



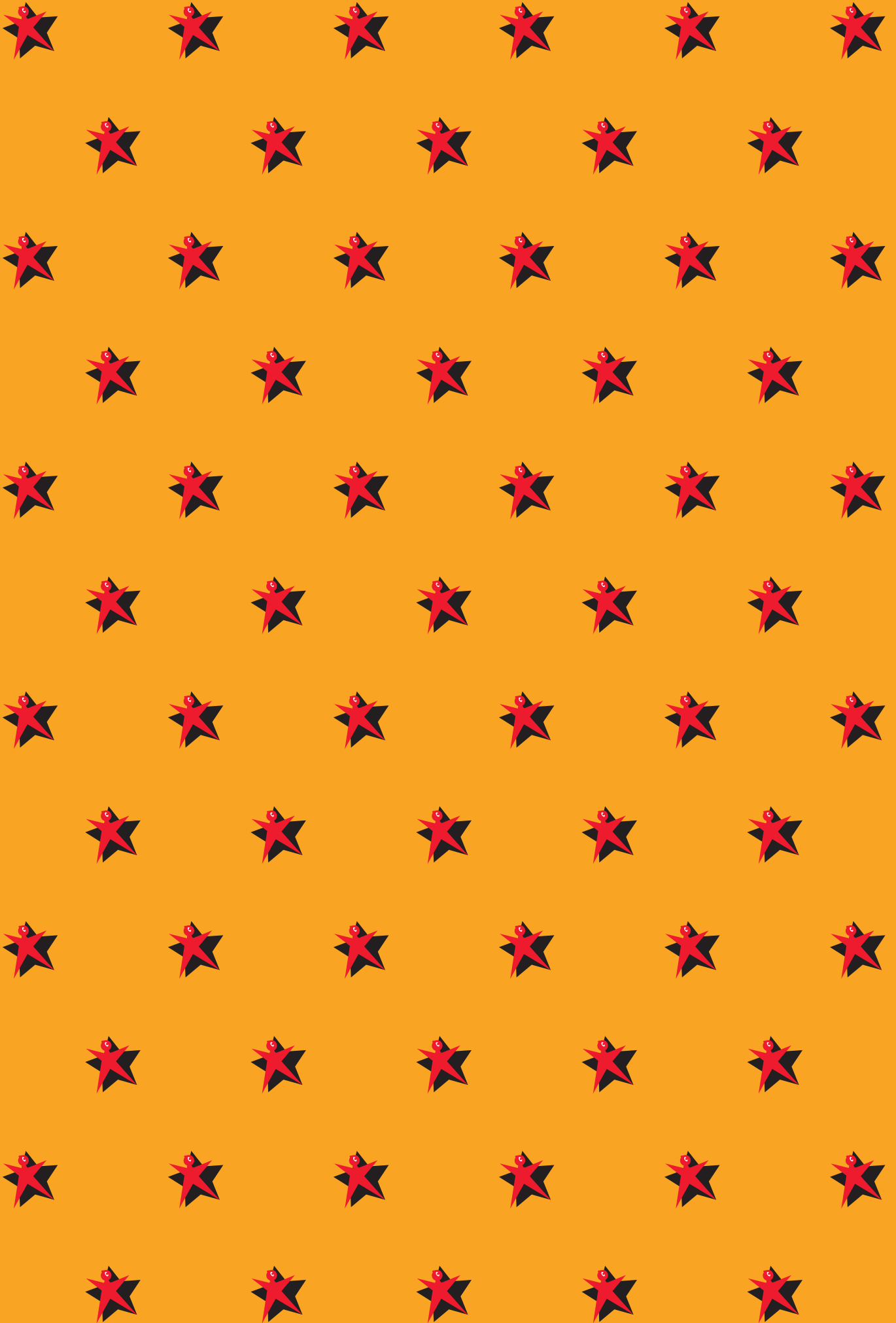
A
Government
of Manipur
Initiative

Can Data-Informed Management and Structured Pedagogy Improve Learning?

Evidence from Government Schools in Manipur

By the End of the 2022–23 School Year After 18 Weeks of Instruction





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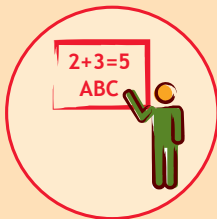


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Executive Summary



The STAR Education programme was introduced in **252 schools across Manipur** in July 2022 for **Standards VI–X**.



Before the start of the programme, students demonstrated severe deficits in foundational reading and mathematics performance. **More than 15% of Standard VI students could not read a single word** from a grade-level passage, and the **average student across Standards VI–X read 70 correct words per minute (cwpm)**, which is the reading fluency rate of the lowest performing Standard III students according to international standards. Similarly, more than **three in five Standard VI–X students could not solve a division problem** in the form of $93 \div 7$, even though this is usually expected by Standard IV to meet national benchmarks.



After the first 18 instructional weeks, dramatic improvements were seen in reading. Students' **reading fluency rate has increased by 12% more than at non-STAR Education schools**, and the share of **non-readers has decreased 67%** more than it would have absent the programme. A metric akin to **Learning Deprivation decreased from 58% to 34%**, a change that places Manipur's literacy level closer to that of some upper-middle-income countries.



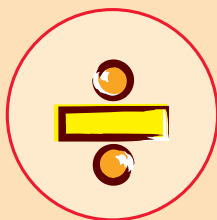
The first 18 weeks also produced stronger mathematics outcomes. Students' **scores on grade-level fraction problems increased 200%** more than they would have without the programme, and their ability to correctly solve **word problems increased 61%** more than it would have without the programme.



STAR Education's effectiveness after only 18 weeks of instruction is far greater than what is typically seen in the majority of educational interventions in low- and middle-income countries (LMIC). The programme's impact on reading proficiency, calculated as 0.22 standard deviations, means that STAR Education is **more successful than 4 in 5 education initiatives**. In mathematical proficiency, the STAR Education programme's impact has been even greater (0.43 standard deviations) – **an effect that is larger than that of 9 out of 10 education programmes**.



The solid foundations in learning built through the STAR Education programme have resulted in **improved performance on higher-level tests**. The HSLC passing rate of Standard X students in STAR Education schools grew at **twice the rate as that of students in non-STAR Education schools**.



The STAR Education programme is supporting learning in both hill and valley regions. In reading, both regions achieved learning gains greater than they would have without the programme, and **in maths, students from hills and valleys made equal gains**, earning 7 percentage points more on their total maths scores than they would have absent the programme.



The launch of STAR Education has strengthened public trust in the education system, as evidenced by the **increased number of enrolled students with regular attendance from 16,000 to 23,000** over the course of 18 weeks.

In Numbers...

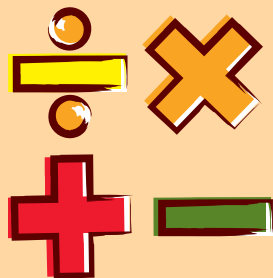
76% fewer non-readers in STAR Education schools than in non-STAR Education schools after 18 weeks.



10 additional cwpm gained in STAR Education schools over non-STAR Education schools.



7.5 percentage points higher average score on the international foundational numeracy assessment than what would have been achieved without the programme.



Standard X students in STAR Education schools passed the **HSLC** at a **rate of 7 percentage points higher** than before the programme – an improvement twice that of students in non-STAR Education schools.

7 % higher







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I. Preamble

Foreword by Ranjit Koshi, Acting Managing Director

Empowering Manipur's Future: The STAR Education Initiative

The Government of Manipur is committed to equipping citizens with the tools they need to live better lives. Among many important priorities, providing education for the children of Manipur is foremost, as they are the future of our State. The Government of Manipur recognises the importance of education, and as such, has implemented powerful interventions in recent years to improve its quality. To be truly successful in this pursuit, supporting every individual student's achievement must be at the system's core. In July 2022, the Government of Manipur launched the System for the Transformation and Rejuvenation (STAR) of Education to achieve this ambitious goal. This programme complements and builds on previous educational investments by leveraging key resources in order to equip today's children with the knowledge and skills they need to become leading, prosperous members of society. This initiative is powered by the use of cutting-edge technology and continuous, evidence-based insights and is devoted to improving the efficacy of the Manipuri education sector.

In only its first 18 weeks of instruction, students under the STAR Education programme experienced tremendous growth in foundational reading and mathematics, outpacing gains seen in other education initiatives around the world. As a result of strengthened foundational skills, students in STAR Education schools achieved an increase in the High School Leaving Certificate (HSLC) passing rate that is double the rate for schools outside the programme, which shows that student performance has reached a historical high at a crucial time in these students' academic careers. The clear improvements in student performance has enabled the programme to gain the larger community's trust in the public education system. Even before the first term of the programme had ended, thousands of new students enrolled in STAR Education schools while those who were enrolled already greatly increased their attendance. These accomplishments are vital, as they foster students' ability to achieve their full potential without hindrance.

For the successes achieved by tens of thousands of students as a result of the STAR Education programme, we sincerely thank all of the teachers, who underwent much transition to deliver life-changing education to their students within the programme's guidelines; the school leaders, who adapted to this programme to motivate teachers and better manage schools; and our technical partner, NewGlobe, for providing the expertise necessary to institute and track the programme over time. We take immense pride in the hard work of all students throughout Manipur, who have put considerable effort into learning, day after day, for the betterment of themselves and their fellow citizens.

Building upon the remarkable progress achieved by the STAR Education programme will require ongoing focus and dedication from all members of the STAR Education team, including those on the ground in all of our schools across the state. The following report details the laudable accomplishments and areas of improvement for the programme. It is with the utmost confidence in our education system's capacity for growth that we will continue to nurture emergent strengths from the programme's initial instructional period and learn from areas for improvement. Our aim is to continue providing students and educational staff with the tools, guidance, and environment that allow them to strive for excellence each day. The Government of Manipur is committed to the continued implementation of the STAR Education programme, which promises strong learning outcomes and a bright future for Manipur.

Ranjit Koshi, Managing Director



Acknowledgements

The successful completion of this study is due to the support and instrumentality of many people. First, we would like to thank the Honourable Chief Minister of Manipur, Nongthombam Biren Singh, for his commitment to the transformation of public education in Manipur and for creating an enabling environment for us to conduct this study. We sincerely appreciate the Education Minister, Thounaojam Basanta, for his visionary leadership and guidance and the Director of Education, Laishram Nandakumar, and his entire team, for the partnership and support they provided throughout the planning and execution of this study.

We would also like to thank all school head teachers and teachers who welcomed the study teams into their schools and classrooms. We are grateful for the input and guidance of Tim Sullivan, Tobias Mitchell, Marlee Mullane, and Savannah Tierney.

Finally, we owe our deepest gratitude to the field team, the backbone of this project: Hoih Thienmuon, Homsing Chamroy, Krishnakumar Naorem, Maurice Thiyam, Nandakumar Yumnam, Ngakuimi Kumrah, Nianglunmang, Ningombam Riteshkumar Singh, Ningthoujam Tarzan Meitei, Nitesh Khangembam, Rajkumari Julia Devi, Robinson Kamei, Shougrakpam Lomit Singh, Sipiangelung Gonmei, Sochan Rimai, Sualiangam Chaithu Aimol, Thiyam Bijendra, Vickson Pauminthang, Victor Ningthoujam, Laishram Karamjit Singh, Ronald Panmei, Maurice Thiyam, Moirangthem Rabichandra Singh, Nitesh Singh Khangembam, Thiyam Phalguni Singh, Guangloungam Gangmei, Ningthoujam Asharani Devi, Bikram Khumanthem, Robinson Kamei, Sipiangelung Gonmei, Patrick Shangh, G. Chinkhankap, Lhingneineng Singson (Pinky), and Yaoreiwung Shimray.

II. The STAR Education Programme

Overview of the Programme

The Manipur State Government put forth a bold vision to transform the quality of public education across the state in order to ensure that all pupils reach their full potential. In July 2022, it launched the System Transformation and Rejuvenation (STAR) of Education programme. STAR Education is a holistic, 360-degree programme strengthening all aspects of the public Upper Primary and Secondary education system. Through STAR Education, school leaders and teachers are empowered to deliver a transformative education to each child. The programme is dedicated to accelerating learning in all subjects, supporting students to master grade-appropriate competencies, and where necessary, strengthening the foundational reading and mathematics skills upon which higher level competencies are built.

The STAR Education programme is anchored in five core pillars:

1. Scientifically based learning materials aligned to the Manipur State 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 five central goals:

- To support the Government of Manipur to better utilise the existing human and material resources allocated to the public education system
- To build capacity among school leaders and teachers, training them in the use of effective and scientifically based instructional practices that create learning-centric classrooms
- To establish management structures that enable effective governance and ultimately increase the quantity and quality of instructional time that each student receives
- To provide materials that enhance the quality of teaching and learning within each classroom
- To raise learning levels in both foundational skills and in subjects covered by the state and national curricula

The Programme's Reach as of February 2023

<p>The STAR Education programme was introduced in 252 schools across Manipur in July 2022 for Standards VI–X. As of July 2024, the programme has reached 511 schools.</p>	<p>During the first 18 weeks of the programme, enrolment increased by 45% across all grades, which translates to 7,000 newly enrolling students in 18 weeks.</p>	<p>Due to STAR Education's positive impact on student participation, the share of schools with at least one student with regular attendance increased by an average of 15% across grades.</p>
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STAR Education: A Holistic Programme With Integrated Features

Academic planning and lesson mapping

STAR Education drives student learning by providing school leaders and teachers with the tools and support they need to deliver life-changing education to each and every child. Moreover, STAR Education also offers government and programme leaders visibility into the minute-by-minute experience of students, 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 systemwide scale. Importantly, STAR Education schools remain under the purview of the Board of Secondary Education, Manipur (BSEM). As such, they receive the same level of scrutiny and monitoring as do other public schools in Manipur outside of the programme. The key difference is that public schools in the STAR Education programme receive the additional support provided by the programme.

.....

“The lesson plan is the best, I feel, because everything is given step by step, and how much the students should be learning and how much we should teach. I think it is very good according to me.”

- Biology teacher, Ibontonsana Higher Secondary

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Below, the core pillars that enable STAR Education to ensure high-quality learning in each and every classroom are highlighted:

1. Scientifically based learning materials aligned with the state curriculum

One key pillar of STAR Education is the materials that teachers use to ensure that all students master the curriculum and build the necessary English literacy and mathematics skills to excel in their studies. STAR Education 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.

STAR Education enables the teaching of the state curriculum in alignment with the National Education Policy (NEP) while also building foundational skills that serve as building blocks to allow access to all curricular content. STAR Education lesson materials cover all curriculum-mandated subjects, and include lessons that strengthen the core foundational reading and mathematics skills necessary for students to meaningfully engage with and master the content in the state curriculum. Importantly, lesson content in the foundational areas is levelled — that is, adjusted to actual learning levels as measured in schools — so that instruction can be aligned with students’ current learning needs. STAR Education aims to meet students where they are, thus more effectively raising learning levels and guiding progress towards grade-level standards.

The quality of instructional materials is constantly evaluated through several mechanisms. First, continuous and comprehensive assessments of students' learning are administered termly, and the data are automatically captured from these assessments, providing ongoing visibility into students' progress across the entire system. Second, STAR Education programme 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.

2. Technology-enabled instructional model

STAR Education's instructional model is made possible by technology. Teacher guides are shared digitally with teachers through a teacher tablet. These digital teacher guides not only deliver high-quality academic content, but also enable the consistent implementation of pedagogical strategies to ensure that teachers are engaging all students. For example, teachers are provided with prompts to pause for student questions or to facilitate small-group sessions, and they can track which students they have called on, so that they can be sure to call on others. Technology also enables the efficient allocation of time, ensuring that every minute of the school day maximises learning. Lessons are organised by a digital timetable, and the teacher tablet automatically tracks the amount of time spent on each page of a lesson, providing insights into time on task. From the delivery of lesson content to supporting strong pedagogical practices to enabling time management, technology enables STAR Education's instructional model.

3. Data-driven training, coaching, and ongoing professional development

High-quality instructional materials are necessary, but not sufficient to transform teaching and learning in the classroom; in addition, teachers need professional development, as well as ongoing support from school leaders. Another key component of STAR Education is data-driven professional development programmes. The first induction training session of the programme took place in July 2022. In October 2022, to boost implementation fidelity and ensure proper teacher support, a subset of STAR Education schools received additional training. This led to increases in the rates at which teachers faithfully delivered lessons ("lesson completion rates"), and positive responses to the programme from teachers, head teachers, and students. Additional induction training sessions are scheduled at each expansion phase of the programme.

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"I'm observing teachers also, not only students. I'm doing something unique. I control them to do their duty. I feel satisfied because even if I go away, they can manage. They will do it, and make STAR successful. They're all using the tablets."

- Head Teacher W, Moirang Multipurpose Higher Secondary School

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STAR Education 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 students.
- To develop the **mindset** that every student can be successful, that high-quality instruction is possible and leads to improved learning outcomes, and that positive reinforcement is the most effective tool to motivate students.
- To strengthen the **communication strategies** needed to engage with the school community and beyond.

A teacher's support does not end with induction training. STAR Education 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 STAR Education programme.

Importantly, STAR Education empowers school leaders to provide powerful coaching for their teachers. School leaders receive frequent visits from supervisors, during which they conduct joint lesson observations and hone their skills in providing improved feedback to teachers. Thus equipped with the tools and training to monitor performance and observe teachers, school leaders can 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.

4. 360-degree support teams

STAR Education 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?). For quality assurance, a team of School Inspection Associates review school operations both in person and remotely on a regular basis to ensure that all schools maintain an environment conducive to learning. Also, a team of Schools Supervisors checks in with schools daily, and visits in person every other 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.

.....

“The STAR system has greatly unburdened me with respect to managing the timetable of teachers. Earlier, I had to oversee this, but now the teachers themselves know when to switch classes due to the clear timeframe provided by the TG.”

- Head Teacher T, Gandhi Memorial Government High School

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5. Technology-driven monitoring and reporting

The identification and resolution of school-based issues does not only occur during in-person visits. STAR Education tracks all core operational and performance drivers that contribute to learning outcomes – such as student and teacher attendance, lesson completion, school leader coverage, and more – as well as the learning outcomes themselves. Digital tools capture these data automatically and in a decentralised manner; for example, teachers do not need to manually log lesson completion, and school leaders do not need to take teacher attendance. Technology then transforms these data into usable insights for school leaders, which, in turn, enables more effective school management and teacher coaching. These data are also used by STAR Education’s 360-degree support team to identify challenges, resolve issues, support school leaders, and drive improvement at the school level. These data are also available for government and STAR Education 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.



Box 1 Enhancing Learning Outcomes Through Structured Pedagogy

Classroom instruction is one of the most critical components of an education system. No other school-level factors have an impact on student achievement as large as teacher and lesson quality (World Bank Group, 2017). The absence of effective instructional practices can consequently render education inputs and systems futile. One of the most effective ways to maximise instructional quality on a broad scale is to incorporate appropriately scaffolded lessons and curricula which enhance retention, employ proven instructional strategies, and are facilitated by educators possessing a comprehensive understanding of subject matter. Unfortunately, classroom instruction in many low- and middle-income countries lack these critical characteristics. Data collected from 2,600 schools over 7 countries in sub-Saharan Africa show that about 14% of grade 4 language teachers can not spell a simple word like “traffic”, and a similar share can not correctly answer questions on a simple grammar exercise. Moreover, even when teachers do possess an adequate amount of subject matter expertise, it does not guarantee their ability to communicate knowledge to students. The same study found that only 31% of teachers are able to prepare a lesson plan, and an even smaller share of teachers can develop lesson objectives, formulate questions to check students’ understanding, and give feedback (Bold et al., 2017). Given the challenges many teachers face regarding lesson planning, competing time demands, school understaffing, and absenteeism rates, it is highly probable that educators lack both the time and capacity required to develop comprehensive course syllabi.

According to the World Bank, structured pedagogy is a package for educational systems that consists of inputs such as lesson plans, learning materials, and ongoing teacher training. Carefully cultivated, evidence-based, policy recommendations classify structured pedagogy as a highly cost-effective measure to enhance educational systems in LMIC (The World Bank et al., 2023). Comprehensive and high-quality structured pedagogy equips teachers with expertly developed and coherent materials, benefiting students regardless of external factors such as location, income, or background. Evidence indicates that structured pedagogy has significantly improved learning outcomes in several LMIC. For instance, the RARA (Nigeria Reading and Access Research Activity) programme focusing on supporting teachers with lesson plans and effective strategies resulted in substantial gains in language fluency for Primary 2 students, equivalent to almost half a year of additional schooling (RTI International, 2015). Similar patterns were observed in a 2018 study by Research Triangle International (RTI), which highlighted the contribution of structured lesson plans to improved learning outcomes across 19 education programs in 13 countries (Piper et al., 2018). In a recent randomised control trial, conducted by an international group of education experts led by Nobel Prize-winner Dr. Michael Kremer, pre-Primary and Primary students enrolled in Kenyan schools using structured pedagogy for two years experienced average learning gains equivalent to 1.5 and 0.8 additional years of schooling respectively, ranking in the 99th percentile of effect sizes measured in LMIC education studies (Gray-Lobe et al., 2022). A comparable model evaluated in government schools in Rwanda also yielded substantial gains after only 17 weeks of instruction (Rodriguez-Segura et al., 2023). While evidence supports the positive impacts of structured pedagogy, it is important to note that this intervention is not monolithic in its ability to improve learning outcomes.

The effectiveness of structured pedagogy on a broad scale relies on well-crafted implementation and necessitates comprehensive support as well as monitoring to sustain its impact over time. Empirical research indicates that structured pedagogy, when lacking research-supported methodologies and adequately trained educators to implement it, can lead to diminished or negligible effects on learning outcomes. In sub-Saharan African school systems between 1990 and 2010, despite the provision of new lesson plans and materials, learning outcomes stagnated due to inadequate teacher training (Hassan et al., 2022). Similar studies in Kenya, Uganda, and Malawi found that after implementing reformed pedagogy, teachers expressed a desire for additional training on the use of lesson plans and materials; those who received more consistent training exhibited higher levels of effectiveness (Piper et al., 2018). To address this issue, robust monitoring mechanisms are essential to facilitate the effective utilisation of materials across the region. The same 2018 studies have shown that incorporating effective teaching aids, prioritising core competencies like literacy and comprehension, and reinforcing prior knowledge positively impacts learning outcomes. Through effective implementation strategies, tailored resources to diverse classroom settings, and comprehensive training, structured pedagogy can lead to improved learning outcomes and empower teachers to facilitate meaningful educational experiences for students.



III. Methodological Considerations

Sampling Schools and Students

Schools included in the study

To study the impact of the programme during the 2022–23 school year, 60 schools were sampled — 40 schools that joined the STAR Education programme during the first 18 weeks of instruction (“treatment” schools) and 20 that did not (“comparison” schools). The 40 schools in the treatment group consisted of an equal combination of Fagathansi schools and non-Fagathansi schools.

Fagathansi schools were selected for the treatment group from the total of 120 schools under this mission in Manipur, all of which received the STAR Education programme during the 2022–23 school year. The non-Fagathansi schools selected for the treatment group were selected from a total of 132 non-Fagathansi schools receiving the STAR Education programme. This study utilised random selection to ensure that the sample of treatment schools is representative of the average Fagathansi and non-Fagathansi school in the state. All 20 schools in the comparison group consisted of only non-Fagathansi schools, given that all of the Fagathansi schools have been part of the STAR Education programme from the start.

After data were collected for all 60 of these schools initially included in the sample, a total of 7 schools (3 treatment schools and 4 comparison schools) were excluded from this study following the identification of serious data quality issues that impeded accurate analysis of learning outcomes¹. Ultimately, the final sample consisted of 53 schools (37 treatment schools and 16 comparison schools) upon which the findings of this report are based.

Geographic Distribution of Schools Included in This Study

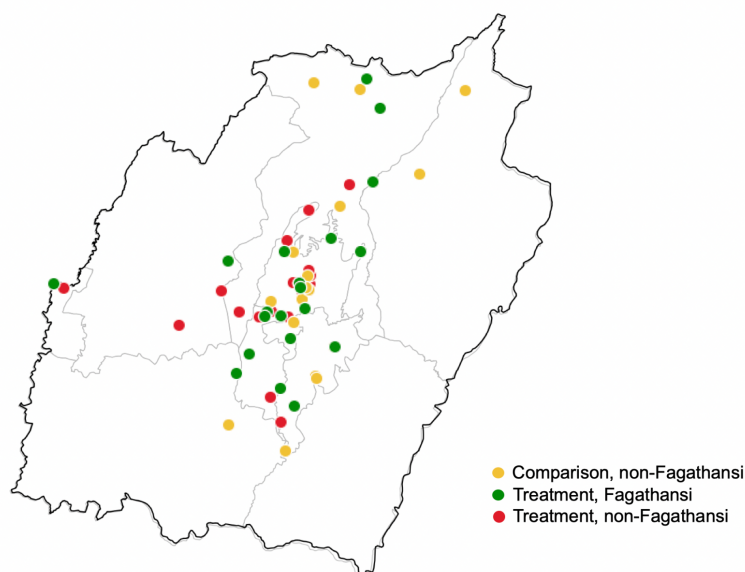


Figure 3.1

¹ Some schools in the sample had to be replaced because they had fewer students than would be necessary to collect adequate data. The specific replacements were Ithai Khunou High School for Bishnupur High School, Grihang Sardar Patel High School for Thingra High School, Talui Hr. Sec. Academy for Lambui High School, Y. Tampha High School for Sorde HS, and Kakching Turel Wangma Junior High School for Larong Govt. High School.

Students assessed for this study

Data were collected from a randomly selected subsample of students across five grades (Standards VI–X) from each of the schools included in this study. The selection process ensured that the assessed students are representative of all other students in their specific grades and schools. As a group, these students are also representative of the group of schools across the state. Initial care was taken to ensure that the treatment group contained a mix of Fagathansi and non-Fagathansi schools, mimicking the composition in the first cohort of schools receiving the STAR Education programme during this period. The intended subsample was of 1,800 students, with 40 students for each Fagathansi school (8 students per grade) and 25 for each non-Fagathansi school (5 students per grade).

Due to low enrolment at some schools, the actual subsample was ultimately composed of 1,111 students: an average of 30 students from each treatment group Fagathansi school, 13.3 students from each treatment group non-Fagathansi school, and 10.8 students from each comparison group non-Fagathansi school. In cases where enrolment was lower than the target number for a given grade (i.e., fewer than 8 students at a Fagathansi school, or fewer than 5 at a non-Fagathansi school), the students included in the sample comprised the entirety of the given school's enrolled population within the assessed grade range. Otherwise, the students in the sample constituted a randomly selected subsample of the school's population in this grade range. Combined with the fact that the students were all selected from the already statistically representative set of schools, this means that the students included in this study can be considered representative of their school and form a group from which valid conclusions about the larger sample can be drawn.

As an additional note, this study employed repeated cross-sections as its sampling method, which involves collecting data from different samples of the population at multiple points in time. This approach allows for the observation of trends and patterns over time without requiring the same individuals to be surveyed repeatedly, thereby reducing respondent burden and potential attrition. Additionally, repeated cross-sections can provide a broader and more representative snapshot of the population at each time point in time. However, a potential disadvantage of this method is its susceptibility to compositional changes, where differences in the sampled populations over time might introduce variability that is not attributable to the underlying trends being studied. Ultimately, every sampling approach has benefits and drawbacks, and repeated cross-sections is one that allows researchers to collect data on learning outcomes while minimising operational costs and logistical complexity.

Learning Assessments Used

This report documents relevant information on the status of learning outcomes in the state of Manipur prior to and following the initial implementation of the STAR Education programme. For the state's academic programme to be effective — and any educational intervention targeting foundational learning, for that matter — understanding students' reading and mathematics levels is crucial. This information ensures that the programme can meet the needs of all learners. In order to identify reading and mathematics levels prior to the start of the programme, and to monitor progress after the initial instructional period, this study assessed three foundational skill areas:



English Literacy

Literacy is a lifelong skill that students must possess to achieve mastery in other subjects and fulfil their potential throughout their educational careers and daily lives beyond school completion. Myriad cumulative subskills comprise this foundational skill, all of which are imperative for children to learn in order to emerge as proficient readers. Reading fluency and reading comprehension are two key subskills that support overall reading proficiency, and this study determines student competencies in both of them via validated assessments.

Reading fluency

Reading fluency describes whether a student can read quickly, accurately, and with expression. Previous research has shown that this is one of the components of early literacy that is most correlated with other key subskills on the path towards reading proficiency. In other words, if a student does well in this domain, it is a strong signal that they have also mastered more fundamental subskills (e.g., letter recognition), and that they are capable of completing increasingly advanced tasks, like reading with some degree of comprehension. To assess this skill, the most common metric used is “correct words per minute” (cwpm).

This study relies on two types of passages to measure English reading fluency. The first is a Standard VI text that all students read, drawn from an internationally validated assessment tool called DIBELS, which is widely used in evaluation studies of educational interventions (University of Oregon, 2018).² The purpose of this text is to allow for comparison of performance across grade levels. The second type of passage is a grade-level DIBELS passage, which enables assessment of the degree to which students can engage with the written materials they are likely to encounter in typical lessons and the grade-appropriate curriculum outlined for them by BSEM and the State Council of Educational Research and Training (SCERT).

Reading comprehension

In addition to reading fluency, students were also assessed on reading comprehension. Students must be able to comprehend what they are reading to reap the benefits of English literacy, both inside and outside the classroom. As such, this subskill was included in the assessments to monitor whether students are successfully making sense of the texts they are reading. After students completed each fluency assessment, they were asked to answer two reading comprehension questions for both passages related to the text that they had just read — one on “direct thinking” (questions for which the answer can be found directly in the text) and another on “inferential thinking” (questions for which students must deduce the answer from the text, or “read between the lines”).

Mathematics

Students’ mathematical skills were assessed using the International Common Assessment of Numeracy (ICAN). ICAN is a tool that measures learning across a range of five core mathematical competencies: number recognition, addition, subtraction, multiplication, and division. In addition to these internationally validated ICAN sub-tasks, two additional mathematics sub-tasks were administered for this study. These sub-tasks, “fractions” and “equations”, target more challenging topics that reflect the older age of the student sample. The inclusion of additional sub-tasks into ICAN simply expands the understanding of how students are performing with tasks aligned to their grade level. This mathematics assessment also includes four word problems, which allows for

² Vernon-Feagans, et al., 2018; Cheung, A. C. K & Guo X., 2018; Kim et al., 2011

understanding the extent to which students can translate their knowledge of arithmetic operations to real-world situations. The STAR Education team refers to this expansion of the ICAN tool as “ICAN+”, to reflect that the assessment retains the same core, but with additional questions.

Externally Administered: High School Leaving Certificate (HSLC)

Standard X students in Manipur must pass the High School Leaving Certificate (HSLC) examination to successfully complete the current level of education. Although the HSLC exam is not administered as part of the STAR Education programme, students' performance on this high-stakes state-administered exam provides additional indications of the learning improvements made by students in the programme. The HSLC includes tests in subjects such as First Language, English, Mathematics, Science, and Social Science, performance in all of which is aided by strong foundations in literacy and mathematics.



Box 2 The Value of Mastery of Foundational Skills Among Older Children

Given the cumulative nature of learning, mastery of foundational skills in the early stages of learning is critical for continued success in secondary school and beyond. Yet, by adolescence, millions of learners across the world have still not mastered foundational literacy and numeracy skills, even when enrolled in and progressing through school (UNICEF, 2022; World Bank, 2018; Belafi et al., 2020). The Programme for International Student Assessment (PISA, 2015) showed that 15-year-old students in the majority of participating LMIC were below the 25th percentile on the performance distribution (World Bank, 2018). A 2021 UNICEF study conducted across 12 LMIC showed that only an average of 42% of students up to the age of 14 possessed foundational literacy skills, with only 28% possessing foundational numeracy skills (2022).

Foundational skills are necessary to effectively advance learning, comprehension, and problem-solving skills throughout students' education and careers. Lacking foundational skills in later grades is especially challenging, as students who did not master the foundations in Primary school will have a harder time participating in more advanced lessons and engaging with more complex learning materials. This can have a negative impact on further skill development, career opportunities, and social mobility later in adulthood (Belafi et al., 2020). For instance, a World Bank study conducted in 2022 in Thailand found that 63% of youth and adults between 15 and 40 years old did not meet minimum reading standards, which included basic tasks like "reading continuous text with a degree of fluency" or "comparing and contrasting information". Their low performance on this assessment translated to lower employment rates and lower income than their higher-performing peers (World Bank, 2024).

Although these individuals are beyond the typical age range of "early learners", dedicated instruction towards mastery of foundational skills is nonetheless essential for enabling them to engage with grade-appropriate academic content, and for preparing them to be successful in more advanced levels of education. The World Bank study concluded that improvements to educational quality could reduce the proportion of low performers, and that interventions to raise learning levels by age 15 would make adolescents more likely to participate in opportunities for furthering their education (World Bank, 2024). In schools, prioritising mastery of foundational skills requires diagnosing learning deficits between grade-level expectations and student ability, making interventions manageable for teachers and school support staff, implementing remediation efforts that target children at their current learning levels, and tracking evidence on what works (Belafi et al., 2020; World Bank, 2024; Banerji and Murthi, 2023).

Insufficient mastery of foundational skills inhibits all subsequent learning, thus diminishing the potential for higher productivity in the labour market (World Bank, 2024; Belafi et al., 2020). To make education systems more effective, governments and schools can introduce mechanisms for teaching and reinforcing foundational skills with the goal of increasing learning for a wider range of children. A system-wide commitment to prioritising foundational skills mastery in schools is a necessary step that not only lays the groundwork for future learning, but also effectively bridges nationwide and global equity gaps with more impactful educational investments.

Measures of Community Outreach and School Participation

Longitudinal metrics on student attendance and enrolment

STAR Education's technological ecosystem allows the study team to track metrics on student attendance and enrolment in real-time. Analysis of these data is completed by comparing average network-wide attendance and enrolment at the beginning of the programme to the same figures observed at the end of the school year. This sheds light on whether programme adoption has led to improved student enrolment and attendance over time. These metrics are collected using the STAR Education ecosystem, and thus by definition, are not available for comparison schools. As such, they are helpful in revealing trends in the educational environment that are relevant to the programme's operation, but are not measures of the programme's effect.

Evaluating the Impact of the Programme

The methodological details of this study were internally designed based on the specific context surrounding the programme's operation. 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 (OECD³, IADB⁴), and as such, multiple impact evaluation assessments can occur throughout the life cycle of a project (USAID⁵). The STAR Education team leverages impact evaluations to uphold crucial aspects of the programme, which include maintaining transparency among stakeholders and utilising robust research design to analyse the programme's effect.

The “difference-in-differences” method

The impact of the STAR Education programme is measured using a statistical methodology called “difference-in-differences”. Comparing STAR Education (“treatment”) schools with non-STAR Education (“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 for both treatment and comparison schools — one at the start of the programme in August 2022 and one at the end of 18 weeks of instruction in February 2023. Having start-of-programme and end-of-year data for comparison schools allows for understanding how students in schools that are not yet part of STAR Education programme progressed under status quo instruction. In turn, knowing the starting learning levels of students in treatment schools and knowing the usual growth trajectory for these students in absence of the STAR Education programme allows for inferring how these students would have performed without the programme. The difference-in-differences technique calculates the difference between the actual performance of students in treatment schools and what their performance would have been under status quo education. This, in turn, allows the study team to quantify the “STAR Education effect”.

³ 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>

⁴ IADB: Inter-American Development Bank. (n.d.) Impact Evaluation: Resources. Retrieved from <https://www.iadb.org/en/topics-effectiveness-improving-lives/impact-evaluation>

⁵ USAID: U.S. Agency for International Development. (2018). Guide for planning long-term impact evaluations. Utilising the Expertise of the Expanding the Reach of Impact Evaluation (ERIE) Program Consortium. Retrieved from https://pdf.usaid.gov/pdf_docs/PA00T9HJ.pdf



Visual Representation of the Statistical Technique Used to Identify the “STAR Education Effect”

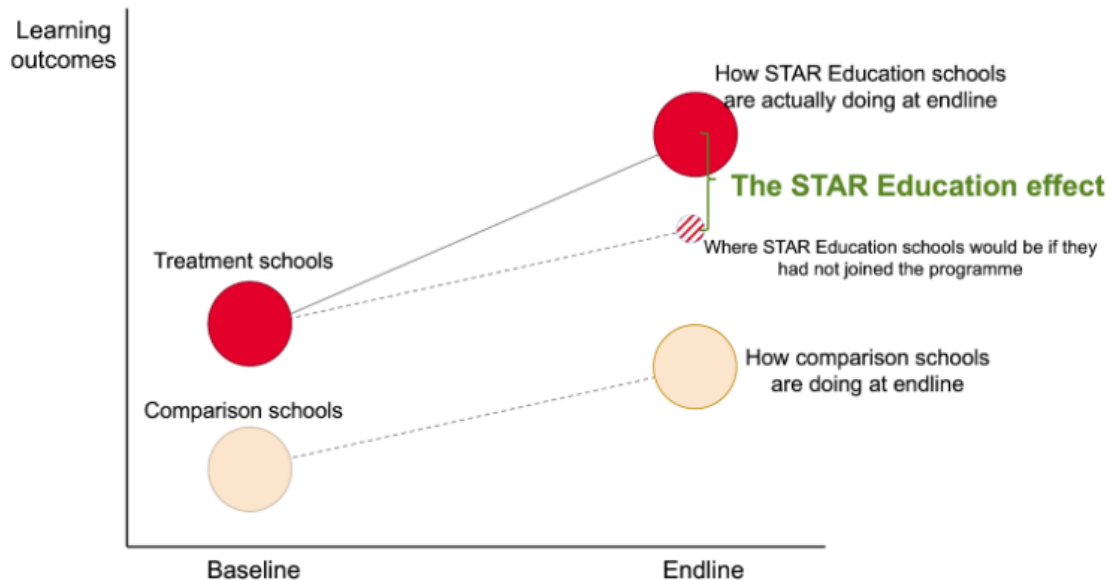


Figure 3.2

Before the STAR Education programme, there may have already been differences in learning levels between schools assigned to the treatment and comparison groups. Importantly, however, difference-in-differences does not require treatment and comparison groups to have the same learning levels at the start of the programme. Instead, it only requires that students’ learning trajectories be similar between the groups, given that it analyses the differences in learning gains between students within and outside the programme to determine the programme’s effect on student growth in treatment schools beyond what is achieved in comparison schools.

Complementing quantitative results with other data

To complement the learnings from the quantitative data from the first 18 weeks of instruction – which measure impact on learning outcomes for STAR Education schools as compared to non-STAR Education schools – this study also included two rounds of qualitative follow-ups, conducted at STAR Education schools between July and October 2022. To obtain detailed insights into how various stakeholders responded to the programme, in-depth interviews touched upon topics of stakeholder satisfaction with the programme, parental and student engagement, and areas for improvement, among others. In total, 82 interviews were carried out with 34 teachers, 12 head teachers, and 36 students from different schools across the state. These interviews followed a structured approach, using the protocol outlined in Appendix D, and the results were subsequently analysed using conventional coding practices for qualitative data.

IV. The State of Learning in Manipur Before the Start of the Programme

Reading Fluency Levels Were Critically Low Across All Grades

At the start of the programme, students scored far below grade level in reading fluency. The average Standard VI student read fewer than 50 correct words per minute (cwpm) from a grade-level passage, and by Standard X, the average student still read fewer than 100 cwpm, which is below the level of the median Standard II student in high-income, English-speaking countries. While the median Standard VI student in these countries approaches a reading fluency rate of 150 cwpm, the median student across Standards VI–X in Manipur public schools had a reading fluency score of 70 cwpm, placing them far behind their global counterparts. Part of these low fluency averages are driven by the non-readers in the system, but even removing non-readers from the analysis, fluency levels were missing the grade-level proficiency that was expected of them given the grade they were enrolled in.

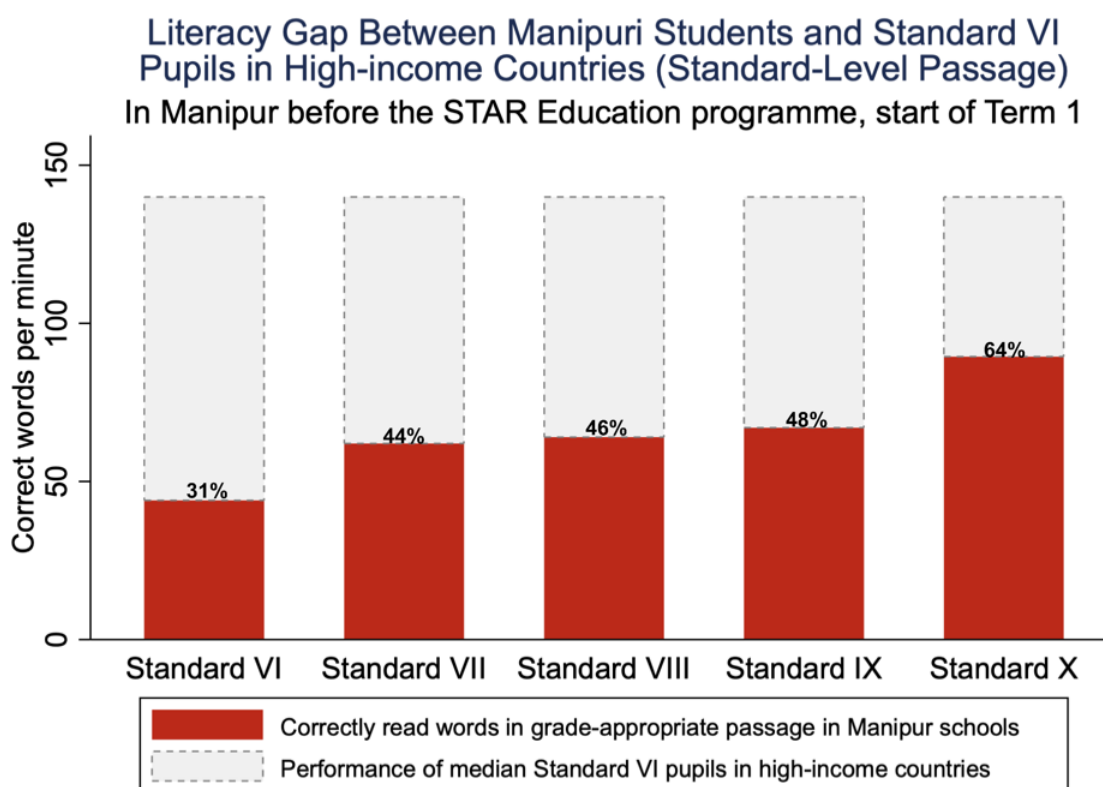


Figure 4.1



Low Reading Fluency Translated to Poor Reading Comprehension

As a result of low reading fluency levels, reading comprehension levels were low (for more on the relationship between reading fluency and comprehension, see Box 3). Across grades, students in Manipur scored an average of 8.5% when tested for their comprehension of a Standard VI-level passage. Even students in Standard X, who should have mastered this level of reading four years prior, only scored an average of 20% (Figure 4.2). Results were similar when students were tested on a passage for their own grade level. Without the ability to comprehend written text, pupils were unable to benefit from academic materials across all subjects.

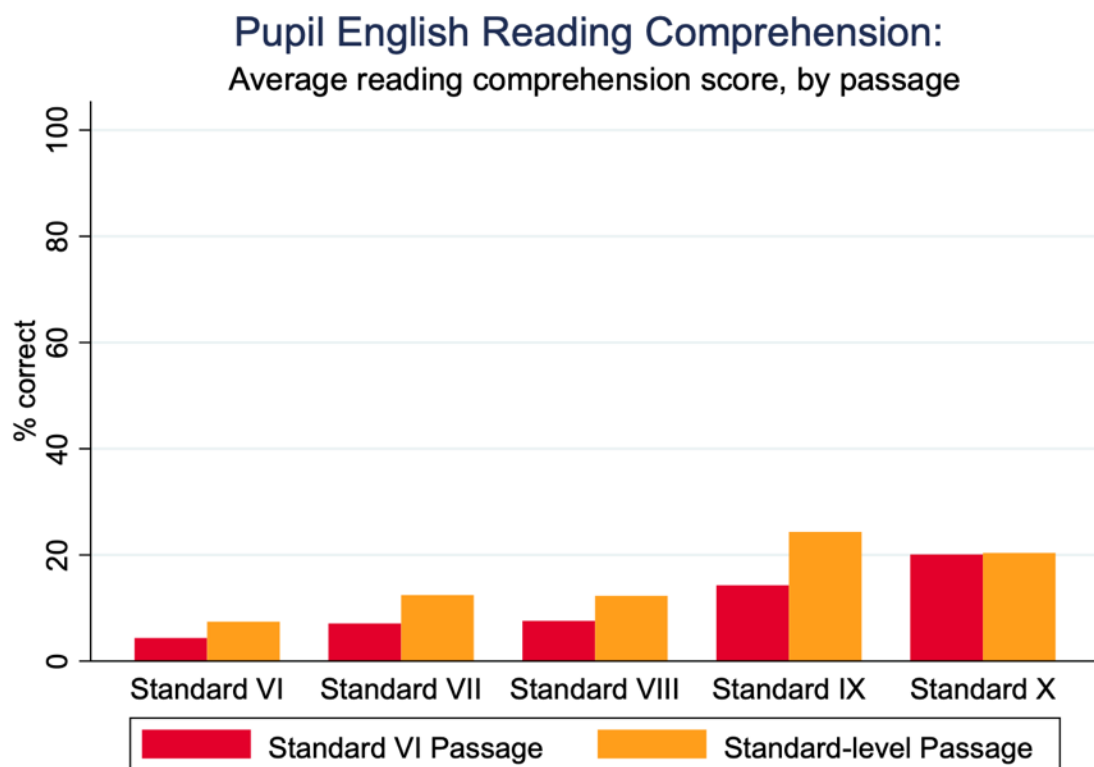


Figure 4.2

Box 3 The Relationship Between Oral Reading Fluency and Reading Comprehension

Being able to read with comprehension is the ultimate goal of literacy. Yet, reading comprehension is a complex skill which encompasses a wide range of cognitive capacities such as attention, memory, critical analytic ability, inferencing, and visualisation (Snow, 2002), and as such, it is a challenging construct to measure and compare across contexts. Furthermore, there are various ways in which evaluators can assess comprehension, including multiple choice questions, fill-in-the-blank tasks, and writing summaries (Habib, 2016). Certain administration characteristics like timing and rereading practices can also make a difference in the quantification of reading comprehension outcomes, as evidenced by a randomised controlled trial conducted internally by NewGlobe. However, the use and types of administration practices vary greatly across assessments, making it difficult to establish a standardised measure of reading comprehension levels.

Education research has consistently documented a strong, positive relationship between "oral reading fluency" and reading comprehension. "Oral reading fluency" (ORF), or simply "fluency", is typically measured in units of "correct words per minute" (cwpm), enabling a simpler comparison across contexts. It refers to the efficient, effective word recognition subskills that allow a reader to derive meaning from the text. Fluency proficiency is typically composed of three major components: accuracy, which is the ability to precisely decode words; automaticity, the capability to recognise and decode words effortlessly; and prosody, the ability to read a text with appropriate expression and intonation (Aldhanhani & Abu-Ayyash, 2020; Pikulski & Chard, 2005).

Importantly, researchers have established a clear link between fluency and reading comprehension. For instance, using the Early Grade Reading Assessment, Jiménez et al. (2014) found fluency to be a key predictor of reading comprehension performance, with students who had high ORF scores exhibiting significantly higher average comprehension scores. Additionally, interventions that focus on increasing fluency have demonstrated considerable improvements in reading comprehension (Klauda & Guthrie, 2008). Often, a significant portion of students who struggle with comprehension find that their issues stem from a deficiency in oral fluency (Aldhanhani & Abu-Ayyash, 2020; Abadzi, 2011). Hence, a lack of appropriate reading fluency negatively impacts both the further development of reading comprehension and academic performance throughout subsequent years of schooling.

Given the close empirical relationship between fluency and reading comprehension, ORF can be used as a proxy for assessing broader literacy skills. This is because it involves many of the same processes that make up reading comprehension. Additionally, fluency is easy to measure, comparable, and there are well-known benchmarks (Pikulski & Chard, 2005; Rodriguez-Segura et al., 2021). Hence, the value of measuring fluency lies not only in its intrinsic significance but also in its role as a signal for other literacy sub-constructs, like reading comprehension. At the start of Term 1 of the STAR Education programme, the average Standard VI–X student was reading at approximately half the fluency rate that would ideally be achieved by the end of Primary school. As a result of low fluency levels, the average student also answered less than 1 out of the 4 reading comprehension assessment questions correctly. Without an adequate reading fluency rate, students cannot read far enough into a passage during a one-minute exercise to understand the main message of the text. Children who have not yet reached this appropriate level of fluency put a heavier cognitive load on the function of "decoding" — the translation of each letter symbol into a sound, and the subsequent blending of sounds to discover full words. Given that researchers have



documented that a certain degree of “automatic decoding” is needed to begin to comprehend a text, future improvement of fluency scores should lead to the improvement of reading comprehension scores, particularly for students who can now decode words, but need to speed up the automaticity of this process. Improving reading comprehension would positively affect their learning in all subjects as they progress through school, enabling them to better read their textbooks, their teacher’s writing on the board, and other materials.



Most Students Were Unable to Solve Grade-Level Maths Problems

Overall, students across Standards VI–X answered fewer than 60% of questions on the ICAN+ correctly in Term 1. Within this assessment, there are two iterations of each sub-task that students complete: The “simple” iteration requires only a fundamental understanding of the given operation, while the “complex” iteration requires a comparatively more advanced understanding. On average, the majority of students were able to correctly solve “simple” mathematics sub-tasks, including two-digit addition without carrying ($32 + 15$), two-digit subtraction without borrowing ($46 - 21$), and single-digit multiplication without regrouping (2×4). However, a significant share of students were not able to solve more advanced sub-tasks under the “simple” operations category, such as exact short division ($9 \div 3$) and recognising the magnitude of fractions (Which is greater: $4/5$ or $3/15$). Less than half of Standard VI students and fewer than 3 out of 4 Standard X students were able to divide 9 by 3. Likewise, less than 40% of students across grades could correctly solve the “simple” fractions problem.

Furthermore, students were largely unable to translate more basic skills to the “complex” operations on the ICAN+. For example, more than a third of students across Standards VI–X could not correctly solve a two-digit subtraction problem with borrowing ($78 - 29$, Figure 4.3). Fewer students could solve the “complex” division problem ($93 \div 7$); less than a quarter of Standard VI students and less than half of Standard X students responded correctly to this sub-task (Figure 4.4). Without mastery of these fundamental concepts, students will be ill-equipped to learn the level of mathematics prescribed by the curriculum. For example, at the beginning of Class IX, students are expected to solve multi-variable algebraic equations and, by the end of the school year, to demonstrate knowledge of statistics and probability.⁶

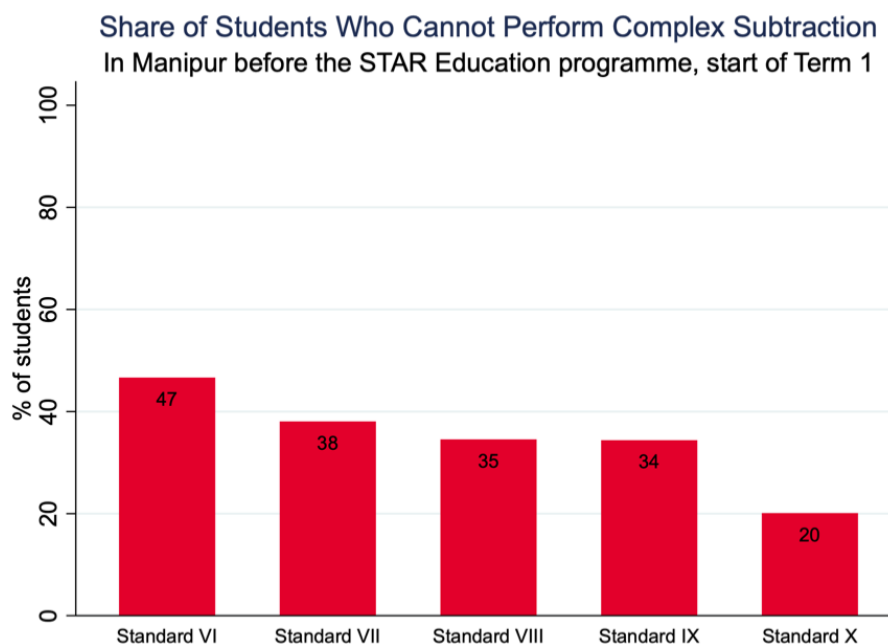


Figure 4.3

⁶ Taken from the 2021–22 Revised Manipur Curriculum, Mathematics, Chapter 4 “Linear Equations in Two Variables”, Chapter 9 “Statistics”, and Chapter 10 “Probability”.



Students Struggled to Translate Their Knowledge into Real-Life Situations

Even students who performed well on relatively advanced mathematical operations often could not solve word problems requiring the same skills, which may reflect both students' inability to apply their operational knowledge and their low reading comprehension skills. For instance, while 80% of Standard X students correctly solved the two-digit subtraction with borrowing problem in operational form, only 55% were able to answer a word problem involving this type of subtraction (Figure 4.4). Scores on more advanced word problems requiring fractions, division, and algebraic equations were even lower across grades. Without the proficiency necessary to read a word problem and understand the mathematical operation it is asking students to do, students will not be able to solve problems that mimic real-life scenarios; without significant improvement, students will not be sufficiently equipped to conduct tasks like managing money, self-administering medication, or calculating time.

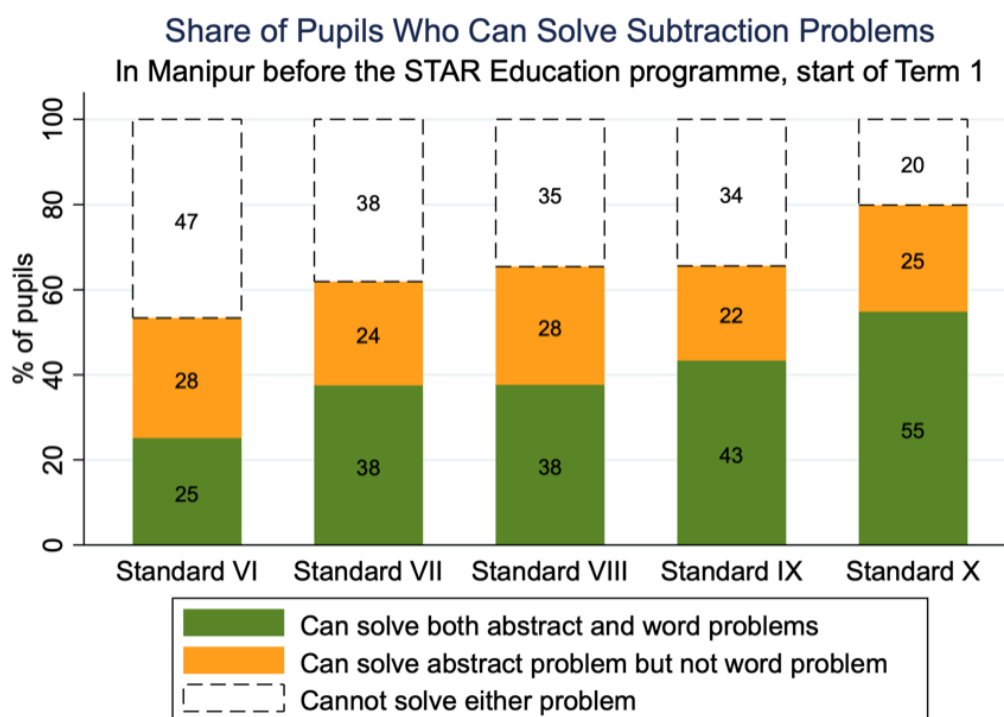


Figure 4.4 ⁷

Enrolment Was Too Low for Many Schools to Offer All Grades

Enrolment numbers in schools in Term 1 were fairly low (Figure 4.5). Only 79% of Manipur schools offering Standards VI–X had at least one student nominally enrolled in all grades, meaning 1 in 5 school-and-grade combinations (21%) across the state did not have even one student enrolled in each grade (Figure 4.6). As such, most schools in Manipur were not able to offer the full suite of grade levels between Standards VI–X because of a lack of enrolled students, which hinders students' ability to progress grade-on-grade within the same school they have been enrolled in.

⁷ Percentages depicted in Figure 4.4 may not sum to 100 due to rounding each proportion included to the nearest whole number.

Large increases in enrolment observed during the first 18 weeks of the programme (results reported in Section V below) indicate that there had been school-age children in the area who were initially unenrolled in the public school system. Further supporting this, according to the 2022 Annual Status of Education Report (ASER)⁸ Manipur had the largest share of students enrolled in private schools compared to the other 30 states and union territories for which data were gathered. Moreover, enrolment in Manipuri government schools that year had considerably declined since schools reopened following COVID-19-induced closures.⁹ By 2022, only 32% of students in Manipur aged 7-16 were enrolled in a government school.¹⁰ The fact that such a large proportion of children were either in private schools or not enrolled in any school at all is a possible indication of the community's perception of poor quality in public schools. To encourage enrolment in government schools in Manipur, improvements needed to be made in the quality of education they offer, so that families would be more inclined to entrust their children's education to them.

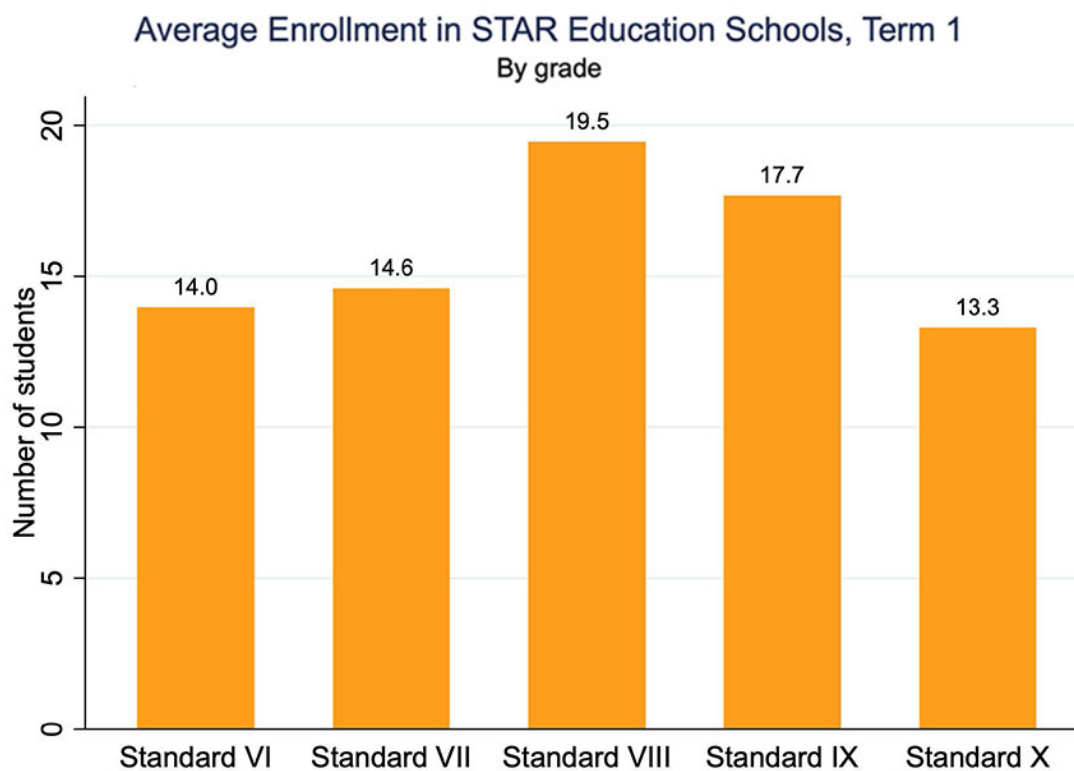


Figure 4.5

⁸ ASER compiled with data from household surveys conducted by over 3,000 volunteers across India.

⁹ Pratham. (2021). The Annual Status of Education Report (Rural). *ASER Centre*.

http://img.asercentre.org/galleries/fullreport_2021.pdf

¹⁰ Pratham. (2022). The Annual Status of Education Report (Rural). *ASER Centre*.

<https://img.asercentre.org/docs/ASER%202022%20report%20pdfs/All%20India%20documents/aserreport2022.pdf>



Share of Schools With at Least One Student In Each Grade, in STAR Education Schools in Term 1

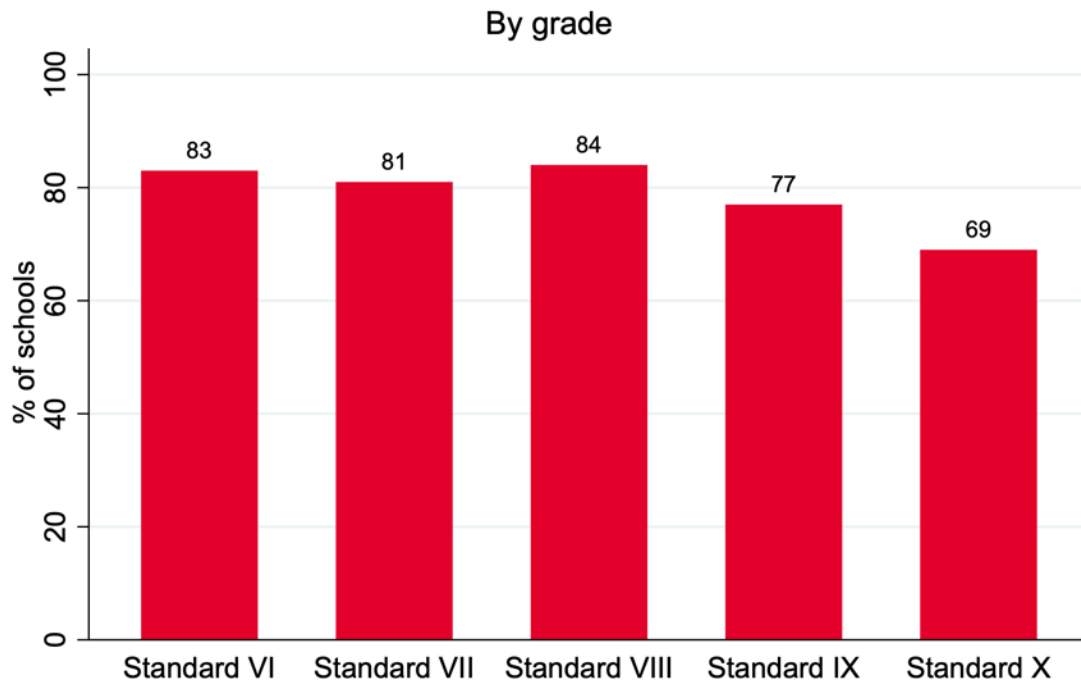


Figure 4.6

.....

“[STAR Education] has made me more interested in learning. I never used to enjoy learning or studying but now I like coming for class. It is easier for me to understand the teachers now.”

- Student K, Standard IX, Meitei Mayek High School

.....

V. Results From the First 18 Weeks of Instruction

The STAR Education Programme Has Led to Significant Increases in Reading Fluency

After the first 18 weeks of instruction, STAR Education schools led to an acceleration in reading fluency rates of 10 cwpm. Students in the programme increased their reading fluency an average of 16 cwpm compared to an increase of only 6 cwpm in non-STAR Education schools (Figure 5.1). The fact that students in the STAR Education programme have achieved this massive improvement in reading fluency after only 18 weeks of instruction is a promising indicator of even greater improvements in reading in the coming years, which will in turn enhance their performance in all other subjects.

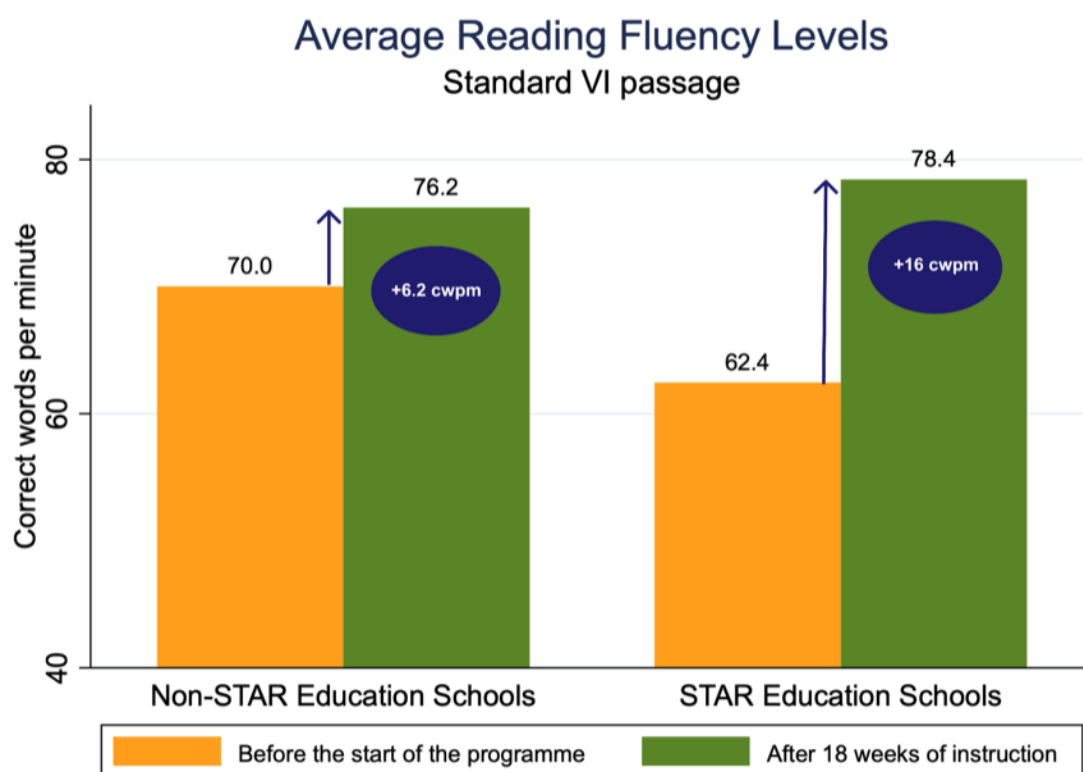


Figure 5.1



The STAR Education Programme Drastically Reduced the Number of Non-Readers

In Term 1, before the start of the programme, there were more than three times as many non-readers across Standards VI–X in STAR Education schools as there were in schools not participating in the programme. Despite this disadvantage, the first 18 weeks of instruction led to an average decrease of 6.1 percentage points in the share of non-readers, which means that **the overall proportion of zero-word readers in STAR Education schools was reduced to less than one-third (31%) of what it was prior to the start of the programme**. This share is now proportional to the percentage of non-readers in non-STAR Education schools, which slightly increased by 0.2 percentage points during the same time period (Figure 5.2). Students receiving the programme have thus made notable progress in crucial English literacy subskills when the evidence indicates that their performance would have stagnated or even declined without the programme. Additionally, their progress demonstrates that the students who are the furthest behind in achieving reading can recoup their learning deficits and meaningfully improve the rate at which they develop necessary skills — even in upper grades, where those students are typically at higher risk of being left behind.

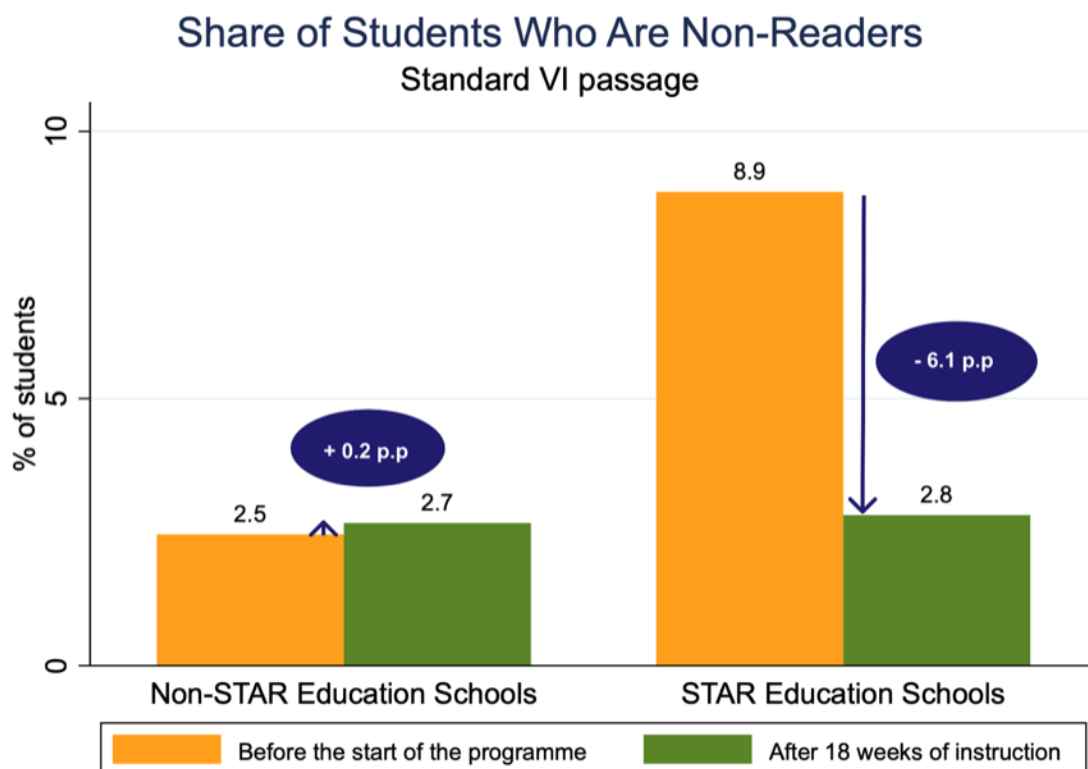


Figure 5.2

A Metric akin to “Learning Deprivation” Has Significantly Decreased

The learning gains in foundational literacy achieved through the STAR Education programme are substantial, both in absolute terms and relative to other interventions in similar contexts. Importantly, these gains also translate into meaningful and tangible effects on policy-relevant metrics, such as “learning deprivation.” Learning deprivation is defined as the proportion of children who are unable to read a simple passage with comprehension, as outlined by the Global Alliance to Monitor Learning (Azevedo, 2021). Learning deprivation is aligned with the minimum proficiency level needed among students to meet Sustainable Development Goal (SDG) 4.1.1, and this can be used to further contextualise these gains. Using this metric, **schools in the STAR Education programme experienced a reduction in a metric akin to learning deprivation¹¹ from 58% to 34% in just 18 instructional weeks** — effectively reducing this metric by a quarter (21%) (Figure 5.3). This change means that STAR Education schools’ performance now dramatically exceeds expectations based on GDP per capita, and approaches that of upper-middle-income countries such as China and Malaysia, and moves away from lower-middle-income countries like Bangladesh or Bhutan.

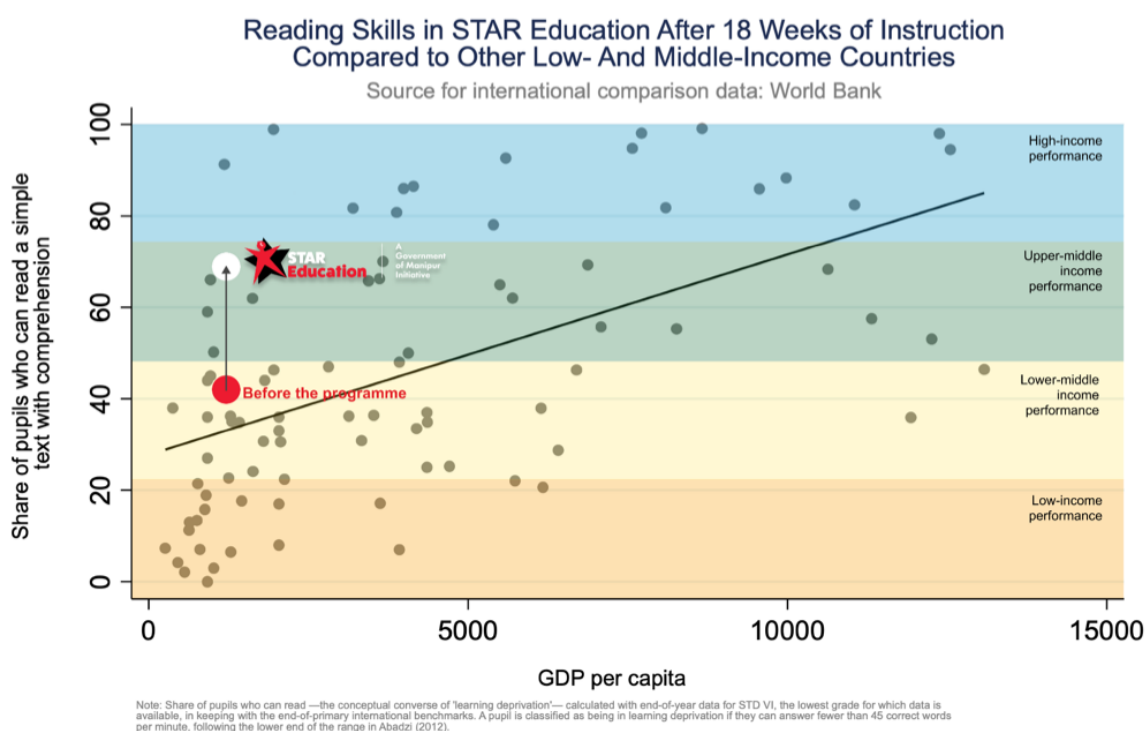


Figure 5.3

¹¹ “Learning deprivation” is a metric created by the World Bank and defined as the proportion of children who cannot read a simple passage with comprehension by the end of Primary school. To develop an aligned metric, the share of students who score 75% or higher on the reading comprehension assessment and have a reading fluency rate of 45 cwpm or higher was used as a comparable data point; this data point was chosen because it is defined as the minimum threshold of reading fluency needed to achieve comprehension (Abadzi, 2011). Given that STAR Education students are above the Primary level, the calculation is based on the performance of Standard VI students, the closest grade level to Primary (Figure 5.3). Nonetheless, this is an especially lenient threshold for Standard VI students and may therefore be an underestimate of their true capabilities.



Improvements in Reading Comprehension Were Seen in Schools with High Fidelity of Programme Implementation

Across STAR Education schools, reading comprehension scores improved by 12% over expectation, but this change was not statistically significant. That said, results differed based on the degree to which schools implemented the programme as intended. At STAR Education schools that had high fidelity of programme implementation – i.e., they had comparatively higher lesson completion rates (~60%) during the evaluation period, and the teachers who had been trained on the STAR Education methodology remained without being transferred out for at least half of this period – there was significantly greater improvement in reading comprehension than at schools where fidelity of implementation was lower (Figure 5.4). This result not only suggests that more growth can be expected as the programme continues in the 2023-24 school year and beyond, but highlights the importance of ensuring that the programme is implemented as it was intended.

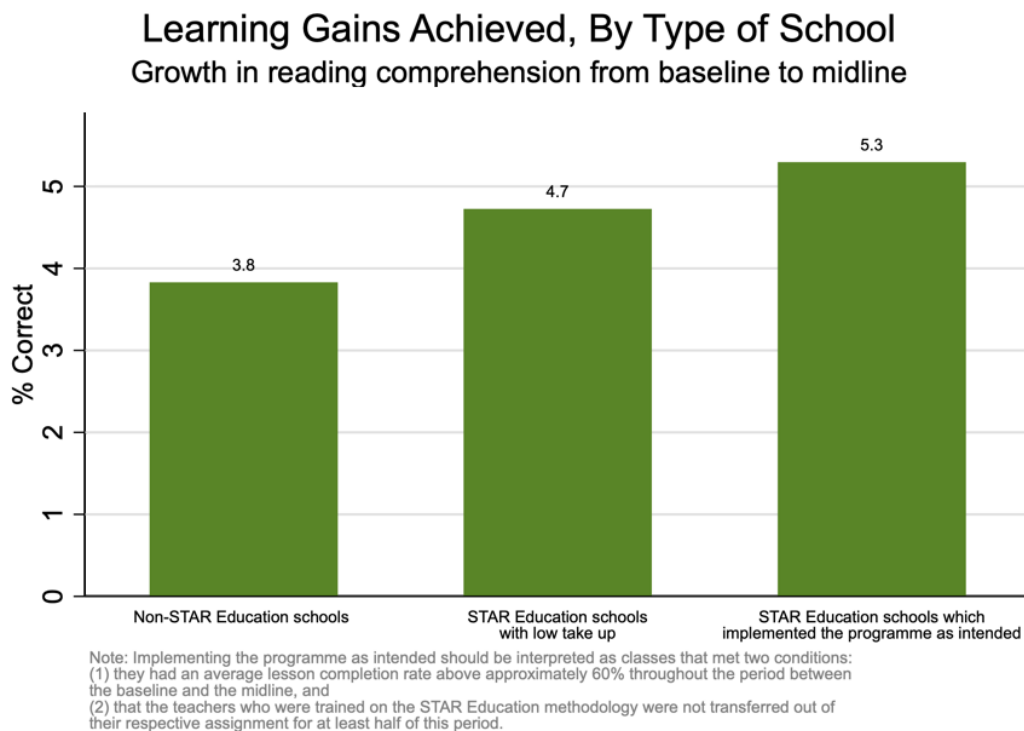


Figure 5.4

Students' Maths Skills Have also Substantially Improved as a Result of the STAR Education Programme

Students in Standards VI–X experienced significant gains in mathematics performance during the first 18 weeks of the programme compared to their expected growth under status quo education. In STAR Education schools, students achieved an average increase of 5.1 percentage points on their overall ICAN+ score after 18 weeks of instruction. This is **7.5 percentage points over students in non-STAR Education schools – whose performance declined during this time period**, although change does not achieve statistical significance at the usual level of 10% (Figure 5.5).

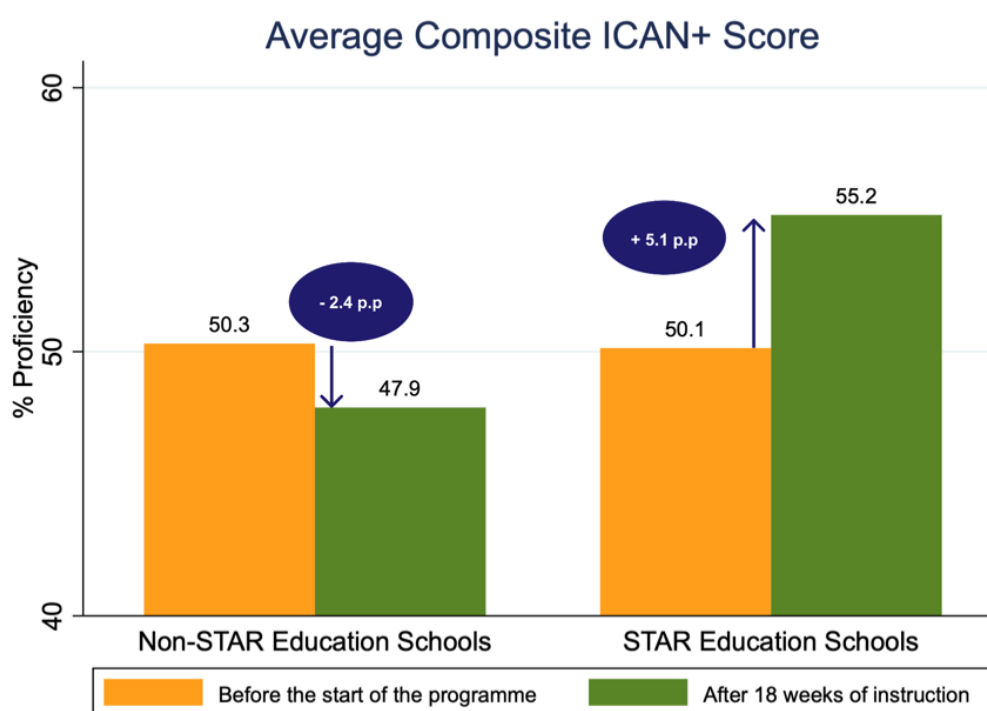


Figure 5.5

On the “complex” tasks included on the ICAN+ — subtraction with borrowing, division of a two-digit number by a one-digit number, and adding a mixed number and a fraction — students in STAR Education schools far outperformed their peers in non-STAR Education schools, even after starting from a similar or even slightly lower level at the start of the programme. For example, their performance on the “complex” fractions operation ($1\frac{1}{6} + \frac{1}{3}$) improved 200% more than it would have without the programme. On “complex” subtraction ($78 - 29$), student proficiency improved by 9.2 percentage points (Figure 5.6), a 19% gain over expectation. Similarly, on “complex” division ($93 \div 7$), students gained an average of 13.1 percentage points (Figure 5.7), improving 75% more than they would have without the programme. Moreover, **students’ ability to correctly solve word problems involving these operations increased by an average of 61% over what would have been expected without the programme** (see Appendix Tables B.1.2 and B.1.3). Their peers who were not a part of the programme, however, displayed a 1.7 percentage point *decrease* in proficiency on the “complex” subtraction word problem task, and a larger 8.1 percentage point decrease in proficiency on the “complex” division word problem task.



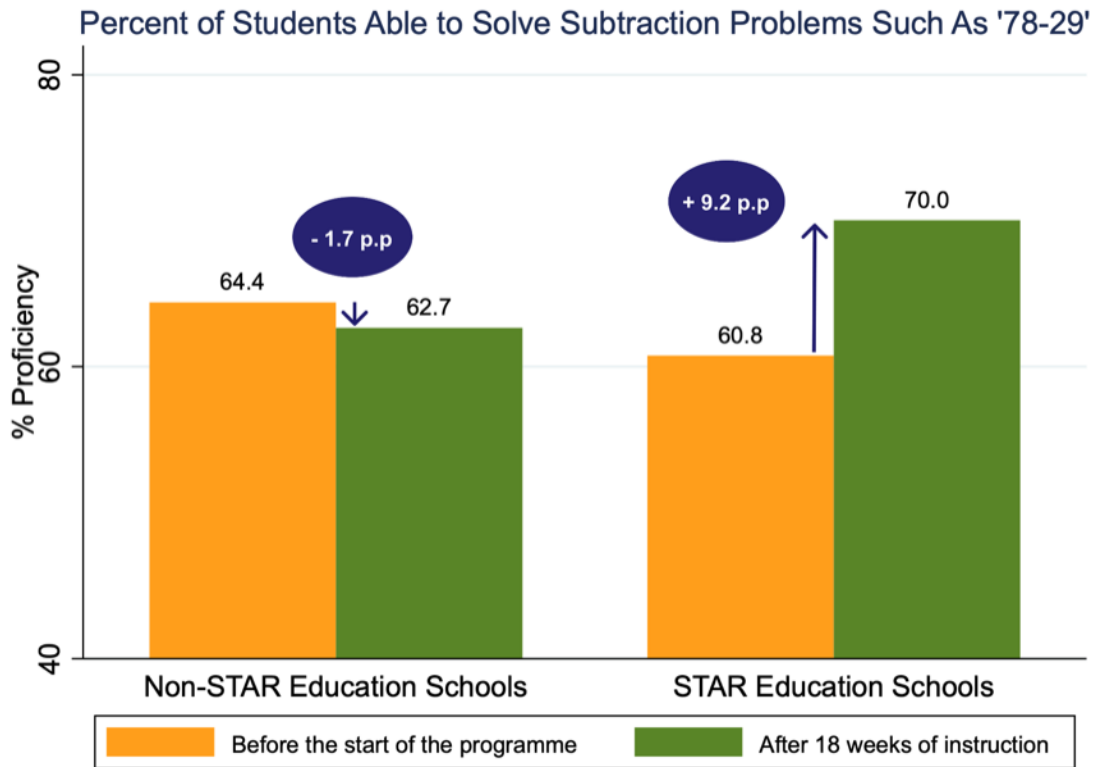


Figure 5.6

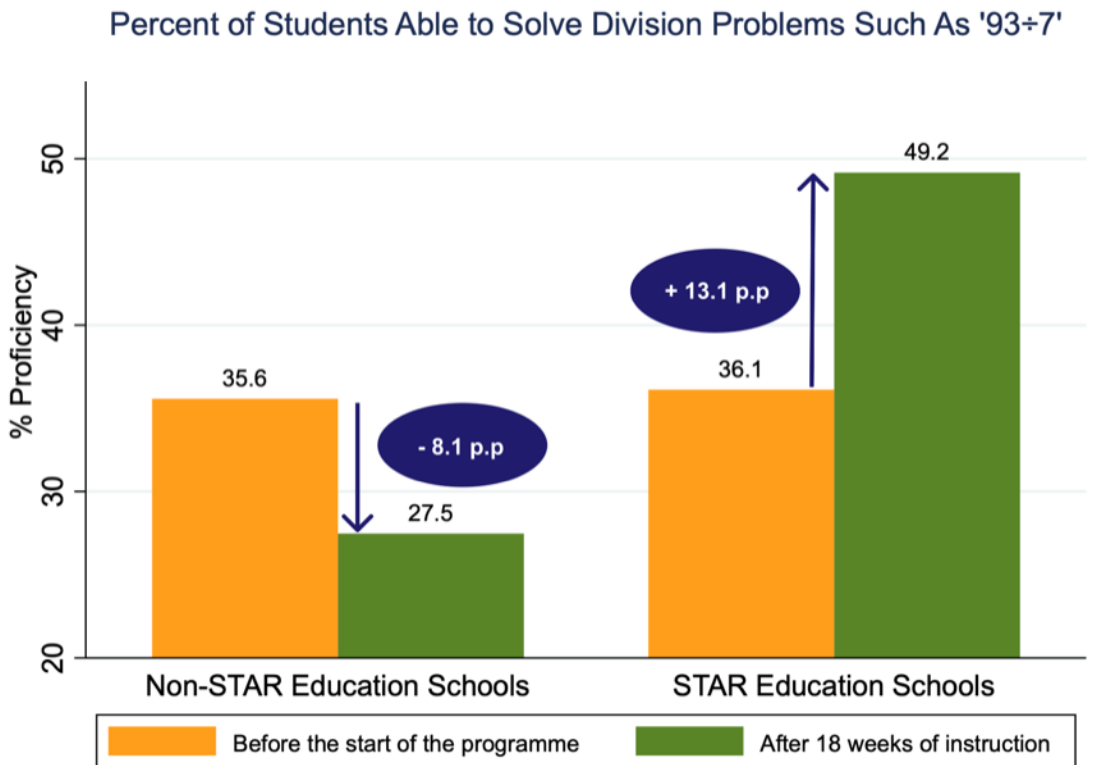


Figure 5.7

Growth in HSLC passing rates in STAR Education schools was double that in non-STAR Education schools

The STAR Education programme places special emphasis on strengthening reading and maths skills that serve as a foundation for higher-level learning, and combines this with strong syllabus instruction aligned with the national curriculum. The foundational learning gains achieved by Standard X students during the first 18 weeks of the programme are already reflected in their performance on the high-stakes exam administered at the end of the academic year in all schools in Manipur: The High School Leaving Certificate (HSLC). In 2022, Standard X students attending STAR Education schools were passing the HSLC at a rate of 60.3% – a lower rate than the 61.2% seen among their peers in non-STAR Education schools. By the end of the 2022-23 school year, students at STAR Education schools had surpassed their non-STAR Education peers, now passing the HSLC at a rate of 67.5%. Thus, they achieved a 7.2% increase in their HSLC passing rate, which is twice as large as the 3.6% increase among students in non-STAR Education schools over the same period of time.

Govt. Schools HSLC Examination Pass Rates		
	STAR Education School	Non-STAR Education School
2022	60.3%	61.2%
2023	67.5%	64.8%
Growth from 2022 to 2023	7.2%	3.6%

These gains not only speak to the significant improvements in foundational skills that students in the STAR Programme have achieved, but also to the fact that these improvements are beginning to reflect in higher-order skills, as measured by external entities. Overall, these results bode well for the programme's impact on students' career progression and the positive returns on state development that these gains will yield in the medium term.

Foundational skills improved in both the hill and valley regions of Manipur

STAR Education's goal is to provide better learning opportunities to all children in Manipur, regardless of where they are located in the state. There was a considerable disparity in the rates of reading fluency between the hill and valley regions in Term 1 — students in the valley region read 22 more cwpm, on average. Hill region schools also performed lower in some mathematics sub-tasks ("simple" addition and division), although this gap was narrower. After implementation of the STAR Education programme, differences in reading fluency performance by region persisted, though schools in both regions achieved learning gains that are higher than they would have been without the programme (see Appendix Table B.1.5, Figures 5.8 and 5.9). **In maths, students from both regions increased their scores at an equal rate, each earning 7 percentage points more than they would have in the absence of the programme.**



Growth in ICAN+ Composite Score Among Standard VI-IX students, by region

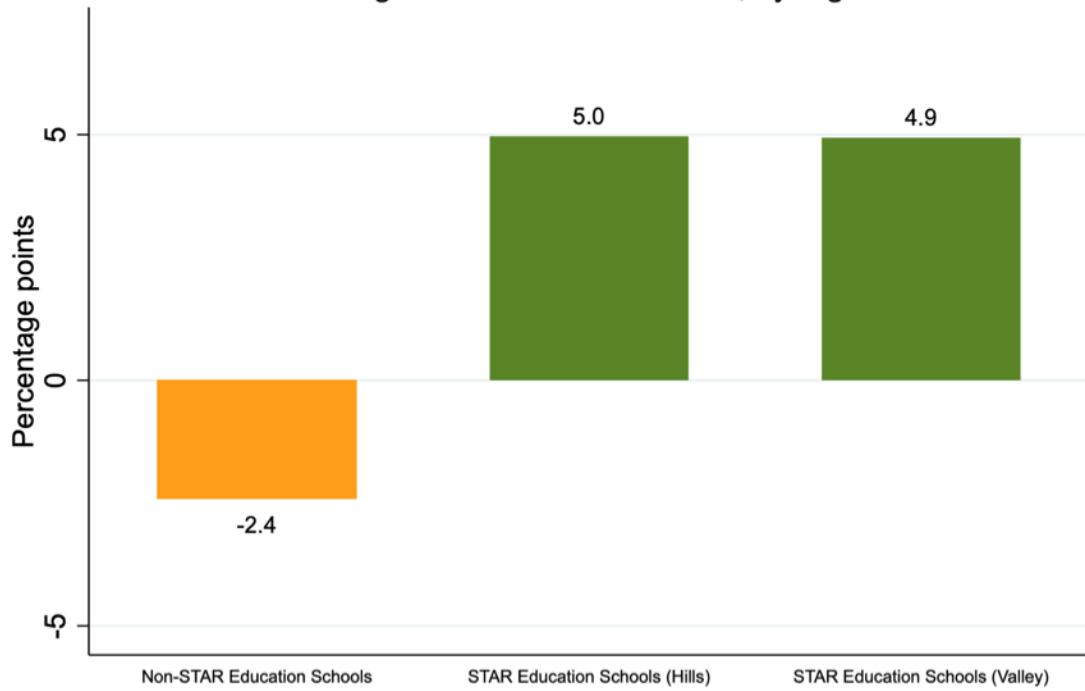


Figure 5.8

STAR Education Growth in Reading Fluency Grade-level Passage

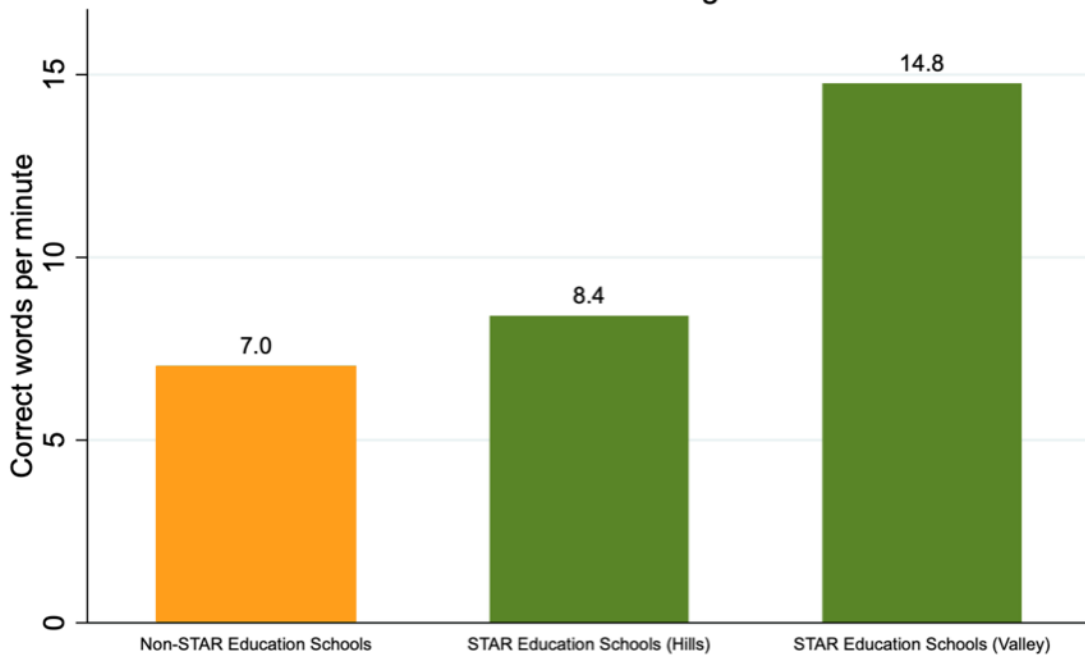


Figure 5.9

STAR Education has had a deeper impact on overall learning than most educational initiatives worldwide

The goal of the STAR Education programme is to provide a holistic, transformative approach to learning that is both cost-effective and scalable. In order to meaningfully interpret the impact of the programme, it is helpful to compare the size of its effect relative to other initiatives conducted in LMIC with similar objectives. In English literacy and mathematics, **the STAR Education programme's effect is larger than the median educational intervention's impact in similar countries by 0.14 and 0.35 standard deviations (SD) respectively**, placing the STAR Education programme in the uppermost percentiles among hundreds of equivalent studies across LMIC.

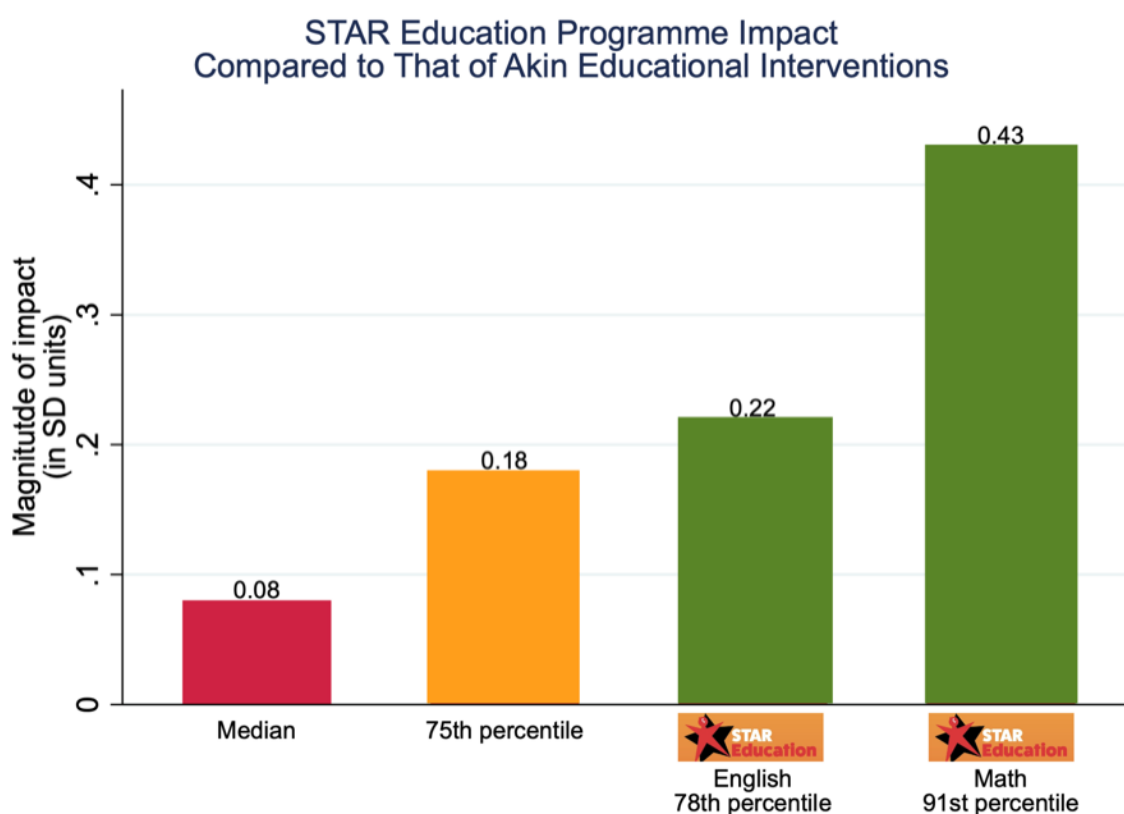


Figure 5.10

The fact that these results have been achieved after only 18 weeks of instruction is one powerful signal of the programme's beneficial impact. It is also a promising indicator that the programme can produce these effect sizes when implemented at a relatively large scale. The median effect size of an educational intervention reaching over 5,000 students is typically more modest (0.05 SD) than smaller interventions, which makes **the STAR Education programme's impact over four times larger in English literacy and over seven times larger in mathematics**¹². This impact is supported by encouraging responses from participating students and school staff, who attest to the programme's positive influence on learning:

¹² Evans, D. K., & Yuan, F. (2020). *How Big Are Effect Sizes in International Education Studies?* (Working Paper 545; pp. 1–15). Center for Global Development. <https://www.cgdev.org/sites/default/files/how-big-are-effect-sizes-international-education-studies.pdf>



.....
“Before I can’t read well, but now I do. Even the maths lesson from [the teacher] tablet is easier than before. Both before and after, teachers give homework. We can understand and answer these.”

- Student H, Standard VI, Moirang Multipurpose Higher Secondary School

.....

.....
“Before, teaching was boring, so we sometimes feel sleepy, but not anymore... the change has helped my learning, as I gain lots of new knowledge.”

- Student P, Standard VI, Phadibi Junior High School

.....

Student Attendance and Enrolment Increased

STAR Education schools saw a 45% average increase in student enrolment across Standards VI–X (Figure 5.11). A school census conducted by the STAR Education team in Term 1 concluded that there were approximately 16,000 students in all 252 STAR Education schools, which was confirmed by school records. Throughout the first 18 weeks of instruction, these schools received an influx of approximately 7,000 newly enrolling students, resulting in a total of more than 23,000 students across schools shortly before the end of the 2022–23 school year. Furthermore, network-wide attendance records confirm that the additional students who appear on rosters also consistently attended school, and were not simply nominally enrolled (see Appendix Tables B.1.8 and B.1.9).

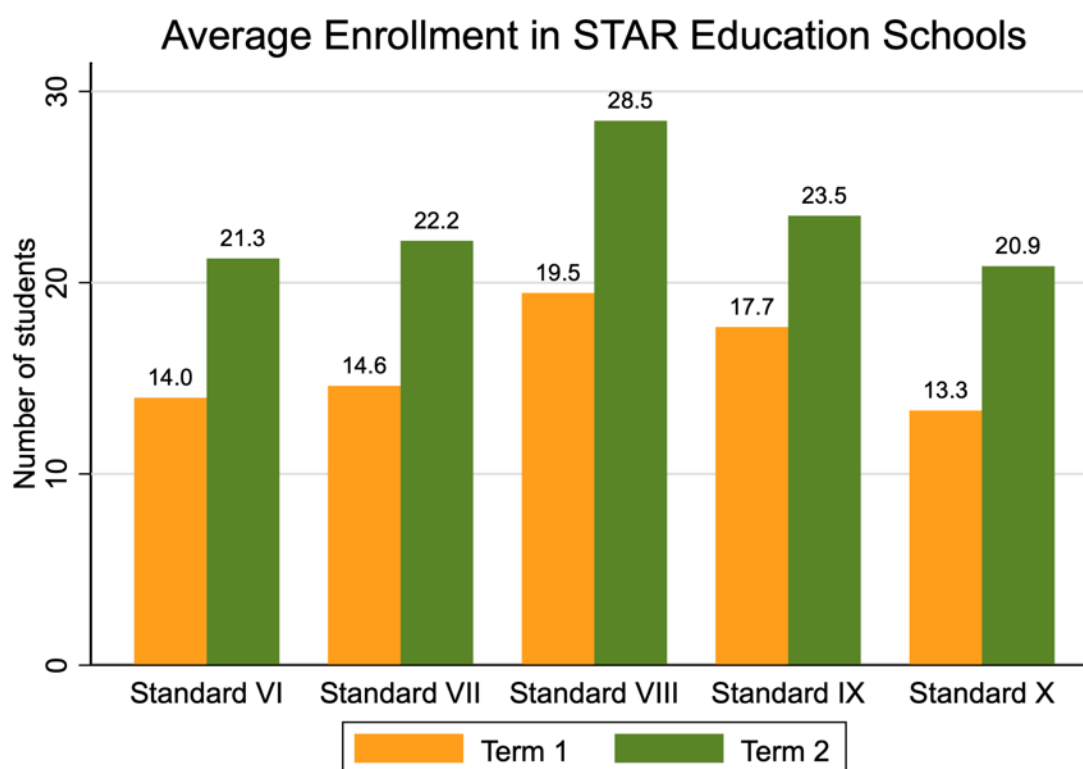


Figure 5.11

Increased enrolment after 18 weeks of instruction enables more schools to offer more grade levels and use resources cost-effectively. The proportion of schools with a Standard VI section with participating students, for example, increased from 2 in 3 at the start of the programme to 5 in 6 (Figure 5.12). Before the programme, only 1 in 8 students were both enrolled and regularly attending schools (Figure 4.6), but this has since improved to nearly 1 in 4 (Figure 5.10). As a note, the large number of newly enrolled students may affect the results of this study, given that it uses a repeated cross-sectional design; however, the direction of any effects – if present at all – is unknown.



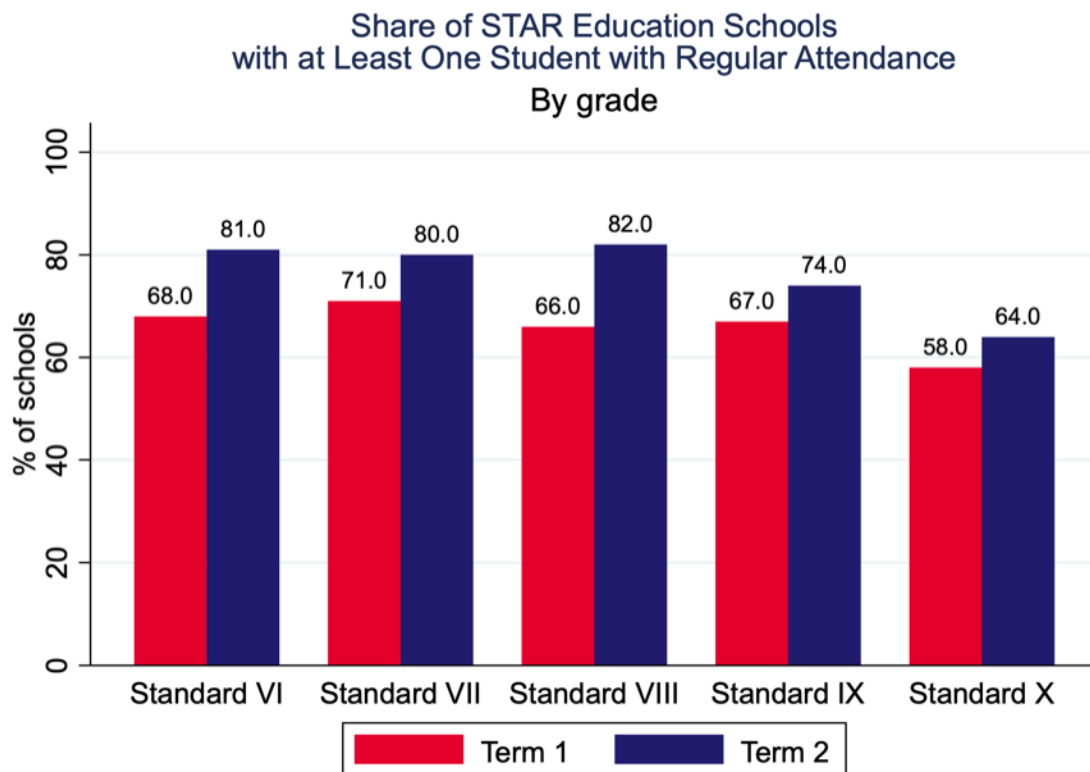


Figure 5.12

Increased enrolment signals that there has been a rebuilding of trust in the quality of the public education system in Manipur via the STAR Education programme. When students and their families are able to clearly perceive the benefits of government school enrolment and attendance, parents are less likely to place their children in private schools, and students are more likely to be consistently present in their classes. This is evident in the qualitative data as well, in which students and teachers have offered their approval of the programme:

“My teachers are very good and they really care about us, so I really like coming to school.”

- Student Y, Standard IX, Ibontonsana Higher Secondary School

“I came from another school and because that school was very far this school is more convenient. [At] the previous schools...we cannot understand the lesson, but here, the teachers explain... so it is very easy to understand the lesson.”

- Student S, Standard IX, Nilapadama Higher Secondary School

Students, Teachers, and Head Teachers Agree: The STAR Education Programme Has Improved Education in Manipur

In addition to the main findings reported above, supplementary data obtained during the course of this study provide strong signals of even greater educational success to come as the STAR Education programme matures and incorporates additional schools in need of transformative interventions.

Instructional quality has improved

Qualitative data also show that the programme has been met with abundant approval from all stakeholders in Manipur schools. For example, **94% of teachers reported an improvement to their teaching practices with the STAR Education programme.** It has provided a positive example of the capacities and capabilities of public Upper Primary and Lower Secondary schools, which forms the necessary foundation for teachers to optimise their performance and drives greater enthusiasm among students to be present at school and keep up with their lessons. In their interview responses, STAR Education teachers and students regularly noted improvements in teaching alongside better learning outcomes in key areas.

“Due to the STAR programme, the school has become more alive. Students come more regularly, and are more excited.”

- Maths teacher, Gandhi Memorial Government High School

“It has made me a better teacher. I get lots of new knowledge, and learn to manage class, like by using cheers. STAR system is best. I have been to other trainings, read books on teaching, but this system is easier and best.”

- English teacher, Kwakta HS

“I have gained more knowledge. My student [management] skills have also improved. My teaching skills have improved, such as when and what to write on the board, using lesson plans, innovative ideas... My connection with students has improved and we have become more close, because they give more attention.”

- Social Science teacher, Phadibi JHS



.....
“Teachers come regularly to school. Before, some used to come late, but now they hurry into the classroom. Before, they didn’t teach properly, but now they do... Now, we are getting a good mix of notes and homework.”

- Student J, STD VIII, Kwakta HS
.....

.....
“Before, teachers just focused on finishing the syllabus. Now, our knowledge is better, we know more, and more in depth... Students become attentive. Even teachers become more attentive... There is no wastage of time like before.”

- Student K, STD IX, Gandhi Memorial GHS
.....

Moreover, head teachers have stated that teachers demonstrated more independence in managing their time efficiently. They noted that the programme’s use of structured pedagogy, digital timetables, and monitoring systems has supported teachers to deliver each lesson within the allotted time frame, which ensures that students have the chance to receive high-quality instruction in all subjects throughout the school day. Over time, these improvements will support effective learning for students and professional collaboration among teachers and school leaders.

.....
“Earlier, students were not required to respond or participate much in class. Now... students are more responsive... Students also benefit from the phonics and similar lessons in the Supplementary English. Their reading speed has improved, their writing has improved. Supplementary Maths has improved their ability to do addition, subtraction, division, etc... Even teachers benefit, for example in terms of pronunciations.”

- Head teacher T, Gandhi Memorial Government High School
.....

Positive classroom management strategies have reduced reliance on corporal punishment

Many teachers rely on corporal punishment as a tactic to manage their classrooms and ensure that students are on task. However, this approach can have the opposite effect, demotivating students from participating in class and distracting them from the concepts they need to learn during the day's lesson. More broadly, corporal punishment contributes to an environment in which violence is normalised and students behave out of fear. Teachers must be supported with alternative, positive classroom management strategies if they are to abandon the use of corporal punishment in their classroom. For these reasons, STAR Education supports teachers and school leaders to adopt healthier classroom management strategies, including verbal correction, energetic refocusing, and positive reinforcement.

“We receive less [physical] punishment. Now, more words are used. The encouragement, cheers — we enjoy it. They are effective, and helpful in learning. Because with punishment, students can get angry and so don't even pay attention to the lesson.”

- Student L, Standard VIII, Gandhi Memorial Government High School

Using these strategies, teachers provide clear redirection to students who are off task and encourage focus and engagement using lively cheers. Teachers also use concrete strategies like “narrate the positive” to highlight appropriate classroom behaviour, encouraging more peer modelling over calling attention to and punishing inappropriate classroom behaviour. As a result, students have reported becoming increasingly motivated to regularly attend school, learn from their lessons, and enthusiastically participate in class. **Seventy-five percent of interviewed teachers have also described improvements to student behaviour, engagement, and attendance when using classroom management and instructional practices encouraged by the programme.**

“Now, the students are specifically asking for the STAR teachers to teach the lessons. Now, they ask questions about things they were never interested in [before]...Now, they are more curious.”

- Social Science and Manipuri teacher, Nilapadama HSS

“Using STAR methods, we are able to tell them when they are acting wrongly and correct them. They are more disciplined. Before, when they misbehave, we teachers often overlooked [this] or beat them. Now, when we show appreciation to well-behaved students, like by doing the ‘Great Cheer’, it affects them, and even bad students change their behaviour.”

- Maths teacher, Motbung HS



.....
“There is a difference in behaviour. Students know STAR very well now, and they respond when we say, ‘sit tall’ or ‘track the speaker.’ Students have become more participative, and less distracted. They are able to give choral responses. These are good tactics of class management. The experience has been positive, and the difference in student behaviour is a good difference.”

- Science teacher, Gandhi Memorial Govt HS
.....

Students and teachers report stronger English language skills

Curricular standards in Manipur stress the importance of English language proficiency for effective communication in an increasingly globalised society. Since the programme was launched, teachers have reported being better supported to use English in the classroom with greater confidence.

Interview responses from students, teachers, and head teachers indicate more exposure to English during the school day, and they report significant improvements in English language proficiency.

.....
“English is more easy, especially Supplementary English - we learn stories, word meanings; it has improved my English.”

- Student L, STD VIII, Gandhi Memorial GHS
.....

.....
“I have learned more English and understand the lessons more compared to previous classes.”

- Student P, STD IX, Motbung HS
.....

.....
“Now the students are crazy about English. They have the enthusiasm to talk in English and they have the habit of writing. Before STAR, they were slow in writing, and they [couldn’t] write when I dictate. They [couldn’t] write even a sentence. Now, their speed of handwriting is improving very fast.”

- Head teacher L, Nilapadama Higher Secondary School
.....

Concurrently, teachers and students are receiving better support in Manipuri language as well. Promoting high-quality language instruction via the STAR Education programme is important to encourage the development of cognitive processes that support better learning outcomes in reading and mathematics.¹³

“Students show presence of mind. They are more active, respond quickly to questions. Their discipline has become better. Before, discipline and response was not good. Now their English knowledge has also improved, and they respond even to English teaching.”

- Maths teacher, Phadibi JHS



¹³ World Bank Group. (2021). Loud and Clear: *Effective Language of Instruction Policies for Learning*. World Bank.



VI. Lessons Learned and Recommendations for the Programme's Enhancement

Strengthening Programme Implementation is Critical for System-Level Change

During this evaluation period, STAR Education made strides towards improving the operational efficiency and implementation of the programme. One of the most significant achievements to emerge during the first 18 weeks of the programme is the substantial increase in pupil attendance. This achievement reflects a unique combination of dedicated field teams and school leadership driving operational excellence, and the use of dynamic and actionable data (via the Spotlight app) to shine a light on key areas of growth at the pupil, teacher, school, or programme level. But more work remains to be done. For STAR Education to transform learning at the system level, consistent teacher attendance and lesson delivery must be achieved. To do this, day-to-day programme implementation must also be improved.

Improving fidelity to the implementation of the programme itself is the single most important lever to improve learning during future years. Improving teacher attendance results in more classrooms with a trained teacher leading instruction each day. Improving lesson delivery leads to more productive learning time informed by high-quality teacher guides and printed learning materials. Improving student attendance means that there are more students present to benefit from these impactful lessons. By investing in these three pillars — alongside other key operational areas like ensuring textbook availability and usage — the programme can ensure more productive learning time in schools and improve the learning experience of students.

Data on students' learning gains support this claim. For instance, reading comprehension scores were 90% higher in STAR Education schools that implemented the programme with fidelity than they were in STAR Education schools that did not implement the programme as intended (Figure 6.1). In mathematics, the differences in performance are even larger. STAR Education schools that fully implemented the programme achieved 128% more growth in two-digit addition with carrying than STAR Education schools that did not fully implement the programme (Figure 6.2). Therefore, with comprehensive programme implementation, the positive effects on foundational reading and mathematics presented in this study likely would have been even larger.

Learning Gains Achieved, by Type of School

Growth in complex addition

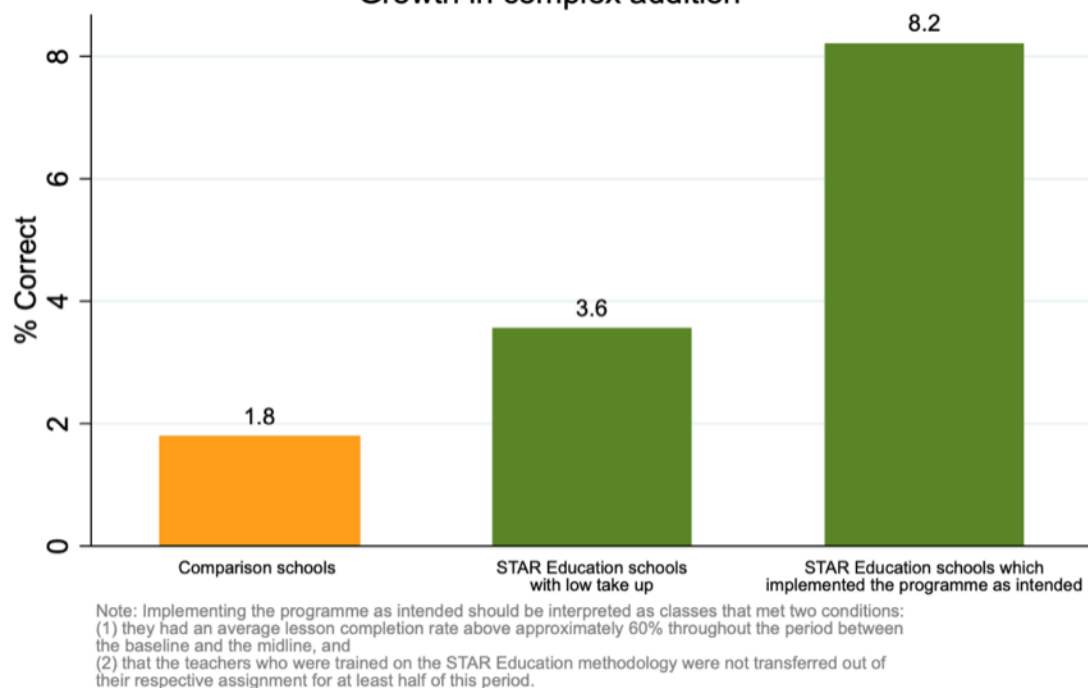


Figure 6.1

Learning Gains Achieved, by Type of School

Growth in reading comprehension Standard VI Passage

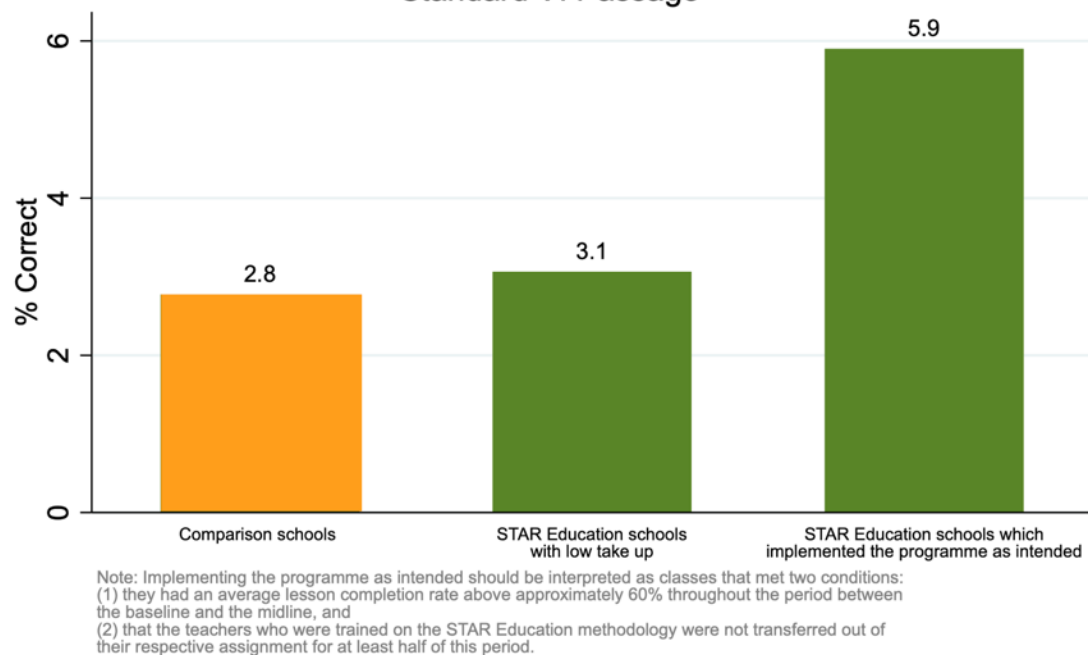


Figure 6.2



The Programme Must Continue to Address Low Learning Levels, Especially in the Lowest Performing Schools

It is clear that students receiving the STAR Education programme achieved tremendous learning gains in a relatively short period of time, underscoring the importance of continuing the programme in future years. Yet, despite dramatic improvements, learning levels in schools across the state are still problematically low in absolute terms, and are comparatively weaker in some of these schools. In order to continue to address these core challenges, the STAR Education programme must continue to embrace and expand upon two core tenets:

Investment in foundational skills

While students have made significant progress narrowing the gap between learning levels and grade-level standards, those gaps still exist for many students — especially those in upper grades. For these students to be successful in their grade-appropriate studies, they must first master the essential prerequisite subskills. Across all grades in STAR Education schools, incoming and current students require support with achieving foundational reading and mathematics skills. STAR Education will continue to prioritise teaching these pre-skills alongside syllabus-aligned coursework. This will take the form of protected time periods on the timetable for foundational reading and mathematics skill-building. In addition, STAR Education will continue to invest in foundational programmes to meet the unique needs of Secondary learners who have fallen behind. The vast majority of foundational reading and mathematics programmes around the world — including those developed by NewGlobe — were created to meet the needs of Primary-level learners. With STAR Education, there is a need for programmes that teach foundational subskills, like phonics or subtraction with borrowing, that are targeted at older learners who are at a very different developmental stage in their lives. Therefore, the programme will deploy an approach that promotes “learning to read across the curriculum”, in which courses outside of English offer pathways to both “learn to read” as well as “read to learn”.

Further differentiation to meet the needs of all learners

While the vast majority of students do require foundational support, there are some students who are capable of meaningfully participating in their grade-level studies. STAR Education must continue to meet the needs of these learners alongside those who require more foundational support. The first and most important way to achieve this is to ensure that the level of English and maths instructional materials (including teacher guides and textbooks) is precisely aligned to the median student’s learning levels, rather than simply to the grade level of the student (which is not necessarily an accurate predictor of learning). In the coming years, STAR Education will use item-level data on English and Maths performance for every student across the system to identify the appropriate level of instruction for each grade level, and to subsequently inform the instructional materials that are provided to each teacher. In this way, the programme can dynamically respond to changes in learning levels over time as well as across grade levels, maximising the relevance of instruction for students.

Additionally, in order to promote more homogeneous ability groups within classrooms, STAR Education will adopt additional strategies to narrow the range of ability levels. First, a new placement test will be introduced. School leaders will be trained on how to administer this placement test to new students in order to assess foundational English and maths competencies. The results of this placement test, considered alongside the newly-arriving student’s age, will

inform their optimal grade placement. This, in turn, will ensure that new students are not placed in grades where content is too challenging and where they have little chance of success. By placing students in classrooms that are both age-appropriate and also at the correct instructional level, classrooms themselves will have a more narrow range of ability levels to which teachers must cater. This allows teachers to focus their feedback and support towards this more narrow range of abilities, resulting in a far more cohesive teaching and learning experience for all.

Finally, a more data-driven approach to grade-promotion will be implemented next year. By analysing data on this year's grade promotion/retention rate, STAR Education can better understand whether the current cutoff scores are resulting in the optimal share of students being retained. This offers a dual opportunity. First, STAR Education can ensure that students are not being retained in any grade level at an unacceptable rate — which is both harmful to the students and teachers, and costly to the education system more broadly. But more importantly, this allows STAR Education to set the cutoff scores at a level that will promote greater within-grade homogeneity of learning levels. By preventing the lowest-performing students from slipping through the cracks and being promoted into the next grade, the programme can ensure that those students receive a more appropriate level of instruction in their repeated grade, and also that the teacher in the subsequent grade is not forced to balance support across students who are ready for more challenging instruction alongside those who are not.

The Programme Will Continue to Cultivate Strengths and Address Weaknesses for Lasting Success

The impressive progress of the STAR Education programme during its first 18 weeks has validated the ongoing investments the state has made to transform its education system. Students receiving the STAR Education programme made much greater gains in English and mathematics than students receiving status quo education, who made little to no improvement. In mathematics, the growth made by students at STAR Education schools in hill regions was equal to that seen in the valley schools. Standard X students at STAR Education schools improved their HSLC passing rate at twice that of students at non-STAR Education schools. Thus, the evidence in this report confirms that children who have not yet received high-quality education can quickly and significantly advance their learning when provided with the proper support.

Despite the large gains achieved in STAR Education schools, more work is required to sustain and build upon these positive trends in the coming years. In absolute terms, learning levels are still short of national and international expectations. As the STAR Education programme matures, and students receive more of the high-quality education it provides, the programme's positive impact on learning will accumulate, and likely produce results that are not yet manifest after only 18 weeks of implementation. For instance, gains made now in reading fluency will equip students to make future gains in reading comprehension; proficiency in operational mathematical skills, combined with improved literacy, will enable future mastery of mathematical word problems; and strengthened foundations will yield even stronger results in high-stakes tests such as the HSLC. Furthermore, ahead of the 2024–25 school year, the programme will expand to hundreds of additional schools, reaching even more children across Manipur.

As a data-driven programme, STAR Education will continue to conduct similar large-scale, rigorous evaluations for upcoming school years as well. These rounds of data collection will give the State Government further insights into the impact of the programme: what is going well, and what needs to be strengthened. Continued investments to address inconsistent programme implementation and low learning outcomes — if done correctly — will drastically improve the quality of teaching and learning across Manipur.



The STAR Education programme is a bold initiative from the Government of Manipur. During its first year of operations, it has enabled students to be on faster, higher learning trajectories. The large impact on literacy and numeracy outcomes — through a large-scale system-wide transformation of education — is a laudable achievement by the Government. Through its STAR Education programme, Manipur will continue to provide rich, nurturing learning environments across the state, where pupils of all backgrounds will have the unprecedented opportunity to actually learn in school and thrive academically.



VII. Appendix

Appendix A: Learning Assessments

Student Oral Reading Fluency Assessment

All Students Passage (Standard VI Level)

Changing Bedtime

Tensions are running high in the Groff home as talks on summer bedtime rules continue. The household is evenly divided into two camps. So far, there is no sign that either side will surrender.

At eight o'clock this evening, the younger Groffs, Ben and Lu, brought their demands to their parents. It appears they had been organizing for some time and be allowed to stay up until ten o'clock in the summer. In support of their request, they pointed to the facts that they have no school in the morning and that it doesn't get dark until late in the summer. They also said that everyone else gets to stay up late and it's not fair.

Their parents responded by offering an eight - thirty bedtime. This would be a half hour gain for the younger Groffs. The younger Groffs rejected this offer. They declared it so far below their original request as to be insulting. The mother of the Groff family gave a speech about the need of growing bodies for proper sleep. The father made a statement about the parents' need to not have kids running around all night. The younger Groffs characterized the mother's speech as dumb. It was typical of their style, they claimed. They disapproved the father's words, calling them irrational, depicting events that would never happen.

The issue remains unresolved. The younger Groffs' skill at arguing could keep them out of bed until their desired bedtime. Should this occur, they could then claim they had been allowed to stay up late before, and so they should be allowed to stay up late again. If their parents can be convinced that a later bedtime has not caused a loss in quality behavior, they might back down. However, another possibility is that their parents are used to stalling tactics and will not be moved by them.

Comprehension Questions

1. How did the parents respond to Ben and Lu's proposal for a 10:00 summer bedtime?
2. Why are tensions running high in the Groff home?



Standard VI Passage**Mom, the Pastry Chef**

I'll tell you something lucky about myself. My mom is a pastry chef. That means she works in a restaurant and makes desserts every day. It's pretty awesome! I always have the best birthday cakes, and she brings home a lot of leftover treats. Another benefit is that when we eat at a restaurant, we order every dessert on the menu so that my mom can see what other chefs are doing. My friends are all jealous. They love coming over to my house, because we always have yummy things to eat.

There are some parts of a pastry chef's life that are a little challenging, though. They have to get up super early in the morning, for one thing. And they don't have weekends like everybody else; Friday, Saturday, and Sunday are really busy days in restaurants, so my mom has Mondays and Tuesdays off. That's a bummer for me, because I'm at school those days. Restaurant people eat at restaurants a lot as part of their job, and it's kind of cool, but sometimes we have to go to stuffy places where they don't really like kids and the food is weird. Speaking of weird food, sometimes my mom will try really strange things. Like adults all thought it was incredible, but I didn't really like it.

Another hazard for pastry chefs is sometimes they just get sick of sugar. Last night, my mom said it was time to take a break from sugar. She brought a creamy sheep's milk yogurt to the table, which she served with dates, orange zest, a cake!"

Comprehension Questions

1. What does a pastry chef do?
2. What does the child not like about "stuffy restaurants"?

Standard VII Passage**Talking Trees**

Annie felt a little silly, but she turned on her computer and typed the phrase "talking trees" into the search box anyway. Her best friend Josh's grandfather was in town and that morning she'd spent some time on Josh's porch, drinking orange juice and swinging on the porch swing. After some pleasantries and a lot of silence, the old man had begun to talk about talking trees.

He'd explained that the woods right out beyond the porch was full of talking trees. She couldn't help but laugh when he'd said it, but he looked serious and said indeed he could hear them murmuring at night.

Annie had said, "What's the point of a talking tree?"

He'd explained that they had many uses, but, most importantly, if one were questioning something in life, a talking tree would listen and might provide an unusual perspective.

As it turned out, Annie was questioning something in her life, so she'd gone home and turned on the computer hoping to learn more about talking trees and what they could do for her. Surprisingly, she learned a lot. Apparently, some trees did have a form of communication. They gave off biochemical messages into the air that could warn other trees to defend themselves against predators. She was amazed, and the next time they sat on the porch, she asked the old man if that's what he'd meant about talking.

But he seemed surprised and said no. He told Annie to just go sit in the woods some time and ask a question in a respectful tone. So later that day she did.

She lay down in the woods and shut her eyes. First, she asked her question silently in her head, but nothing happened. So, in a low, respectful voice, she repeated the question out loud. Suddenly from all around, she heard a murmured "yesssss, yesssss, yesssss."

Comprehension Questions

1. Who started to talk about talking trees?
2. How did Annie react to the idea of talking trees?



Standard VIII Passage**Battling Stings**

If you have ever been stung by a bee or wasp you know what a pain they are, but there are many ways to battle their stings. The best way to battle stings is not to get stung in the first place. To avoid getting stung you can take several steps whenever you'll be outside for an extended period of time. Avoid wearing brightly colored clothing, which might attract insects. Also, avoid wearing fragrances or scents, which can attract insects. Most importantly, never swat at nearby stinging insects because when threatened they emit a chemical signal, urging other members of the colony to attack.

If you are ever attacked by a swarm of stinging insects, the smartest thing to do is run away. Cover your face with your hands or pull your shirt over your head. Any stings near your mouth, nose, and throat are the most dangerous because they could later cause swelling that could interfere with your breathing. Find the nearest safe area, such as a vehicle or a building.

If you do get stung, don't panic. Inspect the wound to see if the stinger is still embedded in your skin. Look for a little black dot. Often the venom sac will still be attached, so don't use your fingers or tweezers to remove the stinger, if you pinch the venom sac with your fingers or tweezers, you could squeeze more venom into the wound.

The recommended way to remove the stinger is by scraping the area with a straight - edged object, such as a credit card or driver's license. Then wash the area thoroughly with soap and water or clean it with an antiseptic.

It's normal for swelling and redness to occur and for the wound to feel sore and itchy. Apply something cold to the wound. An icepack is best, but you can use anything cold, even a chilled can of soda.

Be attentive to other symptoms. If you have any dizziness or shortness of breath, or severe itching and puffiness on other areas of your body, these are signs of an allergic reaction. If you notice any of these symptoms you should seek medical assistance immediately.

Comprehension Questions

1. What animals sting?
2. Why should you cover your face if attacked by a swarm of bees?

Standard IX Passage

Crows

Crows are scavengers. The birds will eat almost anything, from vegetables and fruit, to nuts and seeds. They'll devour insects, frogs, lizards, mice, smaller birds, basically any animal they can fit into their mouths. And they'll happily pick at the flesh of carrion, which probably accounts for why ancient people associated crows with death.

Crows are playful birds, very sociable with their own kind, and they live in large extended family groups. They frequently indulge in silly games, such as carrying a twig high into the air, dropping it, then quickly swooping down and catching it. They've also been observed executing acrobatic backflips in flight.

Though few species of crows migrate, very often, during the fall and winter months, the birds will congregate in large groups, known as roosts. These roosts may range from a few dozen crows to hundreds of thousands. One astonishingly large roost, recorded in Oklahoma, was estimated at over two million crows. Exactly why they gather in such large groups remains a mystery, though researchers suspect that the birds congregate for protection against predators, as well as to communicate with one another and exchange information about where to find food.

Nearly all ornithologists (from the ancient Greek words ornis "bird" and logos "explanation") agree that crows are vastly intelligent creatures, with large brains in relation to their body size. Their intelligence is near the top of the avian world, alongside that of parrots. Their brains, at least in scale, are larger than human brains. A human brain is about one - and - a - half percent of body mass, while the brain of an American crow is more than two percent of its body mass.

And like us, crows are toolmakers. For example, they'll use straight twigs to poke for grubs, and then use a hooked twig to pull the grub from its hiding place. Crows often drop nuts onto roads and rocky surfaces to crack them open. In Japan, the clever birds deposit walnuts at intersections, placing the nuts right in front of the wheel of a car. Then, after the car crushes the nut, the crows return to peck at the pieces.

Comprehension Questions

1. What makes crows 'scavengers'?
2. How do we know that crows are sociable and playful?



Standard X Passage**Government**

Societies tend to function best when there are well - defined laws. Yet, even more important than the laws are the people who get to decide, enact, and enforce those laws. The people and structures that make those decisions are called government. Worldwide there are many types of government. These function at local, regional, and national levels. In all instances, government is the basis of power and control. But even when power is shared among people, problems arise. So, no form of rule is perfect.

An aristocratic government is power and control in the hands of a few people. Usually these people are thought to be different from the general population in some way. Ways in which aristocrats are thought to be different include: wealth, physical strength, intelligence, honor, technology, or achievement.

A despotic government is absolute power and control in the hands of a single person or very small group. Despotic rulers often rule out of self - interest and ignore the desires of the people. They often come to power in one of two ways. First, they can inherit power from a relative - such as a king or queen. These are known as absolute monarchs or dictators. Second, a despotic government can seize power from their predecessors. This process is called a military coup. Often despotic governments are authoritarian or totalitarian. This means that the person or people in power try to control all aspects of life.

A democratic government is one in which people are involved in decision making. There are two main ways democracies function. One is direct democracy where people get to create, vote on, and enact laws on their own. The other is indirect democracy where citizen elect politicians to vote on and enact laws. Often in democracies a simple majority wins, but this can put people with minority viewpoints at a disadvantage.

Anarchy is the opposite of government where a population is not ruled by any controlling body. In some senses, people view anarchy as disorder due to the lack of laws. However, for proponents of this form of "government", it removes all power structures. It makes individuals truly equal because it removes power from those with wealth, strength, merit, military arms, honor, and technology.

Comprehension Questions

1. The passage listed a few different forms of rule. Name one of them.
2. What makes aristocrats different from other people?

Student Mathematics Assessment: ICAN+

Number recognition	Addition	Subtraction	Multiplication	Division
Task 1 Recognise numbers. <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">3</div> <div style="border: 1px solid black; padding: 2px;">8</div> <div style="border: 1px solid black; padding: 2px;">2</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <div style="border: 1px solid black; padding: 2px;">0</div> <div style="border: 1px solid black; padding: 2px;">9</div> </div> At least 4 out of 5 numbers must be correct.	Task 1 $\begin{array}{r} 32 \\ + 15 \\ \hline \end{array}$	Task 1 $\begin{array}{r} 46 \\ - 21 \\ \hline \end{array}$	Task 1 $2 \times 4 =$	Task 1 $9 \div 3 =$
Task 2 Recognise numbers. <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">48</div> <div style="border: 1px solid black; padding: 2px;">84</div> <div style="border: 1px solid black; padding: 2px;">22</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <div style="border: 1px solid black; padding: 2px;">97</div> <div style="border: 1px solid black; padding: 2px;">30</div> </div> At least 4 out of 5 numbers must be correct.	Task 2 $\begin{array}{r} 56 \\ + 17 \\ \hline \end{array}$	Task 2 $\begin{array}{r} 78 \\ - 29 \\ \hline \end{array}$	Task 2 $\begin{array}{r} 42 \\ \times 6 \\ \hline \end{array}$	Task 2 $7 \overline{) 93}$
Word problem				
Task 2a - Subtraction Listen to the question carefully, solve and answer. There were 43 children in the park. Out of these, 25 of them have gone home. How many children are left in the park now?	Task 2b - Division Listen to the question carefully, solve and answer. A shopkeeper has 48 apples. He keeps 3 apples in each box. How many such boxes will he need to keep all the apples?			
ICAN assessment tasks				
Word problem				
Task 2c - Fractions There were 108 goats in the pen. $\frac{5}{6}$ of them were black. How many goats were NOT black?	Fractions Task 1 Which is greater: $\frac{4}{5}$ or $\frac{3}{15}$		Equations Task 1 $17x = 68$ $x =$	
Task 2 $1\frac{1}{6} + \frac{1}{3} =$		Task 2 $-5y - 3 = 12$ $y =$		
Word problem				
Task 2d - Equations A number plus 8 equals $\sqrt{144}$. What is the number?				

SET 2

SET 3

SET 4



Appendix B: Tables

Table B.1.0: Treatment effects on reading fluency		
Subskills	Treatment effect over expectation	% gain over "baseline" expectation
Words correctly read, passage 1	8.91	12%
	(6.83)	
student read 0 words correctly, passage 1	-0.06**	67%
	(0.03)	
Words correctly read, passage 2	6.62	9%
	(6.57)	
student read 0 words correctly, passage 2	-0.07**	64%
	(0.03)	

Note: Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.1.1: Treatment effects on reading comprehension, by subskill		
Subskills	Treatment effect over expectation	% gain over "baseline" expectation
Average comprehension score	0.02	12%
	(0.04)	
Comprehension score, passage 1	0.02	15%
	(0.05)	
Comprehension score, passage 2	0.01	5%
	(0.05)	

Note: Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.1.2: Treatment effects on foundational mathematics, by subskill

Subskills	Treatment effect over expectation	% gain over "baseline" expectation
Number recognition, simple	0.03**	3%
	(0.01)	
Number recognition, complex	-0.01	-1%
	(0.04)	
Addition, simple	-0.01	-1%
	(0.02)	
Addition, complex	0.01	1%
	(0.05)	
Subtraction, simple	0.04	5%
	(0.03)	
Subtraction, complex	0.11	19%
	(0.08)	
Multiplication, simple	0.01	1%
	(0.03)	
Multiplication, complex	0.06	9%
	(0.05)	
Division, simple	0.10	16%
	(0.08)	
Division, complex	0.21***	75%
	(0.06)	
Foundational mathematics proficiency*	3.12	3%
	(3.03)	

Foundational mathematics proficiency is defined as whether a student is able to recognise numbers and do at least two of the other operations listed above.

Notes: Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$



Table B.1.3: Treatment effects on advanced mathematics, by subskill

Subskills	Treatment effect over expectation	% gain over "baseline" expectation
Fraction, simple	0.12*	67%
	(0.06)	
Fraction, complex	0.08*	200%
	(0.04)	
Equations, simple	0.10*	100%
	(0.05)	
Equations, complex	0.03	43%
	(0.04)	
Word problem involving subtraction	0.18*	46%
	(0.1)	
Word problem involving division	0.16*	76%
	(0.08)	
Word problem involving fraction	0.04*	133%
	(0.02)	
Word problem involving equation	-0.02*	-67%
	(0.1)	

Note: Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.1.4: Gender differences in learning outcomes by subskills

Subject	Subskill	Baseline		Treatment effect		
		Boys	Difference girls-boys	Boys	Girls	Is the difference statistically significant?
Literacy	Reading fluency, passage 1	69.60	2.24	11.06	8.43	No
		(44.93)	(3.46)	(7.50)	(8.18)	
	Non-readers, passage 1	0.06	0.02	-0.03	-0.08***	No
		(0.23)	(0.02)	(0.04)	(0.03)	
	Reading fluency, passage 2	66.90	-0.82	8.11	6.86	No
		(40.91)	(3.27)	(6.45)	(8.12)	
	Non-readers, passage 2	0.07	0.01	-0.04	-0.09***	No
		(0.26)	(0.02)	(0.04)	(0.03)	
Reading comprehension, passage 1	0.10	0.02	-0.01	0.04	No	
	(0.22)	(0.01)	(0.06)	(0.05)		
Reading comprehension, passage 2	0.10	0.02	-0.01	0.04	No	
	(0.22)	(0.01)	(0.06)	(0.05)		
Mathematics	Simple addition	0.96	-0.01	0.02	-0.02	No
		(0.19)	(0.01)	(0.03)	(0.03)	
	Simple subtraction	0.92	0.00	0.06	0.03	No
		(0.28)	(0.02)	(0.04)	(0.04)	
	Simple multiplication	0.92	0.02	0.05	-0.02	No
		(0.28)	(0.02)	(0.05)	(0.04)	
	Simple division	0.60	-0.02	0.15*	0.07	No
		(0.49)	(0.03)	(0.08)	(0.10)	
	Simple fraction	0.23	0	0.19**	0.07	No
		(0.42)	(0.03)	(0.09)	(0.07)	
	Simple equations	0.13	0	0.09	0.11	No
		(0.34)	(0.02)	(0.06)	(0.07)	
	Complex addition	0.86	0.01	0.06	-0.02	No
		(0.34)	(0.03)	(0.06)	(0.07)	
Complex subtraction	0.67	-0.03	0.13	0.10	No	
	(0.47)	(0.04)	(0.09)	(0.09)		



	Complex multiplication	0.74	-0.01	0.08	0.06	No
		(0.44)	(0.03)	(0.07)	(0.07)	
	Complex division	0.41	-0.05	0.26**	0.19**	No
		(0.49)	(0.03)	(0.09)	(0.08)	
	Complex fractions	0.08	0.00	0.13**	0.05	No
		0.27	0.02	(0.05)	(0.05)	
	Complex equations	0.09	0.00	-0.02	0.07*	No
		(0.28)	(0.02)	(0.06)	(0.04)	
	Foundational mathematics proficiency	92.81	1.26	5.46	1.38	No
		(25.87)	(1.65)	(4.66)	(4.15)	

Note: Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.1.5: Landforms differences in learning outcomes by subskills

Subject	Subskill	Baseline		Treatment effect		
		Hills	Difference hills-valley	Hills	Valley	Is the difference statistically significant?
Literacy	Reading fluency, passage 1	89.38	-23.42*	5.52	9.89	yes
		(34.55)	(4.47)	(12.58)	(8.08)	
	Non-readers, passage 1	0.01	0.07*	-0.01	-0.07***	yes
		(0.10)	(0.02)	(0.02)	(0.04)	
	Reading fluency, passage 2	83.22	-21.22*	2.24	9.72	yes
		(30.97)	(4.35)	(14.40)	(6.17)	
	Non-readers, passage 2	0.01	0.09*	-0.01	-0.08**	yes
		(0.10)	(0.02)	(0.02)	(0.04)	
Reading comprehension, passage 1	0.18	-0.09**	0.03	0.02	yes	
	(0.26)	(0.05)	(0.15)	(0.06)		
Reading comprehension, passage 2	0.29	-0.17*	0.04	0.01	yes	
	(0.30)	(0.05)	(0.13)	(0.04)		
Mathematics	Simple addition	0.98	-0.03**	0.02	-0.03	No
		(0.14)	(0.01)	(0.03)	(0.03)	
	Simple subtraction	0.95	-0.05**	0.10	-0.01	No
		(0.21)	(0.02)	(0.06)	(0.03)	
	Simple multiplication	0.94	-0.02	0.08	-0.04	No
		(0.23)	(0.02)	(0.06)	(0.03)	
	Simple division	0.56	0.05	0.24	0.03	No
		(0.50)	(0.10)	(0.23)	(0.07)	
Foundational Mathematics	98.50	-6.30*	7.47	-1.49**	No	
	(12.19)	(1.81)	(4.43)	(2.84)		

Note: Significance levels: *p<0.10, **p<0.05, ***p<0.01



Table B.1.6: Landforms differences in learning outcomes by subskills

Subject	Subskill	Baseline		Midline	
		Non-fagathansi	Difference fagathansi-Non-fagathansi	Non-fagathansi	Difference fagathansi-Non-fagathansi
Literacy	Reading fluency, passage 1	74.67	-7.31	75.05	13.36*
		(50.6)	(6.56)	(45.64)	(6.97)
	Non-readers, passage 1	0.05	0.04	0.03	0
		(0.21)	(0.03)	(0.17)	(0.01)
	Reading fluency, passage 2	69.71	-6.27	70.32	11.72*
		(46.83)	(6.19)	(40.68)	(6.52)
	Non-readers, passage 2	0.06	0.03	0.05	-0.01
		(0.24)	(0.03)	(0.21)	(0.02)
	Reading comprehension, passage 1	0.11	-0.01	0.12	0.04
		(0.24)	(0.04)	(0.25)	(0.04)
Reading comprehension, passage 2	0.17	-0.03	0.19	0.06	
	(0.29)	(0.04)	(0.3)	(0.05)	
Mathematics	Simple addition	0.95	0.01	0.97	0
		(0.21)	(0.02)	(0.17)	(0.01)
	Simple subtraction	0.91	0.02	0.9	0.03
		(0.29)	(0.02)	(0.3)	(0.03)
	Simple multiplication	0.91	0.03	0.88	0.05*
		(0.28)	(0.02)	(0.33)	(0.03)
	Simple division	0.57	0.05	0.61	0.18***
		(0.5)	(0.06)	(0.49)	(0.05)
	Foundational Mathematics	93.65	-0.27	93.38	2.22
		(24.41)	(2.62)	(24.89)	(1.94)

Note: Significance levels: *p<0.10, **p<0.05, ***p<0.01

Table B.1.7: Treatment effects on teacher practices		
Subskills	Treatment effect over expectation	% gain over "baseline" expectation
Time on learning	0.05	4%
	(0.17)	
Supportive learning environment	0.12	5%
	(0.15)	
Positive behaviour expectation	-0.16	-8%
	(0.19)	
Lesson facilitation	-0.07	-3%
	(0.2)	
Checks for understanding	0.03	1%
	(0.17)	
Feedback	-0.11	-5%
	(0.19)	
Critical thinking	-0.16	-9%
	(0.21)	
Autonomy	0.05	3%
	(0.21)	
Perseverance	0.06	3%
	(0.21)	
Social and collaborative skills	-0.05	-3%
	(0.22)	
Overall	-0.24	-1%
	(1.61)	

Note: Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$



Table B.1.8: Average student enrolment in STAR Education schools

Grade	Nominally Enrolment		With Regular Attendance	
	Term 1	Term 2	Term 1	Term 2
Standard VI	14.0	21.3	11.4	14.6
Standard VII	14.6	22.2	12.4	14.5
Standard VIII	19.5	28.5	15.5	19.5
Standard IX	17.7	23.5	15.1	18.3
Standard X	13.3	20.9	11.3	15.0

Table B.1.9: Share of STAR Education with at least one student with regular attendance

Grade	Term 1	Term 2
Standard VI	68%	81%
Standard VII	71%	80%
Standard VIII	66%	82%
Standard IX	67%	74%
Standard X	58%	64%

Appendix C: Reading Fluency Performance Standards

Hasbrouck-Tindal Reading Fluency (Spring) Norms

The Hasbrouck-Tindal Oral Reading Fluency Norms are widely used as a tool to benchmark appropriate student progress in English oral reading fluency given their developmental stage at different points during their Primary school experience¹⁴. These benchmarks are developed based on data from a few different assessments, including DIBELS, collected primarily in high-income, English-speaking countries. The chart below contains the Hasbrouck-Tindal grade-level benchmarks for students in the 25th, 50th, and 75th percentiles during the Spring term, the last term of the school year. Furthermore, the chart also includes the average expected growth per week from a student in the 50th percentile at this point of the school year.

Oral Reading Fluency Norms (Correct words per minute)				
	25 th percentile	50 th percentile	75 th percentile	Median average weekly improvement
Standard I	34	60	91	2.0
Standard II	72	100	124	1.6
Standard III	91	112	139	0.9
Standard IV	105	133	160	1.2
Standard V	119	146	169	0.8

¹⁴ Hasbrouck, J. & Tindal, G. (2017). An update to compiled ORF norms (Technical Report No.1702). Eugene, OR, Behavioral Research and Teaching, University of Oregon.



Appendix D: Protocol for Collecting Qualitative Data in STAR Education — Pre-Midline (July & October 2022)

Purpose and framing

The goal of this exercise is to understand what went well during the first year of the STAR Education programme, and what did not. We understand that there were some operational challenges throughout these initial months alongside the momentous achievements resulting from programme implementation. However, as we collect these data, we do not want to prime respondents against any particular issue. Instead, we want to hear their candid opinions and the specific issues that, in their view, were the most significant hindrances to achieving a smoother programme implementation.

The questions below are not intended to be full script. While interviewers should try to cover as much ground as possible, a key to collecting in-depth data via interviews is making the interviews “flow” by avoiding a feeling of “call-and-response” (i.e., jumping from one question to the next without any follow-ups). In other words, these questions are not meant for you to religiously ask one, and move on to the next. Instead, they serve as a guide about the conversations that you should be bringing up, but you should also feel free to ask follow-up questions and pursue tangents, if these appear to be fruitful sources of information.

Throughout your conversation, please make sure to take detailed notes. If the interview allows and you feel that this might not bias their responses, feel free to record the conversation. Otherwise, detailed notes, quotes, and any other evidence/opinions that they might produce should be documented.

How to start the interview:

The following paragraph serves as a potential guide on how you may want to frame the conversation from the start. Please do NOT read this paragraph verbatim — simply understand the main points, and then relay these to each interviewee at the beginning of each conversation:

“Thank you for your help today. We are working on understanding how the first months of the STAR Education programme went — both the positive things, and the things that still need improvement. None of this conversation is a test, and none of your responses will be used against you in any way! In fact, we are looking for your very honest opinion on how the JSS programme could be improved further — what areas you struggled with, and what areas were not working at all. Any questions before we get started? Is it okay if I note your name, grades taught last semester, and the school where you work?”

Questions for teachers:

1. What aspects of the programme have been most helpful to you?
2. How does STAR Education make you a better teacher?
 - a. Does it reduce your workload in any way, like lesson planning?
 - b. Has it improved the quality of your lessons?
3. Have you observed any changes to students' behaviours in the classroom after the introduction of the programme?
4. Are there any other parts of the programme that are a clear improvement relative to before?
 - a. [if yes:] What are they?
5. Did your school leader encourage you to engage with the programme? What do you think their attitudes towards the programme were?
6. To what extent did you use the STAR education methodology?
 - a. [if yes:] Why did you decide to use the methodology?
 - b. [if no:] What challenges or barriers, if any, did you experience that kept you from effectively using the methodology in your teaching?
7. If you could ask for 2 or 3 things to ensure that you implement this programme properly, what would they be?
8. The school transitioned to the 2:1 model in October. Did your workload change as a result of this transition?
 - a. [if yes:] How did your workload change?
9. How, if so, did your opinions about STAR Education change after this transition?



Questions for head teachers:

1. Since implementing the programme, what are some changes that you have noticed among the teachers, especially in regard to classroom management and teaching behaviours?
2. What are some changes that you have noticed among students?
3. How well do you think your teachers are implementing the programme in their teaching?
 - a. [if no:] Can you talk a little bit about why they are not implementing the programme?
4. What suggestions do you have for improving the programme for teachers and students in your school?
5. Is there anything else you'd like to share about your experience with STAR Education?
6. We did a second round of teacher training in October. Did you notice any changes among teachers after this second round? Any changes in lesson delivery? Any changes in teacher motivation?

Questions for students:

1. In the past five months, did you see any changes in how your teachers teach the lessons? If so, what are those changes?
 - a. [if yes:] How, if so, did these changes help you learn in school?
2. In the past five months, did you see any attitude changes from your teacher? If so, what are those changes?
 - a. [if yes:] How, if so, did these changes help you learn in school?
3. Is there anything else you'd like to share about your teachers or schools?

Sample data collection

We suggest that the collection of the data happen in an orderly and systematic manner. To do so, Priscilla Lu can support in the set-up of a spreadsheet with the following structure (where there is one tab for teachers, one for head teachers, one for supervisors, etc.):

For teachers

Question	Respondent 1 Name: (if available) School: (if available) Grades taught last year: (if available)	Respondent 2 Name: (if available) School: (if available) Grades taught last year: (if available)	Respondent 3 Name: (if available) School: (if available) Grades taught last year: (if available)
Question 1	Response	Response	Response
Question 2	Response	[Not discussed]	Response
Question 3	Response	Response	[Not discussed]
Question 4	[Not discussed]	Response	Response
Questions 5	Response	[Not discussed]	Response
Questions 6	Response	[Not discussed]	Response
Question 7	[Not discussed]	Response	Response
Other comments	[Add here additional comments from the respondent]	[Add here additional comments from the respondent]	[Add here additional comments from the respondent]
Interviewer observations	[Add here any observations from the interviewer — what was the tone of the conversation? Hostile? Did they seem to really dislike the programme? Were they frustrated with certain aspects of the educational system, either within or outside of the programme? Did they seem sincere/insincere in their dislike/praise of the programme?]	[Add here any observations from the interviewer — what was the tone of the conversation? Hostile? Did they seem to really dislike the programme? Were they frustrated with certain aspects of the educational system, either within or outside of the programme? Did they seem sincere/insincere in their dislike/praise of the programme?]	[Add here any observations from the interviewer — what was the tone of the conversation? Hostile? Did they seem to really dislike the programme? Were they frustrated with certain aspects of the educational system, either within or outside of the programme? Did they seem sincere/insincere in their dislike/praise of the programme?]



Ideally, after each interview, we suggest that the interviewer either take a few minutes to add all their notes to a new column, or at the very least, that they process their notes either on paper or in the spreadsheet, in such a way that they can come back to the spreadsheet later on, and have a clear memory of everything that was discussed so they can finish filling out the spreadsheet.

As shown in the example above, we do not need an answer for every question from every participant. Although we want to cover a lot of ground with each respondent, we also do not want to sacrifice candour and in-depth discussions for a more superficial coverage of all questions.

Finally, the interviewer should also take a few minutes to meditate about the subjective feel of the interview and of the respondent's attitudes towards the programme. Any "vibe" that was not able to be transmitted through the other (more concrete) questions should be incorporated into this section. Then, interviewers will include this information in the last row of the spreadsheet, for as many interviewees as possible.



Appendix E: Ensuring The Accuracy Of Quantitative Data

An overview of the quality assurance protocol

The context surrounding the quality assurance protocol

Foundational **literacy** and **numeracy** (FLN) skills amongst children in any given education system are integral to their success, both within their academic careers and in their everyday lives. Proficiency in these two fundamental sources of knowledge can be used as a measure of overall education quality, but it is something that is often lacking in students attending schools in low- and middle-income countries (LMIC). Transforming this distressing reality is a direct focus of NewGlobe's government-partnered education reform strategies. However, bringing student competencies in these core skills up to ideal levels necessitates that those competencies be properly assessed and measured before, during, and after our programmatic interventions.

To achieve this, we use internationally validated assessments that contextualise where students' learning levels are within the broader scope of where they need to be. Students are scored based on the number of correct responses they provide, and the number of incorrect responses is also recorded. For literacy, we use two assessment passages provided by **Dynamic Indicators of Basic Early Literacy Skills** (DIBELS), which is widely regarded by researchers as an effective literacy measurement procedure. These passages work in tandem to provide insight into **oral reading fluency** (ORF), the subskill most strongly correlated with others on the path towards reading proficiency, and **reading comprehension**, the ultimate goal of literacy skills. The first assessment is a grade 2 passage, which all students (regardless of grade level) read, and the second is a grade-level passage tailored specifically to each student's respective grade. For both, students are scored based on the number of **correct words per minute** (cwpm), and incorrectly read words are also recorded. In order to assess student numeracy skills, we use the **International Common Assessment of Numeracy** (ICAN), which aligns with global standards for monitoring learning progress in LMIC, and tests students on the core skills of number recognition, addition, subtraction, multiplication, and division. With these tools, we can benchmark students' learning levels based on their assessment scores, and thus precisely target our efforts to help them improve.

Furthermore, given that these assessments are what underpins some of the major policy decisions needed to benefit students to the greatest extent possible, it is vital that the data gathered from them be current and reliable. Therefore, to ensure efficient turnaround and accuracy of assessment scores, NewGlobe dispatches trained enumerators to administer the assessments in the schools our organisation serves. Enumerators are responsible for recording and reporting assessment scores with the utmost precision. In turn, NewGlobe is responsible for effectively monitoring these enumerators' output, to ensure that there are no observances permitted that may compromise the reliability of the data. To execute this undertaking, NewGlobe's Measurement and Evaluation (M&E) team has developed a **quality assurance protocol**.

The goal of the protocol

The quality assurance protocol is embedded within our larger data cleaning process — which is employed to correct erroneous, incomplete, or duplicate information from our data sets — and certifies that the data collection completed by enumerators is of the expected calibre. This is the primary function of the protocol, and what allows it to reach its primary goal of supporting validated data that reflects actual student performance in the assessed skills.



In the interest of transparency and greater visibility into data-gathering performance patterns, the M&E team also produces **quality assurance reports**, which detail our work in identifying problematic enumerator observations, thus allowing for targeted interventions to improve data quality. This documentation also serves as an internal guide to the quality assurance protocol for anyone in our organisation who is interested in understanding how we ensure data quality control.

Defining quality assurance indicators

To facilitate analysis of the quality of our data, the M&E team has implemented an automated approach, built with standardised code created in Stata — a statistical software platform — which allows us to identify certain indicators within the data that point to inaccuracies. These indicators reveal that some reported assessment scores may reflect an issue with enumeration, rather than a true measure of student ability. To further streamline this process, we've identified **seven indicators** that may be flagged for the possibility of potential issues that need to be investigated:

- **Indicator 1:** The share of observations showing that students are non-readers
- **Indicator 2:** The share of observations containing ORF scores of extreme values for a given grade
- **Indicator 3:** The share of observations containing ORF scores that surpass the maximum achievable score
- **Indicator 4:** The share of observations containing discrepant ORF scores
- **Indicator 5:** The share of observations containing identical ORF scores
- **Indicator 6:** The share of observations containing ORF scores that are multiples of 5, or similar grouping patterns
- **Indicator 7:** The correlation of scores among ORF, reading comprehension, and numeracy skills

While it is worth noting that not all of these indicators are, by themselves, a clear indication of inaccurate data, if the data cleaning process leads to the discovery of several of these indicators, this may indicate a pattern of malpractice among certain enumerators. Therefore, a thorough investigation into the specific cases flagged by these indicators is necessary to determine if there is an issue that compromises data quality.

Putting guidelines in place for each indicator

In order for these indicators to support our goal of consistent data quality assurance, the M&E team must have frameworks in place for analysing them. Therefore, we have defined a **reasonable range** that we would expect assessment scores to fall within. Scores that are within two standard deviations (SDs) from the mean are considered reasonable, while scores that are outside of that are more closely examined as outliers requiring further verification. As such, some of the indicators described below revolve around identifying scores that exist above or below a reasonable range.

In addition to this, we have established a **frequency threshold** for how often indicators signifying potential errors in the data collection process should occur. That is, if more than 10% of a given enumerator's observations contain these indicators, the M&E team will investigate the reliability of their findings accordingly.

Indicator 1: The share of observations showing that students are non-readers

The key question to answer for this indicator is whether the share of non-readers (those scoring zero correct words per minute) identified by enumerators is within the established reasonable range for a given territory. Observations outside of this range are considered to be an overestimation or underestimation of non-readers. Additionally, we investigate any discrepancies in the proportion of non-readers identified between the two passages used as assessments. We expect that enumerators who identify many students as non-readers using the grade-level ORF passage will also identify many non-readers using the standard-grade ORF passage, and vice versa.

Other parameters also determine whether this indicator suggests unreliable data. For instance, if most enumerators report a high proportion of non-readers in a given territory, it would not necessarily be viewed as a data quality issue. However, if only a few enumerators report a high proportion of non-readers, we will closely scrutinise the results from those enumerators to identify potential data quality issues. It is important to consider that some schools may genuinely have a higher share of non-readers, but we conduct a thorough evaluation of the data to confirm whether an actual trend exists in the territory, or whether it is an indication of errors in the data set.

Indicator 2: The share of observations containing ORF scores of extreme values for a given grade

Just as we expect there to be a reasonable range of non-readers, there should also be a realistic distribution of high-performers. For this reason, we also monitor enumerator observations for scores that would be considered outliers when viewed in conjunction with the other scores reported for students in a given grade. These scores would fall well outside of the reasonable range — clearly above or below what is expected of students — based on the typical scores seen in the rest of the sample. They would therefore be flagged as indicative of a potential data quality issue. Moreover, if the proportion of an enumerator's observations that are outside this range surpass the predetermined frequency threshold, then we would investigate the accuracy of the data based on how regularly these extreme values are occurring.

Indicator 3: The share of observations containing ORF scores that surpass the maximum achievable score

Since the assessment passages used to measure oral reading fluency contain a fixed number of words, it is impossible for a student to read a greater number of correct words than the total count in the passage. Even if they did not make any errors, the maximum achievable score would be equal to the total number of words in the passage. Consequently, enumerator observations showing ORF scores that exceed this number are considered an indicator of a potential data quality issue. However, it is important to clarify that the word limit can be adjusted during different data collection rounds to reflect the current passage, and this may be the source of the discrepancy.

Hence, we apply the same reasoning for this indicator as for the first indicator. If only a few enumerators report a disproportionately high share of unfeasible ORF scores when evaluating students in a given territory, while the majority of enumerators do not indicate such a trend, then there could be potential issues with the accuracy of their data collection worthy of closer examination. Similarly, the M&E team would also scrutinise the output of an enumerator who records many excessively high scores for one of the assessment passages, but not for the other.



Indicator 4: The share of observations containing discrepant ORF scores

In addition to scores that surpass the total number of words read in a passage, we examine whether enumerator observations contain discrepant scores. A discrepant score is defined as a total number of words read that does not match the sum of correctly read words and incorrectly read words. It is unusual for an enumerator to produce a significant proportion of discrepant scores. However, we closely monitor their observations to ensure that enumerators do not include these errors in either or both of the two passages used for assessment.

Indicator 5: The share of observations containing identical ORF scores

Because it is typical for assessment scores to show variation, it is unlikely that enumerators would report a large share of observations containing the exact same ORF score. Therefore, an enumerator reporting a proportion of identical scores that is above the established threshold would prompt further examination to ensure the accuracy of the data. Likewise, we expect individual students to score differently on the different passages used for assessment. It is hence an indication of a potential data quality issue if enumerators report the exact same score for one student across both passages.

Indicator 6: The share of observations containing ORF scores that are multiples of 5, or similar grouping patterns

This indicator is focused on examining whether enumerators are reporting an excessive number of ORF scores that are multiples of five. Based on the typical range of reading fluency scores, we would expect only around 20% of scores to be multiples of five. Therefore, significant clusters or groupings of scores that are multiples of five, such as 100 cwpm, for example, would raise concerns about potential round number bias, rather than reflecting genuine variations in performance. In cases of high-quality data collection, we anticipate observing scores that are uniformly distributed across a range of values, including those that are multiples of five.

Furthermore, it is more probable for enumerators to report a score that is a multiple of five for one assessment passage than for both passages. Therefore, reporting a score that is a multiple of 5 for one passage is less concerning, but if an enumerator reports scores that are multiples of five for both assessment passages, it would be considered a flag and require further scrutiny.

Indicator 7: The correlation of scores among ORF, reading comprehension, and numeracy skills

Reading fluency, reading comprehension, and numeracy assessment scores tend to correlate with one another. Given this relationship, we assess whether the correlations among these skills reported by specific enumerators differ significantly from those observed across the rest of the sample.

Correlations that are disproportionately higher or lower than others could indicate a serious data quality concern. Correlative deviations may signify inattentive and imprecise observations completed by enumerators — especially in the case of lower correlations — and they can also point to inaccurate assumptions being made about students' competencies in one or more of these skills, based on their performance in other skills, which would mean an inaccurate reading of their learning levels.

Understanding how the M&E team interacts with quality assurance indicators to maximise data quality

Part 1: Creating flags for each indicator across observations

If the observations completed by enumerators contain these indicators, and the number of indicators exceeds the frequency threshold or contain scores that are outside the reasonable range, flags will be raised to signify the need for review of the data. To standardise this process, the M&E team has created code to flag the issues defined by each indicator, for each of the observations in a data set. The specifics of this code ensure that these flags identify the individual enumerator who completed the observations, thereby establishing accountability norms and governance over performance patterns.

Part 2: Aggregating data for each indicator, by enumerator

After the indicator flags for each observation have populated, the next step involves aggregating the data embedded in each indicator, per enumerator. This allows us to quantify the number of flags per indicator that are occurring as a result of a given enumerator's data collection process, which provides further insight into the consistency with which they report accurate data.

Part 3: Investigating enumerator alert rates based on indicators

These tools, used for identifying potential errors within enumerators' observations, provide us with an alert rate, which serves as part of the basis for determining which enumerators' data collection processes require further investigation. An alert rate is a metric that measures the severity of potential errors in an enumerator's work. It is calculated by dividing the number of flagged indicators for an enumerator by the total number of indicators present. A higher alert rate indicates a higher likelihood of errors, and potentially reduced reliability in an enumerator's data collection. We pinpoint enumerators with comparatively high alert rates and rigorously examine the data they collected to determine whether the improbabilities found in their data are genuine, or if they are indicative of unreliable data collection.

Part 4: Reporting enumeration performance to the data collection team

By implementing these measures, our organisation can conduct a thorough evaluation of enumeration performance aligning with our mission to uphold data integrity. Once we have followed these steps, which ensure a sound evaluation of each enumerator's data collection process, we share our results with the data collection team. At this stage, the team carries out independent investigations and takes proactive measures to address any identified issues. Via this iterative process, we foster a collective effort to promote transparency and accountability, and reinforce our commitment to deliver accurate and trustworthy data.



Appendix F: The Learning Crisis in Low- and Middle-income Countries: An Overview of Causes, Contributors, and Consequences



Enrolment and Literacy Rates Around the World have Increased at Record Speed in Recent Decades

The growing global focus on broadening access to schools has led to significantly improved enrolment rates

Over the last 75 years, there has been a significant global shift towards expanding schooling infrastructure and enrolment outreach in an effort to achieve universal education. As a result, more children are in school today than at any other time in history — both in absolute and relative numbers (World Bank, 2018). Of the nearly 2 billion children under 14 years of age worldwide, 80% are now enrolled in school, with the majority living in low- or middle-income countries (LMIC). In LMIC in particular, nominal enrolment rates have increased at unprecedented speeds, now reaching near-universal levels (Pritchett, 2013).

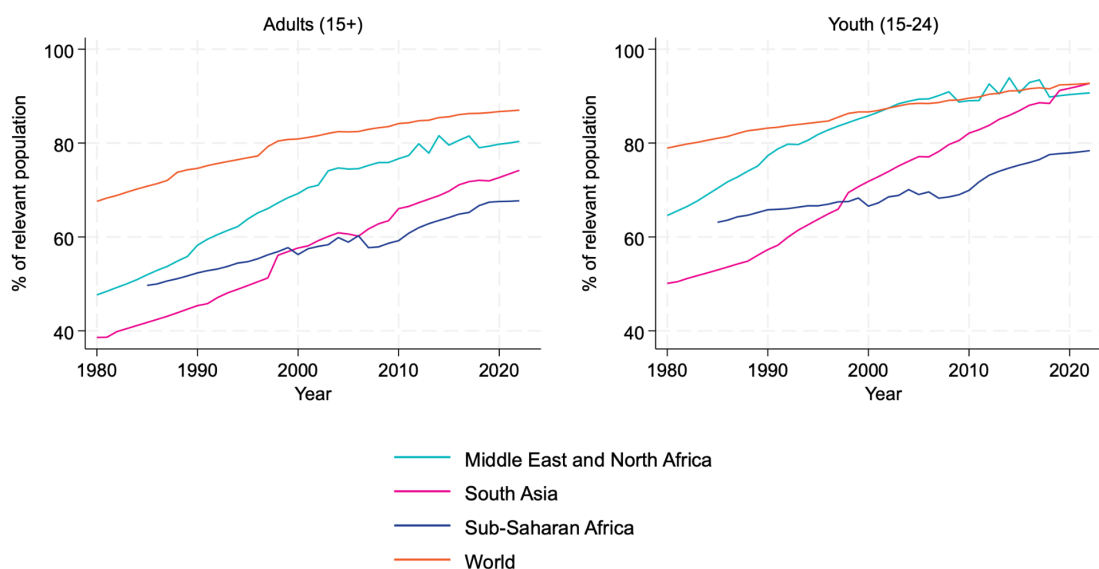
For example, it took Bangladesh only 20 years to achieve nearly universal gross enrolment, growing by 33 percentage points between 1987 and 2007, starting from 65%. Similarly, Pakistan reduced the proportion of out-of-school children from 1 in 3 to 1 in 6 over the 2001-2021 period (World Bank, 2024c). Morocco saw an impressive 54% increase in girls' enrolment over 11 years — a feat that took the United States 40 years to accomplish. More broadly, between 1970 and 2010, the gross Primary enrolment rate in sub-Saharan Africa and South Asia surged from 68% and 47%, respectively, to over 100% in both regions (World Bank, 2018). These remarkable gains illustrate the successful efforts of countries worldwide to match enrolment rates in high-income nations, reflecting a global commitment to the importance of education.

Increased enrolment has been accompanied by growth in literacy rates

With ever-larger shares of the population being exposed to formal schooling, officially reported literacy rates have increased dramatically. Globally, literacy rates more than doubled, from 42% in 1960 to 86% in 2015 (Roser and Ortiz-Ospina, 2013). Along with expanded access, this represents a remarkable achievement in expanding educational access.

Literacy Rates Over Time in Selected Regions

Source: World Bank



Despite Successes in Expanding Enrolment and Raising Literacy Rates, More Progress is Needed

Barriers to enrolment still persist

Access to schooling is a crucial prerequisite to learning, and the rapid, worldwide increases in enrolment in recent history are cause for hope. However, enrolment is still not universal; in 2018, 1 in every 6 Primary and Secondary school-aged children still remained out of school, which accounts for a total of 258 million children worldwide (UNESCO, 2023). The COVID-19 pandemic further exacerbated this situation, with school closures keeping out almost 1.6 billion children (Azevedo, 2020), and even after schools reopened, many students never returned (UNICEF, 2023b; Mighati, 2022).

Several barriers to enrolment persist. In some contexts, particularly in rural areas, there are 'education deserts', where large shares of the population do not live within a reasonable distance from the closest school, or are barred by impassable terrain or issues of travel safety. In other contexts, even government-led schooling is not free and/or compulsory, or comes with associated fees for school uniforms, meals, or textbooks – the cost of which can be prohibitive for many prospective students and their families (Abdul Latif Jameel Poverty Action Lab, 2019; Oyekan et al., 2023).

Beyond physical, financial, and infrastructural barriers, the quality of education offered by school systems is a crucial factor for ensuring that children not only enter school, but also remain in and advance to the next levels of school. There is a significantly stronger likelihood that students will drop out of school or will not transition to higher grades or levels of education if they are not academically



thriving (Pritchett, 2013), and the responsibility of ensuring the scholastic achievement of all students falls on the education system, to a far greater degree than it is dependent on students' backgrounds or characteristics (OECD, 2012; Eble and Escueta, 2022). Ultimately, failure to ensure adequate student retention and attainment has negative implications for both the education system and for students. It is more costly for education systems to devote educational resources to students who must repeat grades or who ultimately withdraw from formal education, and high rates of dropout are equated with lower levels of productivity in the labour force, which is detrimental for individuals and whole societies alike (OECD, 2012; Patrinos and Psacharopoulos, 2018).

Access to education must start with early childhood

While great progress has been made in recent decades towards enrolling larger numbers of school-aged children, children in many contexts enter school later than the intended age, which can profoundly impact the rate at which they master skills during their academic careers and how well they develop into adulthood. For example, in Guinea-Bissau, more than three quarters of children in Primary school are over-age (UNESCO, 2023b), and this is largely due to late enrolment, with only 30% of children beginning school at the specified age of six (Borgen Project, 2021). In Nigeria, 1.8 million children were attending Primary school after the age of 11 during the 2018-2019 school year (Sasu, 2022). A 2017 study conducted in Uganda found that student ages in the final year of Primary school ranged from 12 to 22 years, with most students being 16 years old (Nath et al., 2017). In some contexts, late entry is a result of positive systemic changes that have broadened access to education (World Bank, 2020a) by making schooling available to children who were previously barred from it. However, in the long term, it is more advantageous for students to be equipped with school readiness by entering a learner-centred environment as early as possible — ideally through early childhood development education (Sosu and Pimenta, 2023). This plays a critical role in ensuring that students keep pace with curricular expectations, thereby maximising their potential throughout their academic careers and beyond.



Box 4 Investing in Early Childhood Education as a Foundation for Future Learning and Economic Returns

Early childhood education — systemic services designed to foster early learning before Primary education — represents one of the most impactful socioeconomic investments a government can make. The formative years from birth to age five are critical for the development of working memory, cognitive flexibility, and empathy, providing a unique opportunity for early cognitive and socio-emotional growth that significantly influences a child's academic future (Diamond, 2013). Research consistently shows that preschool cognitive skills can predict later educational outcomes, such as enrolment in secondary education, in diverse contexts including Guatemala and The Gambia (Palacios, 2022; Milosavljevic et al., 2023). These benefits extend to Primary education, where children who have participated in early childhood programmes exhibit higher attendance rates, better academic achievement, and are less likely to repeat grades or require remedial support (Berlinski and Schady, 2015; Naudeau et al., 2011). Thus, investment in early childhood education pays large academic dividends later in children's lives.

Given the significant returns early childhood education can yield, particularly in systems with low learning outcomes, it is clear that investments in this sector can be highly advantageous. This is true economically as well as academically; high-quality early childhood programmes can yield up to a 13% annual return per child (Heckman, 2007), through reduced dropout rates and the development of a more productive workforce. Additionally, large-scale construction of pre-Primary schools and childcare subsidies in low-income communities has been shown to boost maternal employment, further strengthening the workforce (Berlinski & Galiani, 2005, Green & Mostafa, 2011). Despite the need for substantial initial investments to scale and enhance pre-Primary education, the long-term macroeconomic benefits generally surpass the costs, offering a promising return on investment for governments and stakeholders (Sawhill et al., 2006). That said, these benefits can only be realised if pre-Primary education is made accessible, particularly to low-income families.

Particularly in low- and middle-income countries with under-resourced education systems, there are not enough accessible early childhood education programmes for all children to benefit. As of 2020, global enrolment in early childhood education programmes was estimated to be 61% (World Bank, 2024a). Furthermore, in many contexts where these programmes have expanded, it has occurred without a comprehensive and coherent systems approach. The absence of adequate teacher training and support, quality curricula, and quality assurance frameworks has led to fragmented expansion and inadequate quality. Expanding access to early childhood education without sufficient quality constitutes an inefficient use of limited resources that may bring about negligible or even detrimental effects on learning. Yet entry and training requirements, as well as training opportunities for early childhood education teachers, are often the lowest in education systems. Even with low entry requirements, just 44% of early childhood education teachers in low-income countries have received at least the minimum pre- and in-service training required for teaching at the early childhood education level in their country, compared with 72% of Primary teachers (UNESCO, 2020).

High-quality early childhood education programmes are a high-yield, cost-effective tool through which governments can bolster student achievement, national economic progress, and educational efficacy. Broadening access to early childhood education and investing in the structures that will ensure quality will be a critical component of equipping future generations with the ability to meaningfully contribute towards shaping a better future.



Despite the value of investing early in children's lives, 250 million children in low- and middle-income countries (LMIC) were found to be developmentally at risk in 2016, partly due to a lack of early learning programmes — a figure alarmingly similar to that of children out of school entirely in 2019 (Black et al., 2017; UNESCO, 2019). Similarly, UNICEF (n.d.) reports that developmental delay affects 43% of the population under the age of 5. This highlights a pervasive, systemic issue that has seen little improvement over the last decade — an issue that begins with pre-Primary programmes and continues to hinder retention in later years of schooling across education systems. Low enrolment in early childhood education remains widespread: Over 4 in 10 age-appropriate children worldwide were not enrolled in pre-Primary school in 2020, and the vast majority of countries do not include it in free and compulsory education (UNESCO, 2022). For children to succeed academically, it is imperative that they start with a strong foundation. At this formative stage of cognitive development, children benefit greatly from a learning environment that places them on the appropriate path towards essential skill-building (Sosu and Pimenta, 2023; UNESCO, 2022). Education systems are further incentivised to make pre-Primary school access more equitable as it yields the highest return on investment compared to all other stages of schooling and contributes to a smoother-running Primary education system by preparing students to participate meaningfully (UNICEF, 2019).

Students should have the opportunity to enter school at the earliest possible stage to begin their path to becoming lifelong learners, and education systems must be ready to provide them with high-quality education through strong teacher professionalism and accountability — starting with early childhood programmes, appropriately levelled curricula, and environments dedicated to learning. While evidence suggests that most LMIC are nearing their goals of universal access to Primary schooling, this is not the case for early childhood programmes. Ensuring a strong foundation from before Primary school, at the developmentally appropriate age, is a crucial next step for education systems to maintain their current progress and transition from merely increasing schooling to enhancing learning.

Enrolment is necessary but not sufficient

Focusing solely on enrolment is not sufficient to ensure that children are actually learning. The goal of universal education is not merely about superficially exposing children to educational institutions; it also requires that these institutions effectively equip students with the foundational skills necessary to function as members of a knowledge-based economy and to lead fulfilling lives (Pritchett, 2013). The alarming reality is that, despite the unprecedented number of children attending school for longer periods, many are still not mastering the skills they need to excel. This lack of learning, despite many children being enrolled in school, is the defining characteristic of the current learning crisis – and affects most countries around the world.

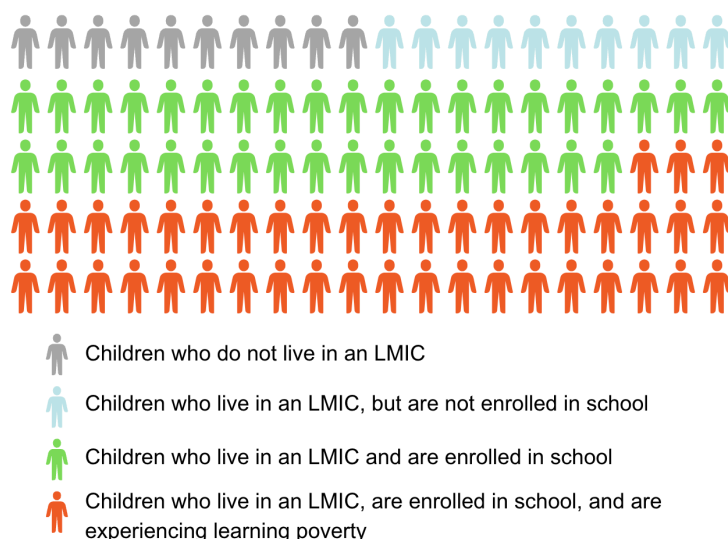
“This lack of learning, despite many children being enrolled in school, is the defining characteristic of the current learning crisis – and affects most countries around the world.”

The rapid increase in enrolment in recent years, coupled with the learning crisis, presents both a policy opportunity and a serious risk. On the one hand, inaction means that more resources will need to be spent on maintaining underperforming education systems that do not yield the returns in human capital that will fuel economic growth and innovation. On the other hand, the greatly expanded access to schooling also provides an opportunity for positive impact on an unprecedented scale. Capitalising on the progress made in bringing children into schools as a crucial first step, policymakers can now implement interventions aimed at improving education quality, so that children in schools actually learn.

Progress is needed on true measures of literacy

As mentioned before, a notable success in recent decades is the doubling of global literacy rates between 1960 and 2015 (Roser and Ortiz-Ospina, 2013). That said, while literacy rates are often used as a measure of education quality, they provide an incomplete — and often overly optimistic — picture of learning outcomes globally. In particular, official literacy rates in LMIC can be misleading due to variations in measurement methods — including self-reporting of literacy levels, which often inflate actual proficiency levels and reflect a level of optimism that does not match the levels of actual reading proficiency. For instance, in sub-Saharan Africa, the illiteracy rate is said to be 24%, but 87% of children are in learning poverty (World Bank, 2018). In Pakistan, the youth illiteracy rate for people aged 15-24 was 73% in 2019, while only 23% of children could read with comprehension (World Bank, 2023).

Distribution of Children Age 0-14 by Region,
Enrollment, and Learning Status



In this context, it is crucial to examine what exactly defines “literacy.” Some definitions — including, implicitly, most official ones — describe it simply as a single, often low, threshold to cross, rather than as a framework within which students should develop the skills to navigate and grow. From an academic perspective, this type of benchmark for achievement may be set too low to ensure substantial returns on subsequent investments on education. Therefore, even if official literacy statistics suggest that a significant portion of a population is nominally literate, it is important to recognise that, in most cases, the majority of youth worldwide remains far from achieving the ultimate goal of literacy: reading comprehension. This skill, which involves extracting meaning from and applying the purpose of a text, is what enables students to progress *from learning to read to reading to learn*.

In the global effort to address the learning crisis, progress is needed on true measures of literacy. Students must be able to understand written class materials in school if they are to gain subject-specific content knowledge and develop more advanced skills. Citizens must be able to comprehend what they read if they are to be civically and economically engaged. Thus, education systems — particularly those that are faced with the opportunity to impact large numbers of new students — must go beyond merely raising literacy rates by superficial measures, and teach students how to *read to learn*.



Learning Outcomes are Weak and Urgently Require Transformative Interventions

Foundational literacy and numeracy skills are severely lacking among students in all levels of schooling, but especially in Primary grades

Ensuring that children have access to school, start school at a developmentally appropriate age, and remain in school for the expected duration is a substantial undertaking. However, success in these areas alone does not guarantee that students are receiving an education that will adequately equip them for their future careers and daily lives. Learning, especially when it is not measured for efficacy, is not the natural by-product of school attendance (World Bank, 2018; Pritchett, 2013). In fact, persistently low learning levels are prevalent in all low- and middle-income countries (LMIC), where over half of all children experience “learning poverty” according to the World Bank, despite the fact that most of them are attending school. Moreover, this regional average conceals the severity of the problem in specific areas, such as sub-Saharan Africa, where learning poverty is estimated at approximately 90%, and in the Middle East, North Africa, and South Asia, where more than 6 in 10 children do not meet the minimum expected proficiency levels. These shortfalls in learning outcomes among enrolled students indicate insufficient education quality, which prevents them from mastering increasingly complex curricular expectations and may lead to their eventual withdrawal from school.

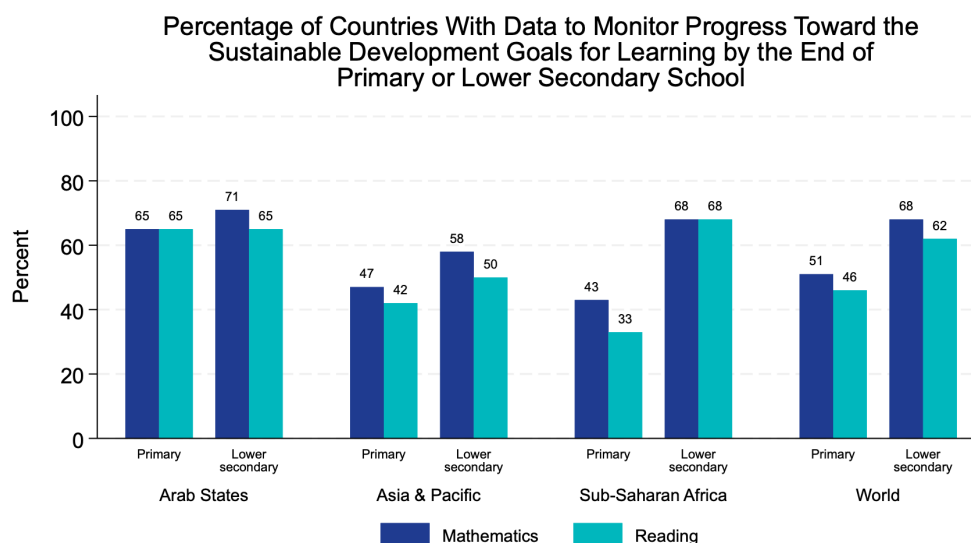
Literacy, the most extensively studied foundational skill, can also be examined among students in LMIC. Competency in this domain is essential for students to follow written instructions, engage with learning materials, participate in assessments, and gain knowledge in every core subject. However, evidence indicates a widespread lack of proficiency in many early-grade subskills that are fundamental to literacy. For example, in Pakistan in 2023, half of Grade 5 students were unable to read a story in Urdu considered appropriate for a Grade 2 curriculum (ASER Pakistan, 2024). Similarly, 80% of Grade 2 students in Ghana and Malawi were unable to read a single familiar word, such as “the” or “cat,” during assessments conducted at the end of the school year. When assessing literacy using a three-sentence passage and lowering the threshold, 75% of students in Nigeria, Uganda, and Bangladesh did not qualify as literate by the end of Primary school (World Bank, 2018). Despite widespread recognition of the benefits of literacy and the negative consequences of illiteracy, there remains a pervasive lack of proficiency in this essential skill among students within and across education systems.

Problematic literacy rates are mirrored by numeracy rates, which could also significantly hinder students’ ability to function in their daily lives. For instance, 50% of all third graders in Uganda cannot solve simple subtraction problems. In rural India, 54% of third graders cannot complete double-digit subtraction, and by Grade 5, half of these students still cannot solve the same operations (World Bank, 2018). Similarly, only 60% of students in urban Pakistan could correctly perform double-digit subtraction by Grade 3, a figure that drops to 40% for the same grade level in rural areas. The lack of numeracy proficiency seen in these contexts extends to broader regions as well. For example, across sub-Saharan Africa, the Middle East, and North Africa, the average percentage of students who score above the minimum proficiency level on a mathematics assessment is between 18% and 42% (World Bank, 2018). While the specific interventions needed to elevate foundational numeracy learning will vary based on the context of each education system, the urgent need to address low learning levels is clear.

Moreover, without the implementation of effective policy solutions to improve learning outcomes, vast amounts of educational resources will continue to be expended without a meaningful return on investment. Globally, for instance, 125 million students who have completed four years of schooling still lack functional literacy or numeracy skills, demonstrating a widespread failure to achieve desired educational outcomes — through no fault of their own — despite the investment in them. This calls for targeted, transformative approaches to address the ongoing learning crisis and to ensure that education funding yields its expected benefits — especially crucial in the aftermath of the economic downturn triggered by COVID-19 (United Nations, 2020).

“Without the implementation of effective policy solutions to improve learning outcomes, vast amounts of educational resources will continue to be expended without a meaningful return on investment.”

Finally, to complicate the matter further, one-third of 121 countries have also been found to lack the data assessing reading and mathematics proficiency levels among children (World Bank, 2018). Therefore, it is pivotal that educational interventions operate with a data-driven core, not only to certify and track their efficacy within education systems, but also to benchmark student progress against international standards, thereby ensuring that students are prepared to become globally competitive adults.



Year-on-year improvement is too slow for students to keep pace with their high-performing peers

Compounding the problem of non-universal enrolment, late enrolment, and low levels of foundational literacy and numeracy, students in LMIC are not making yearly progress at a pace that puts them on track to meet curricular expectations in their own countries, or to catch up with their peers in HIC. Currently, high-performing students in middle-income countries would be ranked in the bottom quarter in wealthier countries, while for many education systems in LMIC, the current rate of student learning would not result in globally comparable content mastery in a reasonable number of decades (World Bank, 2018; Pritchett, 2013). According to a simulation by the World Bank, it would take an estimated 50 years just for LMIC to halve current levels of learning poverty (Azevedo, 2020).



The evidence clearly indicates that generations of students are at risk of continuing to lag behind expected learning levels. However, rapid improvement on a large scale is attainable. If every LMIC in the world were to produce learning gains at a rate that doubles or triples their historical progress, learning poverty would be reduced by almost half by 2030 (Azevedo et al., 2021), which would be an 82% reduction in the counterfactual projection of time needed to meet this goal. Given this, the critical dual objective of education systems in LMIC is to not only achieve large learning gains, but also augment the pace at which they are achieved.

The COVID-19 pandemic led to significant setbacks in learning progress

The onset of COVID-19 has drastically increased the prevalence of weak learning outcomes across the globe. Not only did existing deficits in learning worsen in the years during and following the pandemic, but the resultant need for specialised systems that will reverse learning losses from this global event also presents another obstacle to advancement for education systems that are susceptible to low performance. According to the most recent reports provided by UNICEF and the World Bank, the average student in a low-to-middle-income country spent close to two academic years (236 days) out of school (World Bank, 2023), and learning poverty in LMIC was estimated to have increased beyond original estimates of 53% to as much as 70% — an increase that would signify three years of pandemic-related learning loss (Azevedo et al., 2022).

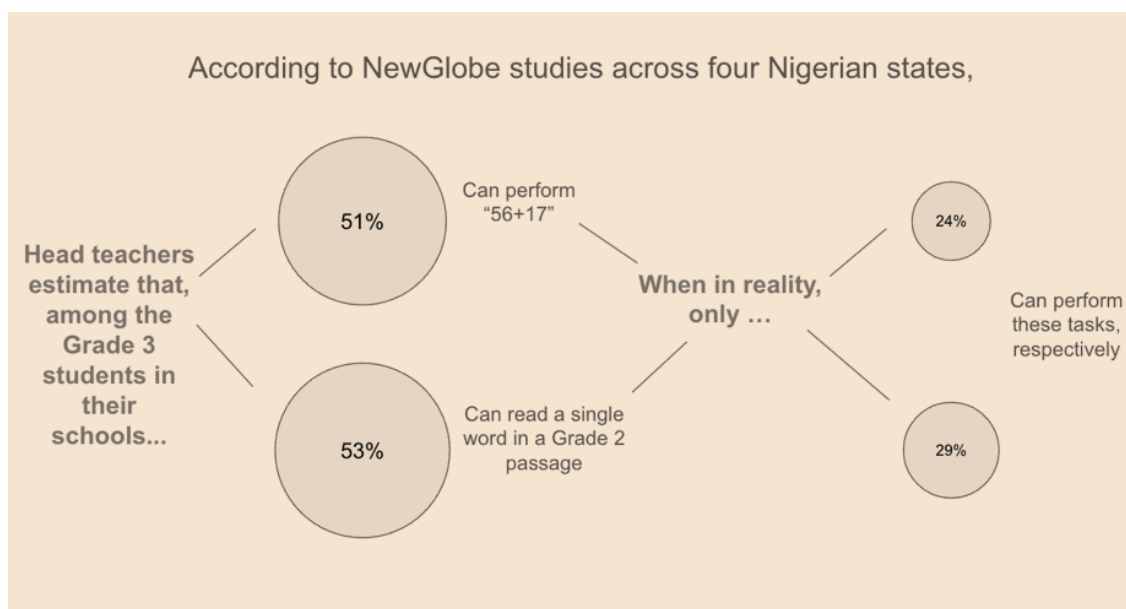
While longer school closures are correlated with a more pronounced decline in learning, the availability of distance learning technologies also played a significant role in students' ability to keep pace with academic expectations. However, in nearly all low-income countries, more than half of the population does not have access to the internet at home (World Bank, 2023). While other at-home learning models were employed by most LMIC that did not require internet connectivity — such as radio lessons, televised lessons, or take-home packages — these did not allow teachers to verify student engagement with lessons via observation, nor did they enable teachers to track student understanding of the subject matter while instructing (World Bank, 2023). In this sense, the tradeoff education systems faced when innovating distance-learning approaches to reach a greater number of students was the inability to manage these students' mastery of lesson content in real-time.

As a result, many students across LMIC learned much less than they would have if participating in conventional, in-person instruction, and therefore, more students demonstrated lower learning levels from 2020 onward. In Brazil, for example, some students participating in at-home learning absorbed only 28% of the content they would typically learn in school (World Bank, 2023), and thus scored over 50 percentage points lower than projected in maths and nearly 40 percentage points lower in language on state exams administered in Sao Paolo in 2021. A similar scenario is observable in South Africa, where second- and fourth-grade students learned only an average of 25–41% of a year's worth of instruction during the pandemic. In India, more than half of second-grade students were already reading fewer than 10 correct words per minute (cwpm) prior to the onset of COVID-19, and this share increased by 42% in 2020 (UNESCO et al., 2021). This disruption to education interrupted the academic trajectory of students on a worldwide scale (United Nations, 2020), with the most significant consequences for students in early grades needing to master foundational skills and for those who were already struggling in their learning. In response, researchers and policymakers have offered and tested a number of solutions involving structured pedagogy, edtech-based solutions, targeted instruction, among others, that aspire to reclaim a positive learning trajectory on an accelerated timeline (UNESCO et al., 2021).

In this sense, teachers need the support of impactful tools and resources, and the motivation of effective leadership, in order to implement systemic changes to education systems in their classrooms, which students will require to overturn the severe learning losses incurred in recent years. Education systems in LMIC, which already faced a learning crisis prior to the advent of COVID-19, are now further incentivised to unite key stakeholders in introducing transformative interventions that will standardise high-quality learning opportunities for all students.

Policymakers often underestimate the extent of the learning crisis

Given the limitations of officially reported literacy rates as metrics for education quality, the lack of reliable learning data at both macro and micro levels in many education systems, and the prevalence of large class sizes, it is not surprising that many policymakers and school officials around the world significantly underestimate the scale of learning gaps in their own contexts. For example, a study involving 931 interviews with officials in sub-Saharan Africa and the Asia-Pacific regions revealed a widespread overestimation of student proficiency in foundational skills by policymakers. This study found that, on average, policymakers believed that twice the actual proportion of students had attained foundational literacy compared to the figures determined using the World Bank's Learning Poverty indicator (Crawford et al., 2021). Similarly, several large-scale studies led by NewGlobe across four Nigerian states (Anambra, Enugu, Jigawa, and Oyo) confirmed the gross overestimation of learning levels even by head teachers regarding their own students. For example, while head teachers estimated that 51% of their Grade 3 students could solve "56 + 17", a Grade 2 skill in the Nigerian curriculum, only 24% could actually do so. Moreover, consistently across the four states, the gaps between head teachers' estimates and actual student performance were significantly larger among the lowest-performing schools.



The mismatch between the beliefs of different stakeholders within education systems worldwide and the actual performance of the students they serve is concerning for at least two reasons. First, it highlights the systematic lack of reliable large-scale assessment data on learning outcomes, as well as the absence of best practices in formative assessments to diagnose critical areas of improvement at both macro and micro levels within systems. Secondly, the overestimation of students' actual skills by policymakers, head teachers, and teachers likely contributes to the slow progress towards implementing concrete programmes aimed at improving learning outcomes. For example, Crawford et al. (2021) found that while four in five interviewed officials (79%)



acknowledged that the learning crisis affected both their own country and the globe, only 2% considered foundational reading or literacy programmes as the most significant recent educational reform in their context. Moreover, overly positive perceptions of students' skills in foundational literacy and numeracy were strongly correlated with a reduced motivation to focus on reform in these areas. Consequently, the relative lack of policy focus aimed at strengthening core student competencies may stem from an overly optimistic view of the state of learning, driven by inadequate visibility into accurate measurements of educational outcomes.

“The overestimation of students' actual skills by policymakers, head teachers and teachers likely contributes to the slow progress towards implementing concrete programmes aimed at improving learning outcomes.”

Increased heterogeneity in learning levels poses a new challenge

Recent successes in raising enrolment rates have brought many children into classrooms who would otherwise not have enrolled in school. This has created a new challenge for education systems: how to educate larger and more heterogeneous groups of students. Multiple levels of heterogeneity exist, and have distinct implications. Heterogeneity *within classrooms* requires teachers to tailor their instruction to a wider range of proficiency levels within their classrooms (Ganimian & Djaker, 2023). Additionally, heterogeneity *between classrooms or between schools* – where learning levels vary widely across classrooms or schools within an education system (Rodriguez-Segura & Tierney, 2024) – poses challenges for central planners who must set appropriate curricular levels system-wide, and/or establish guidelines for schools to diverge from the central policy prescription.

Heterogeneity in students' preparation *within* a classroom makes teaching more challenging, especially in contexts of low teacher capacity, where teachers may already be taking on larger class sizes or have less systemic support. Education systems have adopted a variety of strategies that can reduce heterogeneity, and some have been more effective than others (Ganimian & Djaker, 2023). Expanding access to high-quality early childhood education – with the idea that it can foster a stronger foundation for Primary school – has been successful in improving learning outcomes in upper-middle-income countries (Berlinski et al., 2009), though less so in lower-middle- and low-income countries (Bouguen et al., 2018; Blimpo et al., 2019). Similarly, providing reports for principals and school leaders on their students' performance in maths and language – either as standalone information or in combination with other interventions such as training to design improvement plans based on the data – have proven effective in UMIC and less so in LMIC (Muralidharan & Singh, 2022; de Hoyos et al., 2022).

Providing the lowest-performing students with opportunities to catch up with their higher-performing peers can reduce the need for teachers to cater to a wide range of preparation levels within a classroom (Banerjee et al., 2007; Álvarez-Marinelli et al., 2021), as has remediation before or after school (Saavedra et al., 2017). Using technology to differentiate instruction – by presenting different material to students at different preparation levels – has had limited success; providing students with hardware, either by itself or pre-loaded with educational software intended for use in independent self-paced learning, has typically failed to improve learning outcomes (Cristia et al., 2017). What has been effective, however, is combining technology-based solutions with pedagogy that is responsive to students' current levels. Software that dynamically adjusts the content and difficulty of the material based on students' performance – as contrasted with pre-loaded, static content – had moderate to large impacts on achievement (Muralidharan et al., 2019).

Just as within-class heterogeneity can create challenges for teachers in delivering effective instruction to every student, heterogeneity across schools can pose similar challenges for central planners in setting curricular levels for entire education systems. On the one hand, a one-size-fits-all approach to curriculum setting, even if moderately well-calibrated to learning levels within an education system, risks leaving behind many children on both ends of the distribution. One recent study examines the extent of between-school heterogeneity in six education systems (Rodriguez-Segura & Tierney, 2024) – and finds that learning levels, though low overall, can show considerable variation by school. It also finds that the degree of heterogeneity increases with grade, and varies by subject. In systems with a high degree of between-school heterogeneity, customising the instructional level of the curriculum for the needs of different schools given their baseline levels of performance could enable the education system to reach a significantly higher share of children through appropriate instruction. Yet, such an intervention would require an agile system of assessment and material distribution that does not exist in many countries, and that current governance systems may not be equipped to deliver.

The Causes of Weak Learning Outcomes are Many

Visible, input-based policies are heavily relied on, but their effectiveness is dubious

The most visible manifestations of government efforts to enhance educational opportunities for the growing number of students in their systems have often focused on input-based solutions, particularly as a perceived alternative to improving quality when education systems fail to meet established standards. A lack of tangible resources – such as paper, textbooks, or technological hardware – in some schools has been regarded as a significant barrier to improving learning. In some cases, this concern is valid; for instance, one study found that less than half of all students in Niger and Nigeria had paper to write on, while there was only one maths textbook for every 66 students in Togo (World Bank, 2010–2014). Such deficiencies can hinder the learning process, especially when instructional efficiency is limited. In this sense, inputs are necessary to a degree, but they are not sufficient as a standalone improvement effort.

Despite the shortage of certain materials that may act as prerequisites for strong learning outcomes in many education systems worldwide, the mere injection of resources into classrooms and schools has not been shown to result in higher levels of academic achievement and may even act as a detractor. In other words, if the specific factors inhibiting learning gains in a school have not been identified, indiscriminate expenditures may have little effect, while existing problems persist. For example, in 2008, textbooks distributed to schools in Sierra Leone were discovered unused in a cupboard during a follow-up inspection. Speculation suggests that teachers were hesitant to risk damaging these rare resources (World Bank, 2018), but their lack of use represents a missed opportunity for student learning and signifies non-cost-effective spending on education improvement. Another, more far-reaching example is the One Laptop per Child (OLPC) initiative, which was an ambitious effort to enhance learning via technology access in over 42 countries (Yanguas, 2020). However, one year after successful distribution, nearly half of the teachers reported rarely or never using the laptops in the classroom (World Bank, 2018). Various studies across parts of the developing world have shown neutral or negative effects on academic outcomes stemming from OLPC. In some cases, students spent more time on their computers but less time on independent study or other learning-based activities (Meza-Cordero, 2017). Further evidence aligns with these findings, indicating that the introduction of educational technology hardware only has a 6% positive effect on student learning, while the remaining 94% of the effect is either neutral or negative.



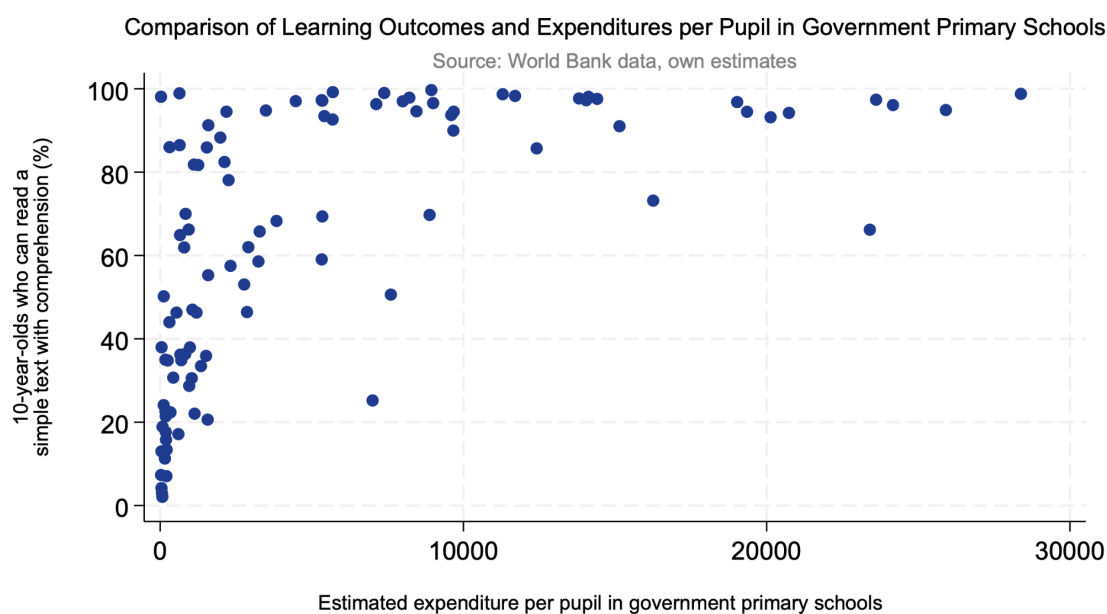
In response, it is imperative for education systems in LMIC to maintain momentum with holistic and proven-effective approaches, so that gaps in educational achievement do not widen during misdirected pursuits. Furthermore, curricular design should justify how and why material or technological inputs are used. These resources must fortify pre-existing teacher-learner relationships as complementary tools, not substitutes (World Bank, 2018). In this sense, while targeted, scaled investments in education are needed to improve learning outcomes, misguided efforts to enhance schooling through simple increases in inputs like books or computers will at best lead to wasted resources, and at worst, exacerbate already-problematic learning levels.

In countries where overall educational spending is relatively low by global standards, how resources are used is more important than *how much* is spent.

Governments worldwide have dedicated significant resources to their education systems, especially in response to the rapid increases in enrolment over recent decades. For instance, while the number of Primary school children globally rose from 502 million in 1978 to 732 million in 2018, the pupil-teacher ratio decreased from 29 to 23 over the same 50-year period, demonstrating countries' commitment to matching "inputs", in this case teachers, with enrolment growth. Given the considerable investment and the potentially high opportunity cost for other development initiatives, it is crucial that these resources be used effectively to ensure that any level of government spending translates into improved learning outcomes.

In general, there is a positive correlation between higher investment in education and improved educational outcomes. For example, a 1% increase in the share of GDP spent on education correlates with a 5.6 percentage point reduction in learning poverty. More tangibly, each additional USD 100 spent on Primary pupils in government schools reduces nationwide learning poverty by approximately 0.3 percentage points.

However, this relationship between educational investment and learning outcomes is not linear. For instance, among countries spending less than USD 5,000 per pupil annually in public Primary schools, there is considerable variation in learning outcomes, even with similar spending levels. For instance, Tunisia and Georgia both spend between USD 600 and 700 per pupil, yet their learning poverty rates differ greatly: while the learning poverty rate in Georgia is only 14%, the learning poverty rate in Tunisia is nearly 5 times that at 66%. This variation among lower-spending countries underscores the importance of prudent financial allocations towards initiatives that can genuinely enhance education quality without incurring excessive costs.



Note: estimates derived using the latest value available on the World Development Indicators for each of the following metrics — GDP (current US\$), Government expenditure on education, total (% of GDP); Expenditure on primary education (% of government expenditure on education), Primary education, pupils, School enrollment, primary, private (% of total primary), Learning poverty, Share of Children at the End-of-Primary age below minimum reading proficiency adjusted by Out-of-School Children (%)

Achieving efficient use of educational investments requires ensuring that resources in LMIC are directed towards evidence-based interventions that have demonstrated impact on learning gains, making the investments, in turn, cost-effective. In other words, *how* allocated resources are used is more critical than *how much* is allocated, up to a certain threshold. For effective decision-making that maximises cost-effectiveness, educational resource allocation should prioritise strategies that yield measurable results rather than those with high visibility. Approaches that build a solid foundation in literacy and numeracy before focusing on other more visible academic inputs have produced positive results in many contexts, and hold the potential for large returns on investments in LMIC. By focusing on effective, proven interventions, increased investments in education by currently low-spending countries can lead to improved learning outcomes for future generations who will fuel their countries' economic growth.

“Achieving efficient use of educational investment requires ensuring that resources in LMIC are directed towards evidence-based interventions that have demonstrated impact on learning gains, making the investments, in turn, cost-effective.”

Importantly, policymakers and education personnel alike should be prepared to recognise that reforms targeting pedagogical improvement and increased accountability are not always as visible as input-based policy changes such as the building of new schools or efforts to increase enrolment and attendance. Nonetheless, the appropriate interventions have the potential to drive unprecedented gains in learning, which is the strongest indicator of a policy's effectiveness. As Rukmini Banerji succinctly summarises it, “Discussions focused on learning are neither easy nor automatic” (Mbiti, 2016). Furthermore, while policies may be adapted for a given education system based on their replicated success in other contexts, it is imperative that education leaders investigate the nuances of the selected education system, in order to ensure that policy implementation is scalable, cost-effective, and aligned with the most urgent learning needs.



Low teacher content knowledge can translate into poorly executed pedagogy

Teachers are central to what can be achieved in any classroom and are the most influential factor across all education systems (Vegas, 2020). Their professional competence and the rapport they build with students enables them to assess learning levels and help students reach their academic potential. However, in some LMIC, teachers may lack the content knowledge needed to effectively support struggling students. For instance, in 14 sub-Saharan African countries, teachers performed at the same level on reading tests as their highest-performing Grade 6 students (World Bank, 2018). Similarly, in India, two-thirds of teachers (66%) could not correctly solve a Grade 5 maths problem. Studies suggest that these deficiencies in teachers' subject knowledge can negatively impact student achievement. In some cases, as much as 30% of students' failure to meet curricular expectations was attributed to a lack of teacher content knowledge. Supporting this, evidence shows that large proportions of teachers in Kenya and Togo could not accurately correct at least 80% of student answers on a fourth-grade mathematics test, revealing an inability to evaluate student learning or guide them towards improvement (Brunetti et al., 2021).

Even when teachers have mastered the content, central instructional design decisions or differing teacher incentives may lead them to focus on higher-performing students. For example, teachers may prioritise maintaining instructional flow over supporting struggling students, or they may push through the curriculum without addressing areas where students need more help. Such approaches are often at odds with the strategies students need for success, and can contribute to student dropout (World Bank, 2018). To explore this issue further, various studies have assessed teachers' pedagogical skills. The World Bank's Service Delivery Indicators report found that the average teacher in Indonesia scored only 25% on a pedagogy assessment in 2019 (World Bank, 2020), while in Madagascar in 2014, the average teacher scored just 23% (Wane and Rakotoarivony, 2017). In Pakistan, Primary school teachers assessed on several pedagogical skills, including lesson facilitation, checks for understanding, and fostering critical thinking using the TEACH tool, saw nearly two-thirds (63%) of teachers score between two and three out of five. The lowest scores were in the areas of fostering critical thinking, providing feedback, and promoting social and collaborative skills (Molina et al., 2020).



Box 5 Meeting children where they are: Designing curricula to target appropriate learning levels

Curricula play a crucial role in educational systems because they establish standardised content and instructional approaches on a system-wide scale. Ideally, curricula should align with the economic and developmental needs of students and the country. However, in many low- and middle-income countries, researchers have documented a discrepancy between students' actual performance and curricular expectations — resulting in “overambitious curricula” (Pritchett & Beatty, 2015). In other words, many countries have national curricula that fail to focus on key fundamental skills, such as foundational literacy and numeracy (FLN), and instead expect students to grow at a much faster rate than what is feasible for the typical student's preliminary learning levels. This discrepancy has been suggested to be one of many contributors to the current learning crisis (Glewwe et al., 2009; Muralidharan et al., 2019). Importantly, the consequences of poorly structured curricula that drive low foundational literacy and numeracy outcomes are not exclusive to the early grades, due to the cumulative nature of learning. Students who perform poorly in early elementary school are more likely to drop out when compared to their peers (World Bank, 2017). On the other hand, mastery of FLN skills is correlated with future success in secondary school and future employment opportunities (Evans and Hares, 2021; Muralidharan and Sundararaman, 2010). Therefore, effectively implemented, large-scale curricular reform focused on FLN skills in low- and middle-income countries can bridge the gap between students' knowledge and policymakers' educational goals and lead to improved learning outcomes and increased regional economic productivity.

Curricular changes which increase focus on FLN — either through stronger pedagogy or more instructional time — have been shown to assist low-performing students in achieving national standards. For example, a study in India implemented a curriculum that was better suited to the median student's level with scientifically tested learning materials and accessible technology, which resulted in increased achievement in Maths and Hindi after just 4.5 months (Muralidharan et al., 2019). In Tanzania, targeted restructuring of early elementary curriculum to better suit the median student's performance was found to increase all participating students' proficiency in literacy and numeracy in grades 1 and 2. Students were twice as likely to reach minimum proficiency in grade 2 maths and significantly improved their language proficiency when compared to their peers who did not receive the restructured curriculum (Rodriguez-Segura & Mbiti, 2022). In both studies, researchers note that a key element to the success of these programmes was the initial low learning outcomes in the nation. Bringing instruction closer to the average student's levels led to widespread benefits, as the median student in many low- and middle-income countries tends to have similar outcomes to the lowest performing students. Also, in both India and Tanzania, these curricular reforms were found to be cost-effective in that they did not require expensive inputs, such as increased staffing in schools or additional classroom resources. Because curricula can be restructured and implemented on a system-wide scale with minimal cost, curricular reforms can yield high returns on learning outcomes in LMIC.

To effectively develop and implement high-quality curricula, data collection and effective educational pedagogy must be incorporated with intention. Accurate and regular data collection on student performance is crucial for tailoring the curriculum to the needs of the student population. Analysing student performance throughout the academic year enables policymakers to identify areas where students are struggling and allocate more attention accordingly. In a curriculum reform in Costa Rica (Rodriguez-Segura, 2020), the lack of monitoring teaching methods and reliance on end-of-year



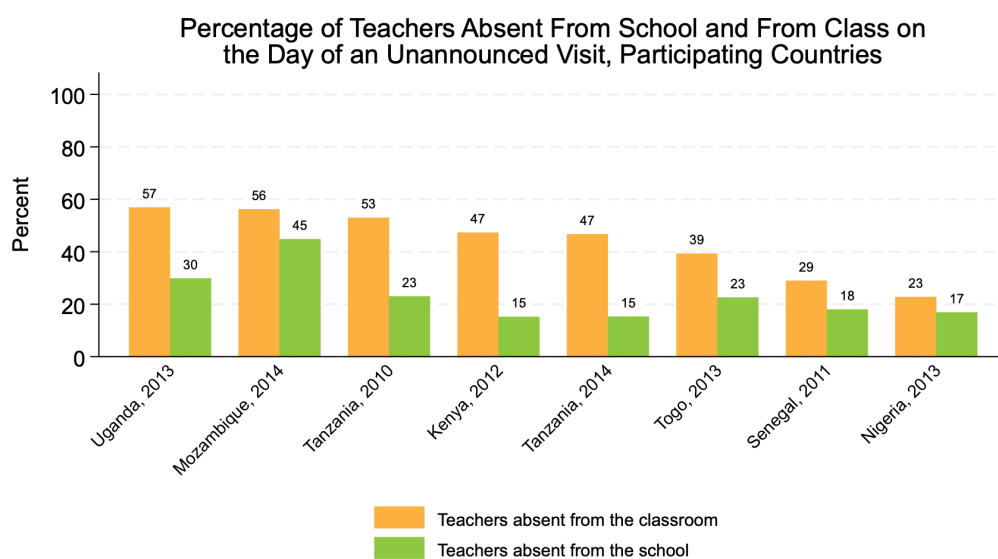
results resulted in unintended consequences, such as long-term grade repetition and insufficient improvement in reading skills. However, when curriculum reforms are aligned with the median student's academic performance and incorporate effective pedagogical practices at the individual level, they can successfully enhance learning outcomes on a broader scale (Rodriguez-Segura & Mbiti, 2022). Well-designed curricula provide clear guidance to teachers regarding prioritised topics, pacing, and learning objectives for students at different academic stages, leading to improved learning outcomes without requiring high-cost measures, such as additional teachers or instructional time. By prioritising mastery of essential pre-skills in curricula before introducing new content, governments can significantly enhance the likelihood of meaningful learning outcomes for both whole classes and individual students.



The consequential link between poor content knowledge and unsatisfactory pedagogical performance provides policymakers with the opportunity to address both shortfalls simultaneously. Solutions like structured pedagogy can provide teachers with expertly researched lesson content that will not suffer from low levels of teacher expertise in subject matter, and include essential techniques, like scaffolding, that ensure the teacher properly paces delivery of the lesson with students' ability to achieve mastery of foundational concepts.

Strong governance is essential for encouraging teacher professionalism and accountability

Regardless of whether teachers possess ideal levels of content knowledge and pedagogical skills, it is essential that they uphold professionalism and accountability if they are to be effective. For this to occur, they must be supported by effective governance administered by informed policymakers. However, evaluative reports suggest that these vital elements are not always in place. Across eight African nations studied between 2010 and 2014, for instance, teachers were frequently absent from their classrooms or the school itself. In Mozambique, Uganda, and Tanzania, teacher absenteeism rates were close to or exceeded 50% (World Bank, 2018). Absenteeism on this scale reduces actual instructional time from that of a typical school day to approximately two to three hours per day, on average. Instructional time is further compromised when present teachers interrupt their classes to check on other classrooms left unsupervised due to absenteeism and a lack of substitute coverage (Bashir et al., 2018; World Bank, 2018). Teachers who are required to integrate these unattended students into their own class are forced to dilute the benefits of ability-grouping and disrupt the appropriate scope and sequence of academic content by delivering it to students for whom it was not intended.



Effective school-monitoring practices are essential to address high rates of absenteeism across LMIC, but they are not always utilised to ensure consistent teacher attendance. In Tanzania, for instance, only 30% of schools reported that recent visits from Ministry of Education officials were related to teaching and learning. In a sample of public schools in India, no teachers with high absenteeism rates were dismissed by principals during their tenure (Mbiti, 2016). Additionally, UNICEF's Time to Teach study found that in several West and Central African countries, school leaders refrained from sanctioning frequent absenteeism due to uncertainty about the education system's hierarchy or doubts that corrective action would follow (Karamperidou et al., 2020).



Box 6 Teacher Absenteeism in Low- and Middle-Income Countries: Challenges, Implications, and Effective Solutions

Teacher absenteeism is a deep and widespread challenge that jeopardises returns on substantial investments in student learning outcomes and enrolment outreach (World Bank Group, 2017). Teacher salaries in low- and middle-income countries (LMIC) often represent a significant portion of the public education budget. For instance, in Uganda, Tanzania, Nepal, and Namibia, 60–95% of the government budget that is earmarked for education is invested in teacher salaries. Yet, high rates of teacher absenteeism have been consistently recorded across many LMIC: In a global study, teachers were not in school 16% of the time in Bangladesh, 18% of the time in Togo and Senegal, and 45% of the time in Mozambique (Chaudhury et al., 2006). Even among the teachers that were present in school across 8 Sub-Saharan African countries, less than half of them were found to be in their assigned classrooms during instructional time when measured by the World Bank via drop-in visits (World Bank Group, 2017). Hence, the large shares of fiscal resources spent on teacher salaries, coupled with the ingrained prevalence of teacher absenteeism, indicates that the fiscal and educational repercussions of this issue are a serious policy concern that deserve immediate governmental action.

From a fiscal standpoint, one study in India found that an unauthorised teacher absence rate of 23.6% cost the government an estimated 1.5 billion INR in 2017 alone (Muralidharan et al., 2017). The World Bank has estimated that teacher absences also cost Senegal, Mozambique, and Tanzania over 300 million USD each in 2013 (World Bank Group, 2017). This financial loss not only correlates with diminished learning gains due to inadequate instruction time and quality, but also with the payment of salaries using limited government funds in contexts where public budgets are particularly constrained.

For the students in the system, the most direct consequence of teacher absenteeism is significantly reduced instructional time, which, in turn, translates into weaker learning outcomes. According to The World Bank's Service Delivery Indicators, out of the 8 LMIC that were surveyed in sub-Saharan Africa, including Nigeria, Kenya, Uganda, and Togo, an average of 2 hours and 46 minutes of instructional time was lost daily due to teacher absenteeism (World Bank Group, 2017). Teacher absenteeism not only detracts from total learning time, but also negatively impacts the quality of learning that takes place in school (Vargas & Patricia, 2016). When classes are combined to compensate for inconsistent teacher attendance, students experience disruptions in their lessons. Furthermore, chronically absent teachers were found to be less productive in school when compared to their peers (Utami & Vioeza, 2021). This lack of consistency and quality contributes to parents' and students' poor perceptions of the public education system, which leads to lower rates of enrolment and attendance among students, therefore permanently stunting their positive educational trajectories (World Bank Group, 2017).

High rates of teacher absenteeism are symptomatic of inadequate management systems and data tracking, which fail to facilitate accountability and motivation. Investment in increased teacher attendance can lead to efficient national education systems that yield greater learning outcomes. By not targeting educational management systems and data collection, national governments are continually funnelling funds into an ineffective education system which produces increasingly diminished returns.

Fortunately, cost-effective, evidence-based solutions have been shown to yield high-impact results that mitigate the harmful consequences of this systemic issue. Studies done by the World Bank and UNICEF suggest that funds should be directed towards improving accountability systems and to the oversight of teachers rather than other applications, such as blindly increasing teacher staffing rates or implementing unconditional salary increases. For example, one study in Chile found that increasing teacher salaries by 4–30% decreased instructional time per student by an average of 1 hour a week, and another study in Indonesia found that the unconditional doubling of teacher salaries did not lead to better self-reported attendance or, most importantly, improved student learning outcomes (Vargas & Patricia, 2016; Utami & Vioreza, 2021). Conversely, cost-effective interventions that have been shown to significantly decrease teacher absenteeism include in-person or technological accountability systems, supportive and competent management, and increased data tracking. When studied in India, attendance tracking systems that relied solely on self-reporting among teachers were found to be ineffective. Instead, randomised, unannounced drop-in visits and daily check-ins to monitor both attendance and curriculum progression were found to produce substantial improvement, and ultimately increased the productivity of the existing workforce (Muralidharan et al., 2017). Therefore, investing in these systems that improve visibility of stakeholder behaviour and allow policymakers to better support teachers on a national level yields increased teacher attendance, performance, and, consequently, greater returns in student learning outcomes.



Regular observation by school leaders and the introduction of programmes that tie professional benefits for teachers directly to academically constructive behaviours can lead to reduced absenteeism and improved classroom engagement, which naturally benefits students. For instance, a study of public schools in India showed a 25% reduction in overall absences and a 40% reduction in unauthorised absences when regular school inspections were conducted (Muralidharan et al., 2017). In another case, financial incentives that required teachers in India to take time-stamped photos with their class at the beginning and end of the school day led to better teacher attendance and, consequently, improved learning outcomes (Mbiti, 2016). Such initiatives not only enhance student learning gains but also establish professional expectations that can positively influence future generations of teachers.

However, the issue of teacher shortages extends beyond absenteeism, particularly in regions with daunting student-teacher ratios, such as South Asia, the Middle East, and Africa, where these ratios range from 35:1 to 90:1 (World Bank, 2018). This imbalance often forces teachers to focus more on classroom management than instruction, detracting from student achievement (Molina et al., 2020). Yet, efforts to reduce class sizes by hiring more teachers do not always lead to better outcomes. In western Kenya, for example, increasing the number of teachers did not improve performance. Instead, the additional staff reduced teachers' sense of urgency and responsibility, leading to a diffusion of accountability and a shift in focus to personal priorities, such as securing jobs for relatives (Mbiti, 2016). This example highlights the need for regular teacher observation and constructive coaching to accompany staffing increases, ensuring that expanded capacity translates into better instructional quality.

To optimise student learning, it is crucial that teachers be adequately supported by their education systems, and this support should include relevant, consistent in-service training. However, this vital support for professional performance is often lacking (World Bank, 2018). According to UNESCO's 2017 data, between one-third and over half of Primary school teachers in 21 countries are not adequately trained, and the quality of training varies across these nations (Montoya, 2019). Additionally, many teachers face heavy workloads that include administrative tasks unrelated to instruction, as well as a shortage of teaching and learning materials. Professional development for non-teaching education personnel is also essential, enabling them to better manage school-wide responsibilities and provide coaching to teachers. The use of structured pedagogy can further alleviate the burden on teachers who lack the time or resources to design effective lesson plans. Through increased training and support, teachers can be better positioned to meet professional standards.

Effective policymaking starts with reliable data

The coordinated, effective action of all stakeholders in an education system is essential for fostering student success – and lack thereof can undermine that success. The latter is especially a risk when policymakers' decisions do not properly leverage all components of the education system towards achieving a clear objective of enhanced student learning. Yet, policymakers seeking to enact change for learning-deprived schools can be inhibited or misled by an absence of data. Without accurate information about the state of learning across their education systems, policymakers lack the context with which to make viable recommendations. This insufficiency of actionable data is most common in the parts of the world where such data are needed most. World Bank research has demonstrated that LMIC, which represent the majority of the global population, have historically lacked assessment results that reliably compare learning outcomes on an international scale – and it is these countries that have the most room for growth in terms of education quality (Angrist et al., 2021). Therefore, it is essential that the decision-making process for improving education quality begin with the system-wide collection of robust, regular measurements on the state of learning.

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Importantly, a single assessment or statistic does not paint the full picture; in order to accurately gauge the health of an education system, policymakers must have access to multiple cuts of data, and be equipped to consider data from multiple angles. For example, if students who struggled on one assessment withdrew from school in higher proportions than mid- to high-performing students, subsequent assessments would present a seemingly more favourable picture on average, even though learning levels will not in fact have improved (World Bank, 2018). Without additional data focusing on the participation and performance of these struggling students, policymakers would be misled – even when lack of measurement is not an issue.

Just as policymakers can benefit from reliable data on learning levels, education systems can benefit from fostering a culture of data usage at all levels. Teachers who regularly conduct formative assessments in the classroom will be able to identify students needing extra support, and provide differentiated instruction based on individual students’ levels of preparation. School leaders and regional officials who access data from state or national assessments – and view breakdowns by classroom, school, or regional subdivision – will be able to identify teachers needing additional coaching and schools needing extra support. Nations participating in international large-scale assessments (ILSAs), which evaluate the effectiveness of education systems across countries and over time (World Bank, 2018; Rocher and Hastedt, 2020), will be able to gauge their own progress against that of their peers. The integrated information from these multiple layers of data sources will inform the broad reforms implemented by education leaders, which will in turn guide the day-to-day instruction in classrooms.

The Case for Solving the Learning Crisis Through Targeted Investment in Foundational Skills and Beyond

There is potential for substantial economic gains from thoughtful, increased investment in education

Students with strong learning outcomes are more likely to achieve higher educational attainment and are subsequently more productive and fulfilled in the labour market. For instance, research by the World Bank in 2018, based on observations in 139 countries, found a 9% average increase in wages for every additional year of schooling (Patrinos and Psacharopoulos, 2018). The converse also holds true; students currently deprived of learning stand to lose a collective \$10 trillion in potential labour earnings over their working lives, which will have broader detrimental effects on the economies where these former students live and work. These foregone earnings are equivalent to one-tenth of global GDP and are twice the global annual public expenditure on Primary and Secondary education (Azevedo, 2018). Moreover, comprehensive research shows that deficits in student performance could lead to a loss of \$700 trillion from the global economy by 2100 (Gust et al., 2022). The failure of education systems to meet the needs of the global population could lead to large financial losses, not only by impeding individual students’ chances for personal prosperity but also by reducing potential future investments in education for subsequent generations.

Still, it should be recognised that the current amount of funding being devoted to education quality improvement is significant. On average, 14% of worldwide government expenditures are devoted to education, according to USAID (2018), and an average of USD 5 trillion is spent on education every year across the globe. A UNESCO report calls for an additional USD 500 billion of yearly



education funding from low- and middle-income countries, specifically, to reach SDG 4 by 2030 (2022). While these amounts pale in comparison to what is forecast to be lost if low learning levels and resultant high rates of school dropout continue, it is possible to achieve higher returns on these investments by ensuring that they are strategically allocated to reforms that have been proven effective in elevating student performance, which will in turn contribute to student retention. Therefore, concerted effort towards solving the learning crisis is the foremost proposed action to ensure the cost-effectiveness of education funding and increased opportunity for sustaining these investments over time.

Supporting cognitive development in childhood is crucial for ensuring a solid knowledge base in adulthood and enhancing pedagogy in classrooms

Missed learning opportunities early in life can have a stunting effect on students' learning trajectories as they advance through their education. Although the brain continues to adapt and foster learning throughout life, it operates most effectively when provided with a strong foundation during childhood upon which to build increasingly complex skills. In other words, students who lack mastery of fundamental content from the early grades are at greater risk of slower progress due to the cumulative nature of learning, which is particularly significant in a finite formal education period (World Bank, 2018; Eble and Escueta, 2022). The negative impact of early learning deficits is compounded by the fact that the synapses responsible for sensory pathways, language comprehension, and higher cognitive functions gradually plateau as children approach early adulthood. Therefore, a robust skills base is essential for pursuing an increasingly comprehensive education that adequately prepares graduates for societal participation (World Bank, 2018).

Further evidence supports the notion that foundational skills are pivotal for academic success. Observations conducted by researchers in high-performing classrooms reveal that foundational skills should be viewed as stepping stones to more advanced knowledge (Hwa and Duong, 2021). Mastery of fundamental concepts enables teachers to connect new ideas to previously learned material, moving beyond rote memorisation to more meaningful practice. This approach enhances students' ability to acquire and retain a broader scope of knowledge throughout their education. However, many curricula in LMIC still do not prioritise mastery of foundational literacy and numeracy, which ultimately hinders students' progress in subsequent stages of instruction.

Conversely, students who engage with and apply foundational skills are better equipped to develop metacognitive thinking from an early age. Those encouraged by their teachers to analyse their own learning processes tend to exhibit better performance and greater interest in learning (Hwa and Duong, 2021). Thus, fostering cognitive development through a learning-centric environment has cumulative benefits, enhancing both teaching practices and student agency. This, in turn, leads to more effective classrooms and improved educational outcomes.

Elevating education quality standards drastically improves educational equity

It is often the case, across LMIC, that students from relatively disadvantaged socioeconomic backgrounds display lower performance in foundational literacy and numeracy competencies, in addition to being less likely to remain in school for the duration of or following their Primary school careers. These disparities increase over time, which highlights the necessity of early interventions that create equitable learning opportunities and foster gains for students from all wealth groups (DHS, 2014, 2015–16; Spaul and Kotze, 2015). Research indicates that improving student mastery of foundational skills in an education system, regardless of the variety of socioeconomic backgrounds of the students comprising it, narrows gaps in academic performance — the very gaps that have been attributable to differences in student background

— by providing the appropriate substructure students need before becoming exposed to more advanced concepts (Crouch et al., 2021; Asim, 2020). The implication of a narrowing learning divide, furthermore, is that a greater number of students become important contributors to a knowledge-based economy from which they otherwise would have been excluded.

Further evidence suggests that even in instances of severe socioeconomic disadvantage, students' demand-side characteristics are neither a determinant nor a deterrent of their level of educational achievement to the extent that the supply-side characteristic — the level of education quality — is. Put plainly, children who are motivated and supported by their households to learn still do not develop crucial foundational literacy and numeracy skills after years of schooling when education quality is poor, while the converse is not true — that is, a lack of fortifying inputs in the households of these children does not detract from their ability to learn at a sufficient pace and to a commendable degree when the quality of education available to them is improved (Eble and Escueta, 2022). In this sense, devoting education resources towards achievement of foundational skills raises performance standards for all students, and therefore promotes the upward mobility of all citizens in a society.

Education systems must be improved holistically

Optimising investments in education requires aligning entire education systems towards the common goal of enhancing learning in foundational skills and beyond. Education systems consist of many components — such as teachers, students, school infrastructure, and school leaders — and reform initiatives often target improving the quality or performance of individual components to mirror the characteristics of high-functioning education systems (Pritchett, 2013; Spivack, 2021). However, such approaches frequently overlook a crucial aspect: the interactions among these components. These relationships not only define but also reinforce the objectives of the entire education system (Spivack, 2021).

When the goals of one component are misaligned with the overall objectives of the system or when no clear objective is present, the quality of education and learning outcomes are compromised (Kaffenberger, 2021). It is not enough to adjust individual components; the processes through which they support or hinder each other must also be evaluated and refined to enhance their effectiveness in promoting meaningful learning.

In recent decades, global education systems have successfully focused on making schooling more accessible, thereby increasing enrolment and attendance (Spivack, 2021). To address the pressing need to improve student learning levels — essential for maintaining high enrolment and attainment rates and for enabling students to translate academic benefits into their future lives — education systems must be similarly aligned with comprehensive accountability and unified coherence. Therefore, any new intervention that countries may consider, particularly large investments, must ensure that all components, including both new and existing resources, work cohesively towards the ultimate goal of stronger learning outcomes that enable students to lead fulfilling and productive lives in the future.



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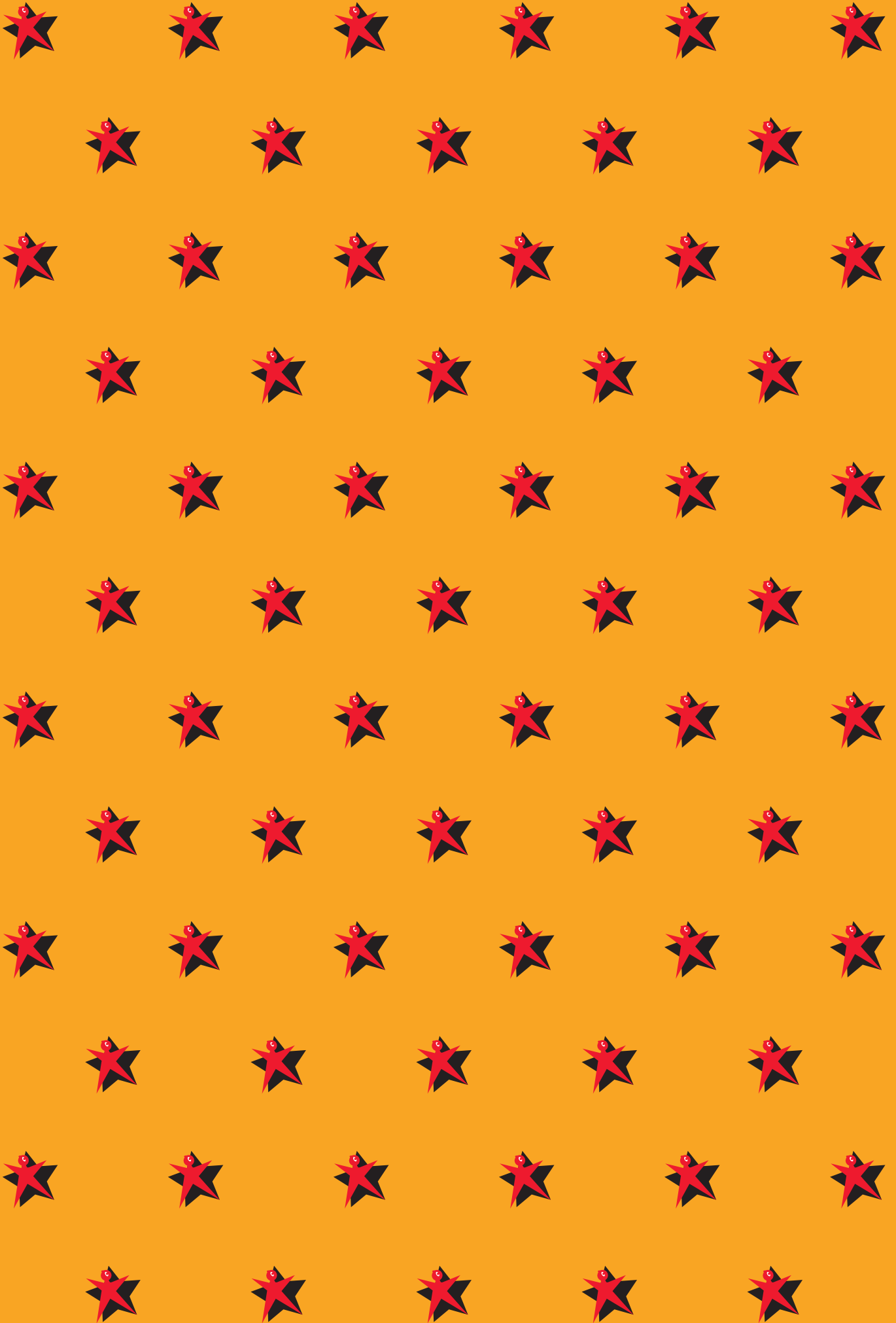
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Notes

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