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ACCELERATING FOUNDATIONAL LITERACY AND NUMERACY

Harnessing Technology and Local Capacity for Educational Transformation in Crisis & Low-Resource Contexts

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About WISE

WISE is a global education platform and think-and-do tank convening leaders to shape the future of learning. Established in 2009 by Qatar Foundation under the leadership of its Chairperson, Her Highness Sheikha Moza bint Nasser. WISE drives educational innovation through policy engagement, research, leadership development, and practitioner programs. Through our year-round activities and flagship bi-annual Summit, WISE is building the future of education through strategic local, regional, and international collaborations.

About the WISE Innovation Briefs

The WISE Innovation Briefs are a new research initiative developed by the WISE Research and Policy team to highlight urgent challenges in education and explore promising, scalable solutions.

Each brief draws on practical insights from WISE Prize finalists, WISE EdTech Accelerator alumni, and WISE's broader global network of innovators and thought leaders.

This brief is part of a three-part series leading up to WISE 12, covering:

- **Accelerating Foundational Literacy and Numeracy** – Innovative approaches to improving literacy and numeracy, especially for underserved learners.
- **Addressing Challenges in Artificial Intelligence** – Exploring how AI is reshaping education, with a focus on innovation, ethics, and equity.
- **Improving the Teaching of Arabic Language** – Solutions aimed at strengthening Arabic instruction through better pedagogy, curriculum, and resources.

Harnessing Technology and Local Capacity for Educational Transformation in Crisis & Low-Resource Contexts

Executive Summary

This innovation brief spotlights leading education solutions that are accelerating foundational literacy and numeracy skills in challenging contexts, from low-resource communities to conflict-affected regions. With more than 600 million children lacking minimum proficiency in reading and mathematics globally (UNICEF, 2024), and education consistently underfunded in humanitarian settings, there is an urgent need for effective and scalable solutions grounded in local contexts.

The global education system faces a dual crisis that demands innovative solutions. First, there is an unprecedented teacher shortage: to meet growing demand for quality education, the world must recruit and train 44 million teachers by 2030 (UNESCO, 2024). Second, even where teachers are present, there exists a severe and growing gap in foundational learning. Many educators lack proper qualifications, training, and pedagogical knowledge, working in isolation with limited support.

However, falling barriers to developing infrastructure and technology-based solutions present a critical opportunity. Rather than replacing teachers, technology can complement and amplify human instruction by replicating and scaling high-quality learning experiences that have historically been accessible only to privileged populations. By thoughtfully combining evidence-based traditional teaching approaches with targeted technology solutions, education systems can support teachers in delivering effective instruction while addressing both the quantity and quality challenges simultaneously.

To address these challenges, the WISE Prize for Education identified accelerating foundational literacy and numeracy as a key challenge in the 2024-25 cycle. Two finalists exemplify innovative approaches: FastTrack+ (Nigeria) employs offline technology to improve literacy and numeracy among displaced populations across Western and Central Africa, while Darsel (Jordan) uses AI-powered algorithms to enhance numeracy through WhatsApp in low-resource settings.

Across these diverse solutions, four core principles emerge for scaling foundational learning: prioritizing mother tongue instruction as an educational accelerator, designing for sustained practice rather than content delivery alone, deploying context-appropriate technology within existing infrastructure, and building local capacity for delivery without external dependence. These evidence-based recommendations provide implementers and policymakers with practical pathways to strengthen foundational literacy and numeracy, even in the most challenging circumstances.

UNICEF, via The FLN Hub (https://www.flnhub.org)

Problem: Global Learning Crisis

600 million Children Left Behind

Limitations in foundational literacy and numeracy (FLN) remain a critical global education challenge, with progress stagnating since 2015. Approximately 600 million children and adolescents of primary and lower secondary school age, over 58% of the global total, lack minimum proficiency in reading and mathematics (UN Stats, 2024; UNICEF, 2024).

This learning crisis unfolds against a backdrop of severe constraints. UNESCO (2024) projects that 44 million teachers will be needed by 2030 to meet global education demand, creating unprecedented pressure on already strained education systems. In many regions, classrooms are overcrowded, qualified teachers are scarce, and existing educators are overwhelmed by the scale of learning gaps they face.

While we recognize and support the growing conversation around expanding education to include skills like creativity, critical thinking, collaboration, and wellbeing, our current focus remains on literacy and numeracy, recognizing these foundational skills underpin success across all areas of learning.

In low- and middle-income countries, the crisis is particularly acute. In 2019, 57% of children could not read with understanding by age 10. By 2022, in the aftermath of the COVID-19 pandemic, the figure had grown to an estimated 70% (UNHCR, 2025).

This learning crisis deepens in conflict-affected regions, where education systems are invariably debilitated by violence and instability. While education plays a critical role in preventing and rebuilding post-conflict societies, the disruption to foundational skill development during conflicts creates a generational learning crisis that extends far beyond the immediate conflict period (World Bank, 2025). The scale of this challenge is evident as more than 32 million children worldwide have never seen a teacher due to armed conflict (Warchild, 2024), and 30% of young people aged 15-24 living in conflict or disaster-affected countries are illiterate — triple the global rate (UNICEF, 2018).

Despite education's crucial role in levelling the playing field for vulnerable populations, it is often the first service halted and the last reinstated during crises. The funding landscape reflects this deprioritization: only 3.6% of humanitarian funding is allocated to providing education for children living in emergencies, making it one of the least funded sectors in humanitarian appeals (UNICEF, 2018).

The Pace Problem: Why Traditional Approaches Fall Short of the 2030 Target

The World Bank (2021) reports that even if countries reduce their learning poverty at the fastest rates seen over the past 20 years, the goal of ending it will not be attained by 2030. On average, low- and middle-income countries (LMICs) spend between 3.5% and 4.3% of GDP on education. While these investments have supported rises in primary school enrolments to over 90% globally, they have not brought meaningful increases in numeracy and literacy rates (Crawford et al., 2025). In fact, in many LMICs, most children in school are not learning (World Bank, 2025). Even if all marginalized children were enrolled and regularly attending, they would likely still miss out on learning the basics, a fundamental difference from high-income countries where the majority of even the poorest students do gain foundational skills.

Traditional top-down education interventions have struggled to achieve scale and sustainability and attempts to involve communities in public education have shown mixed results due to inadequate guidance and failure to address the significant social distance between teachers and students and parents from disadvantaged backgrounds. When interventions do show promise, they often lack the contextual adaptation necessary for scaling across diverse communities and conflict-affected regions to ensure longevity.

However, emerging evidence from grassroots initiatives and randomized evaluations demonstrates promising pathways, showing that pedagogical innovations designed for local contexts can dramatically improve learning outcomes (Kumar et al., 2024).

Madhi Foundation (https://www.madhifoundation.org)

Innovations from the WISE Community

Within the complex landscape of global education challenges, there has been an emergence of grassroots organizations and ed-tech initiatives that are supporting global foundational literacy and numeracy in low socio-economic contexts and conflict zones. These innovations offer scalable solutions that can reach children in otherwise inaccessible areas, providing educational continuity.

Through initiatives such as the WISE Prize for Education and supporting ecosystem innovators, WISE grows a community actively addressing these challenges. By profiling these evidence-based innovations making a real impact, we can learn crucial lessons about addressing educational crises at scale. Darsel and FastTrack+ are two innovations recognized by WISE as 2024-25 Prize Finalists that are demonstrating how context-appropriate technology, when thoughtfully implemented, can bridge critical educational gaps.

Darsel utilizes AI-powered personalized learning algorithms to improve numeracy for middle school students through WhatsApp, specifically targeting low-resource settings. By providing personalized and adaptive learning experiences, Darsel aims to enhance student engagement and achievement in numeracy. In 2025, the solution was validated at the primary school level in partnership with the Ministry of Education of Jordan.

FastTrack+ employs offline, self-guided technology to improve literacy and numeracy skills among displaced populations across Western and Central Africa. By utilizing low-cost, scalable technology with a multi-lingual approach, FastTrack+ aims to sustain literacy uptake outside of school settings for those facing displacement. The new solution started in 2025 to be piloted in refugee camps in Democratic Republic of Congo.

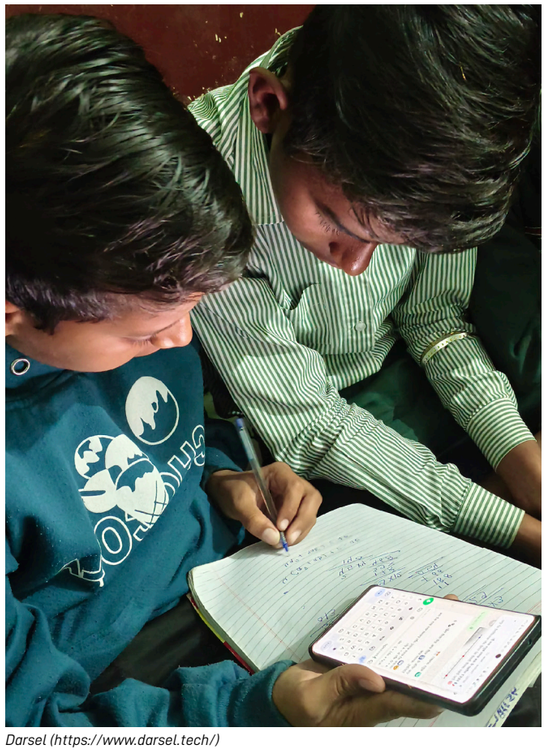
Darsel: The Importance of Human-Centered EdTech Interventions

Six in ten students globally are not meeting minimum proficiency in math, with the COVID-19 pandemic exacerbating learning gaps in low- and middle-income countries with limited resources and connectivity. Learning gaps, especially in numeracy, accumulate over time as students' progress from basic to complex concepts, creating significant barriers to continued learning.

Darsel, a local grassroots organization with operations in Jordan, Nigeria, and India, addresses this challenge by offering an accessible, scalable and affordable alternative to one-on-one tutoring, designed specifically for low-resource environments. It delivers adaptive, self-paced math practice with instant feedback through a low bandwidth chatbot on widely used platforms like WhatsApp, Facebook Messenger, Telegram, and text messaging (SMS). It is putting essential learning tools into the hands of students without the need for new devices or expensive infrastructure.

This approach aligns with strong research evidence. Major et al. (2021) demonstrate that personalized learning technology improves learning outcomes by an average of 0.18 standard deviations in low and middle income countries. Darsel's own research validates this effectiveness, showing that using their platform for a year is equivalent to receiving an additional three months of high-quality math instruction.

Darsel's scaling approach is grounded in localization and strong governmental partnerships. Initially starting with a pilot in two Jordanian schools, it scaled to 10, then 90, and eventually reached over 2,000 schools nationwide. This phased and incremental model allowed Darsel to build trust with education authorities while iterating its product to fit local realities. Today, Darsel operates in Jordan, India, and Nigeria, reaching a total of 200,000 students, with demonstrated improvements in math engagement and learning outcomes.



Darsel (https://www.darsel.tech/)

> "Having access to the resource is one thing, but making the decision to spend time accumulating that knowledge is a completely different one."

Abdulhamid Haidar,
Founder, Darsel

Darsel's founder recognizes that technology alone cannot overcome the behavioural barriers in education systems. To address this, Darsel intentionally integrates human-centered design features, such as school leaderboards, peer competitions, and reward systems, to drive sustained student engagement. At the heart of this model is a recognition that teachers and parents remain the most powerful motivators for student engagement.

- +3 months of high-quality math instruction gained after one year of using Darsel.
- 200,000+ students reached across Jordan, India, and Nigeria.
- Scaled from 2 to 2,000 schools in Jordan.

FastTrack+: Foundational Learning as a Gateway to Digital Futures

A United Nations Children's Fund (UNICEF, 2024) report indicates that only 26% of Nigerian children aged 5-14 possess basic literacy and numeracy skills basic reading and mathematics skills, a crisis exacerbated by the country's large out-of-school population (particularly in Northern Nigeria) and the exclusion of refugee and internally displaced children (IDPs) from mainstream education. Many children in school are also failing to acquire basic foundational skills.

FastTrack+ integrates three complementary approaches: grouping learners by ability rather than age (Teaching at the Right Level), prioritizing instruction in mother tongue before bridging to English, and deploying the offline, audio-assisted Mavis Talking Book and pen for self-paced learning. Teaching at the Right Level; grouping learners by ability rather than age, Bilingual model of instruction; prioritizing instruction in mother tongue before bridging to English or any other language, and the deployment of an offline, audio-assisted Mavis Talking Book and Pen for self-paced learning. The Teaching at the Right Level approach has one of the strongest evidence bases in international education research. Six randomized evaluations across seven states in India showed that grouping children by learning level rather than age is consistently effective when implemented systematically, resulting in some of the largest effect sizes recorded in education research (Banerji, 2021). This model is especially effective in displacement contexts, where formal schooling is often disrupted, and multilingual barriers persist.

Since piloting with 1,500 children in the year 2021, FastTrack has reached over 25,000 learners across ten refugee camps in Nigeria, achieving a 69% improvement in literacy and numeracy proficiency through baseline-to-endline assessments. Its model relies on a community-driven mobilization strategy, localization of instruction, and a formalized training program for facilitators, ensuring long-term program continuity beyond direct involvement.

A key factor in FastTrack's scalability has been its ability to lower barriers to participation by prioritizing mother-tongue instruction as a core component of early learning. Recognizing the importance of language in learner engagement and community buy-in, FastTrack is adapting its educational materials into the dominant languages spoken across Africa, particularly French, Swahili, and English. This language-based approach enables smoother integration into national education systems, especially in contexts where frameworks are open to supplementary resources.

Importantly, while operating in low-resource contexts, FastTrack views AI as an enabler, not a replacement, and foundational literacy is a prerequisite.

> "FastTrack is an enabler for AI. Neither solution overshadows the other; instead, they help bring out the uniqueness and effectiveness of both solutions."

Funmilola A. Bamidele,
Director of Programmes, Aid for Rural Education Access Initiative (AREAi)

FastTrack actively integrates AI to support translation, widen access, and develop a teacher support AI-powered chatbot to offer continuous facilitator guidance and professional development. This builds AI literacy among teachers and positions them as knowledge transfer for foundational digital competencies to learners.

FastTrack+ (https://areai4africa.org/)

Solutions from WISE Innovation Ecosystem

Learning Equality: Restoring Learning and Belonging for Refugee Learners

In Uganda, while over 90% of children start primary school, only half remain enrolled by Grades 4-5, with refugee learners in settlements facing even steeper dropouts due to poverty, displacement, and limited educational infrastructure. While government schools in Uganda's refugee settlements provide essential educational access, they remain under-equipped to meet the complex needs of displaced, trauma-affected learners.

Flying Colors, a project developed by Learning Equality, Amal Alliance and HAF Uganda, addresses the urgent gaps in foundational learning with an offline, tech-enabled, project-based learning model centered on socio-emotional recovery and local capacity building in refugee settlements. At the pilot baseline, with 700 learners, only half of the learners could read a word; by endline, all could, and 73% could read a paragraph. Numeracy outcomes also saw statistically significant improvements (95% confidence level).

> We are innovating with coupling offline edtech with project-based learning because the constraints of resources should not define what's possible for learning experiences that underserved teachers and learners can have.

Navya Akkinepally,
Co-Executive Director at Learning Equality

Flying Colours represents an adaptable model for building foundational learning with a cascade teacher training model, where trained educators from the pilot upskill government school teachers. The prioritization of many-to-many teacher support networks such as with communities of practice, for example, is a critical way for the model to ensure local ownership and reduce programmatic dependence.

Localized content, real-time learning progress tracking, and community-responsive curricula present a scalable, sustainable complement to government education systems. A major success metric of the Flying Colors pilot was that 98% of learners from Cohort 1 enrolled back into formal school. Flying Colors' pilot program lead, Navya Akkinepally, insists that interventions should be structured in ways that enable data-driven advocacy for eventual government adoption, and early engagements with teachers are needed to demonstrate the feasibility of integration from the outset.

- 100% of learners could read a word by endline, up from 50% at baseline.
- Numeracy outcomes improved at a 95% confidence level.
- 98% of Cohort 1 learners re-enrolled into formal school.

Canopy Nepal: Storytelling as a Catalyst for Literacy, Thinking, and Agency

In Nepal, only 27% of students complete upper secondary education. The majority drops out due to poverty, long distances to school, and poor-quality classroom experiences. Traditional education remains dominated by rote memorization and unidirectional teaching, leaving little room for creativity, critical thinking, or self-expression. This disproportionately affects students from low-income backgrounds, limiting their social mobility and perpetuating cycles of poverty.

Recognizing this, Canopy Nepal set out to challenge conventional classroom norms by introducing storytelling as a tool for learning and empowerment. Over 7–8 years, they piloted their flagship program, "Katha Bunaun" (Weaving Stories), in diverse school settings, from elite private institutions to rural public schools, ensuring the model was adaptable, inclusive, and had a tangible impact.

Katha Bunaun uses storytelling to improve foundational literacy, foster critical thinking, and strengthen students' self-expression. The program creates interactive, bidirectional classroom environments; however, as Mohit Rauniyar from Canopy reflected, changing mindsets wasn't easy.

To overcome this, Canopy prioritized rigorous piloting and curating evidence-backed data to demonstrate the program's tangible benefits. This strategy built trust among schools and communities and convinced decision-makers of its value.

The program's proven impact on academic performance and school attendance prompted the Nepali government to fast-track its integration into public education. Active pilots are now running across five local governments, covering 80 schools, with plans for international scaling. To date, Canopy Nepal has impacted over 21,000 students in 250 schools, reporting a 18% increase in school attendance and a 33% improvement in academic results among participating students.

> The biggest challenge we saw was to shift the narrative that parents have, educators have around education in general.

Mohit Rauniyar,
Founder and Director, Canopy Nepal

Lamsa: Turning the 'Black Box' of Early Childhood Education into a National Asset

In the first few years of life, over a million neural connections form every second. Early childhood education is critical to shaping a child's lifelong learning and development. Yet, fragmentation between stakeholders means countries often struggle to align early childhood education with long-term economic, cultural, and national priorities.

Lamsa Learn offers an integrated solution that aligns government strategies, school operations, and classroom practices through curriculum planning tools, real-time learning outcome tracking, customizable assessments, and gamified learning experiences.

> Early education is not just a phase. It's the foundation for individual, community, and national development. And too often it's left to chance.

Badr Ward,
CEO and Founder, Lamsa

A persistent challenge in the sector is the lack of data transparency — early education is often treated as a "black box." Lamsa addresses this through real-time, multi-level data collection and reporting tools for teachers, schools, districts, and ministries, enabling evidence-based decision-making.

Resistance emerged at the classroom level during early rollouts, largely due to over-engineered tools that didn't account for teachers' limited time. Lamsa responded by shifting to a co-design model, involving teachers from the outset to streamline tools, simplify interfaces, and adapt features to real classroom realities. This collaborative approach fostered trust, improved usability, and empowered teachers to lead adoption within their school systems. The result: a 50% reduction in administrative workload for teachers and increased engagement across classrooms and leadership.

Deployed successfully across national GCC programs and international pilots, Lamsa's flexible, culturally adaptive model places local identity and values at the heart of early learning. Before designing educational content, every implementation begins with identity research to understand the country's culture, values, languages, and visual identity. This extends to integrating multi-dialect support, hero characters, and co-created cultural assets to reflect children's lived experiences.

Lamsa (https://lamsalearn.com/home)

GraphoGame: Bridging Research and Application

The global illiteracy crisis is compounded by a global teacher shortage of 44 million. While EdTech solutions continue to emerge and expand, many solutions lack rigorous research backing and tangible, real-time impact in the classroom.

Traditionally, research in education is slow and costly, with students rarely benefiting directly from ongoing studies. Teachers, too, often receive performance data only after a school year has ended, when it is too late to meaningfully intervene.

> Research is expensive, and the kids are not benefiting from it.

Jesper Ryynänen,
COO, GraphoGame

GraphoGame is working to bridge this critical gap between academic research and classroom application. Designed for children aged 4–9, GraphoGame produces evidence-based, gamified literacy apps informed by neuropsychology and brain research. By partnering with universities, the apps undergo rigorous evaluation through Randomized Controlled Trials (RCTs), with third-party evaluators assessing impact to ensure credibility and replicability.

Their predictive analytics have demonstrated the ability to identify potential reading difficulties up to six months in advance, allowing for timely intervention. With 14 language versions available and approximately 10 million downloads globally, their reach is substantial. In Brazil alone, a partnership with the Ministry of Education resulted in 2.4 million children downloading the app.

The company operates on a "Robin Hood model", providing free access in underprivileged regions while generating revenue from paid versions in more affluent markets. To overcome digital divide challenges, they've developed offline distribution methods, including USB drives and pre-installation on devices.

By bringing research directly into the hands of learners and teachers, GraphoGame offers a model for how EdTech can move beyond saturation to deliver scalable, evidence-backed solutions with meaningful, measurable impact.

Freethinking Foundation: Empowerment of Local Community for Program Sustainability

India faces a stark gap in foundational literacy and numeracy, with children in Grades 6-7 still reading at Grade 1 levels. This disparity underscores the need for early educational interventions that can lay a strong foundation for children.

Freethinking Foundation's Montessori on Wheels initiative focuses on children aged 2.5 to 6, providing Montessori-based education in underserved communities, ensuring they have the right skill set and a strong foundation before they even enter school. Traditional Montessori materials are costly, making it difficult for many communities to benefit from this proven method of learning. The innovative mobile setup allows these materials to be delivered to a much broader population, overcoming financial and infrastructural barriers.

A crucial aspect of the initiative is the training of local mothers as Montessori educators. Empowering the community fostered ownership and helped ensure the long-term sustainability of the model. Since the implementation of Montessori methods, there has been a 36% increase in children attending Anganwadi centers where the program is being rolled out. This increase in enrolment reflects the growing demand for quality education, driven by the positive outcomes families have witnessed in their children's development.

GraphoGame (https://graphogame.com/)

Key Insights & Why They Matter

1. Make Mother Tongue Instruction Central to Learning Architecture:

Children grasp basic literacy and numeracy concepts faster in familiar languages, creating stronger foundations for multilingual learning. FastTrack+'s 69% literacy improvement resulted from making mother tongue instruction foundational to their Teaching at the Right Level approach in displacement contexts where children face both educational disruption and multilingual barriers. Similarly, Freethinking Foundation's Montessori on Wheels saw 36% increased enrollment when local mothers delivered instruction in familiar languages

Policy Tip: Develop foundational literacy and numeracy content in community languages with clear bridges to national and international languages.

2. Design for Sustained Practice, Not Just Content Delivery:

Building foundational skills requires consistent practice while treating teachers and parents as key engagement partners. Darsel reached 200,000+ students by addressing motivation through school leaderboards and peer competition. Canopy Nepal achieved 33% academic improvement using storytelling to make foundational learning engaging while Lamsa's co-design model with teachers reduced administrative workload by 50% while increasing classroom engagement.

Policy Tip: Evaluate solutions on usage and learning outcomes over initial access metrics, while supporting iterative solution design based on behavioral data.

3. Deploy Context-Appropriate Technology for Foundational Skills:

Effective FLN solutions match technology to context constraints and existing infrastructure, not the reverse. Darsel's success scaling from 2 to 2,000 schools in Jordan came from leveraging existing WhatsApp infrastructure. FastTrack+'s offline-first Mavis Talking Book design enabled learning continuity in refugee camps where internet access is sporadic.

Policy Tip: Create regulatory enabling pathways for solutions that enhance existing infrastructure and conduct infrastructure audits in target communities before solution implementation.

4. Build Local Capacity for Foundational Learning Delivery:

Sustainable improvement in basic literacy and numeracy requires community ownership with structured skill transfer and support systems that create local expertise capable of replication and adaptation. Flying Colors achieved 98% re-enrollment into formal schooling by implementing cascade training where pilot educators trained government schoolteachers. FastTrack+ operates across 10 refugee camps through community-driven mobilization strategy and formalized facilitator training.

Policy Tip: Engage and train community members to deliver FLN instruction, supported by communities of practice. Create pathways for community-trained foundational learning facilitators to gain official recognition, enabling integration with formal systems.

> A lot of governments are looking at early childhood as the foundations of cultural identity. They want to introduce cultural values and identity at the first interaction — in preschool, nurseries, even kindergartens.

Badr Ward,
CEO and Founder, Lamsa

Conclusion

The innovations spotlighted in this brief highlight tangible, existing pathways for addressing foundational literacy and numeracy challenges in crisis-affected and resource-constrained settings. The documented experiences of organizations like Darsel, FastTrack+, and others illustrate how context-appropriate technology, human-centered design, and community-driven approaches can complement and strengthen existing education systems.

Across these case studies, successful interventions consistently demonstrate three defining characteristics: contextual relevance, active community involvement, and appropriate, accessible technology integration. These commonalities offer valuable insights for those working to close global learning gaps.

There is an urgent need for education stakeholders, including policymakers, education funders, and program implementers, to consider how these effective practices can be adapted, embedded, and scaled. From policy frameworks that create space for educational innovation, investment strategies that prioritize evidence-based, context-sensitive solutions, to programmatic models that center cultural relevance and community participation. The insights shared in this brief aim to inform such decisions, offering direction for more responsive, inclusive, and impactful education interventions for foundational skill development.

UNICEF, via World Bank ((https://www.worldbank.org/en/topic/education/brief/commitment-to-action-on-foundational-learning)

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