA are administered in Pre-Primary through Primary 2, although the specific sub-skills measured vary somewhat by grade, based on test intention and development levels.

Second, Rwanda's Local Early Grade Reading Assessment (LEGRA) — rigorously developed and utilised in other studies as well[6,7] — is used to measure foundational literacy skills in Kinyarwanda. This assessment was developed jointly between the Rwanda Basic Education Board (REB) and USAID, and has been administered in Rwandan schools to more than 2 million pupils between Primary 1 and Primary 3. Therefore, this assessment is particularly valuable for measuring literacy in a contextually-appropriate manner.

Third, an adapted version of the Learning Achievement in Rwandan Schools (LARS) for literacy and mathematics is used in Primary 3 and Primary 6. These assessments were developed particularly for the Rwandan context by the Rwanda Basic Education Board (REB), and they have been externally validated. External research[8] has also relied on versions of this instrument as a measure of learning, which supports its status as an additional point of reference for the tracking of pupil achievement.

[6]USAID. (2021). Equating study: LARS IV, EGRA 2018, LEGRA 2021.

[7]Brolley, K. (2020). Early Grade Reading in Rwanda: What Does `Good' Look Like and How Do We Measure It? https://pdf.usaid.gov/pdf_docs/PA00Z2QZ.pdf

[8]"Understanding the drivers of numeracy assessment scores in Secondary 3 classes in 14 districts in Rwanda." REAL Report — University of Cambridge. 2021.

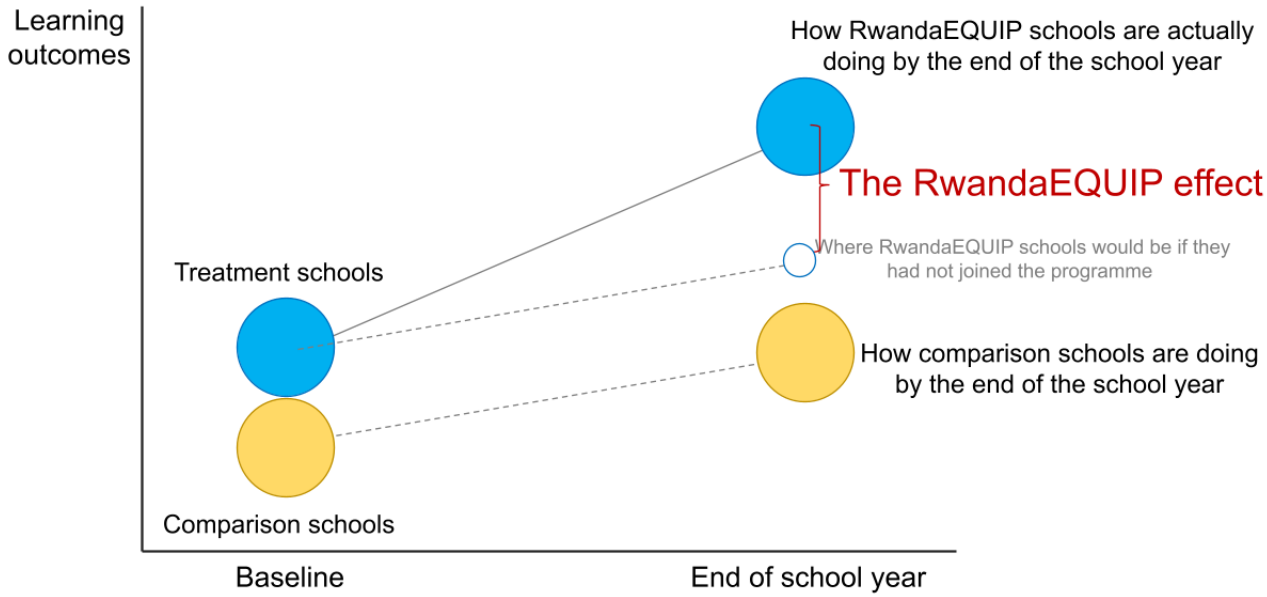

Rwanda
EQUI

Evaluating The Impact of the Programme: Difference-in-Differences

The impact of the RwandaEQUIP programme is measured using a statistical methodology called "difference-in-differences". Comparing RwandaEQUIP ("treatment") schools with non-RwandaEQUIP ("comparison") schools at a single point in time is not a sensible approach, as it would not show what the difference between these two groups would have been had the treatment schools not joined the programme.

To account for that, two rounds of data collection were conducted: one towards the start of the school year and one at the end-of-year check-in, for both treatment and comparison schools. Having start-of-year and end-of-year data for comparison schools allows for understanding how pupils in schools that are not part of RwandaEQUIP progress under business-as-usual education. In turn, knowing the usual growth trajectory for pupils allows for inferring how pupils in the treatment schools would have performed in the absence of the RwandaEQUIP programme. The difference between the actual performance of pupils in treatment schools and their expected performance under business-as-usual education is calculated by the "difference-in-differences"[9] technique, and this, in turn, allows for quantifying the "RwandaEQUIP effect". The full analytical setup of the study is illustrated with a graphic below (Figure 4.3):

Figure 4.3. Visual Representation of Statistical Technique Used to Identify the "RwandaEQUIP Effect"



[9]Specifically, this is a "matched" difference-in-differences set up, where the comparison group was selected before the collection of baseline scores based on its similarity (as quantified by the propensity score matching process) to the RwandaEQUIP schools.

V. The State of Learning Before the RwandaEQUIP Programme

Pupils had Very Weak Learning Outcomes Before the Start of the Programme

Before the start of the RwandaEQUIP programme, learning outcomes were low across most grades, subjects, and schools. This issue was multidimensional and manifested itself in baseline data through at least three different lenses.

First, these low learning levels emerged early on: the majority of foundational literacy and numeracy skills of pupils in the early grades — Nursery through Primary 3 — were very weak. For example, more than half of all Primary 1 pupils could not read a single word in Kinyarwanda at the start of the second term of the school year (Figure 5.1). For English, the share of non-readers was closer to 9 in 10 pupils (Figure 5.2). By Primary 2, one fifth of all pupils remained in the non-reader category in Kinyarwanda, and over 60% remained so in English. For context, developers of LEGRA define "meet expectations" as reading 7 correct words per minute in Primary 1, and 20 correct words per minute in Primary 2. In Kinyarwanda, less than one third of all pupils were meeting these relatively low thresholds.

Figure 5.1: Share of Pupils Who are Non-Readers in Kinyarwanda at the Start of the Programme, by Grade

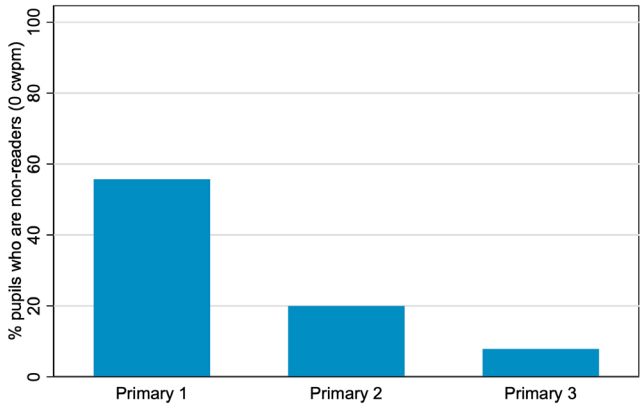
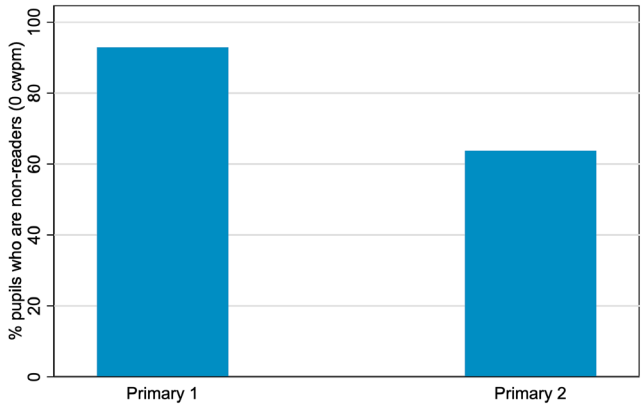


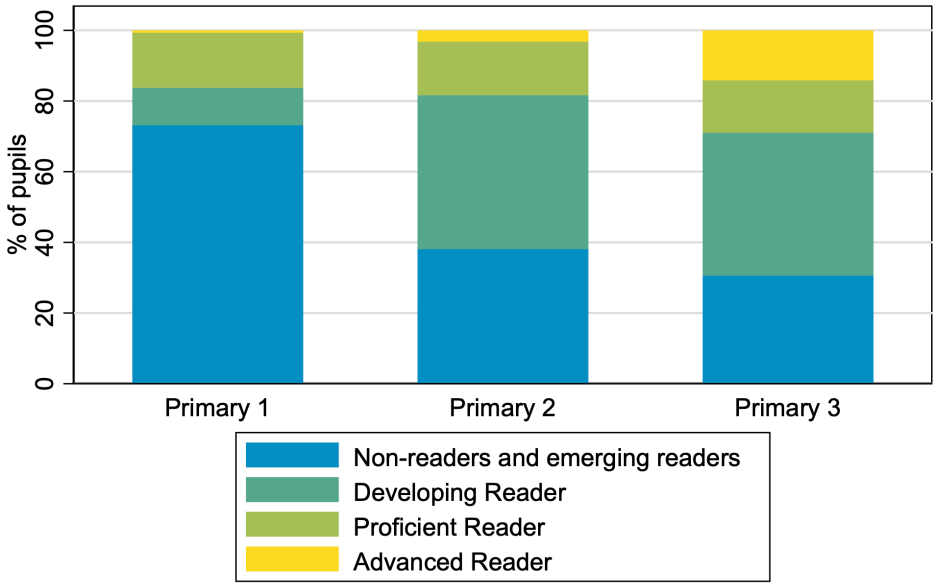
Figure 5.2: Share of Pupils Who are Non-Readers in English at the Start of the Programme, by Grade



When applying the full set of benchmarks recommended by USAID[10] to understand the distribution of performance within each grade, a similar pattern is observed — most pupils in the early grades are off-track from becoming "advanced" readers, even in Kinyarwanda (Figure 5.3), taking into consideration that this is a relatively low threshold for what constitutes being an "advanced reader". By Primary 2, fewer than 1 in 10 pupils could be considered advanced readers, and by Primary 3, this fraction is smaller than 20% of all pupils. So, even though a few pupils are making some progress, the vast majority of them are falling behind developmental expectations. This issue is particularly important, as

[10]USAID. (2021). Equating study: LARS IV, EGRA 2018, LEGRA 2021.

Figure 5.3: Distribution of Oral Reading Fluency in Kinyarwanda at the Start of the Programme, by Grade



it is widely recognised by researchers[11,12], that when pupils do not become strong readers by Primary 3, their probability of ever becoming strong readers decreases sharply. Therefore, as the business-as-usual approach operated in RwandaEQUIP schools before the introduction of the programme, most pupils were not on track to become strong readers in either Kinyarwanda or English.

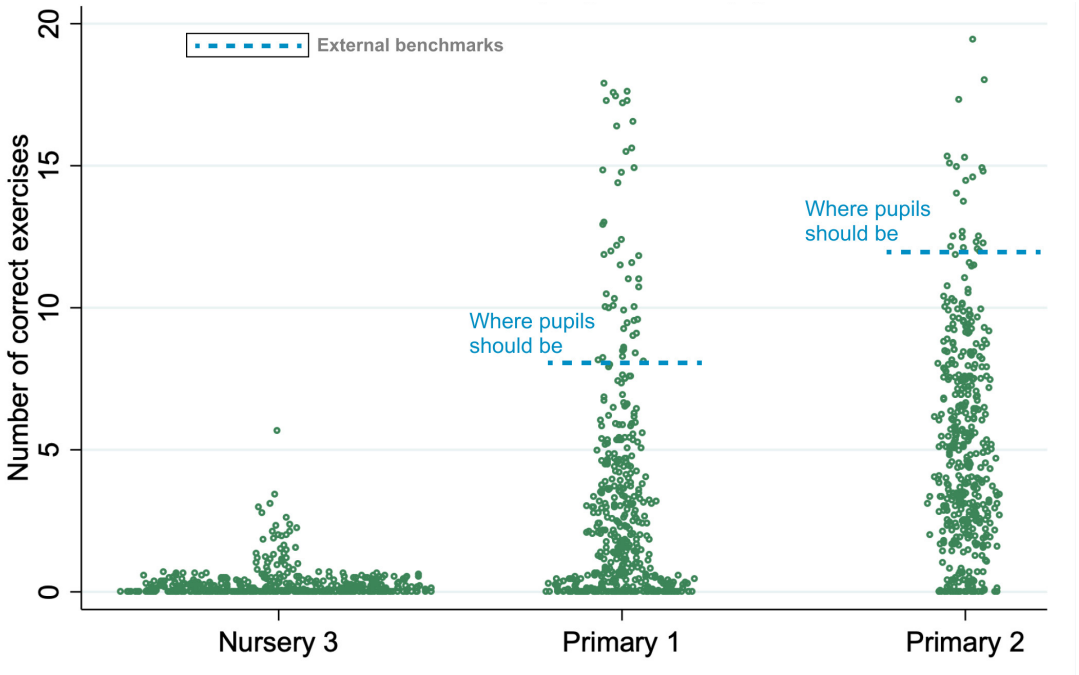
[11]Annie E. Casey Foundation. (2010). Early warning! Why reading by the end of third grade matters.

[12]World Bank. (2017). World Development Report 2018: Learning to Realize Education's Promise. The World Bank.

In numeracy, the situation was similarly bleak: the average Primary 1 pupil could perform fewer than 3 simple addition problems taking the form of "4+5" in one minute. By the time pupils reached Primary 2, the average pupil answered only 5 problems correctly in one minute — taking 12 full seconds on average to answer this type of question. For subtraction problems taking the form of "6-2", these scores were slightly lower than for addition. Similar to the reading fluency outcomes described above, external benchmarks can be applied to these scores — particularly those used in another high-quality research project[13] in an East African context, which used the same instrument to measure outcomes — to understand what proportion of pupils are developmentally behind where they are expected to be. In particular, this report suggests that pupils in Primary 1 should be solving 8 of these simple addition problems in one minute, and by Primary 2, they should be solving 12 of these problems. At the start of the RwandaEQUIP programme, fewer than 10% of all Primary 1 pupils and fewer than 5% of all Primary 2 pupils were meeting these standards (Figure 5.4). Close to two thirds of the pupils were nowhere near half of these thresholds to reach a developmentally appropriate level of foundational numeracy competency, using basic addition problems as a proxy.

[13]RTI International. (2014). USAID/Kenya Primary Math and Reading (PRIMR) Initiative: Final Report. .

Figure 5.4: Simple Addition Problems Per Minute at the Start of the Programme, by Grade



The lack of foundational literacy and numeracy skills also implies the great difficulty that these pupils have engaging with more advanced literacy and numeracy skills, like reading comprehension or solving word problems. For instance, Figure 5.5 and 5.6 show reading comprehension performance levels at baseline, displaying that by Primary 3, for instance, only 1 in 2 pupils have met expectations in Kinyarwanda. This issue is particularly worrying, as these more advanced skills, like reading comprehension, are the "ultimate goals" of literacy in themselves, as they serve as bridges to learn higher-order concepts in other areas, both in school and outside of it.

Figure 5.5: Distribution of Reading Comprehension Levels in Kinyarwanda Before the Start of the Programme, by Grade

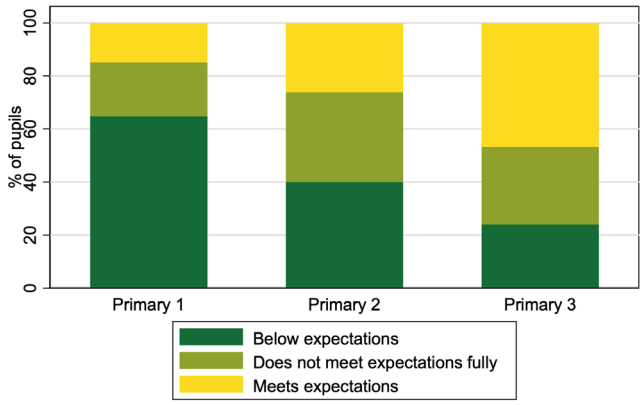
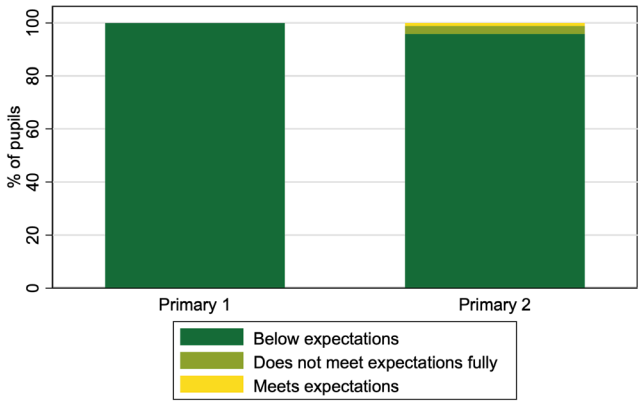


Figure 5.6: Distribution of Reading Comprehension Levels in English Before the Start of the Programme, by Grade



The low levels of performance that were found at baseline were consistently distributed throughout the sample. In other words, the observed gaps in learning were not explained by groups of schools that would usually be considered to display lower performance, like rural schools or schools that have lower PLE passing rates (Figure 5.7 & 5.8). For example, schools from all four quartiles of national-level performance on the PLE performed within 0.5 correct subtraction problems per minute from the overall sample average. In terms of region, the schools in the Southern province were the highest performing schools at baseline on subtraction problems, but the gap between them and the lowest performing schools — those in the Northern province — was less than 1.5 problems per minute. This pattern is consistently replicated across other numeracy skills, and other subjects, like Kinyarwanda and English. In short, the low levels of performance were found across the board, and there was no real subgroup of schools that was achieving strong levels of proficiency on foundational literacy and numeracy skills before the start of the programme.

Figure 5.7: Mean English Reading Fluency, by School Characteristics

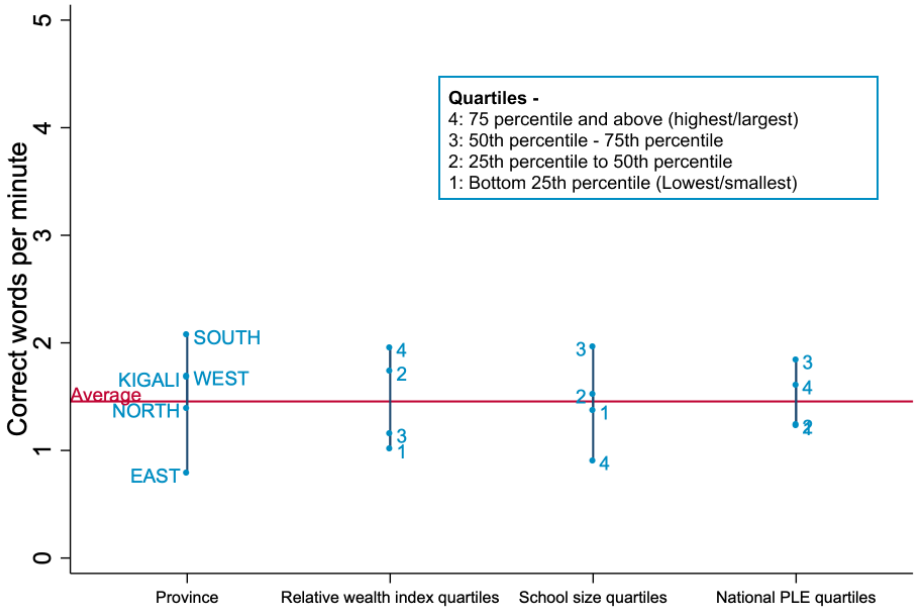
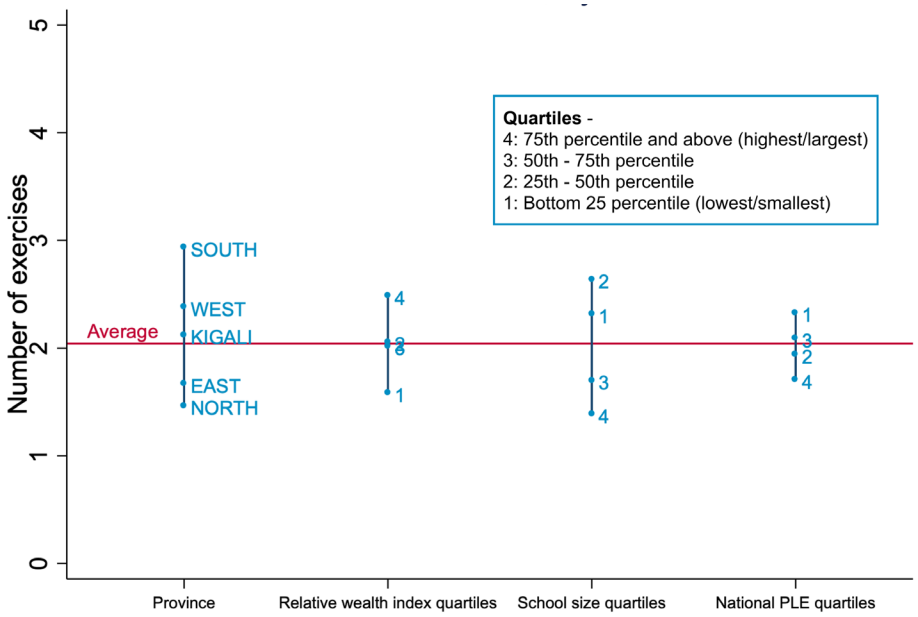


Figure 5.8: Mean Score in Level 1 Subtraction, by School Characteristics



The fact that the majority of pupils were falling behind on foundational literacy and numeracy is not a failure of the pupils, but rather a failure of the system. An education system that does not ensure that all of its pupils master foundational learning, and yet expects them to perform well on a high-stakes assessment at the end of primary school, is an education system that is not coherent, is misaligned with learning, and is unable to provide its pupils with the opportunity to realise their full potential — in spite of the large efforts and resources that stakeholders within the system might be individually devoting to it.

The Comparison and Treatment Schools Started with Similar Levels of Performance

Using the baseline data on learning outcomes and the census data with school-level characteristics, the characteristics of the 30 RwandaEQUIP ("treatment") schools and the 30 non-RwandaEQUIP ("comparison") schools were compared before the rollout of the programme to ensure that these groups are alike (Table 5.1).

Indeed, we find that these two sets of schools resemble each other on most characteristics remarkably well. For instance, the average treatment school has approximately 1,353 pupils and 27 teachers, only 44 more pupils and 1 more teacher than the average comparison school. Similarly, they performed almost at precisely the same level in terms of addition, subtraction, Kinyarwanda reading fluency and comprehension, and English reading fluency and comprehension. This is not surprising, given that the sampling strategy was designed to ensure that treatment and comparison schools resembled each other. However, it is still a reassuring fact to reinforce the sense that when comparing outcomes at the end of the school year, treatment and comparison schools would have had similar levels of performance if neither had received the programme.

Another important fact that emerges from the census data is that the 30 treatment schools selected for this study resemble the set of 100 schools where RwandaEQUIP was rolled out during Year 1[14]. In other words, a group of 30 schools was selected that will be statistically representative of what happens in other schools in the programme as well, and of what would have happened in comparison schools had they received the programme.

[14]For more information about these comparisons, please see Appendix Table 1.5.1.

Table 5.1: Comparison of 30 RwandaEQUIP Schools Versus 30 Comparison Schools Used for this Study

Baseline characteristics		Comparison schools	Treatment schools
Community, school, and teacher characteristics	Population density in 5-km radius	1316.5	1300.6
		(1694.8)	(1507)
	School is in urban area	20.0%	23.3%
		(0.4)	(0.4)
	Total number of pupils (according to SDSM)	1309.6	1353.3
		(270.2)	(342.9)
	Number of teachers (according to census)	25.9	26.7
		(5.8)	(6)
	Pupil-teacher ratio	51.6	51.2
		(9.8)	(8.4)
	Average teacher English fluency (cwpm)	94.9	95.2
		(8.2)	(5.9)
	PLE passing rate	81.7%	83.6%
		(0.1)	(0.1)
	Number of usable classrooms	17.7	19.7
		(5.8)	(5.8)
	School has internet connectivity	100.0%	96.7%
		-	(0.2)
Kinyarwanda achievement	Writing assessment (% correct)	26.1%	23.9%
	(P1-P2)	(0.3)	(0.3)
	Reading fluency (correct words per minute)	15.6	15.9
	(P1-P3)	(17.2)	(17.2)
	Reading comprehension (% correct)	35.6%	34.8%
	(P1-P3)	(0.4)	(0.4)
English achievement	Letter names (number correct)	2.2	1.5
	(Nursery-P2)	(6.0)	(4.2)
	Reading fluency (correct words per minute)	2.0	1.8
	(P1-P2)	(4.8)	(5.6)
	Reading comprehension (% correct)	0.6%	0.6%
	(P1-P2)	(0.0)	(0.0)
Numeracy achievement	Addition problems - level 1 (number correct)	2.8	2.7
	(Nursery-P2)	(3.3)	(3.7)
	Subtraction problems - level 1 (number correct)	2.0	2.2
	(Nursery-P2)	(3.1)	(2.9)
	% Multiplication problems correct (% correct)	19.6%	18.9%
	(P2)	(0.2)	(0.2)

VI. Achievements During the First 17 Weeks of the Programme

Extraordinary Gains in Foundational Learning

During its first 17 weeks of operation, the RwandaEQUIP programme produced very large, positive effects on foundational Kinyarwanda and English literacy and numeracy (FLN) outcomes. RwandaEQUIP schools had significantly higher outcomes than a carefully constructed comparison group of schools, selected based upon similar performance levels prior to the programme. The figures below (Figures 6.1-6.3) show improvement trajectories for each of the three performance assessments used within this measurement and evaluation plan:

Figure 6.1: Improvement in LEGRA Proficiency in RwandEQUIP Schools in Year 1

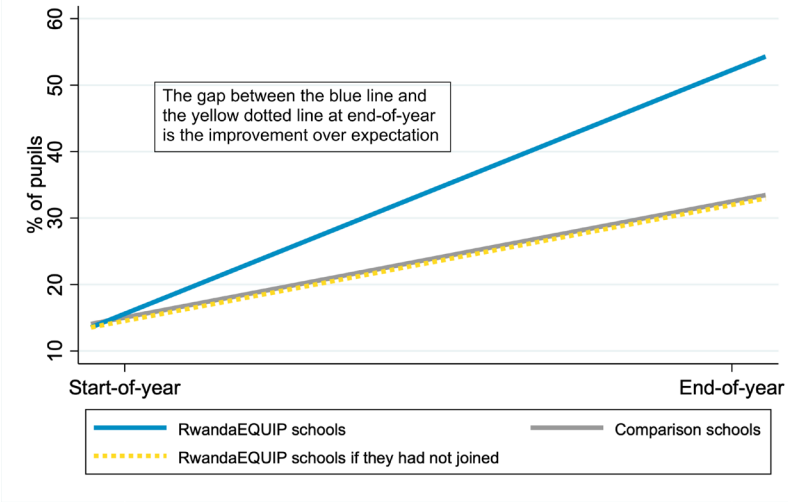


Figure 6.2: Improvement in EGRA Proficiency in RwandaEQUIP Schools in Year 1

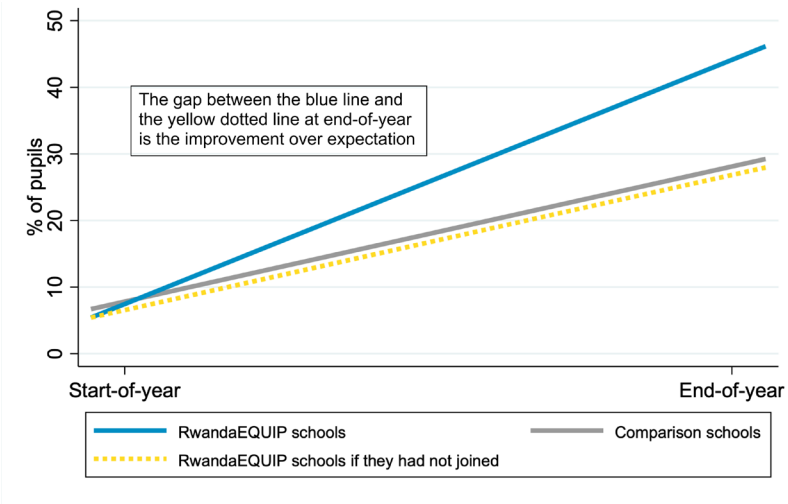
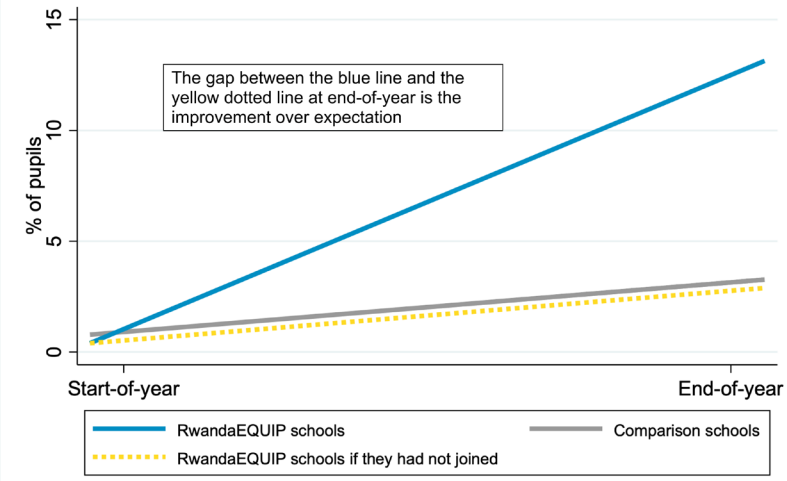


Figure 6.3: Improvement in EGMA Proficiency in RwandaEQUIP Schools in Year 1



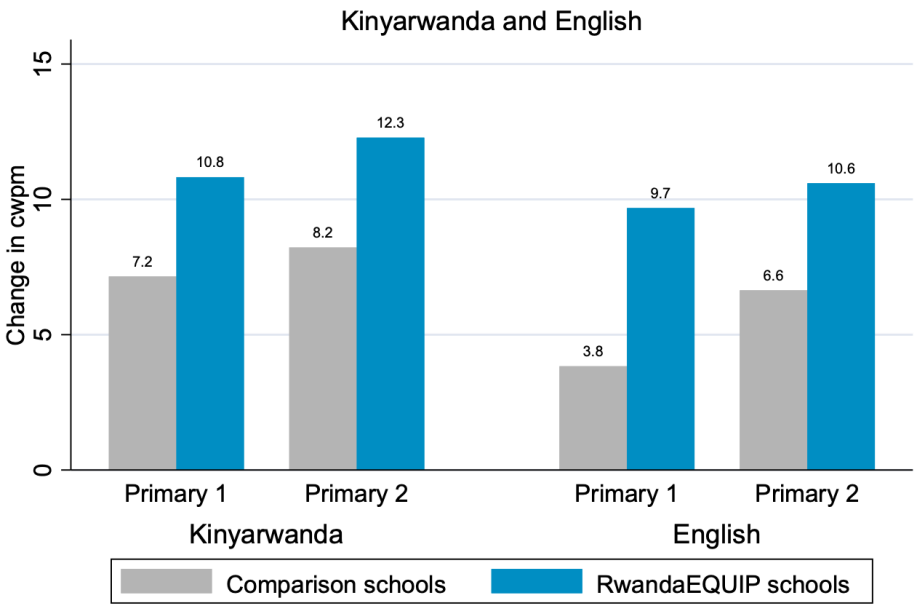
Notes: LEGRA refers to the Local Early Grade Reading Assessment, which measures early literacy in Kinyarwanda, and EGRA refers to the Early Grade Reading Assessment, which measures early literacy in English. EGMA refers to the Early Grade Mathematics Assessment, which measures early numeracy, and "proficiency" is measured using thresholds agreed upon by the RwandaEQUIP and NESA teams in the initial Measurement and Evaluation Plan. More specifically, for LEGRA, official guidelines were followed for proficiency, where a pupil is classified as proficient in Kinyarwanda in their respective grades if they score: P1: at or above 10 cwpm, and at 60% or higher on reading comprehension, P2: at or above 25 cwpm and at 60% or higher on reading comprehension, P3: at or above 40 cwpm and at 80% or higher on reading comprehension. For English, the EGRA fluency thresholds were halved, and for Pre-primary, it was defined as at or above 33.3% on oral vocabulary. Finally, for EGMA, proficiency was defined as pre-Primary: 50% on number identification, and 50% on number discrimination. P1: 60% on both addition and subtraction exercises, level 1 as defined in the assessments. P2: 60% on both addition and subtraction exercises, level 2 as defined in the assessments.

These graphs (Figure 6.1–6.3) display two key insights. First, RwandaEQUIP and comparison schools had similar proficiency levels in foundational Kinyarwanda and English literacy and numeracy before the start of the programme, and as such, it seems likely that in the absence of the RwandaEQUIP programme, both sets of schools would have followed similar improvement trajectories. Second, the "programme effect" is the difference between pupil performance in RwandaEQUIP schools (blue line) and their estimated performance in the absence of the programme (dotted yellow line), which is in turn based on the growth in pupil performance in comparison schools (grey line) and the starting point of RwandaEQUIP schools. The visual gap between the blue line and the dotted yellow line represents the "difference-in-differences" model previously explained in the methodology section. As these figures display, the differences between both types of schools are large — RwandaEQUIP pupils demonstrated 64% better performance for literacy in both languages and over threefold better performance for numeracy.

These effects are visible in concrete sub-skills within each assessment, highlighting the fact that they are not an artefact of how "proficiency" is measured, but rather, of actual improvements in pupils' learning outcomes (Appendix Table 1.6.1-1.6.3). For example, Primary 1 and Primary 2 pupils in RwandaEQUIP and comparison schools were able to read 1.5 correct words per minute (cwpm) in English at the start of the programme. By the end of the first school year, RwandaEQUIP pupils were reading 11.5 cwpm, compared to 7 cwpm for comparison pupils. This treatment effect, 4.8 cwpm in only 17 weeks, is 72% higher than where treatment pupils would have been without the programme. These remarkable gains are also observed in other sub-skills: 115% in reading unfamiliar words (a measure of decoding abilities), 107% in reading familiar words (a measure of both decoding skills and pupils' repository of "sight words"), and 150% in reading comprehension (the ultimate goal of "literacy").

RwandaEQUIP pupils experienced significant learning gains in Kinyarwanda. Their growth rate was twice that of pupils in comparison schools — approximately 9.2 words per minute faster across Primary 1 through Primary 3 (Figure 6.4).

Figure 6.4: Reading Fluency in Kinyarwanda and English



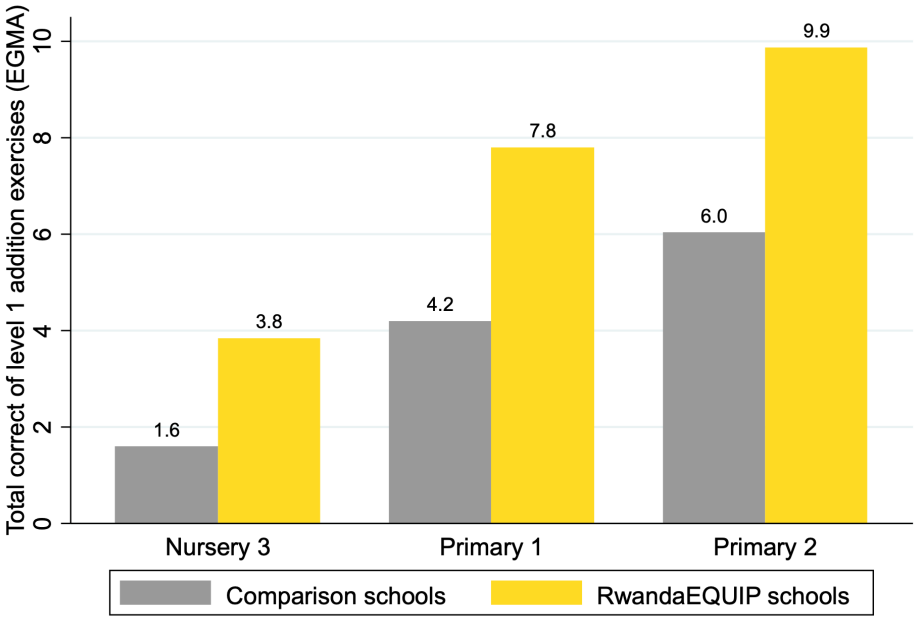
The programme has significantly accelerated pupils' learning — producing over a year's worth of progress in its first 17 weeks in certain sub-skills, as demonstrated by RwandaEQUIP Primary 1 pupils who surpassed the English fluency levels of comparison school Primary 2 pupils. These results suggest gains achieved in English did not come at the expense of progress in Kinyarwanda. In turn, the unofficial language of instruction in many comparison schools is likely to still be Kinyarwanda, meaning that pupils in comparison schools are getting more instruction in Kinyarwanda than pupils in the RwandaEQUIP programme. Therefore, the reason why pupils in RwandaEQUIP schools are becoming more proficient in Kinyarwanda cannot be because they are getting more instruction in this language — they are not — but rather, because of the higher quality of instruction during the reduced amount of official instructional time in Kinyarwanda. In all, these results speak to the fact that high-quality instruction can simultaneously provide higher learning outcomes than business-as-usual education in both languages, and that it might matter more than the amount of instructional time received in one language or the other.

> "When using the method students can easily understand and follow up especially with Kinyarwanda."

Nizeyimana Jean De Dieu, G S Muhondo, Kinyarwanda and Social Sciences teacher.

In early numeracy, we observe that the RwandaEQUIP programme had similarly large effects across the board. For instance, after only 17 weeks of the programme, Primary 1 pupils in RwandaEQUIP are now better at solving simple addition and subtraction problems than Primary 2 pupils in comparison schools. This amounts to an almost five-fold acceleration in the pace of learning in numeracy. This pattern is observed across other skills as well, as we see that pupils are 85% better at solving simple subtraction problems, 27% better at solving simple multiplication problems, and 43% better at solving division problems than they would have been had they not joined the programme (Figure 6.5).

Figure 6.5: Foundational Numeracy, End of the School Year



> “Only 40 days in the programme and you can already see improvements, it is amazing. It has already helped students.”

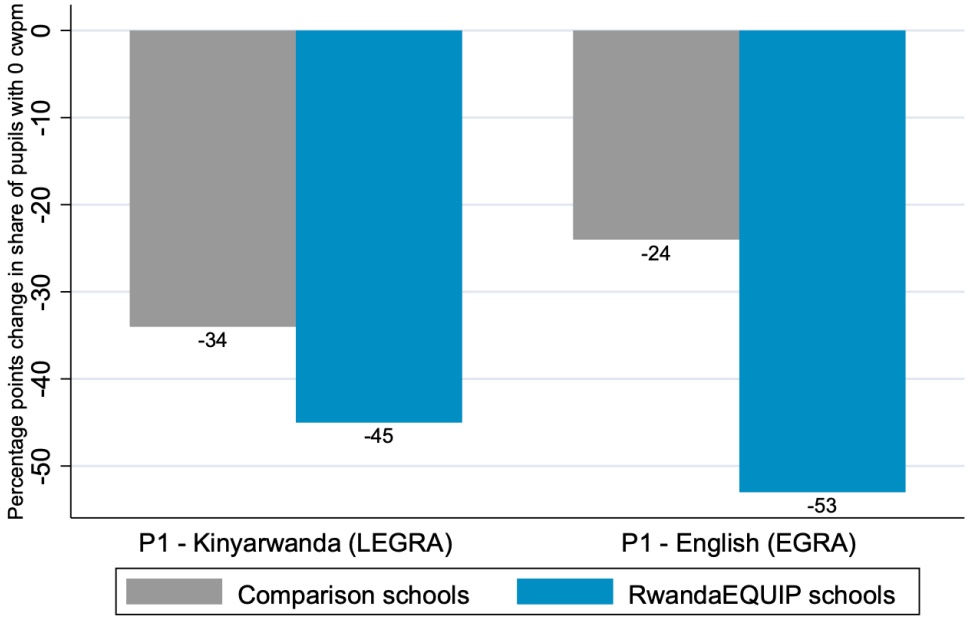
Habumugisha Leonidace, GS Nyarubuye, Math teacher.

The large magnitude and swiftness of these learning gains bode well for both child development and the broader strengthening of educational systems. Stronger foundational learning is correlated with higher incomes in adulthood, greater educational benefits for the next generation, better health outcomes, higher agricultural productivity, and higher civic engagement. Having pupils who can perform foundational skills well initiates a virtuous cycle of still-deeper learning and can also benefit learning in other subjects, raising the potential ceiling of overall learning outcomes at a system-wide level.

The Share of Non-Readers in Kinyarwanda and English in Primary 1 also Decreased Rapidly as a Result of RwandaEQUIP

RwandaEQUIP is particularly effective for the lower-performing pupils, specifically, for early non-readers — those reading 0 correct words per minute. At the end of Primary 1, comparison schools had twice as many non-readers as RwandaEQUIP schools (Figure 6.6). During the programme's first 17 weeks, the share of Primary 1 non-readers in Kinyarwanda decreased by 30% more than the number of non-readers in comparison schools. In English, the number of non-readers in RwandaEQUIP Primary 1 decreased by 53 percentage points in RwandaEQUIP schools, compared to a 24 percentage points decrease in comparison schools.

Figure 6.6: Change in the Share of Primary 1 Pupils Who are Non-Readers (0 Cwpm) in Kinyarwanda and English



Decreasing the share of non-readers is not only beneficial for this group of pupils, but could further benefit other pupils as well. By moving the lowest performing pupils up and narrowing the spread between low performers and high performers, teachers can now teach more effectively, as it is pedagogically easier to teach a more homogeneous class than a class that varies greatly in pupil levels.

> "The programme is good. Now, students can speak more. Before, they could try to write, but now they can even try speaking"

Philip Maniragena, G S Nyinawimana, P4 Teacher.

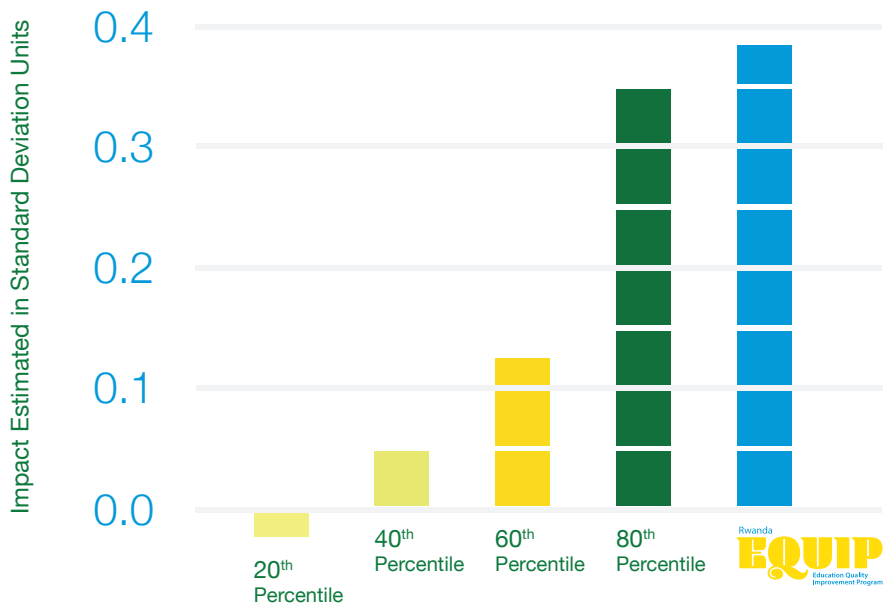
How Does the Size of These Effects on Foundational Literacy and Numeracy Stack Up Against Other Studies in Low- And Middle-Income Countries?

A natural question on the comparative size of the effects on foundational literacy and numeracy arises given the substantial gains measured in the natural units of each assessment. Just how large are these gains relative to what other programmes in similar contexts have achieved?

To answer this question, researchers translate learning impacts into "standard deviation" units (SD). This allows readers to compare the relative effect sizes. Evans and Fei (2022[15]) compared experimental and quasi-experimental education studies in low- and middle-income countries and ranked the effect sizes from over 230 studies. The RwandaEQUIP impact is larger than 90% of the studies compared by Evans and Fei.

For foundational literacy and numeracy skills, we aggregate all the sub-skills and gains within each of the three main assessments: LEGRA, EGMA, and EGRA. As Appendix tables 1.6.4-1.6.6 show, the aggregate effect size for LEGRA is 0.33 SD, and for both EGRA and EGMA it is 0.39 SD. The average effect of the RwandaEQUIP programme on foundational literacy and numeracy is 0.38 SD. Evans and Fei (2022) identified that the median effect size for studies with similar methodologies, and evaluating educational interventions in low- and middle-income countries, is 0.08 SD. Therefore, the effect of the RwandaEQUIP programme is almost four times the median effect size in international education studies. In fact, this effect size is almost at the 90th percentile effect measured — achieved only during the first 17 weeks of programme implementation (Figure 6.7).

Figure 6.7: Comparison of RwandaEQUIP Effectiveness to Other Studies Around the World



Source: International comparisons taken from Table A1 of Evans, D.K., & Yuan, F. 2022. How Big Are Effect Sizes in International Education Studies? CGD Working Paper 545. Washington, DC: Center for Global Development.

[15]Evans, D. K., & Yuan, F. (2022). How Big Are Effect Sizes in International Education Studies? Educational Evaluation and Policy Analysis, 44(3), 532–540. https://doi.org/10.3102/01623737221079646


yam

Comparing RwandaEQUIP's Learning Gains to Global Standards Highlights Significant Educational Improvement, Enabling Programme Schools to Leapfrog their Peers in Other Countries

The learning gains in foundational literacy achieved through the RwandaEQUIP programme are large both in terms of absolute effects and relative to other interventions in similar contexts. Importantly though, they also translate into meaningful and tangible effects on policy-relevant metrics such as "learning deprivation". Learning deprivation is defined as the share of children who are below the minimum proficiency level, according to the Global Alliance to Monitor Learning (World Bank[16]). More specifically, in the case of the current report, learning deprivation metrics are in line with the Sustainable Development Goal (SDG) 4.1.1.a, which measures the share of children who are unable to read a simple passage with comprehension by the age of 10.

Within the context of RwandaEQUIP, the learning deprivation rate can be calculated by focusing on the reading comprehension skills in Kinyarwanda of Primary 3 pupils — the sub-group of pupils closest to the age group for which international comparison data are available, and for which there is an externally developed threshold for "reading proficiency". For this sub-sample, the learning deprivation metric can be mapped through two different approaches: i) using the reading comprehension outcomes on LEGRA, and setting a threshold of 80% in keeping with the spirit of "reading a simple text with comprehension", and ii) following the external recommendation[17] of 41 cwpm as a threshold for reading proficiency in Kinyarwanda[18].

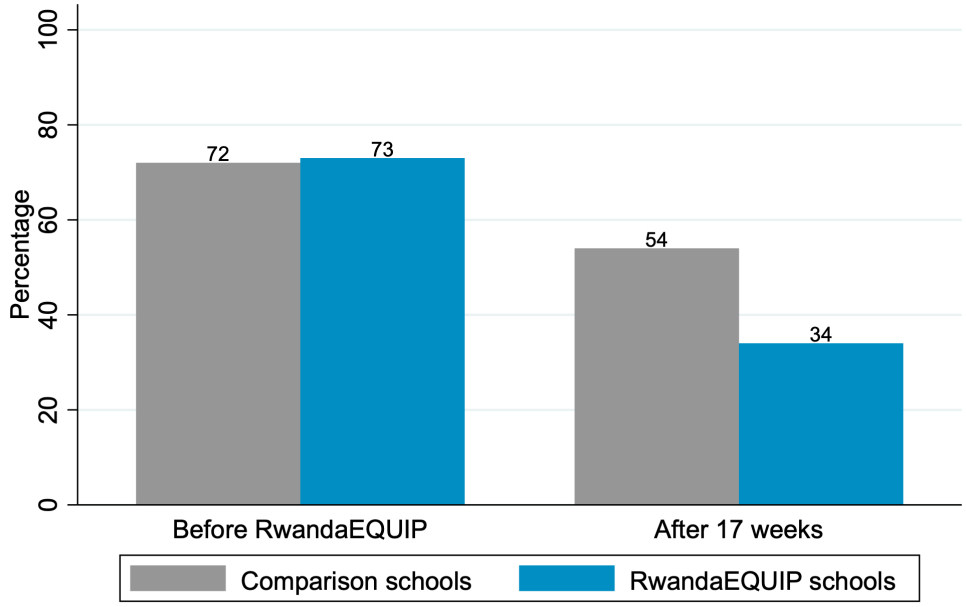
[16]Azevedo, J.P. (2020.) Learning Poverty : Measures and Simulations. Policy Research Working Paper; No. 9446. © World Bank, Washington, DC. http://localhost:4000//entities/publication/18a7915f-736b-54c5-a3bf-f76dd9f92eb5 License: CC BY 3.0 IGO.

[17]EducationLinks. (2019.) Rwanda Pilots an Improved Benchmarking Method. Retrieved from https://www.edu-links.org/learning/rwanda-pilots-improved-benchmarking-method

[18]While this report uses the externally defined threshold as its main outcome, they both deliver qualitatively similar outcomes, with similarly large effects.

The RwandaEQUIP programme led to a decrease of 21 percentage points in the share of pupils who are classified as experiencing "learning deprivation", in line with Sustainable Development Goal (SDG) 4.1.1.a. More specifically, both treatment and comparison schools displayed a learning deprivation rate of 73% at baseline. By the end of Primary 3, 54% of all pupils in comparison schools were classified as experiencing learning deprivation, while only 34% of Primary 3 pupils in RwandaEQUIP schools were in this category — despite the fact that both groups of schools displayed nearly identical rates at baseline. In other words, the RwandaEQUIP programme cut learning deprivation by 38%[19] in only 17 weeks of the programme (Figure 6.8).

Figure 6.8: Decrease in Learning Deprivation Rate for RwandaEQUIP Primary 3 Pupils

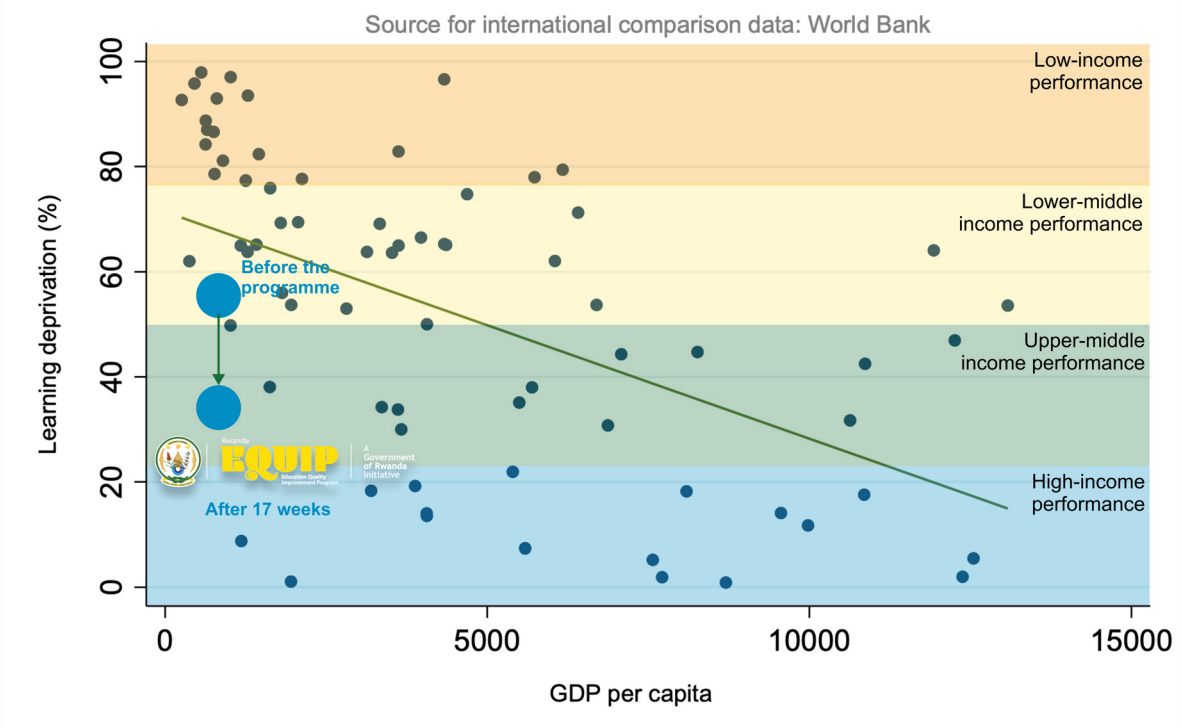


These gains can also be placed on a global scale to understand the magnitude of the transformation achieved by the programme in only 17 weeks. To do so, we leverage publicly available data by the World Bank on learning deprivation outcomes across countries. Although the comparable international data is only available for end-of-primary pupils (in line with SDG 4.1.1.b, not SDG 4.1.1.a), we use this in the absence of other publicly available data for a more similar age group — while also noting that this comparison might understate the magnitude of the gains and also exaggerate the low performance on the initial ranking of these schools.

RwandaEQUIP schools went from having a learning deprivation rate similar to countries like India or Bangladesh, ranking around the 80th position globally out of 114 countries for which data are available, to being closer to countries like Qatar or Indonesia around the 61st position (Figure 6.9). In this sense, not only is the RwandaEQUIP programme delivering large learning gains relative to comparison schools in the Rwandan context, but it is also allowing Rwanda to achieve educational outcomes similar to those of countries with relatively high levels of development.

[19]The comparison group went from 72% at baseline to 54% at the end of the year, establishing a business-as-usual reduction of 18 percentage points. Since the treatment group started at 73%, the expected outcome for the treatment group was 55%. Instead, they ended the school year at 34% — 21 percentage points lower than expected. Therefore, 21% (the decrease achieved by RwandaEQUIP)/55% (the expected outcome for the treatment group) = 38%.

Figure 6.9: Learning Deprivation in RwandaEQUIP Compared to Other Low- and Middle-Income Countries



The Programme Changed Teacher Behaviour for the Better

Teacher Attendance

The RwandaEQUIP programme improved teacher performance on at least two fronts. First, the RwandaEQUIP programme increased teacher attendance and reduced teacher tardiness. During the first three weeks of the programme, teacher attendance was 66%. By the last three weeks of the programme, it had increased to 83% — a 17 percentage point increase[20]. Therefore, the teacher absenteeism rate was cut by half (from 34% to 17%) in only 17 weeks. This increase is comparable to other studies in low- and middle-income countries, with interventions that were solely designed as a way to improve teacher attendance. In the case of RwandaEQUIP, head teachers have noticed this change:

> “It used to be terrible before. Teachers used to miss work several days per month, but now absenteeism is low.”

Ntindendereza Jeanine, G S Gakiri, Head Teacher.

Improving teacher attendance increases instructional time. In a typical 180-day school year, better attendance results in 30 additional days of instruction for pupils. During a typical primary pupil’s six years, a higher teacher attendance rate means their teacher is present for one full additional school year.

There are many possible explanations for this change, ranging from improved motivation, due to the constant support and reinforcement that they receive, to increased accountability offered by the technological platform on which RwandaEQUIP is built:

> “This has been helpful, it was hard for me before to keep track of teachers. But, this technology has helped, teachers are no longer late.”

Ntindendereza Jeanine, G S Gakiri, Head Teacher.

[20]Teacher presence is measured through the technological platform when teachers have an arrival time. When teachers do not have an arrival time, they are marked as absent. If at the beginning of the programme, the take-up of the technological platform was slower, then more teachers might be marked absent because they did not have an arrival time, and not because they were not present. To minimise the concerns that this might be driving this increase in perceived teacher attendance, we conduct different robustness checks. First, we vary the “baseline period” to allow for more time to adopt the technology, finding similar results. Second, we can include as “absent” only those actively marked as absent by head teachers, and again find a significant increase in teacher attendance — even if the sample is changing over time by having more head teachers use this functionality over time, likely making the initial value an underestimate, and again, pointing towards large increases in teacher presence. Third, additional qualitative data suggests that head teachers have indeed noticed an improvement in teacher attendance. Finally, when teachers do not log into their devices, they cannot receive RwandaEQUIP lessons, and while this is not a measure of teacher absenteeism, it is a measure of instructional quality of pupils. In sum, we have a high degree of confidence in the fact that the RwandaEQUIP programme led to a large increase in teacher attendance, and amount of high-quality instructional time received by pupils.

A teacher's main function is inside the classroom, and, as such, teacher absenteeism can be conceptualised as a "fiscal burden" — where governments are using public funds to cover salaries for teachers who are partially failing to fulfil their duties. Researchers in other contexts like India[21] or Tanzania[22] have attempted to quantify the magnitude of the fiscal burden posed by teacher absenteeism as a way to put into perspective the magnitude of the problem not just for education, but for national welfare more broadly.

To quantify the fiscal burden of teacher absenteeism, researchers have previously used data from statistically representative samples of teachers to understand what portion of the time the average teacher is expected to be absent from the classroom. Then, this number[23] would be multiplied by their annual salary to answer the question: what share of the public expenditure for teacher salaries is not being invested in the classroom due to teachers not coming to school?

[21]Muralidharan, K., Das, J., Holla, A., & Mohpal, A. (2017). The fiscal cost of weak governance: Evidence from teacher absence in India. Journal of Public Economics, Elsevier, vol. 145(C), 116-135.

[22]Schipper, Y., Rodriguez-Segura, D. (2022). Teacher incentives and attendance: evidence from Tanzania. RISE Programme Working Paper 22/121. https://doi.org/10.35489/BSG-RISEWP_2022/121

[23]In our case, we do not have access to teacher attendance data before the programme — we only have data for teacher attendance once the programme started. As such, any estimates of teacher absenteeism that we present "pre-RwandaEQUIP" are likely already overestimates —if one assumes that the programme has positive effects on teacher attendance— as teachers would have already been trained with the RwandaEQUIP methodology. However, a major strength in our case is that we do have highly reliable teacher attendance data for all teachers, and therefore, can pinpoint with higher precision the patterns in teacher attendance over time for teachers within the RwandaEQUIP programme. Furthermore, we have data on teachers' arrival and departure times, and as such, we can also use this information to derive a more precise and strict definition of "teacher absenteeism", which quantifies what share of these teachers are in school during the expected period of time.

During the first three weeks of the programme, we observed that teachers came to school approximately 66% of the time when they were expected to. Again, this figure is likely already up from the time of purely pre-RwandaEQUIP, but in the absence of more data for these specific schools, this serves as our baseline. If the average teacher in Rwanda makes an annual salary of approximately USD 630 (Leaver et al., 2021[24]), then during the first weeks of the programme, teacher absenteeism basically implied that USD 214 (or roughly RWF 220,000) of these funds were not being effectively spent to yield a return on investment for educational outcomes. Since there were roughly 3,042 teachers within the programme this first year, this implied a total burden of teacher absenteeism of over USD 650,000 only in the 100 RwandaEQUIP schools "before" the programme. When using the stricter definition of teacher absenteeism, this number increases to over USD 1,100,000.

How can these numbers be put into perspective to understand the magnitude of this issue? According to the World Bank, Rwanda spends, on average, 4.3% of its GDP per capita on each pupil in primary school, or approximately USD 34 per pupil. The total fiscal burden of teacher absenteeism at the outset of the RwandaEQUIP programme means that, for instance, if these funds were hypothetically redirected elsewhere, pupil investment could have been doubled for 19,164 – 34,384 pupils, or between ⅛ to ¼ of all pupils in the RwandaEQUIP programme.

Table 6.1: Estimated Reduction in the Fiscal Burden of Teacher Absenteeism

	% Teachers Present	% Teachers Arrived and Departed on time
First three weeks of the programme	66%	39%
Last three weeks of the school year	83%	66%
Gain in teacher attendance	+17%	+27%
Number of teachers in the programme, Y1	3042	
Average annual salary (USD)	630	
Fiscal burden of absenteeism before the programme	651,596	1,169,041
Reduced fiscal burden of absenteeism (USD)	-325,798	-517,444
Reduced fiscal burden of absenteeism (RWF)	-337,852,733	-536,589,635
Percent reduction of total fiscal burden of teacher absenteeism	50%	44%

Notes: Exchange rate is 1037. Source for salary[25]

Throughout the first year of the programme, we observed a marked increase in the rates of teacher attendance. By the end of the first school year, teachers were coming to school 83% of the time — a complete halving of the teacher absenteeism issue. The rate at which teachers came to school and left at the expected times increased 27 percentage points — a 70% increase from its

[24]Leaver, C., Owen, O., Pieter, S., & Andrew, Z., (2021). Recruitment, Effort, and Retention Effects of Performance Contracts for Civil Servants: Experimental Evidence from Rwandan Primary Schools. American Economic Review, 111 (7): 2213-46.

[25]Leaver, C., Owen, O., Pieter, S., & Andrew, Z., (2021). Recruitment, Effort, and Retention Effects of Performance Contracts for Civil Servants: Experimental Evidence from Rwandan Primary Schools. American Economic Review, 111 (7): 2213-46.

baseline of 39%. This large improvement in teacher attendance does not come as a surprise, as the technological platform on which the RwandaEQUIP programme is based facilitates the visibility and tracking of teacher engagement:

> "It is easy to monitor teacher attendance through the smartphone."

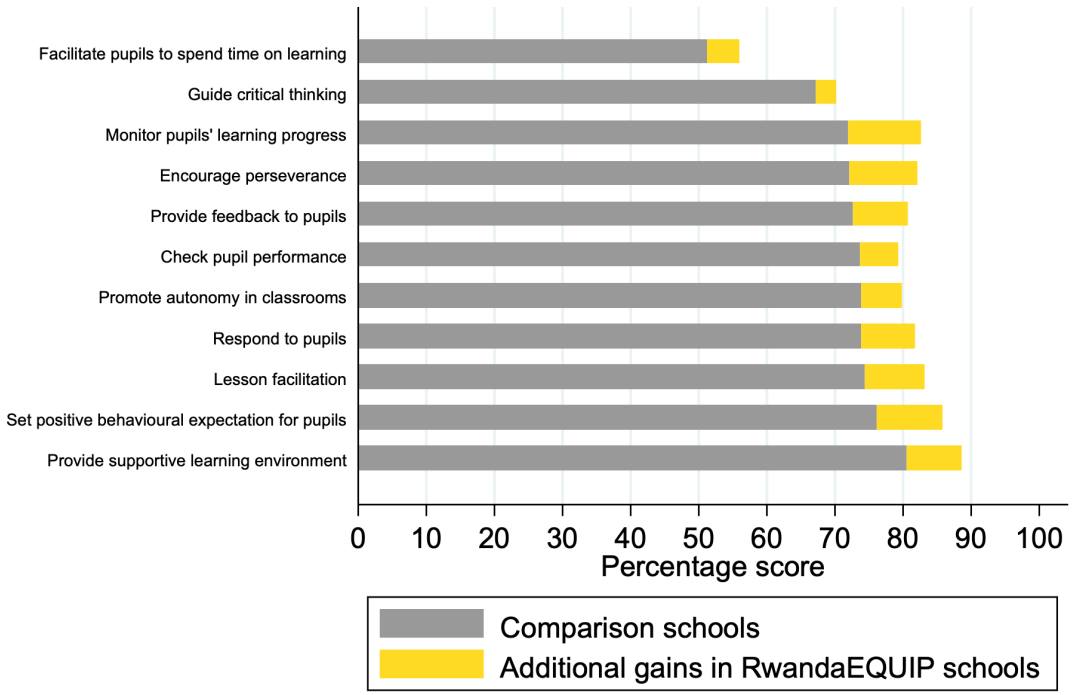
Theoneste Benimana, Head Teacher, Bumba

More tangibly, these increases in teacher attendance meant that the magnitude of the fiscal burden of absenteeism decreased by between USD 326,000 – 517,000. In other words, RWF 338 – 537 million of the government's public funds — before the RwandaEQUIP programme — were being foregone due to lower teacher attendance, but are now being effectively spent on education.

Lesson Delivery

These increases in teacher attendance rates do not imply that pupils were simply getting more of the previous type of instruction. Besides the fact that teachers were spending more time at school, their instructional practices improved significantly relative to the comparison group. Using classroom observations via an adapted version of the Teach tool, we quantify how different instructional practices that affect pupil learning progressed in treatment and comparison schools (Figure 6.10).

Figure 6.10: Difference in Teacher Practice Between RwandaEQUIP and Comparison Schools at Midline




Activity Book
Activity Book

Gains are seen in a wide range of skills and practices in the classroom. For example, "monitor pupils' learning progress" improved by 11 percentage points — which is important, as this category encompasses 1) using questions or prompts to check pupils' understanding, 2) monitoring pupils during independent and group work, and 3) adjusting teaching to the level of the pupils.

The Amount of High-Quality Instructional Time that Pupils Received Increased More than Threefold, Improving the Return on Investment in Education for the Government of Rwanda

The RwandaEQUIP programme has spurred positive system-wide transformation. As documented before, the programme has improved teacher attendance and pedagogical practices. Moreover, the rate at which teachers were successfully completing the RwandaEQUIP lessons as they were intended to be delivered increased from 17% during the first three weeks of the programme to 61% by the last three weeks of it. Even pupil attendance improved from 76% to 84% over this period.

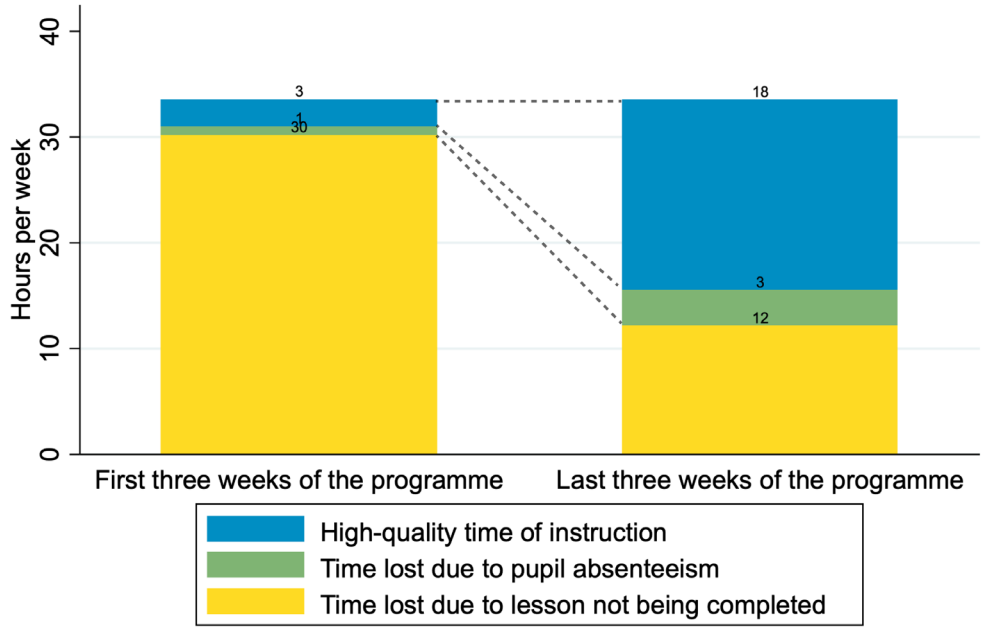
In other words, throughout the first year of operations of the RwandaEQUIP programme, teachers were more likely to be in school, completing high-quality lessons and using better pedagogical practices, and pupils were more likely to attend school. In aggregate, we would expect all of these improvements to have a positive impact on the amount of high-quality instructional time that pupils receive. In order to quantify this improvement, one can assume that the average Rwandan school day for a single-shift school is scheduled to complete 6.7 hours of instruction per day, or 33.5 per week. Before, only 17% of the lessons were completed and pupils would only be there 76% of the time — leading to roughly 4.3 hours of high-quality instruction delivered per week. At the end of the first year of the RwandaEQUIP programme, 61% of the lessons were successfully completed and pupils were present 84% of the time — leading to roughly 17.1 hours of high-quality instruction delivered per week to the average pupil in the programme (see Appendix Table 1.6.7).

> “You can see even when you enter a classroom, students are more active compared to before.”

Buregeya Salomon, G S Nyinawimana, Director of Studies

In other words, the amount of high-quality instructional time that the average pupil receives increased from 4.3 hours during the first three weeks of the programme to 17.1 hours during the last three weeks of the first school year — as such, the average pupil is now experiencing 4 times as much high-quality instruction as compared to before the programme (Figure 6.11). Even this estimate does not take into account two facts: 1) the transition to single-shift (explained later in this report), which is also underestimating the increase in instructional time, and 2) the fact that lessons are, qualitatively, much higher quality and better organised than before. Through this lens, the large and quick learning gains on foundational literacy and numeracy documented before are not surprising: the dosage of instruction —the “opportunities to learn”[26,27] — for pupils are getting much higher than before, both in terms of quantity and quality.

Figure 6.11: Throughout the School Year, the Average Pupil Tripled their Exposure to the Amount of High-Quality Instructional Time



For the government, these results should come as welcome news: the return on the investment of public funds devoted toward education is now much higher as a result of the RwandaEQUIP programme. In other words, the RwandaEQUIP programme is magnifying the impact of previous investments and commitments to education by delivering better performing teachers and pupils who are learning significantly more than before.

[26]Reeves, C., Major, T. (2012). Using pupil notebooks to measure opportunity to learn in Botswana and South African classrooms. Prospects. 42(4) DOI:10.1007/s11125-012-9249-3

[27]Reeves, C., Carnoy, M., Addy, N. (2013). Comparing opportunity to learn and pupil achievement gains in southern African primary schools: A new approach. International Journal of Educational Development 33(5):426–435 DOI:10.1016/j.ijedudev.2012.12.006

The Quality of Implementation Mediated the Gains Observed

During its first year of implementation, the RwandaEQUIP programme led to large average improvements on foundational learning outcomes. However, the magnitude of the gains produced by the programme varied upon observance by two key dimensions: geographical region and grade-level. First, we observe that the programme worked relatively better in less urban areas (Appendix Table 1.6.8). Similarly, the programme seems to have significantly larger effects in the Southern and Northern provinces, relative to other places like Kigali (Appendix Table 1.6.9), even after controlling for the differences in the urban/rural make-up of different provinces. For the most part, these regional differences in the effectiveness of the programme widened the initial differences among the RwandaEQUIP schools in different provinces by the end of the first school year (Figure 6.12-6.14).

Figure 6.12: Improvement in Level 1 Addition in RwandaEQUIP Schools at Midline and Baseline

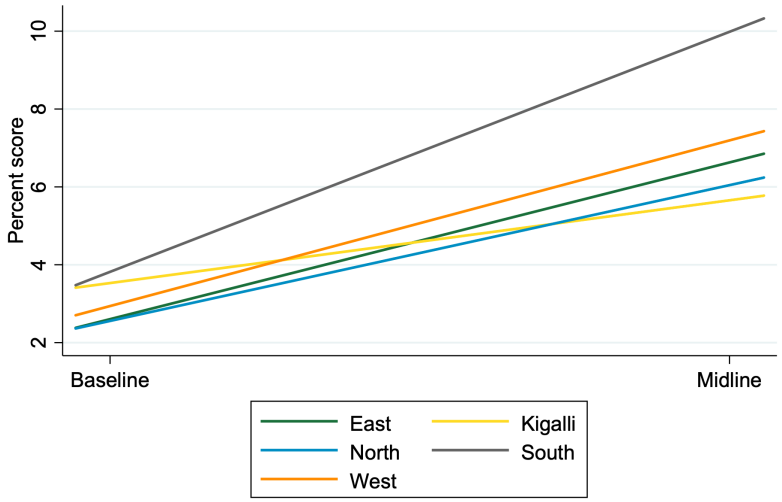


Figure 6.13: Improvement in Kinyarwanda Reading Fluency in Primary 1 in RwandaEQUIP Schools at Midline and Baseline

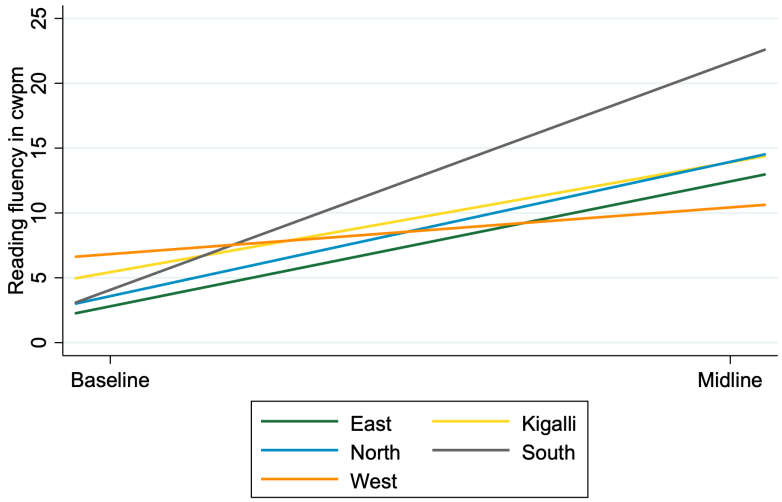
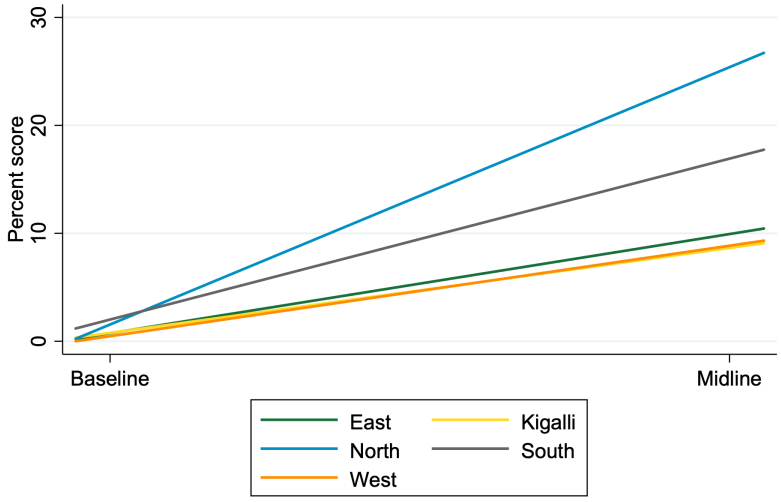
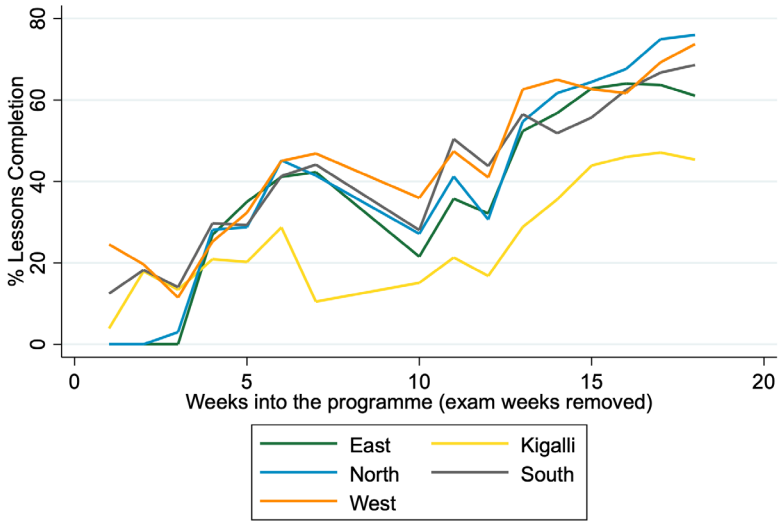


Figure 6.14: Improvement in English Reading Comprehension in RwandaEQUIP Schools at Midline and Baseline



What explains this difference in programme effectiveness across provinces? It has been observed, both quantitatively and qualitatively, that there is a significant difference in the extent of programme engagement and buy-in across the different provinces. For example, there are visible differences in overall lesson completion rates by provinces. Although lesson completion increased over time everywhere, Kigali lagged significantly behind all other provinces throughout the whole year, which could potentially explain the widening gap in learning outcomes (Figure 6.15).

Figure 6.15: Average Lesson Completion Rate in RwandaEQUIP Schools by Region



The other marked difference in programme implementation was between lower primary and upper primary grades. First, the lesson completion rates of lower and upper primary were significantly different. For instance, the Kinyarwanda lesson completion rate was 47% throughout the whole school year for lower primary, while it was only 14% for upper primary (Figure 6.16 & 6.17). These differences in programme implementation also show up in classroom observation data, where most of the gains were driven by lower primary teachers, and upper primary teachers did not adopt better pedagogical practices on average (Appendix Table 1.6.10).

Figure 6.16: Average Lesson Completion Rate in RwandaEQUIP Schools

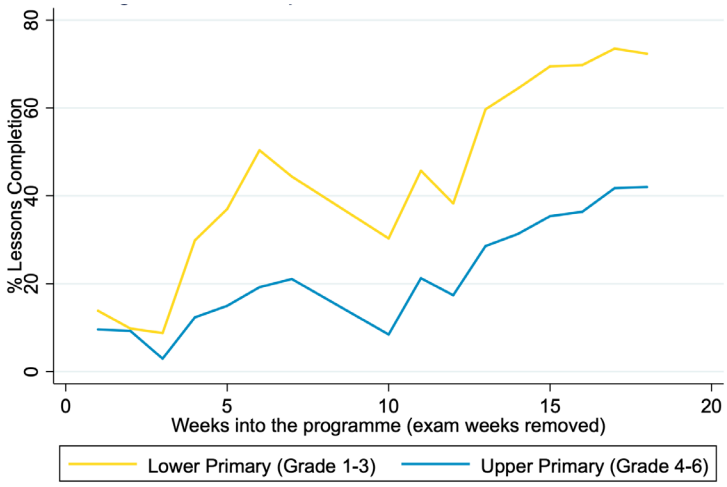
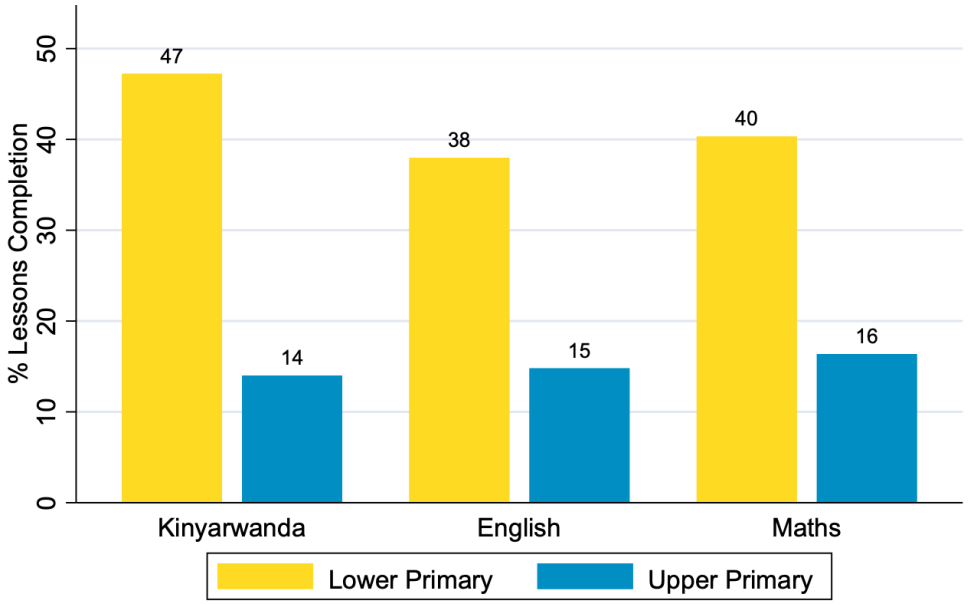
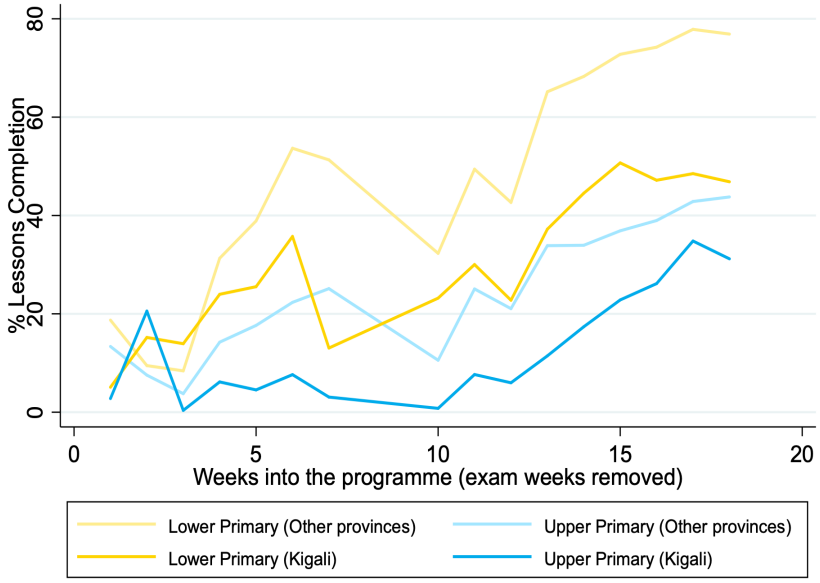


Figure 6.17: Average Lesson Completion Rate in RwandaEQUIP Schools, by Subject



These two issues of differential implementation for certain groups, namely different grades and regions, interact with each other in a way that augments the gap between programme acceptance by school — and as such, the extent to which pupils from different backgrounds can benefit from the programme. As the graph below shows, lesson completion rates within the same grade level were, for the most part, consistently lower in Kigali relative to all other places (Figure 6.18). When lesson completion is broken down both by region and grade-level, these gaps become clear. By the last week of the school year, the average lesson completion rate in lower primary schools outside of Kigali was almost twice that of upper primary schools in Kigali. Even in upper primary grades outside of Kigali, the lesson completion rates were comparable to those in Kigali for lower primary.

Figure 6.18: Average Lesson Completion Rate in RwandaEQUIP Schools




Eye
Nose
Tongue
Tooth


IMIBONERAHAMWE Y
EQUIP

Box 1. School Leaders Matter

A Conversation with Theoneste Benimana from G.S. Bumba

When the RwandaEQUIP team got to G.S. Bumba at around 3:50 pm, the head teacher of the school — Mr. Theoneste Benimana — was diligently working on logistical preparations ahead of the upcoming school year. That day, he needed to enter final marks into his digital records to decide grade-level promotions for all pupils in the school. This was a welcome sight, as we got to Bumba one or two hours after first visiting another school in the area, where the head teacher was nowhere to be found in spite of repeated notices of an upcoming visit, and attempts to reach them after arriving at their school. We never heard back from that first head teacher.

The purpose of our visit was to understand what was making the RwandaEQUIP programme "click" so well in some schools, and why its full implementation was harder in other schools. Therefore, while the numbers and learning assessments in this report can inform how much pupils have improved, it is limited in what it can say about how these improvements came to be. The mere reporting of large increases in English reading fluency, for example, cannot speak to the drive and hard work put in by all those head teachers working tirelessly to make the RwandaEQUIP programme a success in transforming learning outcomes in the country.

Therefore, in order to get more insights about how school leaders can shape the success of the programme, pairs of RwandaEQUIP schools were identified in the same area with some of the largest and smallest gains in learning outcomes. Following the selection of schools, head teachers participated in conversations

with the programme team. Through these conversations, the goal was to understand what it is that they are doing right as they implement the programme, what challenges are holding RwandaEQUIP back from achieving even larger gains, and what feedback they had to keep fine-tuning the programme.

Right around 4:00 pm, we sat down with Mr. Benimana, who promptly took out a notepad with an extensive list of issues he wanted to discuss, in his office. It was clear that he had given this conversation some forethought — and he had the notes to show for it. As the conversation went on, it was also clear that he was tightly in-sync with the programme and what was happening in his school. The deeper we went into his agenda, the more specific the programmatic details that he wanted to discuss: how the change in the language of instruction happened in the classroom, the technical issues

that have gone smoothly and those that have not, and the amount of time that pupils get to practise relative to the overall length of the lectures, among other topics.

To Mr. Benimana, it is apparent that pupils are learning more and are more proficient in English than before: “We have improved the language of instruction. Before we used to teach English but still had to use Kinyarwanda to explain. Now, there’s no need for that, as everything is on the [teacher guide]. Today, we use English only, and learners answer in English only.” The pattern that Mr. Benimana describes is evident in the data too. The average Primary 1–2 pupil in schools in the Northern province — including Bumba — was reading fewer than 2 words per minute in February. By the end of the school year, pupils in Bumba were able to read almost 18 words per minute — beating by over 8 words (80%) the progress observed in comparison schools.

Importantly, in Bumba — as is seen in most other schools — these gains did not crowd out gains in Kinyarwanda, an issue that is often top-of-mind for many parents. As another head teacher in the Northern province said, “The programme is good, especially for teaching English, and parents like it too, but some showed concerns that we are no longer teaching Kinyarwanda properly, since now everything is in English. This is because students go home reciting cheers and songs [in English] that they learn here.”

Yet, the average P1–P3 pupil in Bumba went from scoring a 26% on a reading comprehension test in Kinyarwanda before the programme to scoring 80% at the end of the school year. This is 20 percentage points higher than what pupils in comparison schools achieved, who finished, on average, with a score of 60%. Through the RwandaEQUIP programme, pupils are simultaneously developing stronger literacy skills in both English and Kinyarwanda, relative to pupils in schools outside of the programme.

Mr. Benimana was also keen to highlight that the programme has lightened the more transactional work for teachers, while maximising the time they actually spent engaged in instruction. “Lesson planning is easy for them. Before, we used to write notes with pens on paper before the class, but today, that is not needed. Today, they just use the tablets, and that improves the quality of instruction very much.” This is important, especially in light of the recent Learning Achievement in Rwandan Schools Report by NESA, in which one of the key policy recommendations was to review the workload of teachers, as “teachers urged that students’ performance is low because they do not have time to prepare lessons.” By relieving teachers from the duties associated with lesson planning and exam preparation, the RwandaEQUIP programme ensures that teachers spend more time engaging in high-quality instruction.

But, Mr. Benimana’s long list of issues to discuss was not a cheerleading exercise either. He made sure to also bring up areas that, in his eyes, needed improvement or reconsideration. The most pressing piece of feedback on his agenda was to nudge the programme to use co-teachers' time more wisely. He strongly felt that they were a valuable resource — almost a luxury — which could be better deployed to drive stronger learning gains. He also made sure to vocalise his support for a “specialist” model, where teachers stay in their lane in terms of what subjects they teach, as he said he has witnessed the discomfort of teachers who do not know much about teaching French or Creative Arts struggling to teach those lessons.

According to Mr. Benimana, the success of the RwandaEQUIP programme at Bumba did not come instantly: it took some time and perseverance for teachers to accept the programme and use it widely. For example, at first, teachers struggled with the teacher tablets. So, as the head teacher, Mr. Benimana pitched in as the impromptu, first line of troubleshooting support and helped teachers get set up with the tablets. “Today, nobody comes here to ask for assistance with their tablet.” This increased buy-in into the programme shows up in the data too. The rate at which teachers in Bumba completed their lessons went from 11% during the first four weeks of the programme to 86% during the last four weeks of the 2021-22 school year.

Toward the end of the interview, we revealed to Mr. Benimana why we specifically wanted to visit Bumba — in particular, the impressive implementation of the programme in this school, and the large learning gains that followed. “That performance is all due to the teachers. We have committed teachers in this school. Even if I helped them, they always do what they are supposed to do, without supervision.” Strong school leadership, as Mr. Benimana shows, is open-minded, humble, collaborative, devoted, and pursuant of what is best for pupils’ futures — especially if this comes in the form of a whole-school transformation, called RwandaEQUIP.


TEACHERS' HOSTEL
TEACHER S' TOILET
ADVANCED LEVEL LFK ∝ MEG
REFECTORY
GIRLS ROOM EQUIPMENTS
LOWER PRIMARY P3
DOS P4 MAGASIN
G.S BUMBA
STAFF ROOM O'LEVEL P6 C
NURSERY CLASSES
DIRECTION UPPER PPIMARY P5 P6
P4 ∝ LIBRARY
KITCHEN
ENTRY
LOWER PRIMARY
P1 P2
LEANERS' TOILET

VII. Informing Programmatic Design Through this Study

Besides presenting the main findings on the overall effectiveness of the programme during its first months of operation, the current report also aims to speak to some of the programmatic and policy design questions going into Year 2 and beyond. Below, we present a brief discussion of how our evidence speaks to some of these issues.

Strong Evidence for the Policy Change of Shifting Classes to Single-Shift

The business-as-usual approach in most public primary schools in Rwanda is to have a double-shift model, where approximately half of the pupils go to school for the morning shift, and the other half go in the afternoon. While this approach ensures that pupils receive instruction in smaller classes, and to some extent that schools have enough physical capacity to accommodate all their pupils within classrooms, it is an empirical question whether this model is as effective as receiving twice as much instruction, but in larger classes — in other words, a "single-shift" model, when the physical infrastructure of the school allows it. To explore this question, approximately 75% of all lower primary classrooms were transitioned to a single-shift model, and their outcomes were compared — still within a difference-in-differences model — to those in schools with a double-shift model.

Subsequent findings showed that pupils in single-shift model classes experienced larger learning gains in English reading fluency compared to pupils in double-shift model classes, especially in Primary 2. For instance, Primary 1 pupils under the single-shift model improved their fluency scores by over 3 correct words per minute relative to their counterparts in the double-shift model. For Primary 2 pupils, this improvement was significantly higher, over 7 correct words per minute relative to their counterparts in double-shift schools (Table 7.1).

Underlying the single- versus double-shift model is a trade-off between class size and shift modality. Yet, evidence was not found that class size moderates the learning gains across all schools (Appendix Table 1.7.1). In other words, there is no difference in programme effectiveness between the smaller and the larger classes.

In sum, we find that the single-shift model led to higher learning gains, while class size did not moderate the effect of the observed gains. On top of this, the single-shift approach provides other benefits around strengthening enrollment and stakeholder buy-in. As such, given the current evidence, the recommendation is to make efforts to transition as many classrooms to single-shift as is feasible without overcrowding classrooms.

Table 7.1: Comparison of Pupils' Performance in Single-Shift and Double-Shift Schools

Grade	Differences in gains for single-shift relative to double-shift	
	Proficiency	Fluency
P1	0.1	3.25
P2	0.26**	7.25**
Grade	Percent differences in gains for single-shift relative to double-shift	
	Proficiency	Fluency
P1	26%	44%
P2	237%	155%

Notes: The statistical significance of differences across sub-samples is denoted with the following key: * p<0.10, ** p<0.05, *** p<0.01.

Box 2. Maximising Instructional Time for Children

Transitioning from a Double-Shift to a Single-Shift Model

The popularity of transitioning to a single-shift model was one of the most consistent and loud findings emerging from qualitative interviews with different school stakeholders. Head teachers highlighted several reasons that teachers, pupils, and parents preferred the single-shift over the double-shift model, which might also help explain the additional learning gains achieved by single-shift schools observed in our data.

First, a single-shift model directly leads to more high-quality instructional time for pupils. Through this increased exposure and time, teachers build stronger relationships with their pupils and can better track pupils' progress and disengagement. Hence, it is not surprising that pupils in single-shift model schools experienced higher learning gains relative to their peers in double-shift models.

> "[The pupils] like it because they can learn for longer."
>
> Theophile Mugisha, EP Mbatatabata, Head Teacher

Secondly, single-shift schools provide benefits to pupils and their families beyond just learning — they have also helped with pupils' nutrition, enrolment, and family work schedules. An additional by-product of the transition to single-shift was that single-shift schools started providing school lunch meals, which researchers have also highlighted as one of the most promising ways to increase enrolment in LMICs.

> "When I teach one class and not two, I get more time with my pupils to get to know them better […] For me, the single-shift model is good even if we have a big number of students. In the double-shift model, we don't have that much time to teach."
>
> Theoneste Benimana, G.S. Bumba, Head Teacher

Moreover, having pupils in school for the full day, and not having to worry about their lunch, also allows families to have more flexibility in their work schedules, as several head teachers and parents pointed out.

In nearly all of the schools where head teacher interviews were conducted, head teachers were satisfied with the transition to a single-shift model, and among schools where the shift was not possible due to infrastructural constraints, it was something that head teachers were aware of and found desirable. Although some teachers found the implied increase in class sizes difficult to manage at first, the majority of them still took the trade-off, and overwhelmingly wanted to continue under the single-shift modality.

> “[Big classes in [a] single-shift school would make it hard for teachers to manage classes…but [I] still would prefer the single-shift model.”
>
> Eugene Ndaruhutse, G.S. Kimisange, Head teacher

The Specialist Model Led to Significantly Higher Learning Gains in P6 Numeracy

Another feature of the educational system in Rwanda is the use of "specialist" teachers in upper primary. The specialist model is one in which teachers are assigned to specific subjects that they might have some formal credential, or experience and familiarity teaching. To explore the question of whether this model is superior to the model where teachers are assigned to a single class in which they teach all subjects, 23 schools were assigned at the start of the programme to this alternative "homeroom" model. The assignment was not randomised, but rather based on whether a school was already doing the homeroom model (which amounted to rare cases), or schools where the head teacher was open to trying a new instructional model. However, since baseline and midline data existed for all schools under both types of models, the effect of the specialist model on learning outcomes could still be approximated relative to the homeroom model. To do so, we rely on the LARS assessment for literacy and numeracy, which was the only core assessment in this evaluation given in upper primary.

Evidence showed that the specialist model has medium to large benefits (~0.3 SD) over the homeroom model in Grade 6 Numeracy, but we found no difference in learning outcomes between the two models in Grade 6 Literacy (Table 7.2). Put differently, pupils under the specialist model gained almost twice as much from the RwandaEQUIP programme in the maths assessment relative to their counterparts within the homeroom model. Therefore, from this evidence, there is no reason to believe that the homeroom model is superior to the specialist model in terms of driving higher achievement levels, or in terms of popularity among teachers and head teachers. As such, the policy recommendation from this finding is to stay within the more traditional specialist model framework.

Table 7.2: Comparison of Pupils' Performance in Homeroom vs Specialist Schools

Outcome	differences in gains for specialist relative to homeroom	
	Proficiency	Percent marks
Literacy	0.05	0.01
Numeracy	0.12*	0.07*
Outcome	percent differences in gains for specialist relative to homeroom	
	Proficiency	Percent marks
Literacy	27%	6%
Numeracy	80%	94%

Notes: The statistical significance of differences across sub-samples is denoted with the following key: * p<0.10, ** p<0.05, *** p<0.01.

Box 3. Teacher Guides are Crucial

The Value of Lessons Plans to Deliver High-Quality Instruction

One key pillar of RwandaEQUIP is the implementation of high-quality, structured teacher guides delivered through tablets designed to reach classrooms with a wide range in levels of connectivity, access to hardware, electricity, and digital familiarity. These teacher guides are carefully crafted to ensure that the pedagogical practices within RwandaEQUIP schools are coherent, evidence-based, and aligned with the Rwandan curriculum frameworks. To do so, these teacher guides support teachers in a range of teaching activities, including explaining new concepts, offering appropriate examples, assessing for mastery, providing practice activities, reinforcing past concepts, and helping teachers to scaffold and pace lessons.

Within the RwandaEQUIP programme, teacher guides perform two pivotal roles. First, the provision of high-quality pedagogical support is squarely aligned with the policy recommendations recently expressed by the National Examination and School Inspection Authority (NESA) for the overall educational policy of the programme. In these recommendations, NESA emphasises the importance of providing teachers with sufficient teaching and learning materials, especially in English, so they can deliver effective instruction. It is not surprising that with Rwanda's transition to English-medium instruction, teachers need more support to help them teach in English. Through these teacher guides, the RwandaEQUIP programme addresses this recommendation head-on, by ensuring that

teachers have standardised, high-quality materials to effectively teach in English.

Similarly, NESA recognizes that many teachers have a heavy workload of instruction and pupil assessment already, and that many of them do not have enough time to prepare individual lessons — much less the scope and sequence of whole courses. This weaker level of lesson planning capabilities in the business-as-usual scenario can lead to incoherent lessons and overall course design, and ultimately, to weak learning outcomes. With the provision of high-quality teacher guides, RwandaEQUIP teachers can now shift the time they spent on the burden of lesson planning, and they can instead focus on high-quality instruction and pupil support, to ensure that learning is happening for all.

The second role performed by the RwandaEQUIP teacher guides is as an evidence-based tool, which has led to significantly higher learning outcomes in many other similar contexts. For example, a rigorous programme evaluation reveals that the RARA (Nigeria Reading and Access Research Activity) programme, an instructional approach focusing on supporting teachers with teacher guides and effective strategies, had an average impact of 5 correct words per minute in language fluency in Primary 2 pupils — an equivalent of almost half a year of additional schooling in these contexts. The benefits of structured pedagogy found in this paper are consistent with the broader patterns highlighted in another 2018 paper, where a Research Triangle International (RTI) team reviews 19 education programmes across 13 countries in low- and middle-income countries. In a more recent randomised control trial conducted by an international group of education experts led by Nobel Prize winner Dr. Michael Kremer, pre-primary and primary pupils enrolled in schools in Kenya for two years using NewGlobe's instructional methodology — the same standardised approach as RwandaEQUIP — experienced learning gains equivalent to 1.5 and 0.8 additional years of schooling, on average, for pre-primary and primary, respectively — which rank in the 99th percentile of effect sizes measured in education studies in low- and middle-income countries.

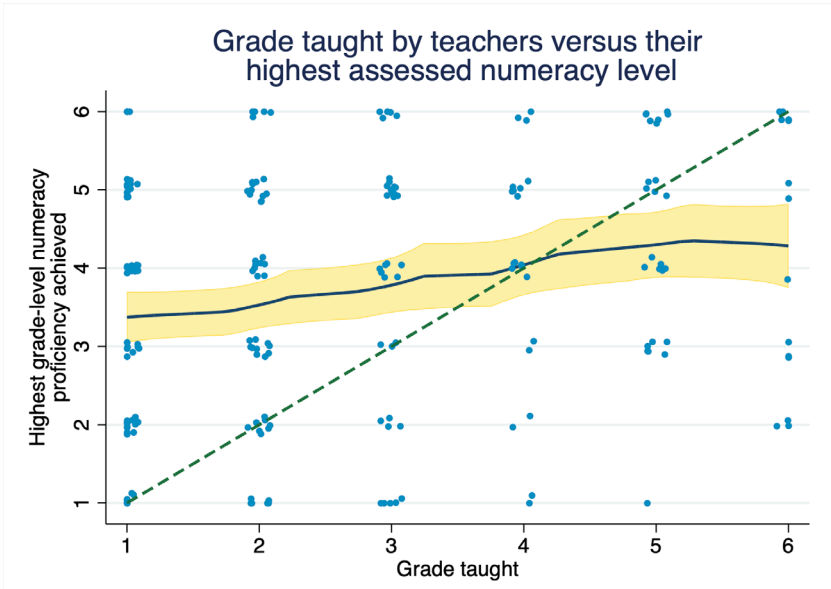
Why are teacher guides so effective?

There are likely several explanations working in tandem as to why teacher guides work.

First, teacher guides can be especially valuable in filling teacher knowledge gaps in territories where educational resources and teacher capacity are limited, as they can support effective teachers even when not all of them are qualified to teach their assigned grades and subjects. In other words, one crucial — necessary, but not sufficient — requirement for teachers to deliver effective instruction is to have a clear understanding of the subject's content knowledge. However, this is not always present in many low- and middle-income countries. Data collected from 2,600 schools over 7 countries in sub-Saharan Africa show that about 14% of grade 4 language teachers could not spell a simple word like “traffic”, and a similar share could not correctly answer questions on a simple grammar exercise. Moreover, even when teachers do possess an adequate amount of subject matter knowledge, it does not guarantee their ability to communicate and teach that knowledge to pupils. The same study reports that only 31% of teachers were able to prepare a lesson plan, and an even smaller share of teachers could develop lesson aims, formulate questions to check pupils’ understanding, and give feedback.

Rwanda is not the exception to these patterns in weak teacher content knowledge. For example, during one of the training sessions for teachers about to join the second cohort of RwandaEQUIP schools, a numeracy assessment, covering questions from Primary 1 to Primary 5, was given to a random sample of approximately 500 teachers. Results showed that less than 56% of primary school maths teachers were able to pass this exam with a score of 80% or higher. Similarly, more than 1 in 4 maths teachers could not actually solve problems at the grade level that they teach. Worryingly, these figures do not get better when looking at teachers in higher grades, or with official certifications. In sum, teacher guides are providing teachers with tools to bridge the gap between each teacher's efficacy when teaching and the level that pupils deserve to be learning at, although it is important to note that teacher guides help all teachers, not just those considered to be weaker.

The second reason why teacher guides are effective is that the rigour with which they are designed — particularly so within the RwandaEQUIP programme — ensures that all pupils have access to high-quality instruction, and that their educational experience is homogeneously strong, as opposed to simply due to the "luck of the draw." The design process thus centres on the idea of coherence, both across lessons and within lessons, as the optimal sequencing of learning enables pupils to master the most complex skills in a course. For this reason, the RwandaEQUIP programme does not start by writing disjointed individual lessons, but rather by identifying learning objectives for a whole course and creating the scope and sequence in which content is covered across multiple lessons, building in rigour and complexity across those tracks. Then, the RwandaEQUIP Instructional Design team uses evidence-based techniques within each lesson to optimise them for what cognitive

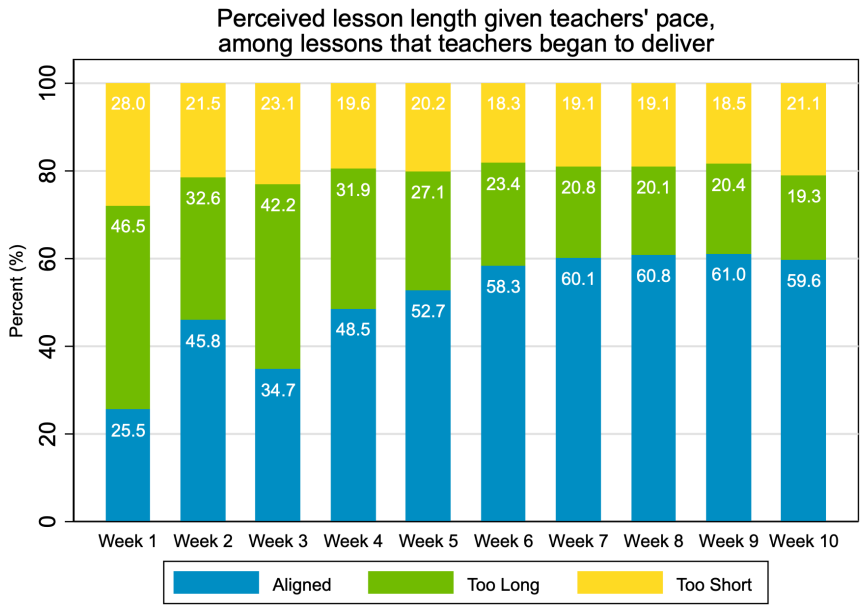


science has found to be best for learning and retention. Moreover, before the start of the school year, the RwandaEQUIP programme also provides teachers with the training and support they need to effectively use the teacher guides through a 10-day long sleep-away induction training, where they learn how to use a Teacher Tablet to access teacher guides, read the different types of text in teacher guides, and use instructional skills to effectively deliver lessons.

The high-quality instructional support that teachers get from these plans has been widely acknowledged and well-received by stakeholders on the ground. Head teachers in RwandaEQUIP schools report that they have observed over 90% of teachers using teacher guides often. During the collection of qualitative data via head teacher interviews, head teachers consistently gave positive feedback about the quality of the teacher guides — particularly in terms of improving the quality of instruction, as it helped teachers to focus on instruction instead of planning:

> "Lesson planning is easy for them. Before, we used to write notes with pens on paper before the class, but today, that is not needed. Today, they just use the tablets, and that improves the quality of instruction very much."

Theoneste Benimana, G.S. Bumba, Head Teacher



> “It also helps teachers as they now don’t need much time to prepare for the daily courses. Everything is prepared for them. Now what they need is to show up at the school.”

Nizeyimana Jean De Dieu, G.S. Muhondo, Director of Studies.

Admittedly, getting used to teacher guides on the tablets and effectively using them might take time and training. For instance, one concern that head teachers relayed on behalf of their teachers is that some lessons felt too long for the time allotted to deliver them. As one teacher said: “Teacher evaluation is not easy, because the material is too long. It is not prepared for a 40 minute-long lesson.” Fortunately, the minute-by-minute data collection platform of the RwandaEQUIP programme allows for exploration into this question at the system level.

Data showed that toward the beginning of the programme, almost half of all lessons were indeed “too long” — either because the content was extensive, or teachers’ delivery pace was too slow. However, this share rapidly decreased over time, and by week 10, fewer than 1 in 5 lessons were in this category. Instead, the share of lessons that teachers were able to deliver successfully more than doubled, which serves as evidence that teachers’ increased familiarity with RwandaEQUIP materials is a valuable component in the correct implementation of the programme within the classroom — especially when given that, qualitatively, the lesson length did not significantly change during these weeks, so teacher pace seems to be the driver of these improvements. Furthermore, if the programme does have subjects and grades that have consistently long lessons, the feedback loop in the design process and the richness of the RwandaEQUIP data platform allow for tracking these issues and course-correcting them. More specifically, we have officers from the Learning Innovation team monitoring lessons and providing feedback on how to improve things like timing and language. Along with other data-driven insights, changes to the digital teacher guide are promptly updated. Through these back and forth processes, the programme can continue to be improved and aligned with stronger pupil learning outcomes.

The Programme Worked for a Diverse Set of Schools with a Wide Range of Teacher Qualifications and English Levels

Did teachers with stronger qualifications or better English levels benefit more from the RwandaEQUIP programme? Although the available data to answer this question is somewhat limited, no evidence was found to suggest that either teacher certification (Figures 7.1 and 7.2) or English language fluency below a certain level moderated the effects of the intervention (Figures 7.3 and 7.4)[28]. This finding is encouraging, as it sheds light on the broader potential effectiveness of the programme in other schools within Rwanda, especially those with limited educational resources.

Figure 7.1: Relationship Between Teacher Qualification and Programme Effects on English Reading Comprehension

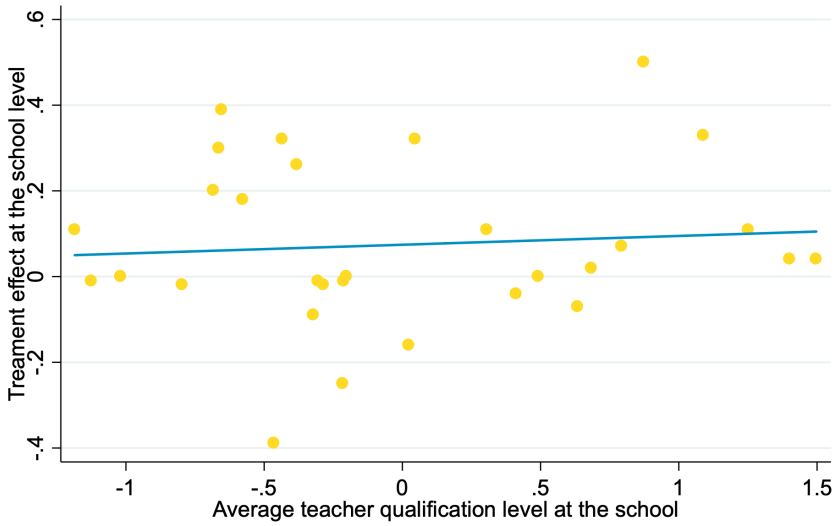
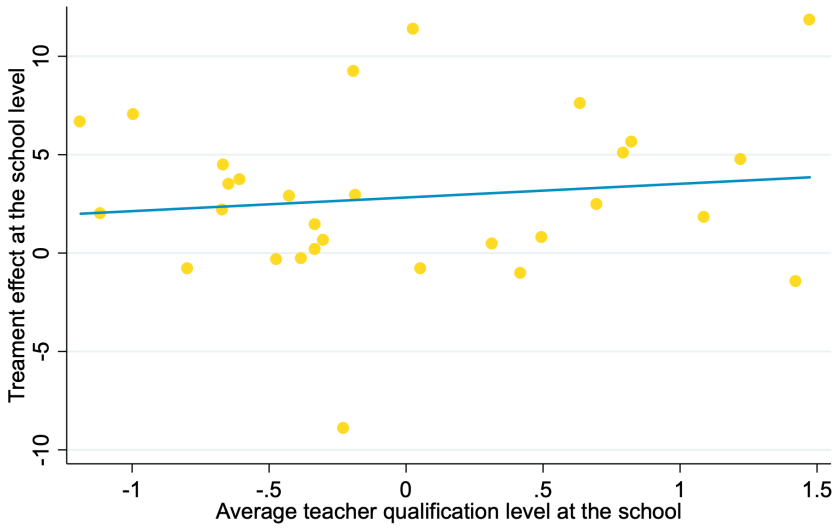


Figure 7.2: Relationship Between Teacher Qualification and Programme Effects on Level 1 Addition



[28]This finding was also confirmed through a statistical regression framework. Additional figures in the appendix (Appendix 1.7.1–1.7.3).

Figure 7.3: Relationship Between Teacher Fluency and Programme Effects on English Reading Comprehension

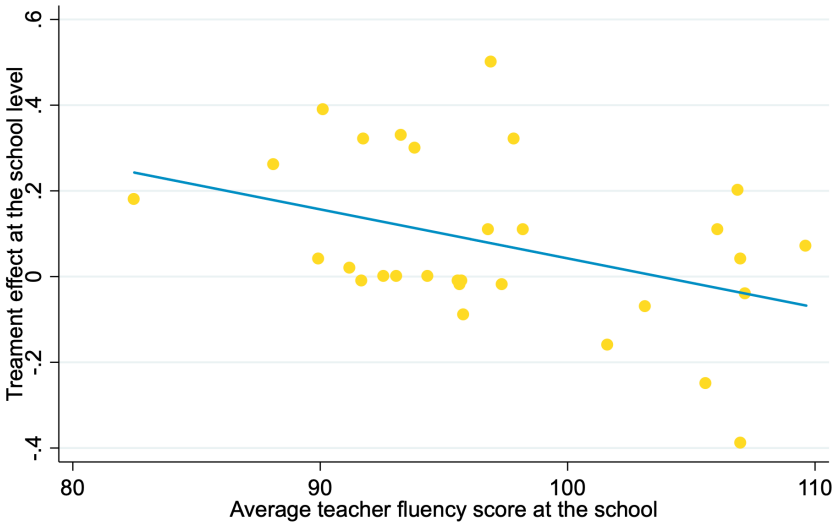
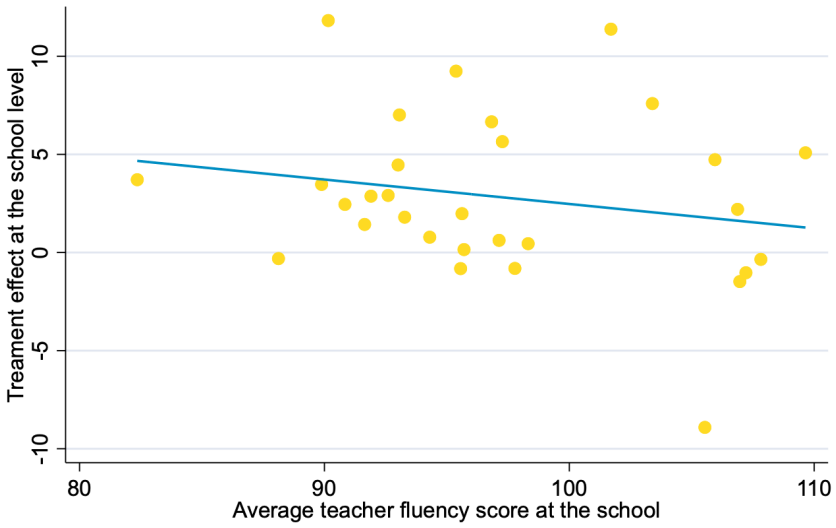


Figure 7.4: Relationship Between Teacher Fluency and Programme Effects on Level 1 Addition



Before the start of the programme, teacher data were collected from all schools on their teachers' English reading fluency level, their oral language skills in English, and their professional credentials. Unfortunately, due to issues with the timing of the data collection and how it was recorded, there is not an available link between each individual teacher and their class during the first 17 weeks of the RwandaEQUIP programme. However, school-level averages of teacher English fluency and professional credentials can be created. Using this metric at the school level, there is no evidence of either of these factors moderating the overall treatment effects. Instead, teachers who were more proficient in English didn't deliver better outcomes, suggesting that the programme supported all teachers roughly equally.

Through teacher and head teacher interviews, there were also teachers and head teachers who claimed that through practice, their level of familiarity with both the teacher guides and with English as a medium of instruction increased over time:

> “The programme is good for me, personally. It helped me to improve my vocabulary. It has also helped me to manage my time well when I am in class.”

Philip Maniragena, G S Nyinawimana, P4 Teacher

When leveraging the administrative data on lesson completion rates, it is apparent that teachers took less time to deliver Kinyarwanda lessons than English lessons, as was expected (Appendix Figure

1.7.4). However, the pace of teachers over time improved in both languages, and by the end of the semester, the pace in both Kinyarwanda and English had mostly converged. In other words, the teacher guides not only help teachers of a wide range of backgrounds deliver high-quality instruction in English at a given point in time, but they are also building their capacity to do so more effectively over time.

Gender Parity in Learning Outcomes was Maintained

Despite the rising awareness to promote gender equity in education, large gender gaps still exist in learning achievement in many settings, most often leaving girls at a disadvantage. When exploring potential learning gaps between boys and girls at the start of the programme, it was found that, at least in the subjects and grades tested, there were very small, if any, differences in pupils' performance between boys and girls. More importantly, the programme did not have heterogeneous effects by gender. In other words, the programme worked equally well for both boys and girls, maintaining the gender equity in learning outcomes found at baseline — but at higher levels of performance (Appendix Table 1.7.2).

There is Still Work to Do

Part of an evidence-led, data-oriented programme like RwandaEQUIP is to monitor areas for constant improvement. Therefore, despite the outstanding success of RwandaEQUIP during its first 17 weeks, this evaluation also found that there are areas for improvement to continue strengthening the programme and the education landscape in Rwanda more broadly. In this section, some of the areas for growth found in this evaluation, as well as the policy recommendations to address those areas, are outlined.

First, not all schools implemented the programme with equal enthusiasm and fidelity to the programme. As documented before, programme adoption was correlated with geographic region and grade taught, but it was also correlated with larger gains in foundational literacy and numeracy. The regions that had the highest rates of lesson completion also had the largest gains in learning outcomes. Therefore, it would be natural to expect that if all schools and teachers had similar rates of programme acceptance like schools in the Southern province did, the average effects of the programme would have been even larger than the already significant gains documented in this report.

The second area for improvement found through this evaluation is that the programme had significantly smaller effects on the Primary 6 LARS assessments, both in numeracy and literacy. Especially when compared to the dramatic gains in foundational skills after only 17 weeks in the early grades, improvement in upper primary was limited, as the programme only had a small positive effect on P3 and a small to null effect on P6 LARS literacy scores[29] (Appendix Table 1.7.3). To understand the lack of larger effects in the upper grades, two views may be proposed: First, in order for the advanced skills in higher grades to improve, pupils' foundation must be strong. For example, in the absence of strong reading skills, pupils may not be able to develop higher order knowledge that helps them learn more in Primary 6. In this sense, the large gains in foundational skills in the earlier grades

[29]By the time that this report was prepared, we were still awaiting the Primary Leaving Examination (PLE) data from 2021, as another data point on upper primary performance.

are a leading indicator that the more advanced skills will improve when those students reach upper primary. In addition, however, the RwandaEQUIP programme must continue to cultivate those critical foundational skills among students currently learning in upper primary, who have fallen furthest behind. While those foundational skills may not manifest in an assessment like LARS, which assesses more challenging and higher-order skills, those skills are essential for upper-primary students to be successful on LARS, and more broadly in their more challenging coursework. Secondly, no claims can be made that the RwandaEQUIP programme was not effective, per se, in upper primary, if there is also strong evidence that take-up in the upper grades was significantly weaker. In other words, we found that both lesson completion rates and the progress made on the extent to which different pedagogical practices improved was significantly lower in Primary 4 – Primary 6, relative to Primary 1–Primary 3. Therefore, driving higher take-up in the upper primary grades will remain a vital part of the improvement plan for the RwandaEQUIP programme to keep delivering strong learning gains.

Another area for improvement found through this evaluation was that, despite the large gains on foundational skills and large reductions in non-readers in Primary 1, the extent to which the programme decreased non-readers in both Kinyarwanda and English after Primary 1 was significantly muted. In other words, the gains observed in Primary 2–3 were largely not driven by a raising of the absolute floor in these grades, but rather by the improvement of pupils who had already started to read. This finding is congruent with the fact that the Rwanda national curriculum targets grade-level skills and concepts, even though most students outside of Primary 1 lack the foundational skills necessary to engage with this more advanced content. This also means that there are pupils on the lower end of the distribution who may need additional support or remedial interventions to get them up to speed, and closer to the instructional level in their grade.

Figure 7.5: Reduction Achieved by RwandaEQUIP in the Share of Pupils Under Different Kinyarwanda Fluency Thresholds (LEGRA)

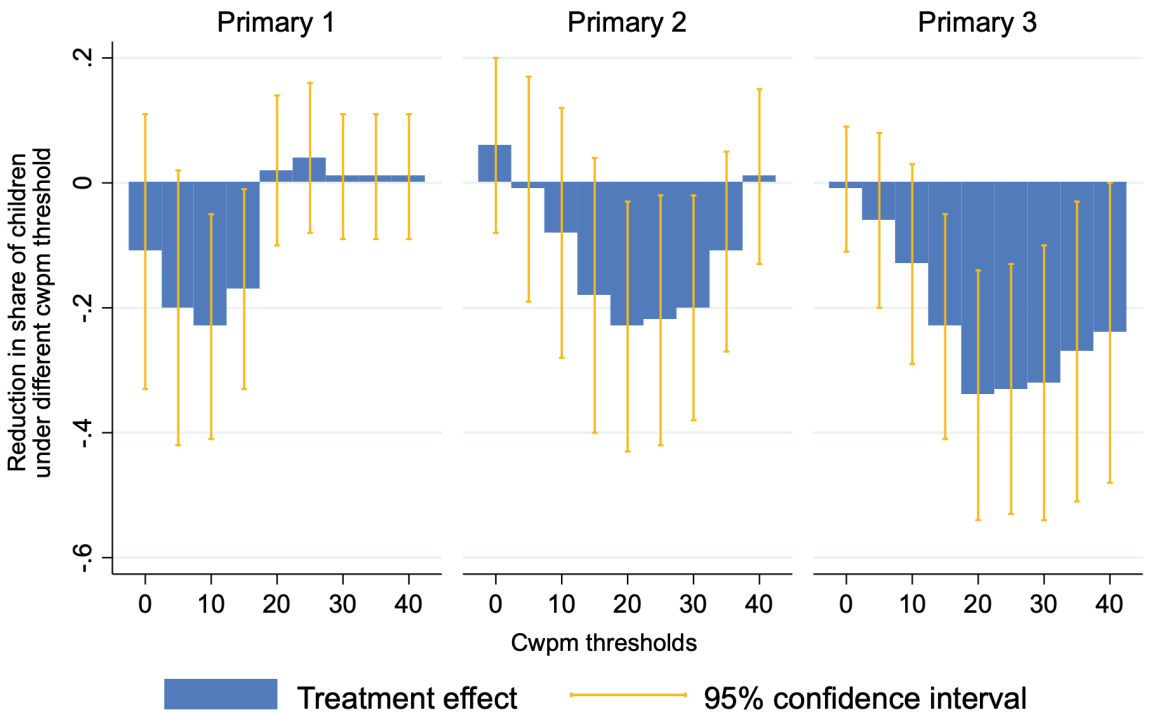
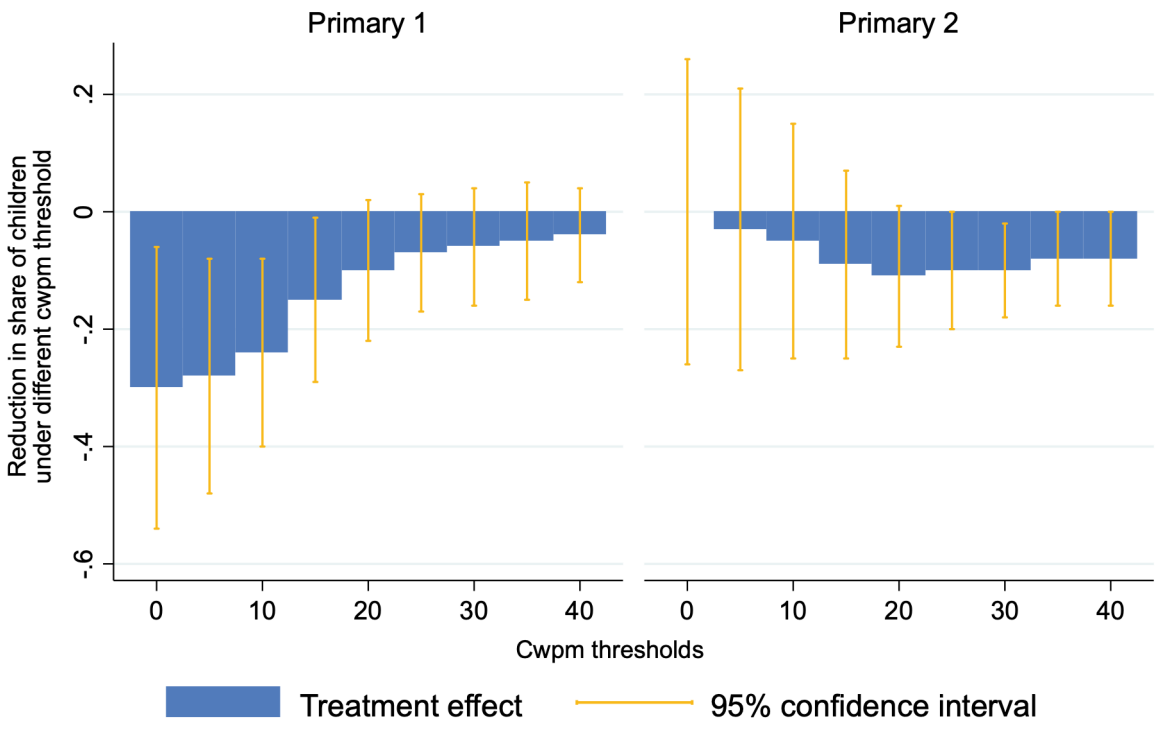


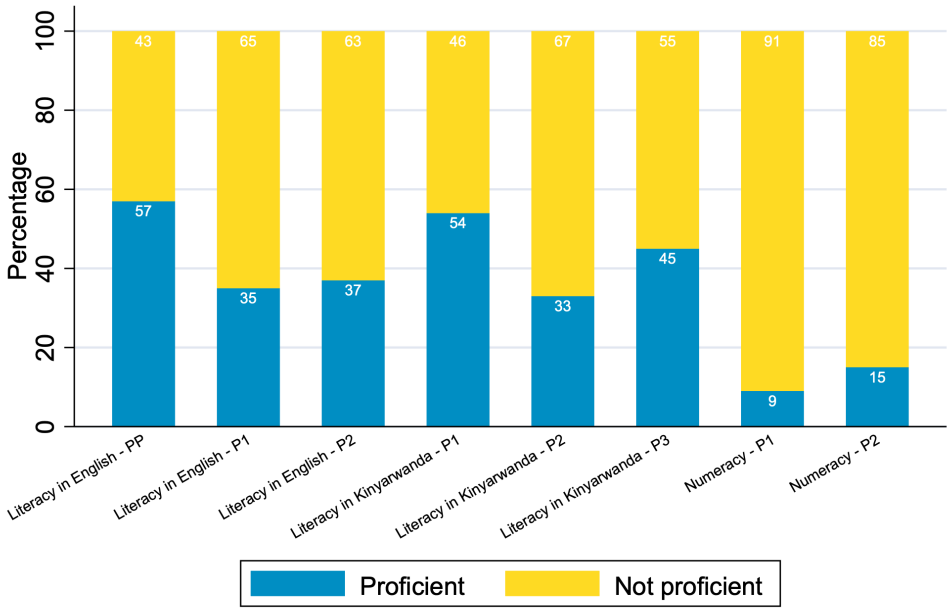
Figure 7.6: Reduction Achieved by RwandaEQUIP in the Share of Pupils Under Different English Fluency Thresholds (EGRA)



With this finding in mind, it is critical to ensure that every lesson on the timetable offers meaningful and accessible learning experiences to students of all grades, including those learning below grade-level. Based on baseline learning levels, many students will enter the RwandaEQUIP programme learning far below grade-level. As a result, those students will be unable to meaningfully engage with more complex content in their grade-level lessons like Science and Mathematics. Furthermore, the number of required subjects and lessons per subject limit RwandaEQUIP's ability to provide more support targeting foundational English and Maths skills, which are critical for success in those other subjects. To address these concerns, RwandaEQUIP will pursue a three-tiered strategy to maximise learning for all students. First, more time on the timetable should be allocated to English and Mathematics, in order to support the development of foundational reading, language, and numeracy skills. Second, the content of all lessons should reflect the actual learning levels of students, and in the short-term, should omit content that is clearly too challenging based on pupil learning levels. And third, students who are far behind or far ahead of the grade-level coursework should be supported through differentiated instruction and small-group support. This combination of a focus on English and Maths, a prioritisation of levelled content, and the provision of differentiated and targeted support will ensure that within two years, all students are reading and doing maths at grade-level. This, in turn, will ensure that those students can more meaningfully participate in their grade-level lessons.

Finally, despite the large improvements achieved by the RwandaEQUIP programme, there are still findings that many pupils in these schools are still far from reaching an appropriate level of proficiency in foundational learning. Therefore, despite the transformational gains achieved in only 17 weeks, large amounts of work, time, effort, and buy-in are needed from different sets of stakeholders to ensure that pupils in Rwanda can continue to develop stronger foundational literacy and numeracy through the RwandaEQUIP programme.

Figure 7.7: Share of Pupils in RwandaEQUIP Schools Who are Proficient in the Respective Subjects



VIII. How Do These Results Speak to Broader Educational Policy in Rwanda?

The RwandaEQUIP programme is a government-led programme and, as such, is not removed from the broader education policy within the country. In this section, we engage with the larger policy landscape and impetus within the country and map out the extent to which RwandaEQUIP is working as an effective and coherent programme to achieve policy goals set out by the Government of Rwanda. More specifically, we engage with the policy recommendations that the 2021 report by the National Examination and School Inspection Authority (NESA), “Learning Achievement in Rwandan Schools”, offered as a way to strengthen education policy in the country and describe how the RwandaEQUIP programme is supporting these goals.

	Policy Recommendations from NESA	Programme Features and Evaluation Findings
Foundational learning and curriculum design	**Focus on building foundational skills in lower primary pupils** "Put great emphasis on early grades of Primary: there is a need to focus on the learners in early grades to equip them with foundational skills. Research has shown that the knowledge not acquired in the first years of schooling cannot easily be recovered in subsequent school years." (p. 28)	In just 17 weeks, RwandaEQUIP lessons have produced massive gains in foundational literacy and numeracy in Primary 1 and 2. • English: improvement of 150% in reading comprehension, relative to comparable non-RwandaEQUIP schools. • Kinyarwanda: improvement of 20% in reading comprehension, relative to comparable non-RwandaEQUIP schools. • Numeracy: improvement of 80% in level 1 addition and subtraction across Primary 1 and 2, relative to comparable non-RwandaEQUIP schools.
	Promote gender equity in education "Gender responsive teaching and learning strategies need to be prioritised within the teacher training and continuous professional development. It is evident that there is a gender gap in all the subjects and at all levels involved in this assessment." (p.29)	In RwandaEQUIP schools, there is a very small to negligible gender difference in pupils' performance between boys and girls at the start of the programme. More importantly, the programme worked equally well for both boys and girls upon comparison of the treatment effect for boys versus girls.
Teachers and their role in policy	**Teacher motivation is key to pupils' performance** "Motivate [teachers] to concentrate on teaching and learning, which will lead to improved performance of learners." (p. 27)	Interview data collected from field visits suggest that head teachers are understanding the RwandaEQUIP programme's focus on pupils at all levels of performance, that they are coaching and encouraging teachers to use the programme, and finding the structured approach helpful in supporting teachers.
	Build teachers' capacity to teach in English "There is a need to put in place a structured capacity-building plan for teachers, especially in English, which is the language of instruction." (p. 27)	The RwandaEQUIP programme helps teachers to teach in English. The structured teacher guides allow teachers of different English levels to effectively deliver lessons of standardised quality, which produce learning gains. To quote one of the head teachers from an interview: "We have improved the language of instruction. Before we used to teach English, but still had to use Kinyarwanda to explain… Today, we use English only, and learners answer in English only."
	Reduce teachers' workloads "Review teacher workloads: The teachers urged that pupils' performance is low because they do not have time to prepare lessons… Teachers proposed to the policy makers to preserve one day per week for every teacher to allow enough time for preparation for lessons for the whole week." (p. 27)	With RwandaEQUIP's high-quality teacher guides, teachers can now shift their time spent on the burden of lesson planning and instead focus on high-quality instruction and pupil support.

	Policy Recommendations from NESA	Programme Features and Evaluation Findings
Teachers and their role in policy	**Implement Continuous Professional Development (CPD)** "Teachers should be trained on topics like classroom management, specific teaching methods for the subject, etc. School leaders must put in place the continuous coaching programs of the teachers." (p.28)	The RwandaEQUIP support systems, both formalised training and regular feedback, strengthen teacher capacity and provide a positive cycle of improvement leading to still greater motivation. For example, the STRIVE boards reinforce school-wide behavioural standards and teaching methods, increasing pupil attention. Similarly, through classroom observations and coaching enabled by technological platforms that are updated in real time, teachers receive continuous feedback on their performance and how their instructional practices can improve even further.
Educational inputs	**Provide sufficient teaching and learning materials** "Provision of sufficient teaching and learning materials for all subjects, especially English learning resources for primary schools to support the implementation of the recent language of instruction in lower primary."(p.27)	RwandaEQUIP's teacher guides ensure that teachers have standardised, high-quality materials to effectively teach in Kinyarwanda and in English. The creation of these teacher guides follows an evidence-based approach, the lessons are rigorously observed and iterated upon, they are integrated with existing school resources like XO laptops, REB textbooks, and RwandaEQUIP print materials, and are designed to reinforce training and CPD.
	Promote the use of technology in education "ICT in Education policy should be sustainably reinforced to expand opportunities for both learners and teachers to access resources that will promote quality teaching and learning during formal as well as informal schooling processes…This should be accompanied with strengthening the necessary infrastructure and internet connectivity that should be monitored strongly to guarantee implementation." (p.27)	The RwandaEQUIP programme is grounded in a technological platform that makes coherent and thoughtful use of inputs through a targeted application of technology with a clear theory of change in mind. In other words, the technology used in the RwandaEQUIP programme is crafted to address recurring issues present before the start of the programme, like weak pedagogy and lack of accountability for teacher attendance.

IX. Looking Forward

The impressive success of the RwandaEQUIP programme during its first year is a powerful and encouraging first step in the continued work — in breadth and depth — of the programme, as a vehicle to transform Rwandan education. Given the large gains documented in this report, one can only wonder what can be achieved once the programme reaches an even higher level of maturity, and when more schools in need of a transformational intervention like RwandaEQUIP are incorporated into the programme.

The learning gains achieved in only 17 weeks, particularly regarding foundational literacy and numeracy, are inspirational. These gains sharply describe a programme that is on track to radically improve learning outcomes in Rwanda — where most pupils are starting from a place of deep learning deprivation. And yet, these gains do not imply that the work is done. Many pupils in both RwandaEQUIP and non-RwandaEQUIP schools have not yet mastered the most foundational skills, and programme adoption — although on an upward trajectory — still needs to be strengthened. Further, school support from both the governmental partners and the RwandaEQUIP team will be vital to ensure that all schools use the programme as designed, in order to guarantee beneficial learning gains for even more pupils throughout Rwanda.

In terms of policy design, this M&E report documents areas that the programme still needs to strengthen both internally and externally. In this way, M&E work does not function purely as a celebration of the gains achieved, but also as a way to take an honest and evidence-driven look at the programme and keep improving it. M&E work does not end after this report, and as a data-driven programme, we will continue to conduct similarly large-scale, rigorous evaluations for the upcoming school years as well. The same comparison group will be maintained to continue benchmarking learning gains throughout the duration of the programme, relative to the initial set of treatment schools, while also incorporating representative samples of the new cohorts of schools and monitoring learning gains among those schools. These rounds of data collection will give the Government of Rwanda further insights into the impact of the programme on Rwandan education, on what is going well, and what needs to be strengthened.

The RwandaEQUIP programme is a bold initiative from the Government of Rwanda. During its first year of operations, it has enabled pupils to be on faster, higher learning trajectories than what they could have expected from business-as-usual education. The large impact on foundational literacy and numeracy outcomes in both Kinyarwanda and English— through a large-scale system-wide transformation of education — is a laudable achievement by the Government of Rwanda. Through its RwandaEQUIP programme, the Government of Rwanda will continue to provide rich, nurturing learning environments across the country, where pupils of all backgrounds will have the unprecedented opportunity to actually learn in school and thrive academically.

Appendix

Appendix 1: Tables and Figures

Appendix Table 1.5.1: Balance Table with Characteristics of Different Groups of Schools in M&E Plan

	Census schools (all 299 schools)	RwandaEQUIP schools (100 schools)	Treatment schools selected for M&E (30 schools)	Comparison schools selected for M&E (30 schools)	Difference 100 RwandaEQUIP schools–30v30 schools selected for M&E	Difference between Treatment–Comparison in 30v30
Population count in 5-km radius around school	102999	94906	102147	103395	10343.5	-1248.6
					(25436.8)	(23633.0)
Population 5-14 count in 5-km radius around school	24479	22794	24296	25034	2145.1	-738.2
					(4959.8)	(4996.1)
Population density in 5-km radius around school	1311	1208	1301	1317	131.6	-15.9
					(323.9)	(300.9)
School is in Eastern province	0.19	0.21	0.27	0.27	0.08	0.00
					(0.09)	(0.00)
School is in Kigali	0.23	0.19	0.17	0.17	-0.03	0.00
					(0.08)	(0.00)
School is in Northern province	0.17	0.17	0.2	0.2	0.04	0.00
					(0.09)	(0.00)
School is in Southern province	0.2	0.15	0.17	0.17	0.02	0.00
					(0.08)	(0.00)
School is in Western province	0.21	0.28	0.2	0.2	-0.11	0.00
					(0.09)	(0.00)
ECD is currently available	0.77	0.84	0.83	0.9	-0.01	-0.07
					(0.08)	(0.08)
School has internet connectivity	0.92	0.99	0.97	1.00	-0.03	-0.03
					(0.03)	(0.03)
Total pupils according to SDMS	1423.3	1334.8	1353.3	1309.6	26.43	43.73
					(75.29)	(82.82)
Total pupils in ECD, according to census	72.8	88.2	79.8	84.5	-11.95	-4.67
					(12.64)	(11.24)
Total pupils in primary, according to census	1207.2	1090.7	1123.8	1131.2	47.55	-7.4
					(65.04)	(72.96)
Total number of teachers, according to census	26.4	26.7	26.7	25.9	-0.05	0.80
					(1.35)	(1.57)
School-level pupil-teacher ratio	54.6	50.4	51.2	51.6	1.11	-0.42
					(1.81)	(2.43)
Share of teachers at 80 cwpm or higher	67.2	75.5	71.1	70.7	-6.37***	0.41
					(1.86)	(2.32)
School-level passing rate of PLE 2020	83.2	81.7	83.6	81.8	2.73	2.22
					(2.72)	(3.09)
Estimated number of classrooms at the school	23.2	24.4	23.8	23.4	-0.87	0.40
					(1.12)	(1.24)
Average number of math textbooks per pupil in P2-P6	0.44	0.47	0.49	0.54	0.03	-0.05
					(0.12)	(0.17)
Observations	299	100	60	239	100	60

Notes: The number of observations refers to the number of schools in each category, but the actual number of observations in each cell may vary depending on missingness for each variable. The differences between the RwandaEQUIP schools and the 30v30 schools are calculated in a regression adjusted framework. The difference between treatment and comparison schools is also calculated in a regression-adjusted framework, and includes fixed-effects for each randomisation pair, akin to controlling for stratification strata. The statistical significance of differences across sub-samples is denoted with the following key: * p<0.10, ** p<0.05, *** p<0.01.

Appendix Table 1.6.1: EGRA - Percent Improvement Over Expected Performance, by Sub-skill and Grade				
Sub-skill	All	N3	P1	P2
Print orientation	20%	49%	12%	17%
Listening comprehension	46%	58%	47%	28%
Initial sound identification	39%	29%	58%	31%
Phonemic awareness	73%	50%	150%	47%
Oral vocabulary	27%	39%	28%	24%
Letter names	65%	92%	114%	27%
Non-familiar words	115%	-	-	115%
Familiar words	107%	-	188%	75%
Reading fluency (cwpm)	72%	-	141%	45%
Reading comprehension	150%	-	300%	100%
Proficiency	64%	90%	119%	15%

Appendix Table 1.6.2: EGMA - Percent Improvement Over Expected Performance, by Sub-skill and Grade				
Sub-skill	All	N3	P1	P2
Counting circles	9%	23%	-1%	-
Number identification	65%	96%	86%	53%
Number discrimination	14%	33%	13%	12%
Missing number identification	33%	57%	47%	21%
Word problems	35%	92%	14%	33%
Addition - L1 (#)	74%	132%	96%	61%
Addition - L2 (#)	71%	-	9%	74%
Subtraction - L1 (#)	85%	101%	122%	74%
Subtraction - L2 (#)	82%	-	83%	70%
Multiplication	27%	-	-	27%
Division	43%	-	-	43%
Shape recognition	3%	16%	-6%	7%
Proficiency	333%	-	1400%	229%

Appendix Table 1.6.3: LEGRA - Percent Improvement Over Expected Performance, by Sub-skill and Grade				
Sub-skill	All	P1	P2	P3
Understanding words	9%	13%	5%	-
Writing	11%	17%	6%	-
Reading fluency (cwpm)	37%	30%	18%	51%
Reading comprehension	20%	23%	37%	8%
General language	34%	-	-	34%
Proficiency	64%	60%	86%	60%

Appendix Table 1.6.4 Normal Regression Table (EGRA)

	All		Nursery 3		Primary 1		Primary 2	
	Comparison schools at midline mean/SD	Treatment effect	Comparison schools at midline mean/SD	Treatment effect	Comparison schools at midline mean/SD	Treatment effect	Comparison schools at midline mean/SD	Treatment effect
All outcomes (standardised across rounds)	-0.17	0.39***	-0.12	0.37***	-0.22	0.46***	-0.16	0.36***
	(0.85)	(0.11)	(0.87)	(0.14)	(0.80)	(0.14)	(0.88)	(0.13)
Print orientation (%)	0.59	0.12**	0.45	0.18**	0.59	0.08	0.71	0.12*
	(0.39)	(0.05)	(0.39)	(0.08)	(0.39)	(0.07)	(0.35)	(0.07)
Listening comprehension (%)	0.35	0.16**	0.36	0.21***	0.32	0.15*	0.38	0.11
	(0.36)	(0.07)	(0.35)	(0.07)	(0.36)	(0.08)	(0.35)	(0.08)
Initial sound identification (%)	0.35	0.14**	0.25	0.06	0.32	0.19**	0.46	0.15
	(0.35)	(0.07)	(0.28)	(0.07)	(0.34)	(0.08)	(0.37)	(0.1)
Phonemic awareness (%)	0.22	0.16***	0.15	0.07	0.17	0.24***	0.32	0.16*
	(0.27)	(0.05)	(0.21)	(0.05)	(0.24)	(0.07)	(0.31)	(0.08)
Oral vocabulary (%)	0.36	0.1***	0.28	0.11***	0.36	0.11**	0.42	0.1**
	(0.2)	(0.03)	(0.19)	(0.04)	(0.2)	(0.05)	(0.19)	(0.04)
Letter names (#)	7.19	4.42	3.16	2.91	6.81	7.3*	11.21	2.80
	(12.28)	(3.17)	(8.25)	(2.67)	(11.67)	(3.91)	(14.47)	(4.06)
Non-familiar words (#)	4.40	4.71**	-	-	-	7.3*	4.40	4.71**
	(7.23)	(2.01)	-	-	-	(3.91)	(7.23)	(2.01)
Familiar words (#)	4.23	4.35**	-	-	2.44	4.2**	5.99	4.39**
	(7.03)	(1.66)	-	-	(5.64)	(1.74)	(7.78)	(1.93)
Reading fluency (cwpm)	6.99	4.81*	-	-	4.28	5.78**	9.43	4.06
	(10.75)	(2.5)	-	-	(10.47)	(2.77)	(10.42)	(2.71)
Reading comprehension (%)	0.06	0.09***	0.00	0	0.04	0.12***	0.12	0.13**
	(0.16)	(0.03)	(0)	(0)	(0.13)	(0.04)	(0.22)	(0.06)
Proficiency	0.29	0.18**	0.29	0.27***	0.23	0.25**	0.36	0.05
	(0.46)	(0.07)	(0.45)	(0.08)	(0.42)	(0.1)	(0.48)	(0.09)

Notes: The statistical significance of differences across sub-samples is denoted with the following key:
* p<0.10, ** p<0.05, *** p<0.01.

Appendix Table 1.6.5: Normal Regression Table (EGMA)								
	All		Nursery 3		Primary 1		Primary 2	
	Comparison schools at midline mean/SD	Treatment effect	Comparison schools at midline mean/SD	Treatment effect	Comparison schools at midline mean/SD	Treatment effect	Comparison schools at midline mean/SD	Treatment effect
All outcomes (standardised across rounds)	-0.22	0.39***	-0.26	0.46***	-0.19	0.34***	-0.22	0.42***
	(0.83)	(0.10)	(0.82)	(0.12)	(0.83)	(0.12)	(0.85)	(0.12)
Counting circles (%)	0.79	0.07*	0.67	0.16***	0.90	-0.01	-	-
	(0.26)	(0.04)	(0.28)	(0.05)	(0.18)	(0.04)	-	-
Number identification (%)	0.33	0.22***	0.21	0.23***	0.31	0.24***	0.45	0.24***
	(0.29)	(0.04)	(0.25)	(0.06)	(0.27)	(0.06)	(0.29)	(0.06)
Number discrimination (%)	0.14	0.02	0.09	0.03	0.14	0.02	0.17	0.02
	(0.08)	(0.01)	(0.08)	(0.02)	(0.08)	(0.02)	(0.08)	(0.02)
Missing number identification (%)	0.20	0.07**	0.12	0.08**	0.19	0.09**	0.25	0.06*
	(0.17)	(0.03)	(0.14)	(0.04)	(0.15)	(0.04)	(0.18)	(0.03)
Word problems (%)	0.24	0.09*	0.13	0.12**	0.26	0.04	0.30	0.11*
	(0.28)	(0.05)	(0.21)	(0.05)	(0.28)	(0.06)	(0.31)	(0.07)
Addition - L1 (%)	0.23	0.19***	0.16	0.22***	0.21	0.19***	0.30	0.19***
	(0.2)	(0.04)	(0.2)	(0.05)	(0.18)	(0.05)	(0.19)	(0.05)
Addition - L1 (#)	4.10	3.13***	1.58	2.21***	4.19	3.87***	6.02	3.74***
	(3.78)	(0.74)	(2.03)	(0.52)	(3.58)	(1.06)	(3.87)	(1.01)
Addition - L2 (%)	0.11	0.06	0.00	0	0.12	0.08	0.18	0.11*
	(0.22)	(0.04)	(0)	(0)	(0.23)	(0.06)	(0.26)	(0.07)
Addition - L2 (#)	1.35	1.13***	-	-	1.11	0.88**	1.56	1.23***
	(1.39)	(0.3)	-	-	(1.34)	(0.35)	(1.39)	(0.4)
Subtraction - L1 (%)	0.19	0.17***	0.13	0.14**	0.17	0.2***	0.26	0.2***
	(0.19)	(0.04)	(0.2)	(0.05)	(0.17)	(0.05)	(0.19)	(0.05)
Subtraction - L1 (#)	3.42	3.06***	1.27	1.4**	3.37	4***	5.19	4.02***
	(3.6)	(0.71)	(1.99)	(0.53)	(3.35)	(0.94)	(3.85)	(0.98)
Subtraction - L2 (%)	0.09	0.06*	0.00	0	0.10	0.1*	0.16	0.10
	(0.2)	(0.04)	(0)	(0)	(0.19)	(0.05)	(0.24)	(0.06)
Subtraction - L2 (#)	1.22	1.13***	-	-	0.98	1**	1.41	1.09**
	(1.27)	(0.35)	-	-	(1.18)	(0.45)	(1.32)	(0.45)
Multiplication (%)	0.33	0.09	-	-	-	-	0.33	0.09
	(0.27)	(0.08)	-	-	-	-	(0.27)	(0.08)
Division (%)	0.28	0.12	-	-	-	-	0.28	0.12
	(0.26)	(0.09)	-	-	-	-	(0.26)	(0.09)
Shape recognition (%)	0.28	0.01	0.24	0.04	0.16	-0.01	0.43	0.03
	(0.2)	(0.03)	(0.14)	(0.03)	(0.12)	(0.04)	(0.22)	(0.05)
Proficiency (%)	0.03	0.1***	0.00	0	0.02	0.14***	0.07	0.16***
	(0.18)	(0.03)	(0)	(0)	(0.14)	(0.04)	(0.25)	(0.06)

Notes: The statistical significance of differences across sub-samples is denoted with the following key:
* p<0.10, ** p<0.05, *** p<0.01.

Appendix Table 1.6.6: Normal Regression Table (LEGRA)

	All		Primary 1		Primary 2		Primary 3	
	Comparison schools at midline mean/SD	Treatment effect	Comparison schools at midline mean/SD	Treatment effect	Comparison schools at midline mean/SD	Treatment effect	Comparison schools at midline mean/SD	Treatment effect
All outcomes (standardised across rounds)	-0.07	0.33***	-0.04	0.34**	-0.05	0.24*	-0.12	0.44***
	(0.96)	(0.11)	(0.98)	(0.17)	(0.96)	(0.13)	(0.94)	(0.14)
Understanding words (%)	0.80	0.07	0.79	0.10	0.82	0.04	-	-
	(0.26)	(0.06)	(0.27)	(0.07)	(0.24)	(0.06)	-	-
Writing (%)	0.66	0.07	0.68	0.11	0.64	0.04	-	-
	(0.34)	(0.06)	(0.34)	(0.07)	(0.33)	(0.06)	-	-
Reading fluency (cwpm)	23.62	8.92**	11.04	3.30	21.11	3.94	38.94	19.61**
	(23.87)	(3.69)	(11.28)	(2.82)	(17.49)	(3.39)	(29.69)	(7.62)
Reading comprehension (%)	0.60	0.12**	0.61	0.14*	0.49	0.16**	0.70	0.06
	(0.34)	(0.06)	(0.36)	(0.07)	(0.35)	(0.08)	(0.29)	(0.07)
General language (%)	0.59	0.19***	-	-	-	-	0.59	0.19***
	(0.28)	(0.05)	-	-	-	-	(0.28)	(0.05)
Proficiency (%)	0.33	0.21***	0.42	0.25***	0.24	0.19**	0.34	0.21**
	(0.47)	(0.07)	(0.49)	(0.08)	(0.43)	(0.08)	(0.47)	(0.09)

Notes: The statistical significance of differences across sub-samples is denoted with the following key: * p<0.10, ** p<0.05, *** p<0.01.

Appendix Table 1.6.7: Hours of High-Quality Instructional Time Per Week		
	First five weeks of the programme	Last five weeks of the programme
Average instructional hours scheduled	33.5	33.5
Lost to lessons not being started or successfully completed	-27.8	-13.1
	(17% lesson completion rate)	(61% lesson completion rate)
Remaining instructional time	5.7	20.4
Lost to pupil absenteeism	-1.4	-3.3
	(76% pupil attendance)	(84% pupil attendance)
Total high-quality instructional hours received by the average pupil per week	4.3	17.1

Appendix Table 1.6.8: Urban/Rural Differences in Learning Outcomes, by Assessment And Sub-skill

		Baseline		Treatment effect		
Assessment	Sub-skill	Score for rural/peri- urban schools	Difference urban- rural/ peri-urban	Rural/peri-urban schools	Urban schools	Statistically significant?
EGRA	Proficiency	0.05	0.03	0.19**	0.09	No
		(0.23)	(0.02)	(0.08)	(0.15)	
	Proficiency - Nursery	0.06	0.13	0.31***	-0.03	Yes
		(0.23)	(0.1)	(0.09)	(0.16)	
	Proficiency - P1	0.04	-0.03**	0.23**	0.39*	No
		(0.18)	(0.01)	(0.11)	(0.21)	
	Proficiency - P2	0.07	0.02	0.04	0.12	No
		(0.26)	(0.04)	(0.1)	(0.21)	
	Reading fluency	1.4	0.08	4.63	6.87	No
		(3.55)	(0.48)	(2.84)	(5.07)	
	Reading comprehension	0.003	-0.0008	0.08**	0.1*	No
		(0.03)	(0.002)	(0.03)	(0.05)	
EGMA	Proficiency	0.007	-0.007***	0.12***	0.02	Yes
		(0.08)	(0.003)	(0.04)	(0.04)	
	Proficiency - Nursery	-	-	-	-	-
	Proficiency - P1	0.02	-0.02**	0.18***	0.04	Yes
		(0.12)	(0.008)	(0.05)	(0.03)	
	Proficiency - P2	0.006	-0.006**	0.19***	0.03	No
		(0.08)	(0.003)	(0.07)	(0.08)	
	Level 1 addition	2.64	0.44	3.71***	0.61	Yes
		(3.48)	(0.39)	(0.85)	(0.78)	
	Level 1 subtraction	2.0	0.46	3.51***	1.10	Yes
		(2.99)	(0.36)	(0.81)	(0.67)	
LEGRA	Proficiency	0.13	0.03	0.25***	0.03	No
		(0.34)	(0.05)	(0.07)	(0.19)	
	Proficiency - P1	0.10	-0.009	0.31***	-0.03	Yes
		(0.29)	(0.05)	(0.09)	(0.18)	
	Proficiency - P2	0.10	0.09	0.23**	0.04	No
		(0.30)	(0.07)	(0.09)	(0.21)	
	Proficiency - P3	0.2	-0.005	0.22**	0.05	No
		(0.40)	(0.06)	(0.10)	(0.23)	
	Reading fluency	15.61	0.85	9.67**	4.13	No
		(17.68)	(1.30)	(3.92)	(9.27)	
LARS	P3 Literacy	0.04	0.10*	-0.06	-0.08	No
		(0.20)	(0.05)	(0.08)	(0.14)	
	P3 Numeracy	0.12	0.07	0.16**	-0.02	No
		(0.32)	(0.05)	(0.08)	(0.16)	
	P6 Literacy	0.21	0.10	0.08	-0.07	No
		(0.41)	(0.07)	(0.07)	(0.15)	
	P6 Numeracy	0.11	0.09	0.11*	-0.053	No
		(0.31)	(0.06)	(0.06)	(0.15)	

Notes: The statistical significance of differences across sub-samples is denoted with the following key: * p<0.10, ** p<0.05, *** p<0.01.

Appendix Table 1.6.9: Province Differences in Learning Outcomes, by Assessment and Sub-skill

			Province				
Assessment	Sub-skill	All	Kigali	East	West	North	South
EGRA	Proficiency	0.18**	-0.04	0.21	0.17	0.23*	0.26
		(0.07)	(0.16)	(0.13)	(0.15)	(0.12)	(0.18)
	Reading fluency	4.83*	1.1	4.39	2.69	8.41**	6.13
		(2.55)	(2.82)	(4.73)	(3.20)	(3.73)	(9.08)
	Reading comprehension	0.09***	0.07	0.01	0.05	0.22***	0.09
		(0.03)	(0.05)	(0.05)	(0.05)	(0.06)	(0.10)
EGMA	Proficiency	0.10***	0.07*	0.03	0.19**	0.17	0.23**
		(0.03)	(0.04)	(0.05)	(0.07)	(0.05)	(0.09)
	Level 1 addition	3.07***	0.24	2.78*	4.82**	1.47	6.19**
		(0.73)	(0.78)	(1.34)	(1.71)	(0.94)	(2.54)
	Level 1 subtraction	3.00***	0.71	2.34	5.35***	1.51*	5.48**
		(0.68)	(0.77)	(1.42)	(1.62)	(0.83)	(2.21)
LEGRA	Proficiency	0.21**	0.23	0.24*	0.06	0.14	0.41**
		(0.06)	(0.23)	(0.11)	(0.15)	(0.08)	(0.14)
	Reading fluency	8.92**	12.38	7.11	4.52	2.65	20.38**
		(3.63)	(10.05)	(6.91)	(8.33)	(3.67)	(10.03)
LARS	Literacy	0.006	-0.01	-0.0004	-0.02	0.002	0.1
		(0.05)	(0.14)	(0.11)	(0.12)	(0.07)	(0.18)
	Numeracy	0.09*	0.09	0.16*	0.06	-0.008	0.16
		(0.05)	(0.14)	(0.09)	(0.13)	(0.09)	(0.09)
	Sample size	60	10	16	12	12	10

Appendix Table 1.6.10: Programme Effect on Teacher Practices Reported by Teachers (All Outcomes in SD Units)

Sub-skill	Full Sample	Lower Primary	Upper Primary
Q1: time pupils spend on learning	0.17	0.17	-0.18
	(0.14)	(0.15)	(0.3)
Q2: supportive learning environment	0.16	0.19	-0.11
	(0.18)	(0.19)	(0.31)
Q3: positive behavioural expectation for pupils	0.38**	0.39**	-0.28
	(0.17)	(0.19)	(0.69)
Q4: lesson facilitation	0.22	0.22	0.22
	(0.17)	(0.19)	(0.39)
Q5: monitor pupils' learning progress	0.26	0.26	0.17
	(0.17)	(0.19)	(0.47)
Q6: provide feedback to pupils	0.24	0.21	0.21
	(0.17)	(0.2)	(0.3)
Q7: encourage pupils' critical thinking	0.19	0.22	-0.16
	(0.17)	(0.19)	(0.39)
Q8: promote autonomy in classrooms	0.18	0.17	0.23
	(0.14)	(0.17)	(0.34)
Q9: encourage perseverance	0.36**	0.42**	0.04
	(0.17)	(0.18)	(0.41)
Q10: promote pupils' social and collaborative skills	0.14	0.13	-0.10
	(0.19)	(0.21)	(0.36)
Q11: teacher is actively leading	0.03	0.02	-0.32
	(0.07)	(0.08)	(0.26)
Q12: enough materials for all pupil	0.00	-0.12	0.46*
	(0.13)	(0.14)	(0.24)
Q13: motivate pupils	0.50	0.62	-1.74*
	(0.54)	(0.58)	(0.95)
Q14: accurate lesson plan	0.87	1.09	-2.26
	(0.73)	(0.79)	(1.43)
Q15: check pupil performance	0.68	0.85	-2.94*
	(0.55)	(0.59)	(1.5)
Q16: respond to pupils	0.83	0.82	-0.97
	(0.54)	(0.59)	(1.44)
Q17: help pupils to learn	-	-	-
	-	-	-

Notes: There was no variation from baseline to midline for Q17 - all teachers answered yes at both rounds

Appendix Table 1.7.1: Class Size Differences in Learning Outcomes, by Assessment, Sub-skill, and Grade					
Assessment	Sub-skill	Grade	Baseline		Interaction effect
			Large class size (mean and standard deviation)	Difference large–small class size	Small class size* treatment effect
EGRA	Proficiency	P1	0.01	0.07**	0.1
			(0.1)	(0.03)	(0.2)
		P2	0.09	-0.02	-0.05
			(0.28)	(0.03)	(0.19)
	Reading fluency	P1	0.15	0.4**	-5.87
			(0.07)	(0.18)	(5.35)
		P2	2.35	0.33	-0.37
			(4.58)	(0.62)	(5.52)
	Reading comprehension	P1	0	0	-0.11
			(0.01)	(0.00)	(0.08)
		P2	0.01	0.01	-0.07
			(0.04)	(0.00)	(0.1)
EGMA	Proficiency	P1	0	0.02	0.08
			(0.5)	(0.01)	(0.09)
		P2	0	0	-0.07
			(0.05)	(0)	(0.11)
	Level 1 Addition	P1	2.05	1.48**	3.92*
			(2.61)	(0.56)	(2)
		P2	5.01	0.12	-1.06
			(3.48)	(0.47)	(1.96)
	Level 1 Subtraction	P1	1.42	1.46**	2.49
			(2.32)	(0.49)	(1.74)
		P2	3.82	0.45	-1.86
			(3.28)	(0.62)	(1.87)
LEGRA	Proficiency	P1	0.08	0.03	0.04
			(0.27)	(0.03)	(0.17)
		P2	0.12	0	0.06
			(0.33)	(0.04)	(0.16)
		P3	0.23	-0.06	-0.12
			(0.42)	(0.06)	(0.19)
	Reading fluency	P1	3.37	0.97	4.5
			(6.04)	(0.85)	(5.57)
		P2	12.84	0.9	4.98
			(10.7)	(1.71)	(6.64)
		P3	31.85	-4.14	-9.33
			(19.44)	(3.18)	(15.13)
LARS	Literacy	P3	0.19	0.02	-0.02
			(0.18)	(0.03)	(0.07)
	Numeracy		0.21	0.02	-0.03
			(0.2)	(0.03)	(0.08)

Notes: Small class size is defined as class size below the 50th percentile; large class size is defined as class size above the 50th percentile.

Appendix Table 1.7.2: Gender Differences in Learning Outcomes, by Assessment and Sub-Skill

		Baseline		Treatment effect		
Assessment	Sub-skill	Score for boys	Difference girls-boys	Boys	Girls	Statistically significant?
EGRA	Proficiency	0.05	0.02**	0.16**	0.19**	No
		(0.22)	(0.008)	(0.07)	(0.07)	
	Proficiency - Nursery	0.06	0.02	0.26***	0.28***	No
		(0.24)	(0.02)	(0.08)	(0.1)	
	Proficiency - P1	0.02	0.01	0.27**	0.24**	No
		(0.14)	(0.01)	(0.1)	(0.11)	
	Proficiency - P2	0.07	0.02	0.01	0.07	No
		(0.25)	(0.02)	(0.1)	(0.1)	
	Reading fluency	1.28	0.28	3.78	5.68**	Yes
		(3.56)	(0.18)	(2.37)	(2.7)	
	Reading comprehension	0.001	0.003***	0.09***	0.08***	No
		(0.02)	(0.001)	(0.03)	(0.03)	
EGMA	Proficiency	0.005	0.002	0.1***	0.1***	No
		(0.07)	(0.003)	(0.03)	(0.03)	
	Proficiency - Nursery	-	-	-	-	-
	Proficiency - P1	0.01	0.001	0.14***	0.15***	No
		(0.1)	(0.007)	(0.5)	(0.04)	
	Proficiency - P2	0.002	0.004	0.16**	0.16***	No
		(0.05)	(0.004)	(0.06)	(0.06)	
	Level 1 addition	2.69	0.07	3.26***	3.02***	No
		(3.45)	(0.14)	(0.77)	(0.76)	
	Level 1 subtraction	2.08	0.04	3.0***	3.1***	No
		(2,91)	(0.11)	(0.7)	(0.7)	
LEGRA	Proficiency	0.12	0.24*	0.23***	0.19***	No
		(0.33)	(0.01)	(0.07)	(0.07)	
	Proficiency - P1	0.06	0.06**	0.27***	0.21**	No
		(0.24)	(0.02)	(0.09)	(0.1)	
	Proficiency - P2	0.13	-0.02	0.21**	0.18*	No
		(0.33)	(0.02)	(0.09)	(0.1)	
	Proficiency - P3	0.18	0.03	0.21**	0.2*	No
		(0.29)	(0.02)	(0.1)	(0.10)	
	Reading fluency	15.04	1.40***	9.54**	8.54**	No
		(17.17)	(0.47)	(3.96)	(3.64)	
LARS	P3 Literacy	0.05	0.03	0.02	-0.06	No
		(0.21)	(0.02)	(0.08)	(0.08)	
	P3 Numeracy	0.14	-0.02	0.12	0.13*	No
		(0.35)	(0.02)	(0.08)	(0.08)	
	P6 Literacy	0.3	-0.12***	0.004	0.05	No
		(0.46)	(0.03)	(0.08)	(0.08)	
	P6 Numeracy	0.17	-0.07***	0.07	0.07	No
		(0.38)	(0.02)	(0.09)	(0.06)	

Appendix Table 1.7.3: LARS - Percent Improvement Over Expected Performance, by Sub-Skill And Grade					
Sub-skill	All	P3, Literacy	P3, Numeracy	P6, Literacy	P6, Numeracy
Proficient	10%	-9%	21%	7%	24%
Percent marks	4%	-5%	16%	2%	2%

Figure 1.7.1: Relationship Between Percentage of Post-Secondary Qualification Teachers and Programme Effects on Reading Comprehension

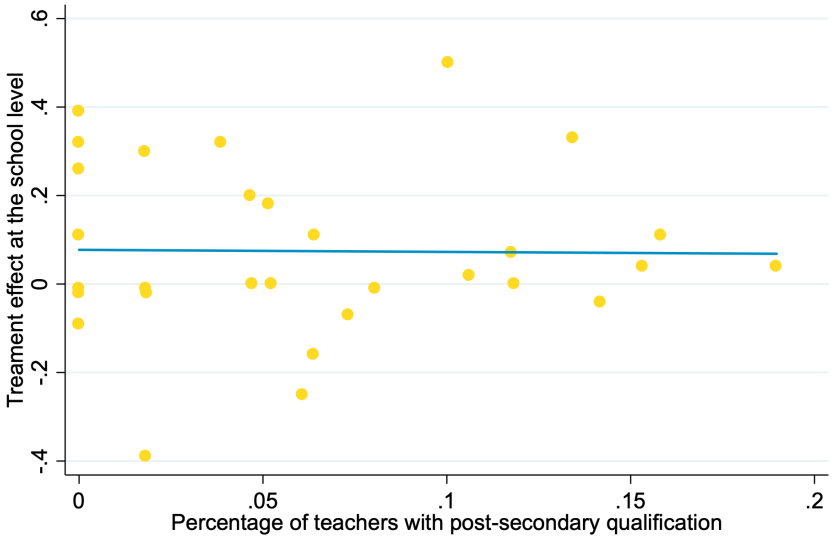


Figure 1.7.2: Relationship Between Teacher Qualification and Programme Effects on Level 1 Addition

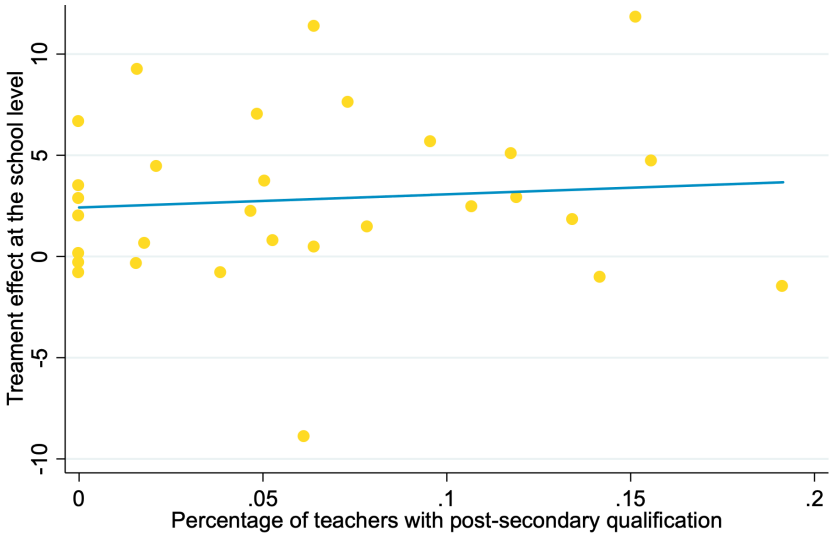


Figure 1.7.3: Relationship Between Teacher Fluency and Speaking Scores

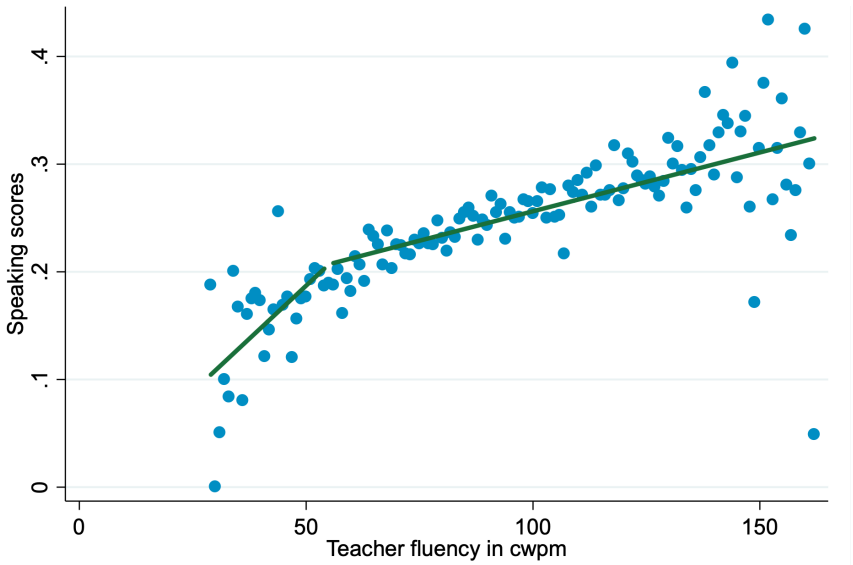
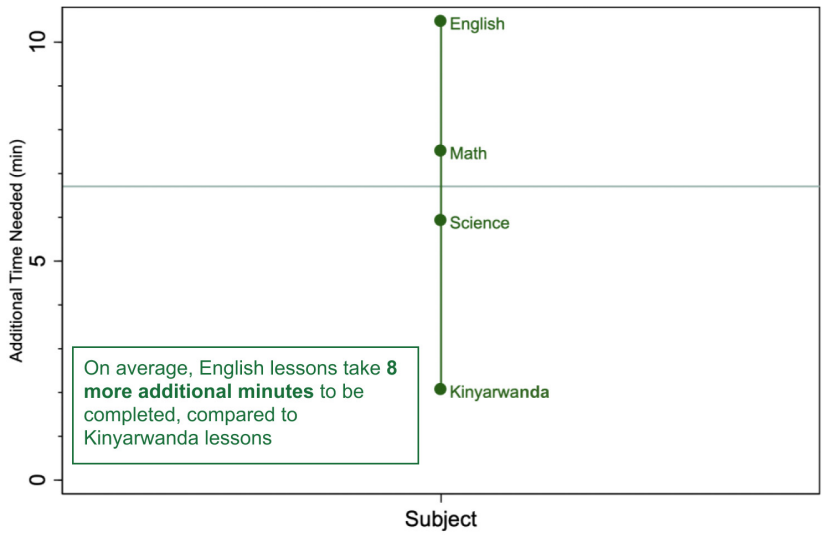


Figure 1.7.4: Average Additional Time Needed to Complete the Lesson at Pace by Subject in RwandaEQUIP Program



Appendix 2: Technical Details on the Selection of the 30v30 Schools

A more extensive technical description of the selection process is provided here for the 30 treatment schools and 30 comparison schools in light of the propensity-score matching technique used:

1. We began with the set of 299 schools included in the census, and the 27 variables outlined below. Missingness for these 27 variables across the 299 schools was low: 13 variables had no missing values, and for those with some missingness, the missingness rate was only 1.4%. Across all observations, the missingness rate was 0.7%.

2. Given the relatively low number of observations in the census, we preferred to minimise the extent to which missingness on a given variable disqualified an observation from being considered. Therefore, variables were separated into those that had no missingness, and those that had at least one observation for which its value was missing. Through ordinary-least squares, each of the variables was regressed that had at least one missing value on the full subset of variables without missing values, and these regression coefficients were used to predict, and hence impute, the missing cells for this variable. Indicator variables were also created that highlighted whether the value of each observation for a given variable was missing. This yielded a dataset of 299 observations and 27 core variables with no missingness, as well as an additional subset of variables with indicators for whether each observation was missing a value for that specific variable.

3. Using the complete data set, a logistic regression was run using an indicator of whether each school was part of the 100 RwandaEQUIP schools or not as the dependent variable. The independent variables consisted of the set of 27 covariates along with their respective indicators for missingness.

4. Using the results of the logistic regression, a propensity score for all 299 schools was created, which indicated the likelihood of being selected into the set of 100 RwandaEQUIP schools.

5. Stratifying by province, the propensity score was leveraged to find a pair for each treatment school within the pool of comparison schools. This was done using a “nearest neighbour” approach (nn=1) without replacement, and using the psmatch2 command in Stata with a calliper of 0.50. This approach yielded 40 potential pairs of treatment and comparison schools that were in the common support area of the propensity scores within their provinces. 30 of these potential pairs were randomly selected to be included in the sample.

6. Finally, balance tests were run to ensure that these 60 schools were balanced on covariates — that is, representative on observables, of the 100 RwandaEQUIP schools, and that the 30 treatment and 30 comparison schools within this sample were also balanced. The balance tests were conducted through regression-adjusted frameworks, and the balance test between treatment and comparison schools also include fixed-effects for each pair, akin to strata fixed-effects.

School-Level Characteristics Included in Analysis

- Population count in 5-km radius around school
- Population 5-14 count in 5-km radius around school
- Population density in 5-km radius around school
- School is in Eastern province
- School is in Kigali
- School is in Northern province
- School is in Southern province
- School is in Western province
- ECD is currently available
- Schools have internet connectivity
- School was a duplicate in the census
- Total pupils according to SDMS
- Total pupils in ECD, according to census
- Total pupils in primary, according to census
- Total number of teachers, according to census
- School-level pupil-teacher ratio

Schools Selected for M&E Plan on Year 1

Comparison Schools		Treatment Schools	
Name	District	Name	District
Curugusi	Gakenke	Bumba	Gakenke
E.P. Gafunzo	Ngoma	E.P. Cyuga	Gasabo
E.P. Kageshi	Rubavu	E.P. Kiryi	Musanze
E.P. Karugira	Kicukiro	E.P. Mbatabata	Gakenke
E.P. Gasagara	Gasabo	E.P. Muhira	Rubavu
E.P. Kigarama	Ngoma	E.P. Rubago	Ngoma
E.P. Rugeshi	Musanze	E.P. Yaramba	Nyaruguru
G.S. Nkanka	Rusizi	G.S. Muganza Ii	Kamonyi
G.S. Kirwa	Gicumbi	G.S. Muhondo	Gicumbi
G.S. Bibare Ngarama	Gatsibo	G.S. Gatizo	Kamonyi
G.S. Kabirizi B	Ngoma	G.S. Jarama	Ngoma
G.S. Masaka 1	Kicukiro	G.S. Kimisange	Kicukiro
G.S. Muhato	Rubavu	G.S. Kigina	Kirehe
G.S. Sheli	Kamonyi	G.S. Muyange	Kicukiro
G.S. St J Bosco Kamonyi	Kamonyi	G.S. Ryabizige	Rubavu
G.S. Bisagara	Kirehe	G.S. Saint Vincent Pallotti Gikondo	Kicukiro
G.S. Kagarama	Nyaruguru	G.S. Gahengeri	Karongi
G.S. Kivumu	Musanze	G.S. Gakiri	Gatsibo
G.S. Mugogo	Kirehe	G.S. Kimironko I	Gasabo
G.S. Musave	Gakenke	G.S. Munini	Nyaruguru
G.S. Mutongo	Rusizi	G.S. Murambi I	Gatsibo
G.S. Nyamiyaga	Nyamagabe	G.S. Nyinawimana	Gicumbi
G.S. Rubingo	Gasabo	G.S. Nyabikiri	Gatsibo
G.S.. Gasaka	Nyamagabe	G.S. Nyarubuye	Gatsibo
G.S.ndg Janja	Gakenke	G.S. St Dominic Gihara	Kamonyi
Kabusunzu Ps	Gatsibo	Kibali	Gicumbi
Kanogo	Ngororero	Kuruganda	Karongi
Kinunga Ps	Kicukiro	Mujyojyo	Karongi
Marimba Primary School	Gatsibo	Nyange P	Ngororero
Muramba A	Ngororero	Zaza B P/S	Ngoma

Appendix 3: Approval and Co-Design of Study with Government Entities

REB RWANDA BASIC EDUCATION BOARD

Kigali,...10.../...6...../2022
No: 3396./REB/01/2022

The Mayor of District: Kamonyi, Nyaruguru, Karongi, Musanze, Ngororero, Rubavu, Gatsibo, Kirehe, Ngoma, Gakenke and Gicumbi Districts

The District Executive Administrator: Gasabo and Kicukiro Districts

Dear Madam/Sir,

RE: Introduction of the RwandaEQUIP team to conduct End of Year Assessment in selected schools.

The Rwanda Quality Improvement Programme ("RwandaEQUIP") is a core new education programme by the Government of Rwanda to deliver improvements in learning outcomes in public and government-subsidized primary schools.

RwandaEQUIP started activities in 100 schools in January 2022. In order to establish the values of program performance indicators in learning, teaching and school management practices, RwandaEQUIP will conduct a Baseline Assessment in 60 schools (find the attached list).

It is in this regard that we request you to facilitate the RwandaEQUIP team that will be carrying out the end of year assessment to interact with headteachers, the teachers, and the pupils in order to successfully collect the data.

The assessment will take place from the 13th to the 24th of June 2022. Please find enclosed the list of schools that will be visited. For further information, you may contact Mr. Jules NTABWOBA, with tel; 0788315663 and email: jules.ntabwoba@rwandaeuip.org.rw.

Yours sincerely,

RWANDA BASIC EDUCATION BOARD (REB)

Dr. MBARUSHIMANA Nelson
Director General
Cc:

- Hon. Minister of Education
- Hon. Minister of Local Government
- Hon. Minister of State in charge of Primary and Secondary Education
- Hon. Minister of State in charge of ICT and TVET
- Permanent Secretary/MINEDUC
- Mayor of Kigali City
- Governor of Province (all)
- Director General/NESA

Rwanda Basic Education Board
P.O. BOX 3817, Kigali, Rwanda
Toll Free 3020
info@reb.rw
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REB RWANDA BASIC EDUCATION BOARD

SCHOOL LIST FOR RWANDAEQUIP END OF YEAR ASSESSMENT

School Name	Province	District	Sector
G.S KABIRIZI B	EAST	Ngoma	Karembo
G.S Kigina	EAST	Kirehe	Kigina
G.S BIBARE NGARAMA	EAST	Gatsibo	Ngarama
GS Nyarubuye	EAST	Gatsibo	Kabarore
E.P GAFUNZO	EAST	Ngoma	Sake
G.S JARAMA	EAST	Ngoma	Jarama
GS BISAGARA	EAST	Kirehe	Mushikiri
EP RUBAGO	EAST	Ngoma	Rukumberi
KABUSUNZU PS	EAST	Gatsibo	Rwimbogo
GS GAKIRI	EAST	Gatsibo	Gitoki
GS MUGOGO	EAST	Kirehe	Gahara
GS Nyabikiri	EAST	Gatsibo	Kabarore
MARIMBA PRIMARY SCHOOL	EAST	Gatsibo	Kabarore
ZAZA B P/S	EAST	Ngoma	Zaza
EP KIGARAMA	EAST	Ngoma	Rurenge
GS Murambi I	EAST	Gatsibo	Murambi
GS RUBINGO	KIGALI	Gasabo	Jali
G.S MUYANGE	KIGALI	Kicukiro	Kagarama
E.P KARUGIRA	KIGALI	Kicukiro	Kigarama
GS KIMIRONKO I	KIGALI	Gasabo	Kimironko
G.S MASAKA 1	KIGALI	Kicukiro	Masaka
E.P CYUGA	KIGALI	Gasabo	Jali
KINUNGA PS	KIGALI	Kicukiro	Gikondo
G.S KIMISANGE	KIGALI	Kicukiro	Kigarama
EP GASAGARA	KIGALI	Gasabo	Rusororo
G.S Saint Vincent Pallotti Gikondo	KIGALI	Kicukiro	Gikondo
G S KIRWA	NORTH	Gicumbi	Rutare
G S MUHONDO	NORTH	Gicumbi	Kageyo
GS MUSAVE	NORTH	Gakenke	Gakenke
KIBALI	NORTH	Gicumbi	Byumba
EP RUGESHI	NORTH	Musanze	Cyuve
BUMBA	NORTH	Gakenke	Muyongwe
GS KIVUMU	NORTH	Musanze	Kimonyi
GS NYINAWIMANA	NORTH	Gicumbi	Nyamiyaga
GSNDG JANJA	NORTH	Gakenke	Janja
EP MBATABATA	NORTH	Gakenke	Kamubuga
CURUGUSI	NORTH	Gakenke	Muzo
EP KIRYI	NORTH	Musanze	Muhoza
GS. GASAKA	SOUTH	Nyamagabe	Gasaka
G.S GATIZO	SOUTH	Kamonyi	Gacurabwenge
G.S ST J BOSCO KAMONYI	SOUTH	Kamonyi	Gacurabwenge
GS MUNINI	SOUTH	Nyaruguru	Munini
GS KAGARAMA	SOUTH	Nyaruguru	Nyagisozi
GS ST DOMINIC GIHARA	SOUTH	Kamonyi	Runda

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REB RWANDA BASIC EDUCATION BOARD

G.S SHELI	SOUTH	Kamonyi	Rugarika
EP YARAMBA	SOUTH	Nyaruguru	Ngera
GS NYAMIYAGA	SOUTH	Nyamagabe	Kaduha
G S MUGANZA II	SOUTH	Kamonyi	Runda
GS MUTONGO	WEST	Rusizi	Mururu
G.S RYABIZIGE	WEST	Rubavu	Cyanzarwe
KANOGO	WEST	Ngororero	MUHORORO
GS GAHENGERI	WEST	Karongi	Rugabano
G.S MUHATO	WEST	Rubavu	Gisenyi
MUJYOJYO	WEST	Karongi	Murundi
G S NKANKA	WEST	Rusizi	Nkanka
EP MUHIRA	WEST	Rubavu	Nyakiriba
E.P KAGESHI	WEST	Rubavu	Busasamana
NYANGE P	WEST	Ngororero	NGORORERO
MURAMBA A	WEST	Ngororero	HINDIRO
KURUGANDA	WEST	Karongi	Murundi

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MINEDUC, NESA and RwandaEQUIP M&E Workshop Report

November 17th to 19th, Musanze

1. Background

RwandaEQUIP will establish the Baseline Performance and measure performance of Key Performance Indicators (KPIs) against Baseline Performance. To measure performance against these KPIs, a matched set of non-RwandaEQUIP public schools will be chosen using previous performance and demographic data to establish that they will form an accurate comparison group to the schools chosen for RwandaEQUIP. The performance of these matched sets of non-RwandaEQUIP public schools on KPIs will form the Baseline Performance ("Baseline Performance") to which performance of RwandaEQUIP schools will be compared. RwandaEQUIP performance will be compared to Baseline Performance to determine how much improvement above Baseline Performance has been achieved compared to the target for that KPI (Annex A shows the list of all KPIs)

RwandaEQUIP will conduct a baseline assessment to monitor the achievement levels of students in the early grades with regard to foundational skills in literacy and numeracy, prior to the deployment of RwandaEQUIP's full interventions in January 2022. The baseline assessment will provide rich performance and contextual data that can be used for comparison with midline and endline studies after the introduction of RwandaEQUIP interventions. This will allow RwandaEQUIP, Rwanda Ministry of Education (MINEDUC), and other stakeholders to understand and highlight the progress achieved through the RwandaEQUIP Programme.

For this purpose, RwandaEQUIP organized a 3-days (17-19 November 2021) workshop prior to the baseline assessment to develop and adapt baseline tools in consultation with education experts from MINEDUC, REB and NESA. The ideal situation was for MINEDUC/NESA/REB staff to participate throughout the entire baseline process.

2. Expected outcomes

At the end of the workshop, the participants were able to:

- Understand the tools that will be used, able to run the baseline exercise in collaboration with RwandaEQUIP team and aligned on the approach to select the control schools
- Develop EGRA tools for N3, P1 and P2
- Develop EGMA tools for N3, P1 and P2
- Develop classroom observation tool
- Develop headteacher and teacher questionnaires for baseline

3. Objectives of the baseline assessment

- The baseline will help RwandaEQUIP and MINEDUC establish the values of program performance indicators before the implementation of RwandaEQUIP intervention activities, which will subsequently be compared to future values collected at midline and endline timepoints to evaluate the impact of the program.
- To determine the literacy and numeracy levels of pupils prior to the deployment of RwandaEQUIP's full interventions in January 2022
- To provide a basis for future action in the public education system

4. DAY ONE: 17th November 2021

On day one, the workshop was met with general enthusiasm and interest from participants. The following topics were explained to the participants: Introduction to RwandaEQUIP (by RwandaEQUIP Partnerships & Policies Director), RwandaEQUIP Teacher Guides (by NewGlobe VP Academics), Objectives of the Baseline Assessment (by RwandaEQUIP M&E Director) and then participants spent a half day learning and validating baseline instruments (EGRA and EGMA).

5. DAY TWO: 18th November 2021

On the second day of the workshop, participants were explained LEGRA (Local Early Grade Reading Assessment); then, the participants spent time discussing Baseline complementary instruments (lesson observation form, teacher questionnaire and headteacher questionnaire).

6. DAY THREE: 19th November 2021

On the third day of the workshop, participants started with a discussion and agreement on subtasks to administer to each grade level (N3, P1 and P2):

EGRA Subtask	**N3**	**P1**	**P2**
Listening comprehension			X
Sound identification		X	X
Phonemic awareness (word BEGINS WITH A DIFFERENT SOUND)		X	X
Letter sound knowledge			
Oral Vocabulary	X	X	X
Letter names identification	X	X	X
Identify onset sounds		X	X
Non-Word Reading			X
Familiar Word Reading		X	X

Passage fluency		X	X
Reading comprehension			X

EGMA Subtask	**N3**	**P1**	**P2**
Oral counting	X	X	
One-to-one correspondence	X	X	
Number identification	X	X	X
Quantity discrimination	X (using objects to count or compare)	X	X
Missing numbers		X	X
Addition level I	X (using objects, e.g. bottle tops)	X	
Addition level II		X (Set questions without carrying over)	X
Subtraction level I	X (using objects)	X	
Subtraction II			X
Word Problems (use familiar terms)	X (using objects)	X	X
Multiplication		X (multiply by 2)	X
Division			X
Shape attributes	X	X	X

The workshop ended with closing remarks by the Director General of Education Sector Planning, Monitoring & Evaluation at the Ministry of Education. He emphasized the importance of RwandaEQUIP to increase the learning outcomes in Rwandan schools. He suggested that RwandaEQUIP should share activity plan/implementation plan for phase 1; identifying all activities that will be conducted and specify roles and responsibilities for different stakeholders who will be involved in the implementation of the programme.

Participants photo with DG Planning, Monitoring & Evaluation at MINEDUC.

7. Challenges

- On day one, participants were late due to the delay in getting approval letters from NESA
- Topic about LARS was not covered in the workshop because the participants didn't have much information to share about it
- Participants complained about getting the allowances (per diems) for motivation. This would be addressed in subsequent meetings

8. Next Steps (Upcoming Priority Activities)

Task	Timeline	Methodology
School Sampling (30 vs 30) and Field plan (logistics)	22-26 Nov	30 Rwanda EQUIP schools will be randomly selected from 100 schools in districts identified for participation in phase 1 Program (sample will be driven by different factors: geographical distribution...). For each selected Rwanda EQUIP school, find the best matched school for control in the same cell from the same districts of the phase 1 Program
Baseline Assessment Training (data collection prep)	29 Nov-3 Dec	Training on data collection instruments, methodology, data quality and ethics

Field data collection	6 -10 Dec	Baseline: EGRA and EGMA (N3, P1 and P2)
Data monitoring and cleaning	13-15 Dec	
Analysis preparation	16-17 Dec	
Analysis and reporting	20 Dec-28 Jan	
Presentation of baseline findings	31 Jan-2 Feb	Findings from the baseline assessment would be presented to MiNEDUC and NESA

9. List of participants

#	Name	Organization/Title
1	Marthe UWIRINGIYIMANA	NESA/Examination Officer
2	Pascasie MUKANDERA	NESA/Examination Officer
3	Leon NSENGIMANA	NESA/Examination Officer
4	Barnabe KABAYIZA	NESA/TTC Assessment Officer
5	Anaclet MUHAYA	NESA/Examination Officer
6	Joseph BISENGIMANA	MINEDUC/Planning, M&E Specialist
7	Jean François RUBANDA	NESA/Examination Officer
8	Johnson NDAYAMBAJE	NESA/Director of Languages Subjects Question Item Bank Unit
9	Martin ARABARUTA	RwandaEQUIP/Instructional Design Manager
10	M. Clemence UMUHOZA	RwandaEQUIP/Academic Manager
11	Pierre Claver HABIMANA	RwandaEQUIP/M&E Director
12	Funmilayo AYENI	NewGlobe/Impact Director
13	Geri MEZZONI	NewGlobe/Director Academics
14	Timothy Sullivan	NewGlobe/Vice President Academics
15	Christophe NSENGIYAREMYE	MINEDUC/Director General Planning, M&E
16	Jules Ntabwoba	RwandaEQUIP/ Director, Policy and Partnerships
17	Ibtihal Arafat	RwandaEQUIP/ Manager, Policy and Partnerships.


77%
Numeracy - Imibare
13:19
Save and Exit
7. There's Sunday and there's Monday.
8. There's Tuesday and there's Wednesday.
9. There's Thursday and there's Friday.
10. And then there's Saturday.
11. Very good.
Gusoma Indangaminsi – Iminota 4
1. Tugiye gusoma Indangaminsi.
2. Ndavuga musiberemo.
3. Ku wa mbere (Ikumenyetsol Ku wa mbere.
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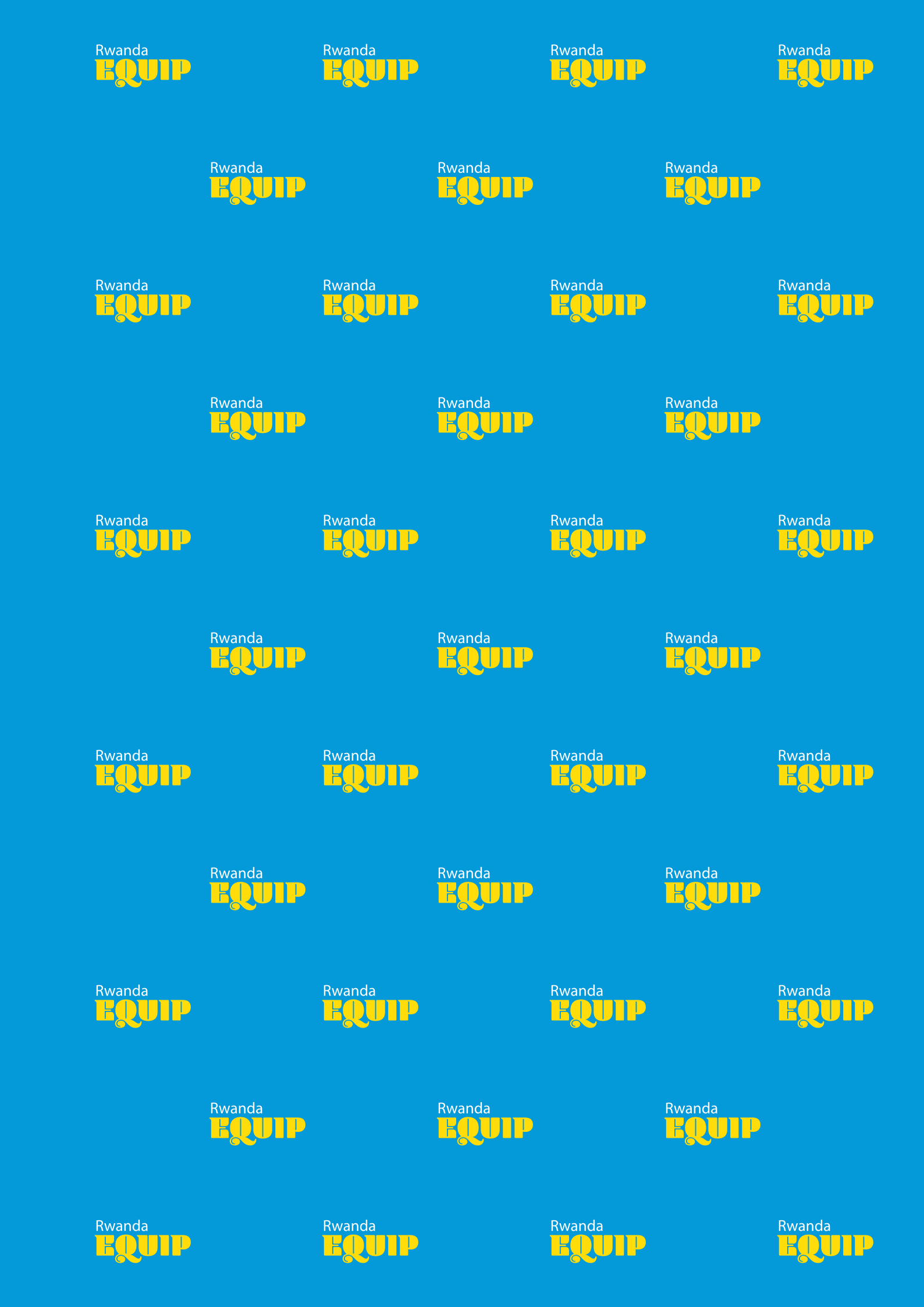
Rwanda
EQUIP

Rwanda EQUIP Education Quality Improvement Program

A Government of Rwanda Initiative

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