Remediation Literature Review

1. Introduction

Many countries are finding that the proportion of children acquiring basic foundational literacy and numeracy (FLN) skills remains well below Sustainable Development Goal (SDG) 4,[1] with some earlier gains having been reversed during the COVID-19 pandemic. But even prior to the pandemic, over 50% of the world's children were not on track to meet SDG 4 and were unable to read even one word in a grade-level-appropriate story.[2] This backdrop—pre-pandemic challenges coupled with the devastating consequences of the global pandemic—translates into an acute global learning crisis with potentially long-term consequences. The International Monetary Fund reiterated the severity of this crisis in an April 2022 note confirming that more than two-thirds of youth globally do not have basic skills, which start with FLN, and that addressing this gap could increase global GDP by US$700 trillion by the end of the century.[3]

The consequences of the COVID-19 pandemic have resulted in a greater awareness of the need to intensify efforts to find sustainable solutions to the world's learning crisis, as well as to recover from recent pandemic-related learning losses. The need to improve and accelerate learning requires implementing broad education strategies that can boost learning for all children, especially those at the lowest learning levels.

1.1 FOUNDATIONAL LITERACY AND NUMERACY ACHIEVEMENT IN LOW- AND MIDDLE-INCOME COUNTRIES: ACCESS, QUALITY, AND EQUITY

International efforts to increase school enrollment over the past few decades have been enormously successful. However, when national policies first expanded public education, which resulted in increased enrollment, curricula were not adjusted for the learning needs of the many newly enrolled children who were often first-generation students.[4] Consequently, learning gaps between struggling students and those meeting the curriculum expectations significantly increased in many low- and middle-income countries (LMICs).[5]

SDG 4.6 aims to "ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy" by 2030. While access has increased dramatically in recent years, improvement in learning—and particularly in achieving equitable learning outcomes—has been relatively stagnant. Moreover, the COVID-19 pandemic has dramatically worsened the situation. While the current context speaks to an urgent need to improve school quality, a broader question of educational quality must also be addressed: **Why have so many children who have attended or are currently attending school not developed the necessary FLN skills?**

Historically, instruction in many LMICs has not been effective in providing children with basic foundational skills, except in a small percentage of schools catering to families and children with higher socioeconomic status. In many countries, teachers are required to teach the grade-level curriculum and stay on pace to cover the year's content, making it difficult for them to meet the learning needs of many of their students who might not learn at the same pace.[6] The teaching focus seems to be on the top performers in the classroom, who are more likely to successfully engage with current curriculum content, rather than on students whose skills fall below the level of the standard curriculum being taught. Thus, teachers may focus their attention on students who can successfully perform the skills presented[7] because they are evaluated on curriculum coverage and not improved learning outcomes for all students. In many contexts, teachers are overly dependent on "chalk and talk" approaches that involve little meaningful interaction with students;[8] and even in more active classrooms, many teachers have not been trained or supported on instructional strategies for FLN, or on ways to differentiate instruction to ensure that all students master the targeted skills. When teachers do not know effective pedagogical strategies that support successful learning for all students and are evaluated based on curriculum coverage, it should come as no surprise

that students struggle to acquire essential FLN skills or that those who are "easiest" to teach become the focus of instruction. Curriculum content that is too ambitious for children's starting points and moves too quickly without helping children consolidate their learning leaves many children behind and discouraged. Children who are not learning are more likely to drop out.[9]

Class size is another factor that impacts teaching and learning in primary-grade classrooms, particularly teachers' ability to ensure that all children receive sufficient attention and support. In recent years, the increase in primary school enrollment has also resulted in an increase in class size.[10] For example, in Malawi and Nigeria, average class sizes have increased to over 100 in the primary grades. Some studies suggest that learning declines when the class size exceeds a ratio of 40:1.[11]

The impact of these constraints is a significant equity gap. Children who begin with higher levels of performance appear to benefit the most from attending school, while those at the lowest levels of academic performance often remain there. This phenomenon is known as the "Matthew effect"—students who are high academic performers at an early age are more likely to remain high performers over time.[12] Children who struggle to learn also often live in poverty and attend poorly resourced schools with poorly trained teachers, reducing their opportunities to "catch up" to their higher-performing peers in better-resourced schools. Similarly, children who begin school with significantly less formative background knowledge compared with peers, children who do not speak or understand the language of instruction, and children whose families have limited educational experience are at risk of lagging behind unless they receive targeted intervention.[13] Past experience with large-scale school closures shows that these disruptions can have a long-term impact of widened learning disparities. For example, a study of the learning effects of the 2005 earthquake in Pakistan showed that four years afterward, children in areas most affected by the earthquake remained one and a half to two years behind their peers in terms of learning outcomes.[14] Recent evidence indicates even more devastating impacts on a global scale from COVID-19-related school closures.[15] Such inequalities in learning outcomes require a response that "levels the playing field" by ensuring that the lowest achievers receive the support needed early to improve their learning.[16] Since academic skills are not necessarily learned at a standard pace for all students, some skills will require more reteaching and review than others. Efforts to reduce learning gaps have often employed input methods such as increasing the number of books, adding classroom supports such as flip-charts, and reducing class sizes.[17] However, in several randomized evaluations of the impact of these methods, researchers found that inputs alone do not result in improved learning outcomes. However, recent research has shown that a structured pedagogy model, which ensures that targeted inputs focus on instructional improvement (including sufficient training and support to teachers), leads to improved learning.[18] There is also growing evidence, reviewed here, that when assessment-informed instruction is coupled with opportunities for remedial support for struggling students, learning gaps can be further reduced.

1.2 PURPOSE OF THE REVIEW

Much is now known about the key supports—particularly structured pedagogy and assessment-informed instruction—that can lead to improved instruction and learning (see Science of Teaching's how-to guides on these two topics). Even within a well-functioning system that supports FLN, however, some students will struggle. Assessment-informed instruction includes approaches for teachers to identify students who are struggling to keep up, as well as mechanisms for providing the support they need—which may include remedial intervention. In addition, because system improvement takes time, many children will continue to lag behind even as systems improve. Thus, alongside the need to institutionalize FLN efforts, such as structured pedagogy and assessment-informed instruction, there is an urgent need to provide effective support to children who are struggling the most. In the post-COVID-19 context, this need is even more urgent and applies to an even larger number of children—indeed, according to a recent report, this figure is estimated to be 70% in LMICs generally and 90% in sub-Saharan Africa specifically.[19]

The purpose of this review is to present evidence-based models for remediation—that is, to examine interventions that focus on providing appropriate support for the lowest-achieving students to help them catch up. While some of these models have not been implemented as part of FLN programs, they could potentially be complementary to or part of an FLN program.

2. Remediation Intervention Models

This section presents remediation models that have been demonstrated to improve children's reading and math skills and identifies core features that are key to the success of these interventions. In addition to models that have demonstrated success in multiple contexts, this section also highlights several models that show potential as effective approaches, including the following:

- Pratham's Teaching at the Right Level (TaRL) approach, which has been shown to significantly improve the FLN skills of students in India, Pakistan, and several countries in sub-Saharan Africa and Latin America.
- The Response to Intervention/Multi-tiered Systems of Support model developed in the United States; although there is no published research on the implementation of this model in LMICs, it is a promising approach that may be adaptable to other contexts.
- One-to-one and small-group tutoring models, which present a promising alternative for addressing the needs of struggling students; these models often include peer and cooperative learning approaches.

The section describes essential features of each model, as well as common core characteristics and possible constraints and challenges.

2.1 TEACHING AT THE RIGHT LEVEL

The earliest TaRL model was developed in the 1990s, when Pratham, an Indian nongovernmental organization, sought to address the need to help children who were attending school but not learning.[20] The Abdul Latif Jameel Poverty Action Lab (J-PAL) has partnered with Pratham to measure the impact of these TaRL interventions several times.

The first intervention was an in-school remediation program called the Balsakhi (meaning "child's friend" in Hindi) program, which was implemented in Mumbai primary schools in partnership with community volunteers. The intervention model was a "pull-out" program—it took children in grades 3–5 out of the classroom who were identified as having fallen behind their peers in FLN skills and taught them in remediation sessions for two years. Trained volunteers who had completed secondary school received two weeks of training and ongoing mentoring support, after which they taught children in groups of 15–20 for two hours daily out of their normal four-hour school day. Under this model, the intervention supplanted the basic education curriculum for half of the school day and used content that was not aligned with the basic education content. The model was successful in improving student achievement—children who received remediation improved their test scores by 0.14 standard deviations in the first year and 0.28 standard deviations in the second—and it expanded with continued success. This model is easily scalable because of its low cost (US$2.25 per child per year), as it uses local volunteers, employs a short but effective training program for the volunteers, maintains a simple and standardized curriculum and pedagogy, and uses free and available spaces for remedial instruction. Such inputs allow for ease of scaling, thus permitting the model to reach thousands of students across India in a multitude of cities.[21]

Over the years, Pratham refined and adjusted its remediation model to focus on the targeted basic literacy and numeracy skills reflected in the data collected via the Annual Status of Education Report (ASER) assessment tool and expanded both its partnership with the government and its scale of operation. Pratham's Read India program included learning camps conducted during school holidays that were taught by trained teachers and volunteers who focused on improving the basic reading and math skills of children in grades 3–5 who had fallen behind their peers. Pratham staff worked with government partners and schools to organize the camps, and Pratham instructors visited children's homes to share learning progress and to explain the purpose of the camp. The camps ran for 40 days and included a ten-day supplemental summer camp.[22] Data on participating children showed learning gains that exceeded one full academic year of growth. These gains persisted for at least two years following the intervention.

The Read India program was developed in partnership with the government and included supervisory government staff serving as teacher mentors. The staff were trained and then required to teach TaRL for 15–20 days before they trained teachers and provided on-site support to teachers. These staff became "leaders of practice,"[23] and their role became critical to successful implementation. Data collected on this model indicated even stronger results than the learning camps. This intervention ultimately reached more than six million children in India.[24]

2.1.1 TaRL Interventions across Contexts

As mentioned above, the TaRL approach has now been implemented in multiple contexts in Africa, Asia, and Latin America. This section describes a number of these interventions and their impact. At the end of the section, Table 1 compares key design characteristics across various TaRL interventions.

Ghana

The Teacher Community Assistant Initiative was implemented in Ghana in partnership with the Ghana Education Services from 2010 to 2013.[25] The initiative used teaching assistants from local communities to teach remedial classes for students in grades 1–3 whose skills fell below grade level. The team implemented four different variations of the model, as well as a control group (see list below). The initiative reached 25,000 students and focused on literacy and math skills.

- **In-school remediation**: Trained teacher community assistants (TCAs), hired by the Ghana National Youth Employment program and paid a small salary, provided FLN instruction in pull-out programs conducted during the school day using TaRL-developed materials, targeting the weakest students.
- **After-school remediation**: Trained TCAs provided remedial support in classes held after school, targeting the weakest students.
- **Normal-curriculum TCAs**: TCAs reviewed lessons with a randomly selected group of students (not the weakest students) in a pull-out class during the school day, alternating the students who were pulled out each time.
- **Targeted training for teachers in small-group instruction**: Teachers were trained on how to split their students by ability group (rather than grade) for one hour each day so they could provide instruction at students' learning levels.
- **A control group** received no additional support outside of standard classroom teaching.

After two years of implementation, the first two models—in-school and after-school programs—were determined to have the greatest, though still modest, impact on student achievement (see impact presented in Table 1). The initiative was not scaled up, however, in part because of problems encountered in relation to the government program on which it depended for its TCAs.

The Ghanaian government employed the fourth variation—training teachers to utilize ability-level grouping in their classrooms—in the subsequent Strengthening Teacher Accountability to Reach Students program. This program, which focused on differentiated instruction using grouping in the classroom, might not be considered a remedial intervention per se since it was intended to be delivered to all students. That said, it is worth exploring because the findings add to the evidence associated with the TaRL approach generally. The program was aimed at students in grades 4–6 and included three variations:

1. **Teacher training on ability-level grouping to target instruction**: Teachers, head teachers, and circuit supervisors were trained on how to group their students by learning level. For eight weeks, students were divided based on their learning levels for eight 30-minute sessions a week, representing 40% of the time allotted for the English and math curriculum.
2. **Targeted instruction plus management training**: Along with the training given in variation 1, head teachers and circuit supervisors were provided with training on mentoring and supporting teachers, including access to a resource manual and best practices in mentoring.
3. **A control group** received no intervention.

This program recorded positive, though also modest, impact on student performance (as described in Table 1), and positive outcomes among teachers, such as increased teacher attendance.[26]

Zambia

The Catch-Up pilot program in Zambia was launched in 2017 in 80 schools.[27] The program targeted students in grades 3–5 who were struggling with FLN skills. Instead of being grouped by grade level, students were grouped into five levels for literacy and five levels for numeracy; importantly, students could be in different levels for each (for instance, level four in literacy but level two in numeracy). The two lowest levels were placed in one class, the next two levels in another class, and the top level in its own class. The purpose of the pilot was to determine whether a TaRL model improved learning outcomes and could be scaled successfully. Three variations of the model were implemented:

1. One hour daily of targeted instruction implemented during the school day over 20 days within a term.
2. A 20-day intensive model implemented during a school holiday break.
3. Daily one-hour lessons (before or after school) that spanned two academic terms.

All three variations included trained government staff who also taught the TaRL program for ten days before training and supported teachers during the intervention. According to a report submitted to UNICEF by Innovations for Poverty Action, the first two variations (20-day intensive models both during school and over the holiday break) were more effective than the third, longer-term variation. This is likely due to a few factors, including lower rates of student absenteeism (10–20% in the intensive variations versus 20–50% in the long-term one) and overall higher rates of teacher performance in the shorter programs, possibly due to the fact that these programs either were implemented during school hours (meaning that teachers had fewer lessons to plan and had more time to focus on TaRL) or were the only teaching being implemented, again allowing for more focus.[28] That being said, overall, all students in the pilot showed improvement: While at the beginning of the pilot over half the students were unable to read words (with 33% unable to read a single letter and only 34% able to read with basic proficiency), after the pilot only 8% could not read a single letter, and 52% of students could read with basic proficiency. For math, the pilot witnessed a 16% decrease, from 44% to 28%, in the proportion of students who could not complete two-digit addition sums, and the percentage of students who could perform basic two-digit subtraction rose from 32% to 50%.[29]

The pilot sought to determine which of the three variations on the TaRL model would be best for implementation at scale. The summary report found that the more intensive variations—20 days of lessons provided in one term or during the holiday break—were more effective than the longer two-term variation, although all variations showed improvements in learning outcomes. However, government officials felt that there would be significant challenges in consistently finding sufficient time during the school day or during holidays, which would make those models difficult to scale.[30] It thus chose to implement the longer-term variation that provides intervention support for one hour daily during two school terms, and it scaled the intervention from 80 to over 1,800 schools (approximately 20% of primary schools in Zambia).[31]

Côte D'Ivoire

In Côte D'Ivoire, the TaRL approach was piloted in partnership with the government in 2017-2019. Pilot study data indicate learning gains in reading that motivated the decision to expand the program.[32] Students improved significantly in both literacy and numeracy, with the percentage of students able to read a simple paragraph rising 37 percentage points and those able to do simple subtraction sums rising 51 percentage points. Based on this success, the government is scaling up the program, with the intent to have French and mathematics instruction for a combined 1.5 hours every day for grades 3–6 and to scale the reach from 200 schools to 991 schools, with further plans to expand to more than 5,000 schools over the next four years.[33]

Kenya

In Kenya, Zizi Afrique's Accelerated Learning Program targets students in grades 3–5 and, in keeping with the TaRL approach, groups them by learning level instead of grade level.[34] The programs uses an adaptation of the "learning camp" approach. Preliminary results show improved learning by students after participation. Currently, the program is being scaled to more schools.

Also in Kenya, the government partnered with the nongovernmental organization to launch the G-United Program in 2014, a volunteer-led TaRL intervention. The program engaged university graduates as volunteers who work with students in grades 2–3, before or after school, during 15-day learning camps spaced throughout the year.[35]

Mozambique

The Wichutha Nithuelaca Programme was implemented in Mozambique in 2018. This program focused on math and reading for grade 4 students. Remediation was provided by teachers and government staff for two to three hours a day for nine weeks. One of the major challenges of implementation was the fact that many teachers were unable to do the assessments they would be asking students to complete: 16.6% of teachers were unable to read a simple story, and 22.2% were unable to do simple subtraction. This led to difficulty in finding qualified individuals to train and implement the curriculum. Despite these

challenges, however, results were promising.[36] The percentage of students who were unable to recognize letters dropped 16% (from 56.2% to 30.2%) within the first 15 days, and the percentage of students who could perform simple addition rose from 22.9% to 50.4%. Perhaps the most extreme result was that of division: at baseline, only 6.5% of students were able to do division, while at endline, that percentage was 70.8%.[37]

Botswana

In 2019, the Botswana government, in partnership with the nongovernmental organization Youth Impact (formerly Young 1ove), launched a TaRL-inspired numeracy pilot program in 50 schools. The program is currently reaching 20% of all primary schools and is being scaled to reach all 755 primary schools in the country by 2025. The intervention began by focusing on numeracy, where student skills increased substantially as a result of instruction: After just 30 hours of TaRL instruction, the innumeracy rate dropped from 13% to 1% in the 50 schools from the pilot program,[38] while by the end of the year across the intervention as a whole (162 schools), the rate dropped from 40% to 4%.[39] At baseline, 84.7% of students were listed as beginner for addition and subtraction. By endline, this number decreased to 43%.[40]

Pakistan

In Pakistan, a variation on the TaRL program design included both primary and secondary students. This low-cost remediation program designed for low-performing students[41] was implemented by a nongovernmental organization. The first iteration of implementation was conducted during two in-school cycles that coincided with each of two academic terms. Instructional content was not a standardized curriculum but was customized by the Citizen Foundation (the implementing nongovernmental organization) to target the specific learning gaps of students in each group. Thus, the curriculum varied across teachers and schools. Because there was no control group, a regression discontinuity methodology was used to determine the impact of the intervention. Results based on a sampling of schools in Karachi after two cycles of intervention showed significant student performance in English and math. Growth was not seen in Urdu classes where teachers were not Urdu subject experts. Researchers hypothesize that a lack of teacher subject expertise in Urdu might explain the lack of results in this subject. Results were robust in both primary and secondary classrooms but with little spillover to other subjects. The authors suggest that it might be more effective for subject-expert teachers, rather than volunteers, to provide remediation in the secondary classes.

A second TaRL program in Pakistan, Learning for Access,[42] reported positive learning outcomes in the out-of-school eight- to ten-week learning camps in which the Pratham TaRL program was implemented. The intervention was conducted with struggling students in primary English, math, and Urdu. Assessment data indicate that students participating in the TaRL program performed higher than the control-group students in both English and math. However, there was no significant difference between treatment and control groups in Urdu, similar to the results of the Uraan program described above. Nonetheless, given the overall success of the program, another program in Khyber Pakhtoonkhwa was implemented in 1,500 public schools for 30 months.[43]

Colombia

Researchers designed and implemented an adapted TaRL intervention in schools in the city of Manizales. Through an iterative process, a randomized controlled trial study was conducted over three cohorts of students in grade 3.[44] The study employed an intervention based on an explicit instructional model[45] in which trained tutors provided modeling, as well as guided and independent practice when teaching new skills. Each cohort of students completed the early grade reading assessment (EGRA) in Spanish as pre- and post-tests.

The intervention focused on evidence-based foundational literacy skills (in Spanish), with a particular emphasis on reading fluency. Tutors were trained to deliver 40-minute sessions three times a week during the school day, all of which took place during the second half of the school year for all cohorts. There were 36 sessions for cohort 1; this increased to 48 sessions for cohorts 2 and 3 based on feedback from cohort 1. The intervention's effects on student reading performance were significant, and effects increased in magnitude after the model was refined using feedback from previous cohorts. This feedback highlighted the need to increase the amount of instructional time, as well as to fine-tune the materials.[46]

Researchers summarized the impact of this intervention by highlighting four major findings:

1. The intervention was effective in improving reading outcomes for targeted students, and the effects were persistent over time.
2. There was a spillover effect of the intervention in that students who participated in the reading intervention performed better than students in the control group on a standardized math test.
3. The effectiveness of the intervention increased over time due to program refinements guided by feedback obtained from each cohort. Increasing the number of sessions provided was an important element of these refinements and is believed to have contributed to the increased impact of the intervention over time.
4. The intervention was cost-effective.

Table 1, beginning on the next page, presents key design characteristics across the interventions described above.

Table 1. TaRL Interventions Across Contexts[47]

	Cote D'Ivoire	Kenya	Mozambique	Ghana	Botswana	Zambia	Pakistan	Colombia
# of Beneficiaries (# children and/or schools)	Expansion: 200 schools, 21,000 children National: 1,000 schools, (roughly 100,000 students), plans to increase to 5,000 schools and reach more than 500,000 children in the next 4 years	ziziAfrique pilot: 150 schools, 3 counties, and 25,000 learners G-United: 40,000 children; hope is to grow to reach 200,000 children annually	5 schools in Larde District, Nampula	Teacher Community Assistant Initiative (TCAI): 25,000 children in 500 schools STARS: 210 government schools	20% of primary schools; on track to be in all primary schools over the next 3–5 years	Pilot: 80 schools Scale Up: 1,800 schools (out of 9,000 primary schools total in the country)	Uraan: 1,500 schools, 220,000 children; however, the study where this data came from examined only 75 schools in Karachi. Learning for Access: 20,800 out-of-school children, 13,327 in-school children across 530 schools	Sample: 94 schools, roughly 2,000 children
Implementer(s)	• Ministry of National Education • Transforming Education in Cocoa Communities • Pratham • J-PAL Europe	ziziAfrique: • Ministry of Education • Teacher Service Commission • Kenya Institute of Curriculum Development • National Commission for Nomadic Education G-United: • Evidence Action • Ministry of Education • Commission for University Education • Kenya Institute of Curriculum Development • Teachers Service Commission • Kenya National Union of Teachers • County Directorate of Education	• Facilidades ICDS • Nampula Provincial Department of Education • Larde District Department of Education • Provincial Civil Society Network for Education • Pratham • PAL Network, School Management Committees	TCAI: • Innovations for Poverty Action • Ghana Education Services • Ghana National Association of Teachers • National Youth Employment Program STARS: • Ministry of Education agencies (Ghana Education Service, National Teaching Council, National Council for Curriculum and Assessment, National Inspectorate Board) • UNICEF • Innovations for Poverty Action	• Ministry of Basic Education • Ministry of Youth Empowerment, Sports and Culture Development • Ministry of Finance • Young 1ove • UNICEF • University of Botswana • Pratham • J-PAL • Center for Universal Education at Brookings Institution	• Ministry of General Education • J-PAL Africa • Innovations for Poverty Action • Pratham • UNICEF • USAID's Development Innovation Ventures • USAID Zambia, VVOB • Zambia Education Sector Support Technical Assistance (ZESSTA) Facility	Uraan: • Citizens Foundation Learning for Access: • Dubai Cares • Idara-e-Taleem-o-Aagahi	Unknown

** "Unclear" in any cell indicates that the information is not clearly provided in the evaluation report.*

	Cote D'Ivoire	Kenya	Mozambique	Ghana	Botswana	Zambia	Pakistan	Colombia
TaRL aspect that model builds on (pull-out, after school, summer camps)	Unclear	ziziAfrique: Camp sessions G-United: Camp sessions before and after school	During school	TCAI: Four different types: during school, after school, pull-out, 1 hour in-school small-group instruction STARS: During school	After school	During school hours* for Chipata, during school holidays for Katete, before or after school for Monze and Pemba	Uraan: Extra classes, Timing unclear Learning for Access: Learning camps	During school
Age range (grades)	Grades 3–6	ziziAfrique: Grades 3–5 G-United: Grades 2–3	Grade 4	TCAI: In-school remedial: Grades 1–3. After school remedial: Grades 1–3 STAR: Grades 4–6	Grades 3-5	Grades 3–5	Uraan: Lowest-performing students in grades 3–8 Learning for Access: Grades 3–5 (in school children), and out-of-school children aged 6–12	Grade 3
Frequency	1.5 hours every day of French and mathematics (combined)	ziziAfrique: 1 hour every day	2–3 hours every day of basic reading (Portuguese) and mathematics	TCAI: In school: unclear. After school: unclear. Pull outs: "a few hours" every day. Small group: 1 hour every day STARS: 1 hour per day 4 days a week of English and mathematics	1–2 hours every day of mathematics	3 hours a day for Chipata; 1 hour a day for Katete, Monze, and Pemba	Uraan: English, Urdu, mathematics 30 minutes, 2 times a week Learning for Access: During school hours, English, Urdu, mathematics; unknown time or frequency	40 minutes 3 times a week

	Cote D'Ivoire	Kenya	Mozambique	Ghana	Botswana	Zambia	Pakistan	Colombia
Duration of program	Expansion: Dec. 2019–March 2020; May 2020–June 2020; (distance learning via radio adapted from the PEC approach for all primary school children in country) 76 recorded radio pods National: 2020–2021 and 2021–2022 school years	ziziAfrique: 20 days G-United: 15 days	9 weeks	TCAI: Unclear STARS: 8 weeks each school term (12 weeks)	30 days during term	20 days during term exam period in Chipata, during school holiday for Katete; 100 days for Monze and Pemba	Uraan: One school year during the two academic terms for 2 years Learning for Access: 45–60 days (8–10 weeks)	16 weeks (one semester)
Assessment (by teachers or by programs)	Innovation for Poverty Action will independently evaluate	ziziAfrique: By teacher assistants	Teachers and Facilidades ICDS staff	TCAI: Teachers STARS: Circuit supervisors and head teachers	Unclear	Unclear	Uraan: Teachers performed assessments of students, University of California, Irvine did the evaluation of 75 schools LFA: Independent organization	Independent researcher
Instructors (government teachers, teaching assistants, volunteers)	Trained government mentors and teachers	ziziAfrique: Teaching assistants G-United: Volunteer graduate assistants (young university graduates)	Teachers and Facilidades ICDS staff	TCAI: High school graduates (teacher community assistants), teachers STARS: Teachers	Originally, Young 1ove volunteers, then shifted to teachers	Teachers and senior teachers	Uraan: Teachers who were not paid for extra instructional time Learning for Access: Parateachers from local community	Paid tutors who were trained for 8 hours and participated in regular coaching and feedback

	Cote D'Ivoire	Kenya	Mozambique	Ghana	Botswana	Zambia	Pakistan	Colombia
Impact	During pilot in 2017-2019 (in50 schools, ran from 2017-2019, % of students able to read a simple paragraph went from 14% to 51%, and the % of students able to do simple subtraction sum increased from 12% to 63%.	ziziAfrique: The % of children who could read a simple paragraph rose from 23% to 63%. G-United: Unknown	The % of students who could read at least a simple sentence rose from 12.7% to 20.8%. In the first 15 days alone, the percentage of students who could read words rose from 14.7% to 25%. In addition, the % of students who could perform subtraction increased from 4.1% to 25.9%, and there was a 40% increase in the number of students able to do multiplication operations.	TCAI: In school: 6.4% increase in scores for 3rd and 4th graders (one year after the intervention)After school: 6.2% increase in test scores for 3rd and 4th graders. Pull outs: 5% increase in test scores for 3rd and 4th graders. Small groups: 4% increase in test scores for 3rd and 4th graders. Across all interventions, reading scores went up by 18% for local language and 10% for English. STARS: There were two versions of this intervention—one with targeted instruction, and another with targeted instruction plus management training. These groups increased their English and math test scores by 0.07 standard deviations (SD) and 0.13 SD, respectively.	95 National Service participants have been trained to implement TaRL in 3 regions, 80% of students gained numeracy skills, and % of students learning division jumped from 7% to 52%	The % of students who could not read a letter decreased from 33% to 8%, and the % of students who could read a simple paragraph or story increased from 34% to 52%. In math, those classified as "beginner" (i.e., cannot do two-digit addition) decreased from 44% to 28%, and basic proficiency (i.e., can do two-digit subtraction) increased from 32% to 50%. In the 20-day pilot, the results were better, possibly because it was during school hours and was shorter, resulting in better focus and attendance.	Uraan: Students gained 0.288 SD in English and 0.217 SD in math, but no gains in Urdu. Similar gains were found for both primary and secondary students (with primary students performing better than secondary students overall), but no spillover effects for other subjects. Learning for Access: For grade 3: 59% of students could read English words, compared to 41% in the control group; 54% could read Urdu words, compared to 46% in the control group; and 56% could do number recognition for numbers 10–99, compared to 44% in the control group. For grade 5, results were less substantial: 52% could read an English story, compared to 48% in the control group; 51% could read an Urdu story, compared to 49% in the control group; and 55% could do single-digit addition, compared to 45% in the control group.	Literacy scores improved by 0.270 SD, and evidence showed that this intervention led to better learning outcomes in other subjects (in math, treated students performed addition problems better, with gains between 0.081 and 0.104 SD). However, there was no impact on reading comprehension from this intervention.

2.1.2 Key Features of TaRL

Overall, across TaRL interventions, Pratham tested a variety of formats and showed significant gains in many of them—including various learning camp structures, in- and after-school lessons, and the use of volunteers, government teachers, and teaching aids as instructors. Because these formats were implemented at different points in time and because the research reports lack detailed information about what exactly was happening during the instructional time—and also given various implementation difficulties (such as high turnover of Balsakhis and low student attendance during summer camps)—it is difficult to directly compare results among the different models. However, trends in results and key features that are consistent across the models are informative.

Partnering with Communities and Governments

Partners are a key component of all TaRL programs. In all TaRL models, but especially those where community volunteers are involved, such as some of the learning camp models where volunteers act as or support instructors, the TaRL team must partner with community stakeholders in the development and implementation of the program.

Government partnerships are another important aspect of the TaRL model and help ensure that the model is adapted to the local learning context. Such collaboration provides an opportunity for TaRL experts to provide evidence for the key components of the program, including teacher-guided materials that provide targeted learning activities for each of the designated learning levels. Each TaRL team creates activities designed to increase skills in the targeted FLN skill area using materials and strategies that are consistent with the science of teaching and adapted to the local learning context. The textbox highlights an example activity from the Catch-Up Zambia program.[48]

> Instructors make phonetics fun by playing games. For example, in Zambia, children play the Kambeba (basket) game, where they sing a song as they pass around a basket full of phoneme cards. When the song stops, a child picks a card at random, reads it out to the class, and comes up with a word containing the phoneme. In a variation of the game, children are also asked to write the word with the help of the phonetics chart.

Partnerships with the government help ensure that implementation is aligned with government expectations and includes government commitment and investment.[49] They involve close collaboration in all aspects of programming, including development of the model for the specific context, adaptation of assessment tools, creation of context-appropriate activities, definition of goals that align with national and regional curriculum standards, scheduling, grouping, monitoring support, and evaluation and review.[50]

Training Teachers and "Leaders of Practice"

TaRL instructors have variably included volunteers, paid tutors, government teachers, and nongovernmental organization staff. In all cases, instructors receive training and support during implementation to ensure that they have the skills to teach the lessons and to track student progress. Typically, district- or cluster-level leadership teams receive training on how to implement TaRL and are required to spend at least ten days teaching the program prior to conducting instructor training. Instructors then receive a minimum of ten days of training plus regular mentoring support from these "leaders of practice." This approach is a unique component of the TaRL program and should be considered in any remediation program. The "leaders of practice" engage government leadership significantly in the implementation of TaRL and in the classroom experience, which helps increase government leaders' commitment to the program and thereby paves an easier path for scale-up and implementation.

Assessment, Grouping, and Monitoring Progress

In the TaRL model, students are assessed, grouped by level, and then provided instruction starting at that level. Assessment is further used to monitor student progress. The ASER assessment, frequently used in TaRL programs, was developed in 2005 as a citizen-led household survey to assess the foundational learning levels of young children in India. The highest level of reading skills assessed is at the standard 2 level; for math, it is the standard 3 level. Scores on the ASER reading survey provide information that can be used to identify individual students' learning levels, as well as to provide an overall picture of what proportion of children have mastered target grade-level skills.[51]

The ASER reading survey aims to classify children's performance into one of five learning levels. The beginner level includes children who are unable to identify any letters; this is followed by the letter level, word level, paragraph level, and story level. For the ASER math assessment, the five levels also start with the beginner level, in which the

child is unable to recognize any numbers, followed by number recognition for digits 1–9, number recognition for numbers 11–99, two-digit subtraction with borrowing, and three-digit-by-one-digit division. The content of the ASER addresses very basic skills, and the TaRL models reviewed do not address more advanced and complex skills. However, learning outcome data across a number of countries in the global South suggest that the intervention provides important skills necessary to close learning gaps, thereby preparing students to learn the more advanced skills.

TaRL skill levels are based on ASER performance levels in which children are asked to read letters, then words, then short sentences, and then a short paragraph. Cut-off scores on each individual task determine whether the child continues with the assessment. A learning level is assigned when the child is unable to respond successfully. The teacher then uses these ASER results to create groups for instruction. ASER is again administered after a certain period of time, often an academic term, to determine whether students have met their learning goals or require additional instruction.

Instructional Activities

TaRL activities include games to target the basic skills assessed by the ASER survey. The alignment of curriculum activities with the data gleaned from ASER allows the teacher to structure engaging learning activities for a particular learning level group. TaRL activities and games are developed by TaRL teams, but there is no set TaRL curriculum for reading or math. The goal is for the teams to use the TaRL teaching methodology to design developmentally appropriate activities for groups of students within the same learning level. For example, an activity for student groups at the beginner and letter levels involves using a phonetic or syllabic chart to help children map the sounds they hear in words and then to write the letters and make words. There are a number of games and activities that involve the use of the chart to help children learn the sound and symbol relationships so important to foundational reading skills.[52] The TaRL website provides details on games and activities that align with foundational math and reading skills and provides examples that illustrate the developmental progression in skills for literacy and numeracy. The TaRL model is flexible in that it encourages teams to consider the cluster of skills most appropriate for their context while also remaining consistent with the science of teaching and the research evidence on what and how to teach FLN skills.

One example of a math activity from the TaRL website[53] uses number frames followed by practice to help students solve more challenging word problems. Students read the problem as a group and then work in smaller groups to identify the relevant information and the appropriate operation needed to solve the problem. In order to consolidate learning, children are also provided with individual problems to solve. Teachers monitor the groups and individuals during these activities to ensure that they are successful in their problem-solving efforts.

2.1.3 Evaluating the Impact of the TaRL Approach

The TaRL approach has now been used in a variety of LMIC contexts and has often shown to have positive impacts on student learning, while being cost-effective. Certainly, TaRL has led the way in LMICs in terms of testing and sharing information on how to successfully provide remediation for struggling students. At the same time, the variety in TaRL program design, as shown in Table 1, as well as the lack of details presented in evaluation reports, makes it difficult to examine exactly which design elements of the approach are, or could be, most impactful (e.g., the length, timing, or frequency of sessions, as well as the instructor-student ratio). In addition, TaRL reports typically do not explain the relationship, if any, between the TaRL program and core instructional support inputs that may be taking place through a structured pedagogy or other FLN program, and they typically do not provide details around the instructional approach used within TaRL sessions. Providing such information would benefit government officials, donors, and implementers who are working to develop programs aimed at improving FLN for all students.

2.2 TIERED SYSTEMS OF SUPPORT: RESPONSE TO INTERVENTION

Response to Intervention (RtI) is a remediation model popular in the United States and has been researched widely for the past 20 years.[54] The original RtI model expanded to a broader model, Multi-tiered Systems of Support, to include behavioral and academic support. For purposes of this review, the focus is on the foundational reading and math RtI models. RtI includes three core tiers:

2.2.1 Tier 1: High-Quality Classroom Instruction, Screening, and Group Interventions

Tier 1 includes effective core instruction in foundational skills for all children. Effective teachers are prepared and willing to adapt instruction in the context of core classroom instruction when necessary. These teachers model new skills with a carefully planned sequence for instruction and provide time for guided and independent student practice. They ensure that students learn skills by checking for understanding and conducting formative assessments. They also provide scaffolding and support when students struggle to learn a new skill.[55]

The screening and progress monitoring tool often employed in RtI models is a version of curriculum-based measurement (CBM), an approach to measuring academic improvement and the effectiveness of instruction in the classroom.[56] CBM is a set of standardized procedures that can provide valid information on student achievement. CBM measures look at progress toward a general outcome measure rather than toward a specific mastery goal. In other words, they measure a global skill, such as reading fluency, rather than a specific skill, such as whether a child is able to identify specific letters correctly. CBM assessments, such as the EGRA, often include measures that tap the underlying skill set and provide a more global indicator of a particular skill. For example, the EGRA typically includes fluency measures examining letter-sounds identification, decoding, and passage reading. It is similar to the levels tested in ASER but is scored based on how many items a child can identify or read correctly in one minute. Under RtI, screening using CBM measures is usually conducted early in the school year. Cut-off scores identify those students who need tier 2 support.

2.2.2 Tier 2: Targeted Interventions with Progress Monitoring

Tier 2 interventions provide targeted small-group instruction to students who have fallen behind their peers in foundational learning or behavioral skills. They are evidence based and aligned with the national or core curriculum in the school. Key personnel who teach tier 2 are specially trained to provide the intervention. For tier 2 interventions, data are collected during implementation, and progress is monitored. An RtI team engages in a decision-making process at defined intervals to gauge students' progress and determine whether any tier 2 students should return to core classroom instruction or if they need more intense intervention.[57]

2.2.3 Tier 3: Intensive Interventions and Comprehensive Evaluation

Students who do not make expected progress in a tier 2 program may be considered for a more intensive tier 3 intervention. This tier advances at a slower pace with more practice and review and often involves specialist intervention. Progress monitoring continues to determine whether the intervention is effective.

While the tiers described above provide an overview of the RtI model, the process of identifying the most appropriate intervention often rests on more than an academic screener. The RtI support system includes a problem-solving model for students who appear to be at risk for learning difficulties. This model includes a series of iterative steps and decisions that facilitate the process of identifying effective solutions. It begins with identifying the problem: the gap between what is expected of a student and the student's performance. The next step is to analyze the problem to determine why the student is struggling (e.g., curriculum is too difficult, the student is frequently absent from school, or the student is unable to see or hear adequately). A plan is developed and implemented, and progress is monitored. If improvement is not reflected in the progress monitoring data, then the model begins again.[58]

The RtI model recognizes that some students fall behind in FLN skills despite high-quality core instruction. A targeted small-group intervention can help them close the learning gap and return to their grade-level classrooms. For others, long-term interventions, including special education support, may be necessary. In recent years, the RtI model has become a broader system of support to embrace a larger set of learning challenges, including behavior.[59]

2.2.4 RtI in the Netherlands

Houtveen & van de Grift designed a quasi-experimental study using an RtI model focused on grade 1 students who struggled with reading in 21 schools across the Netherlands.[60] Their three-year study explored whether an RtI approach could lead to an improvement in reading skills among struggling students.

In this intervention, classroom teachers were trained to deliver additional targeted instruction at three tier levels and to use specific strategies and tools to monitor students' progress. While tier 1 was the core instructional program, tier 2 had increased instructional time for struggling students but did not require a dedicated separate learning session. Tier 3, the most intensive, included a pull-out small-group instruction session.

A unique aspect of this study was that it focused not only on additional support for low-performing students but also on enhancing core instruction at tier 1, with the goal of reducing the number of students requiring additional support. The study reported that the percentage of struggling readers in the experimental group dropped from 22.5% to 5.7%, while the percentage in the control group remained at the initial level of 11.6%. In terms of effects on reading achievement, a significant difference was found on the post-test between treatment and control groups, with the treatment groups outperforming the control groups.

A review of research did not result in any studies of the RtI model being implemented in LMICs, but the basic framework of the RtI model is consistent with TaRL in that it uses assessment to identify struggling students, groups them by level, and provides additional support at their level, monitoring their progress over time. Partnerships with schools and communities are essential components of both models. The RtI model can be more costly to implement, and the learning levels extend to what appears to be a wider range of FLN skills, such as other math domains and finer-grained reading skills. Schools implementing RtI three-tiered instruction frequently purchase intervention and assessment materials (e.g., DIBELS/Acadience), which can be expensive. Training and coaching can also be costly, and teacher coaches and mentors are often advanced-degree teachers. With TaRL, research studies demonstrate that the model can be implemented at a far lower cost, with greater flexibility in terms of the context in which a program can be implemented (community learning camps or schools). The RtI model is designed for PreK–12, while most TaRL programs are implemented in grades 3–5, although there is some flexibility in terms of implementing TaRL in earlier grades. TaRL addresses FLN skills, and RtI addresses math, literacy, and significant behavioral issues.

2.3 TUTORING AND OTHER REMEDIATION MODELS

2.3.1 Tutoring Programs

Tutoring is perhaps one of the oldest and most common approaches to providing assistance to students beyond core classroom instruction. This literature review follows Nickow et al.'s definition of tutoring, as provided in their recent review of tutoring programs in the United States: one-on-one or small-group assistance by teachers, paraprofessionals, volunteers, parents, or peers that is a supplement to the core instructional program.[61] This section focuses here on tutoring programs that have an equity focus, targeting students who are at risk or struggling to keep up (as opposed to private paid tutoring, which usually benefits the most privileged students). Tutoring can further be distinguished from models such as TaRL and RtI, as tutoring programs are typically less structured and often do not have a specific assessment and instructional program. In addition, tutoring programs can sometimes be more cost-effective than these models if they utilize peers, university students, or community members as tutors, instead of specially trained teachers.

In a meta-analysis of tutoring programs that included a review of 96 experimental studies on tutoring interventions conducted with children from PreK–12,[62] researchers found that tutoring programs have substantial positive effects on learning, with stronger results when the programs are taught by teachers or paraprofessionals compared to parent tutors or nonprofessionals. The review further found that effects were stronger for children in earlier grades, and while overall math and reading programs resulted in similar effect sizes, tutoring interventions in reading resulted in stronger effect sizes in the early grades, and math tutoring had stronger effects in later grades. Interventions conducted during school were more effective than those implemented after school. Studies that evaluated after-school programs and parent tutoring programs had the weakest effects, though in these cases it is more difficult to monitor whether the tutoring is actually occurring.

In terms of efficacy, between small-group and one-on-one tutoring, one-on-one tutoring has shown larger effect sizes,[63] and Bloom notes that it is uncommon to find small-group tutoring effects as large as one-on-one tutoring effects: the average gains on effective one-on-one programs yield improvements for the average tutored student of two standard deviations beyond the control group—a remarkable gain.[64]

In another study, Juel and her research team worked with college athletes who were poor readers to prepare them to provide one-on-one tutoring to grade 1 students.[65] This tutoring was part of a college course, with the hope of improving both tutee and tutor reading levels. The college tutors were assigned students in grade 1 who were

struggling to learn to read. The tutoring sessions lasted 45 minutes and were scheduled twice a week at a time determined by the classroom teacher. For each session, tutors selected from among seven primary activities, and the tutors were required to read books, complete reading journals, and write books with targeted high-frequency words repeated throughout each book for the children they tutored. After a year of intervention, data indicated significant improvements in the reading skills of tutored children compared with children at the same instructional level who were not tutored. Of the seven available tutoring activities, those that contributed the most to learning progress were (1) an activity focused on letter-sound instruction and (2) interactive reading of the "My Book" series, which were the books the tutor created for the child. After their completion of the program, some tutors asked to continue tutoring on a volunteer basis. The study also assessed the reading skills of the college tutors, finding that their reading skills improved during their tutoring experience. Thus, tutoring can confer benefits to the tutor as well as the child who receives tutoring.

Tutoring interventions can be costly when they are one to one; however, small-group interventions in classrooms, such as peer-assisted tutoring strategies (PALS), are potentially more cost-effective. PALS are collaborative learning interventions in which peers serve as learning partners. Students are paired or placed in small groups and are taught to follow a schedule of activities that include strategies for providing effective and supportive feedback to their peer partners. The sessions are typically conducted during language arts periods three times per week, with sessions lasting 30–45 minutes. Evaluation data from PALS interventions indicate strong effect sizes on student learning. According to Nickow et al., peer tutoring programs are among the most adaptable and "potentially transformative" learning programs for students at the PreK–12 grade levels.[66]

In the wake of the COVID-19 pandemic, many countries are turning toward remedial tutoring programs to make up for learning losses. While programs such as PALS and others have been around far longer, this new global focus on recouping foundational learning skills has made the demand for cost-effective remediation strategies balloon. More concerted efforts to collect impact data from these interventions, and thus contribute to the evidence on remediation, would be of great benefit to the sector.

2.3.2 Remedial Tutoring across Contexts

Worldwide, there are significant variations in how remedial tutoring programs are conducted, who provides the tutoring, and how successful the programs are. Below are some illustrative examples of different remedial tutoring programs from around the globe.

Chile

In Chile, in response to the COVID-19 pandemic and subsequent school closures, the government launched a tutoring model called Tutors for Chile. This intervention was unique in that the government utilized an existing network of pedagogy students from Chilean universities to serve as primary and secondary school tutors to assist students who were struggling in reading, mathematics, science, and history. This resulted in more than 70,000 tutors serving students, with all the pedagogical institutions in the country participating and giving college credit to all tutors.

Each tutor worked with two to three students for an hour each week for a period of three to four months. Sessions were conducted virtually, with tutors utilizing a variety of intervention strategies tailored to fit the students' school plans and curricula.[67] There is not yet definitive data on this intervention's efficacy. Since the tutors were given college credit instead of compensation, the program had no associated costs. The tutors were able to get valuable experience teaching while students also gained extra time with pedagogically trained tutors. As noted by one of the tutors, the intervention gave her and other university tutors a chance to "enhance our practices and, above all, support the tremendous work teachers throughout Chile are doing."[68]

Cambodia

In Cambodia, a peer tutoring model was used in the Education Support for Children of Underserved Populations project, funded by USAID. Under this model, grade 1 and 2 students who were falling behind their peers were paired with student tutors from grades 5 and 6. The older students were trained by their teachers and focused their tutoring on foundational numeracy and Khmer literacy skills. The sessions took place during student free time (with teacher supervision), as well as during homework clubs.[69]

Another project implemented in Cambodia by World Education, the Total Reading Approach for Children, focused on a similar model of peer tutoring, pairing older students with younger ones during break times to read and play games. This was done using the Aan Khmer app, which consists of interactive stories and games aligned with the national reading curriculum.[70]

In both of these tutoring interventions, the use of peer tutors represented no added costs, increased the amount of attention that struggling students were able to receive, and utilized existing curricular or teacher plans to assist in student learning.

Bangladesh

The Global Development Research Initiative, a nongovernmental organization in Bangladesh, offered free tutoring to support students in rural areas outside of school over the course of two years. All the tutors hired by the organization had university degrees and were local community members looking for work experience. Because they were not qualified as teachers, they were paid a fraction of the regular teacher wage. They were given one week of training, which was reinforced throughout the school year with an additional three-day training every two months. Tutors worked with groups of 10–12 students in grades 3 and 4 for two hours a day three times a week; the sessions, which took place after school, focused on foundational math and English, as these were the subjects identified as most at risk. Additionally, one of the treated schools also included home visits for the students. In these home visits, the tutor would conduct a one-hour tutoring session in the student's home, give the parents updates on their child's progress, and give parents advice on how to create a positive learning environment at home.

Unlike most remedial programs, this study did not choose students to be tutored based on their academic achievement. Students were chosen randomly or, in the case of the study to determine spillover effects, their network centrality. In this study, there were three treatment groups and a control group:

- T1: Random sample of students who received tutoring (58 schools)
- T2: Random sample of students who received tutoring and a home visit (58 schools)
- T3: Students with high network centrality who received tutoring (38 schools)
- Control: No intervention (100 schools)

The results showed improvement: students who received tutoring had improved scores of 0.75 standard deviations in English and 0.78 in math, compared to 0.38 in English and 0.48 in math for the control group.[71] Students also saw gains in non-cognitive skills, such as social skills and motivation, as evaluated by their teachers (not tutors). More interestingly, however, was the spillover effect of the tutoring to the classmates of the tutored students. Scores in math and English for the untreated students rose by 0.57 standard deviations in English and 0.62 in math. This spillover effect was attributed to the "network centrality" of the treated students. This means that targeting tutoring to students who have high social skills and are more likely to interact with their peers when it comes to school-related issues could impact other students also, not just those directly receiving tutoring.[72]

Italy

The Tutoring Online Program was a J-PAL initiative created in response to the closure of schools in Italy from March 2020 to the summer break that same year. The program, which was an entirely online tutoring remediation program, was targeted toward students in grades 6–8 from disadvantaged backgrounds. Students were chosen by school administrators based on observations of difficulties seen during distance learning. Students could choose whether they wanted to participate in the program, and participation was free. Tutors consisted of 530 volunteer university students who received pedagogical support from qualified experts in the field. In addition to initial training, tutors received ongoing one-on-one support with expert educators throughout the intervention.

The students were tutored in math, Italian, and English as needed based on school recommendations. Tutoring sessions took place for three hours a week over the course of five weeks, except for a small subset of students who received tutoring in multiple subjects for six hours per week. The program did not follow a set curriculum but instead focused on assisting students with their schoolwork and was therefore in line with school curricula.[73]

Students who received online tutoring experienced higher performance on standardized tests in math, Italian, and English, with endline tests showing improvement of 0.26 standard deviations across subjects. Most students received tutoring assistance in math (78% of students), and the largest effects were seen in this subject.[74]

This study also measured non-cognitive aspects, such as educational aspirations, perseverance, locus of control, and psychological well-being. All of these aspects saw increased outcomes, with educational aspirations showing a 0.15 standard deviation increase; perseverance, and locus of control (grouped together) showing a 0.14 standard deviation increase; and psychological well-being (happier, less depressed) showing a 0.17 standard deviation increase when compared to the control group.[75]

Dominican Republic

Drawing from the success of the Italian program, J-PAL partnered with the Ministry of Education in the Dominican Republic to pilot an online tutoring program to address learning loss as a result of COVID-19. The project, dubbed the Tutoring Online Project, mobilized volunteers from national universities to provide personalized academic support to students from disadvantaged backgrounds. In total, the program recruited 800 university students, who were matched with students experiencing learning gaps in approximately 100 public schools. This intervention is based on a pilot program during the summer of 2021 which saw 200 university volunteers matched with 300 students from disadvantaged backgrounds. Similar programs are now being piloted in Brazil and Uruguay.[76]

Botswana

During the school closures prompted by the COVID-19 pandemic, Youth Impact introduced a program in Botswana in an effort to mitigate learning losses.[77] Two low-tech interventions focused on empowering parents to support their children in foundational numeracy skills. In one intervention, parents received text messages with "math problems of the week." In another, parents received text messages along with weekly phone calls designed to help them teach their children how to solve the problems presented in the text messages. Results indicated significant improvements in students' numeracy skills. Following the initial wave of text messaging, the research team adapted the intervention to focus on individual children's learning levels based on their skill levels. Not only were these interventions cost-effective and successful in improving children's numeracy skills, but parents also reported higher levels of engagement with their children and more accurate perceptions of their skill levels.[78]

2.4 COMMON FEATURES OF SUCCESSFUL REMEDIATION PROGRAMS

Partnerships with governments and communities: TaRL, tutoring and RtI programs require partnerships with governments when conducted in schools, and with communities when conducted outside schools. The goal is to ensure that community and government stakeholders "own" the intervention, thereby contributing to the likelihood of sustainability and building a basis for scale-up if appropriate. Similarly, many tutoring programs are implemented in partnership with schools and communities. For example, PALS tutoring programs are conducted within classrooms without the need for additional support for implementation or monitoring. And in the case of the J-PAL tutoring programs implemented in Italy and the Dominican Republic, partnerships with national universities and teacher training programs proved vital to the success of the remediation intervention.

Teacher training and support: Effective remediation programs include teacher training and support. The most effective TaRL models provide an average of ten days of training. A unique element of TaRL training is the requirement in some programs to train government staff as "leaders of practice" and to require that these leaders teach the program prior to training teachers. The RtI model provides training on implementation, with a particular focus on using assessment to monitor progress. The common curriculum-based measures implemented in many RtI models provide individual scores by task rather than a composite score, requiring that teachers learn how to use task scores and groups of scores to inform instruction.

Focus on core skills: Effective remediation programs focus instruction on the core skills that struggling students need in order to succeed. Many programs include instructional materials that provide guidance to teachers; sometimes, they also include student materials. Further, program materials and assessments are closely aligned

so that data can more easily inform instructional decisions. In some cases, materials are aligned to the school curriculum to maximize efficacy.

Effective pedagogy targeting student competency level: Every remedial program discussed in this brief focused on pedagogy, with some programs offering scripted pedagogical approaches (e.g., RtI tier 2–3 interventions and PALS tutoring programs) and other programs offering clear instructional goals and resource activities. Yet other programs (e.g., some TaRL programs) offered flexibility in how instructors implemented the program in their contexts.

Monitoring of progress and measurement of outcomes: Effective programs include assessment tools to gauge program effectiveness, and most also include teacher-administered tools to monitor students' learning progress. Commonly employed assessment tools include the ASER survey and generic CBM tools (including EGRA-like measures). All programs design assessments so that the data clearly link to instructional decisions.

2.5 CONCLUSION

According to available evidence, tiered and targeted support programs—including RtI, TaRL, and some small-group tutoring interventions (e.g., PALS)—can produce significant improvements in learning in fairly short periods of time. Remediation programs that rely on low-tech interventions, such as the phone and text message intervention implemented in Botswana, demonstrate the power of harnessing parental involvement in their children's learning at very little cost. Tutoring programs that include structured peer tutoring also demonstrate great potential at low cost.

Targeting support to the actual competency levels of students who are struggling has broad and profound implications. The process of providing remediation by assessing students to identify skill needs, grouping students by skill level for instruction, and monitoring student progress to ensure that students learn the foundational skills that allow them to experience later school success alongside their peers constitutes a dramatic shift for many education systems. Tiered systems of support also offer flexibility and remediation opportunities tailored to the needs of students, including students who need one-on-one or small-group intensive instructional support. Policy makers and school leaders should plan for and provide teachers with the skills and system support required to aid struggling students.

An issue that is not addressed in this review of remediation studies is the role of core academic instruction and the instances in which remediation may not be the best way to support struggling students. When core instruction is not working for a majority of students, providing a layer of remediation may not be the ideal solution. Instead, a comprehensive review and possible revision of core instruction—including teacher training, pedagogical approaches, and a review of the developmental sequence of skills across grades—may be more appropriate. Remediation is most effective when it targets the needs of students who, despite having high-quality core instruction, need additional support to catch up. Remediation should not be intended to replace core quality instruction; otherwise, large numbers of children are constantly going to need to catch up, signaling a very inefficient education system.

In summary, research supports the efficacy and impact of several remediation models. In this document, we have reviewed various intervention models, including TaRL, RtI, and tutoring programs, including PALS. The intervention studies that are available for these models report significant improvements in student learning and describe features that are flexible and can be adjusted to align with many contexts. At the same time, many of these reports lack details that would enable replication and further testing across contexts. Still, there appear to be key common features that are essential for success.

Finally, remediation interventions should be just one part of efforts to improve learning and equity, geared toward helping a small proportion of struggling students. When there are significant proportions of young children who are falling behind, more effective core FLN curricula and better teacher preparation should be part of a multipronged effort to improve learning outcomes. Goals for FLN remediation need to remain simple and visible. All remediation programs should be focused on the goal of helping children successfully exit a remediation intervention so that they can continue to learn important skills in their classrooms going forward.

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