

Africa and Asia

Successful Global Tutoring
Experiences: ConnectEd

Noam Angrist - Colin Crossley - Claire Cullen

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PART I:

Context & Background

Learning levels remain very low in many low- and middle-income countries, a phenomenon referred to as the global “learning crisis.” COVID-19 exacerbated this learning crisis, with evidence of substantial learning losses due to school disruptions.

Solutions that can promote learning are urgently needed. Tutoring is one particularly promising approach shown to improve learning. Evidence from 96 randomized trials in high-income countries shows tutoring has been consistently effective with an average effect of 0.37 standard deviations (Nickow, Oreopoulos, and Quan, 2020; Robinson and Loeb 2021). Yet a constraint to scale-up tutoring remains high cost. For example, a prominent tutoring program yielded 0.19 to 0.31 standard deviation learning gains at a cost of US\$2,500 per child (Cook et al. 2015). To ensure tutoring approaches can be adapted and scaled, evidence is needed on low-cost models, especially in low- and middle-income contexts.

A low-cost tutoring model that has gained recent attention is tutoring via mobile phone. Estimates show that 70%–90% of households globally own at least one mobile device, suggesting that simple phones can be an effective tool to reach children at scale from a range of backgrounds. Phone tutoring is an attractive low cost alternative to in-person tutoring models. Multiple randomized studies now show high effectiveness of tutoring by phone, at extremely low cost at just \$12 per child (Angrist et al. 2023). Phone-based tutoring also has the advantage that it can be flexibly deployed in out-of-school settings. These settings include school disruptions, such as COVID-19, as well as during numerous other settings, such as floods, natural disasters, teacher strikes, and school holidays, which are estimated to affect 222 million children in any given year.

Together with a coalition of partners including governments, NGOs, and multilaterals¹, we tested phone-based tutoring interventions via randomized trials in Botswana (Angrist et al. 2022) early on in the covid-19 pandemic. Results provided some of the first evidence on effective ways to promote learning during the pandemic; learning improved by 0.12 standard deviations (Angrist et al. 2022). We then replicated and tested the approach in five additional countries (Kenya, Nepal, India, the Philippines and Uganda) with over 16,000 enrolled children. The intervention tested, called ConnectEd, improved learning by an average of 0.30-0.35 standard deviations across all testing sites (Angrist et al. 2023). Collectively, this is some of the largest, fastest evidence produced in education, including novel evidence on delivery through government scaling models. A related set of remote tutoring programs have also been tested online, including efforts in Italy (Carlana and La Ferrara 2021) and Spain (Gortazar et al. 2023), among others.

These interventions are among the most cost-effective ways to improve learning and have inspired replication trials around the world, including Inter-American Development Bank (IDB) led tutoring projects in Latin America. In addition to the studies described in this brief, the IDB has engaged in an effort to replicate similar approaches across multiple contexts. This effort demonstrates the potential of rigorous evidence to inform policy and practice worldwide. Together, this broad coalition will have generated evidence on a promising approach across over 10 contexts – one of the largest multi-country evidence bases ever generated in education.

In this policy report, we describe the evidence behind phone-based tutorials and outline the key features of phone-based tutoring programs that lead to effectiveness. We also outline a future research and scaling agenda.

1. Special thanks goes to the following partners, who collaborated with Youth Impact to develop, test and implement ConnectEd globally. Funding Partners: UBS Optimus Foundation, Jacobs Foundation, Echidna Giving, Mulago Foundation, Stavros Niarchos Foundation, Douglas B. Marshall Jr. Family Foundation; Overall support: Peter Cundill Foundation, Ripple Foundation, Partners for Equity (general operating support which made this effort possible); Implementing and Government Partners: Ministry of Basic Education (Botswana), Department of Education (Philippines), Ministry of Science, Education and Technology (Nepal), the World Bank, Street Child Nepal, Teach for Nepal, NewGlobe, Alokita, Global School Leaders, Innovations for Poverty Action (IPA), Building Tomorrow; Research Partners: University of Oxford, Columbia University, Learning Collider, Jameel Poverty Action Lab (J-PAL)

A woman with dark hair, wearing a dark top, is leaning over a desk, pointing at a document. A young girl with dark hair, wearing a light-colored shirt, is sitting at the desk, looking down at the document. The background is a blurred classroom setting. The entire image is overlaid with a semi-transparent green filter.

PART II:

The Approach

Mobile Tutoring

We developed a phone tutoring intervention called ConnectEd that provides targeted tutoring support to children in basic mathematics. The program relies on two equally important components: (1) the platform - simple low-tech mobile phones and (2) the pedagogy -an instructional approach that focuses on foundational skills and targets instructional content to student's individual learning levels .

Households enrolled in the program receive a package of interventions. This includes a one-way SMS with practice math problems followed by a 20-minute phone tutorial. Phone tutorials are held between tutors and children and are often conducted over speakerphone to encourage caregivers to listen and provide support. In this way, phone calls approximate the experience and relationship building of one-on-one tutoring, using a flexible remote model, which can also involve caregivers in learning.

In addition to leveraging mobile phones, ConnectEd uses a pedagogical approach that provides individually targeted instruction to children on a week-to-week basis. This is achieved through checkpoint questions, or 'problems of the day,' delivered at the end of each tutorial session that help to inform a tutor whether a child has mastered a skill. A child answering one of these checkpoint questions correctly at the conclusion of a call will progress to the next topic in the following tutorial session, whereas a child answering incorrectly will repeat a lesson in the following week.

This targeted approach builds on a related approach called “Teaching at the Right Level” (TaRL), a classroom-based intervention evaluated in randomized trials over 20 years that targets instruction by learning level rather than by age or grade. TaRL has been shown to produce cost-effective gains in learning across multiple studies. This approach has worked when delivered by teachers or volunteers (Banerjee et al. 2007; Banerjee et al. 2010; Duflo, Dupas, and Kremer 2011; Banerjee et al. 2017; Duflo et al. 2020; Angrist and Meager 2023). Our evidence shows similar principles can be adapted to phone-based tutorials.

Testing a Proof of Concept: Early Evidence from Botswana

Learning levels are low in Botswana. A recent survey of basic competencies found that 32% of fifth grade students could perform simple operations like subtraction (Pansiri et al. 2017). These learning deficits were exacerbated by COVID-19 school closures. On 20th March 2020, schools in Botswana closed to pre-empt the spread of COVID-19. We responded quickly, conducting the world’s first randomized controlled trial of remote tutoring approaches during school closures in April of 2020 with 4,500 households.

The program ran for a total of eight weeks. In one treatment group, students were provided with SMS messages with math problems only. Households enrolled in the second treatment received a combined package of phone tutorials and SMS messages. Our assessment tool was adapted for phone delivery from the widely used Annual Status of Education Tool (ASER), a rapid assessment developed in 2005 by Pratham and used in over 14 countries worldwide. Using this tool, we monitored the program in four to six week intervals and implemented quality-assurance measures to ensure reliability. For example, students had a time cap of two minutes per question to minimize the likelihood of family members in the household assisting the child, and we asked each child to explain their work and only marked a problem correctly if the child could explain how they solved the problem. These measures provide a level of verification to maximize the tool’s ability to capture child learning. We also included formal validity tests, such as comparing in person to remote assessments (Angrist et al. 2023).

Results showed that weekly phone calls to parents can improve learning by 0.12 standard deviations and up to 0.89 standard deviation gains per \$100 USD, ranking among one of the most cost-effective tutoring programs relative to the literature (Angrist et al. 2020).

Replication and Scale-Up Randomized Trials in Five Countries

Having demonstrated the effectiveness of targeted phone tutorials in Botswana, we collaborated with partners and governments to replicate the approach in additional contexts around the world. These additional trials were aimed at testing replicability and scalability, including with government delivery models. The replication and scale trials took place across five countries: India (in partnership with the NGOs Global School Leaders and Alokit), Kenya (in partnership with NGO NewGlobe), Nepal (in partnership with the World Bank, Street Child Nepal, Teach for Nepal and the Government’s Ministry of Science, Education and Technology), Uganda (in partnership with NGO Building Tomorrow), and the Philippines (In partnership with Innovations for Poverty Action and the Government’s Department of Education). In total, the research enrolled over 16,000 households in large-scale randomized trials.

	Text Alone	Text + Phone	Tutor Profile		Timeframe (Weeks)	Location	Trial Launch
			NGO	Government			
Botswana	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		8	8 of 9 regions	April 2020
Kenya	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		12	30 of 47 countries	December 2020
Nepal	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	16	All 7 provinces	January 2021
India		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		8	Telangana state	April 2021
Uganda	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		8	9 of 135 districts	August 2021
Philippines	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	8	3 of 17 regions	August 2021

These studies represent one of the largest multi-country evaluations in education conducted to date. Fewer than one percent of randomized studies in education have been conducted across multiple countries, notwithstanding notable examples such as Teaching at the Right Level (Banerjee et al. 2017). These multi-country replication efforts demonstrate how an approach can replicate across contexts and demonstrate the potential of rigorous evidence to inform policy and practice.



PART III:

Results

Phone tutoring Improves Learning Across Contexts

Results from the five-country study showed consistently large effect sizes of phone call tutorials on learning across country contexts, with average effects across all five countries of 0.30-0.35 standard deviations (Angrist et al 2023). Impacts were largest in countries that experienced the longest school closures: Uganda and the Philippines. These results translated into large learning gains in absolute terms. In Uganda, for example, less than 20 percent of grade 4 students could divide at baseline, which increased to nearly 50 percent at endline. In this case, children were able to fully recover any learning losses due to school closures and make substantial progress beyond learning loss recovery. On average across all countries, we find a 65 percent increase in the percent of students who learn division (Angrist et al. 2023).

However, the data showed that SMS delivered independently of phone tutorials were less effective at producing meaningful learning gains. On average, there was an 0.08 standard deviation effect on learning for households receiving only SMS messages. While these effects are positive and statistically significant when pooled across contexts, they are not consistently statistically significant in every country. Average effects are largely driven by substantial impacts in Uganda, with a 0.21 standard deviation effect that is significant at the 99 percent level, as well as effects in the Philippines, with an effect of 0.09 that is significant at the 90 percent level; there is no effect in Kenya or Nepal (Angrist et al. 2023). These findings suggest that SMS messages alone are not enough to improve learning in some low and middle-income settings. In contrast, live phone call tutorials appear to best strike the balance of being intensive enough to deliver sustained impact across diverse contexts while remaining cheap and scalable.

Multiple Delivery Models Can Be Effective, Including Government Teachers.

A key feature of replication studies in Nepal and the Philippines was an assessment of program delivery using both NGO instructors and government teachers. The average effect of phone call tutorials on learning when delivered by teachers was 0.31 standard deviations, compared with 0.26 for NGO facilitators. As teachers represent a possible pathway to scaling phone tutoring programs, assessing their ability to do so is an indicator of whether this type of program can be scaled through government systems.

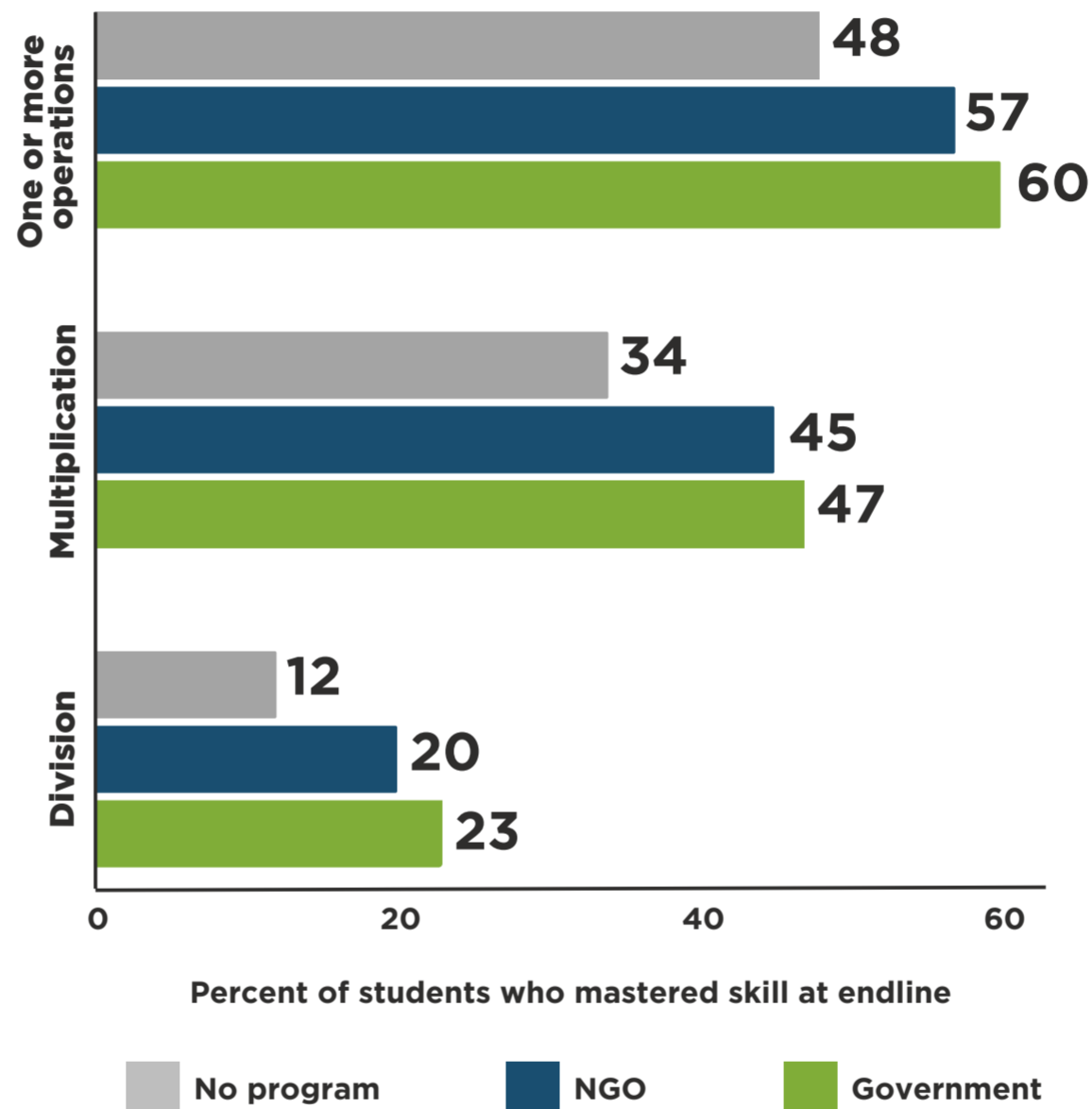
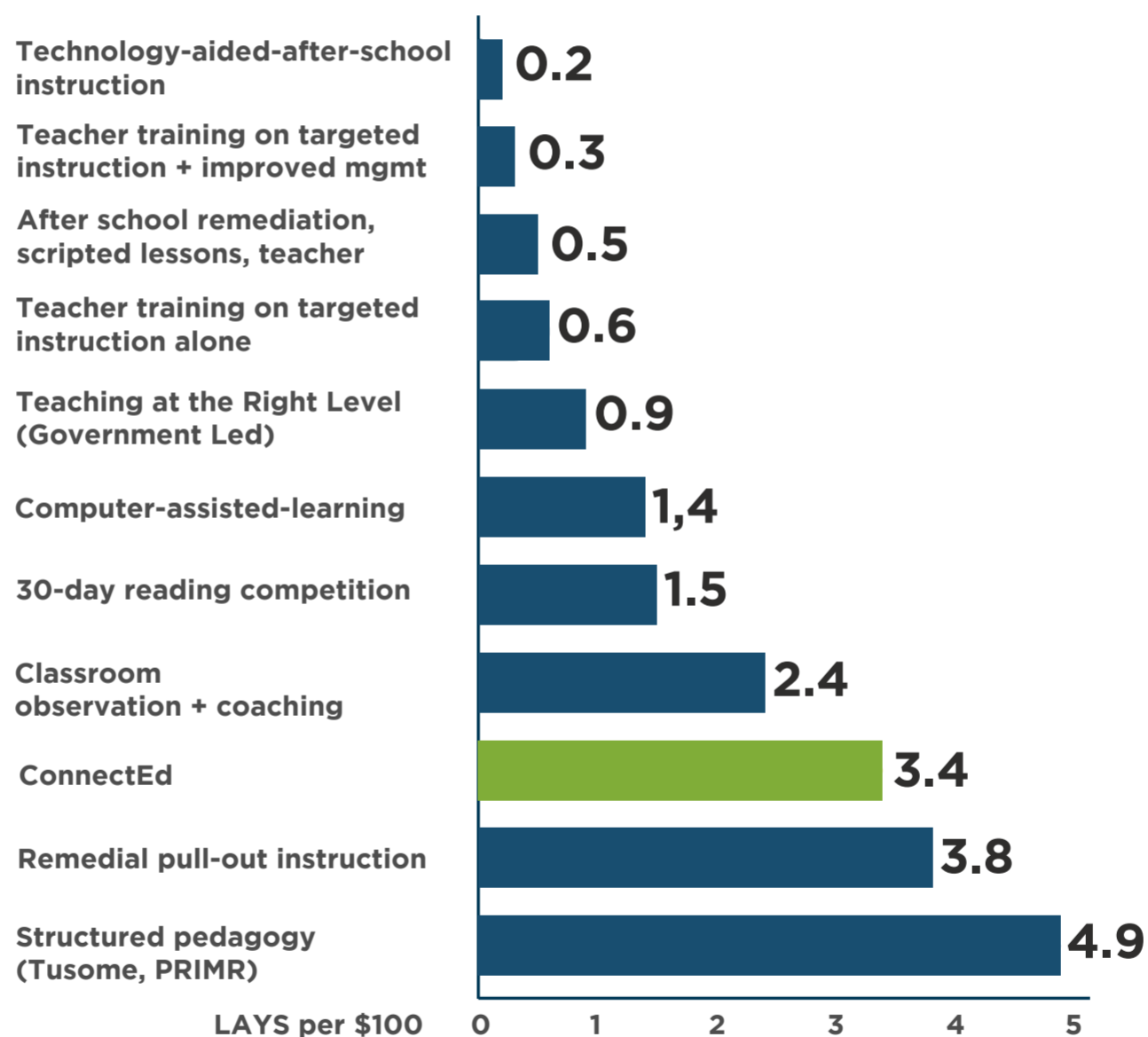


Figure taken from *'The Tutor is Calling: Targeted Instruction by Phone Boosts Learning Across Six Countries'*

Phone Tutorials are Highly Cost-effective

The average cost to deliver phone tutoring across all five country contexts was USD 12 per child, representing a significantly lower delivery cost than other tutoring modalities. One reason for this is likely due to the use of mobile phones as a primary delivery tool required to implement and receive instruction. Mobile phones were owned by nearly every household in countries where phone tutoring was tested and were therefore able to build on existing household infrastructure. Of note, none of the trials required procurement procedures to source the tools required for program delivery since households often already own devices, a particularly important feature of scalability for bureaucracies. The main costs drivers for the program were (a) training tutors; (b) staff time spent preparing lesson content; (c) tutors' time (for scheduling and making calls), (d) mobile phone airtime; and (e) staff time for supervision and management.



To benchmark cost-effectiveness we used Learning Adjusted Years of Schooling (LAYS), which is a calculation of how many high-quality years of schooling an intervention is equivalent to in a given context. The figure above shows a comparison of the LAYS per \$100 for edtech and pedagogy interventions that demonstrated an impact. ConnectEd produced 3.4 LAYS per \$100, making it among the top most cost-effective interventions across a survey of tutoring and education technology interventions (Angrist et al. 2023).

Implementation Can Improve Over Time

We measured the degree to which instruction was accurately targeted in all studies – the key metric of implementation fidelity. To derive this measure, we collected data on which math operation each tutor taught during a given week and whether the child was able to answer a simple ‘checkpoint’ question correctly.

Contrary to much of the prior literature, where replication results are typically less strong than the proof-of-concept study, we found implementation improved over time.

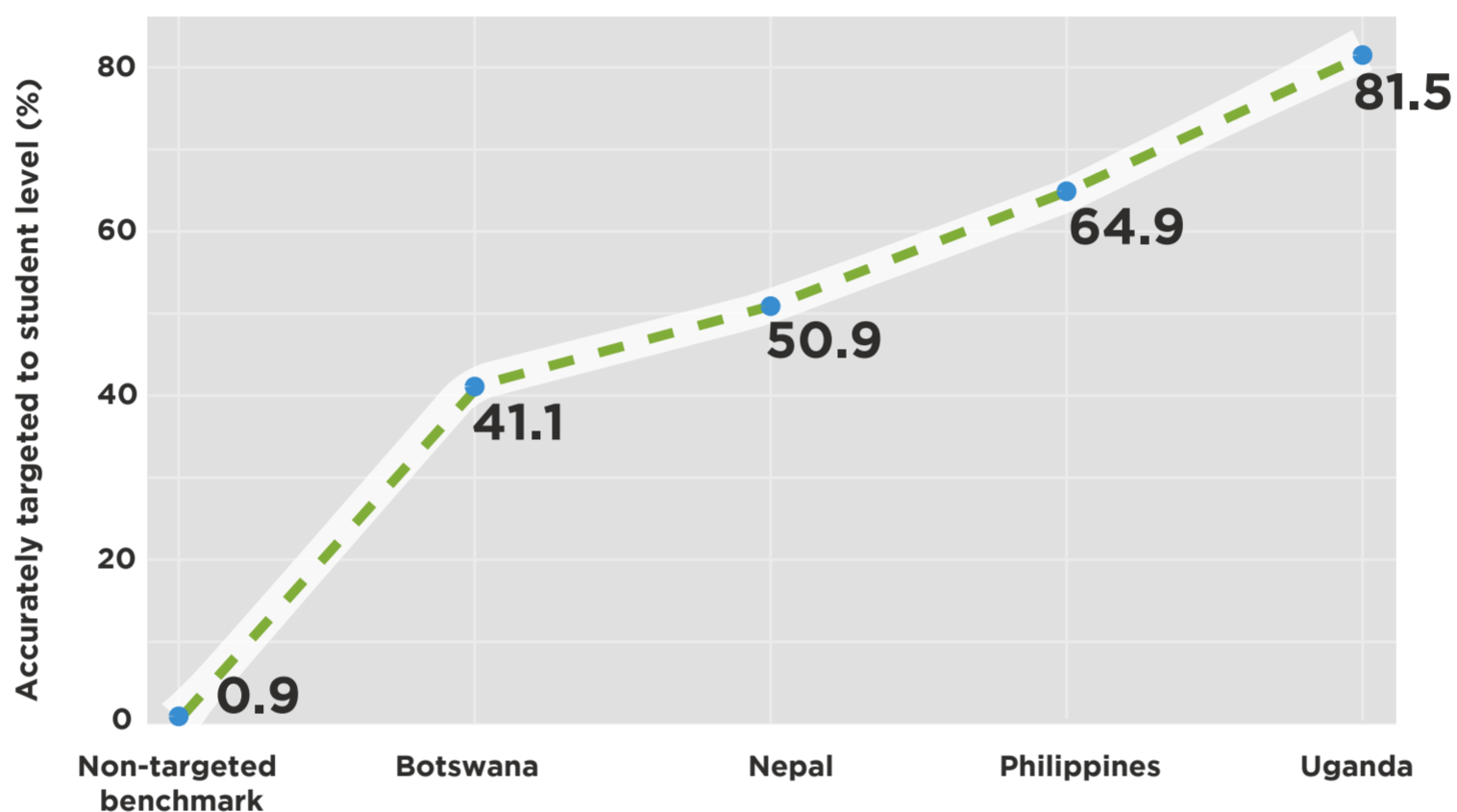


Figure adapted from Angrist et al. 2023

Figure 6 shows how targeting improved between the original study in Botswana and subsequent replications. Whereas roughly 40 percent of children were properly targeted in Botswana, nearly 80 percent received accurate targeting in Uganda.

PART IV:

Future Research and Scaling Agenda

Recent and accumulating evidence demonstrates that mobile phones can provide an effective method for quality educational instruction. These low-cost interventions provide a scalable model, delivering effects equal to that of standard tutoring programs at a fraction of the cost (Cook et al. 2015).

However, phone tutorials should not be viewed as a silver bullet to end the learning crisis and must be adapted carefully to achieve optimal impact. As our own research shows, some phone-based modalities such as SMS messages are minimally effective unless paired with more involved phone engagements. Other studies have found phone interactions to be less effective at improving learning, such as a trial conducted in Sierra Leone (Crawford et al. 2021) that focused on complementing uniform national radio programming rather than targeted numeracy instruction to each child's learning level. This highlights the importance of the pedagogy – such as focusing on targeted instruction – as well as the phone platform.

Lessons to better target instruction include collecting data to target instruction every week (e.g., in Nepal, the Philippines, and Uganda) rather than for only four weeks (in Botswana). Another lesson includes modules and practice sessions during training to emphasize targeted instruction, which was done intensively in the Philippines and Uganda. Other lessons include minimizing complex data flows: for example, in the Philippines, teachers would input data and rely on preprogrammed recommendations of what operation to teach the following week based on the child's performance. In Uganda, where targeting was highest, instructors would record their student's level as well as the next level to target on a piece of paper on hand, requiring almost no complex data flow (Angrist et al. 2023).

It is particularly striking that results improve beyond Botswana. It is typically assumed that the proof-of-concept site has the highest fidelity. Yet, in these studies, fidelity improves with each replication, showcasing the ability to learn from experience and translate experience elsewhere, including to entirely new countries, implementation partners, and governments.

Pedagogy should be simple and is effective when highly targeted

Instruction delivered during phone tutorials is most effective when it can connect students with highly targeted content focused on simple foundational skills. This is built on well known approaches such as Teaching at the Right Level (Banerjee et al. 2017) and has been shown to work across a number of randomized trials. Moreover, phone calls were based on a tutoring model that provided one-on-one instruction, another effective and highly targeted educational approach. These features worked together to provide instruction that could be particularly well targeted to children's level.

Taking Next Steps: From Research to Scale

Given the global evidence base now amounts to over ten randomized trials, including ongoing efforts by the IDB and others, future efforts related to phone tutorials should shift away from proof-of-concept studies and focus on scale-up and related research.

First, there are a number of opportunities to optimize phone tutoring programming for greater impact and cost-effectiveness. Rapid testing models such as A/B testing that have been traditionally used in the tech sector have been recently adapted to test social programming. Youth Impact is one organization that has used iterative, rapid testing to improve programming, including phone tutorial interventions.

For example, a recent test examined how phone call frequency and length can drive learning gains and decrease costs. For example, we estimate that it takes tutors roughly 40-minutes of scheduling attempts for each successful 20-minute tutoring phone call to households, or a 2:1 ratio in favor of scheduling. To better consolidate costs and impact around tutoring, Youth Impact developed a comparison of our core weekly delivery system with a bi-weekly model that doubled the length of each tutoring session. Facilitators in this system delivered a 40-minute tutoring session every other week, equalizing the amount of time that facilitators spent on scheduling and tutoring. A comparison of these models showed that each was equally effective at delivering learning to households, but that the bi-weekly delivery model was substantially more cost-effective and could reach a greater number of students.

Second, research and scale-ups of phone tutorials can target students who need extra support. Barriers to implementing more widespread individualized tutoring have been cost and access. Phone tutorials lower these costs, unlocking potential for scale. The low-cost, accessibility, and ease of implementation of phone tutorials can allow school systems to utilize more tailored approaches to address the persistent learning crisis.

Finally, more evidence is needed on effective education programs in emergency settings. Many emergencies occur beyond the context of COVID-19, yet little experimental evidence exists in these settings on how to most effectively promote learning. A recent prominent review by Burde et al. (2015) on education in emergencies highlights a lack of research on improving access to education, as well as the quality of education, in contexts affected by disaster, as well as a major gap in experimental studies. They identify the use of mobile phone technology to deliver educational instruction as a particularly promising yet underutilized approach, and recommend future research in this area.

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