

Learning, Marginalization, and Improving the Quality of Education in Low-income Countries

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Second volume in the series
Learning at the Bottom of the Pyramid



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13. Ivory Coast

Promoting Learning Outcomes at the Bottom of the Pyramid

Kaja Jasińska and Sosthène Guei

Introduction

Millions of children in low- and middle-income countries (LMICs) do not realize their learning potential, and this has profound consequences: in sub-Saharan Africa, 30 percent of youths aged 15–24 and 41 percent of adults aged 15+ are illiterate, creating severe economic and social disadvantage within local communities and globally (UNESCO Institute for Statistics, 2019).

In Ivory Coast specifically, literacy rates remain poor, particularly for children growing up in impoverished rural communities where access to quality education remains a challenge. Although the number of out-of-school children in Ivory Coast has declined from 1,463,648 in 2009 to 241,575 in 2018, and primary school enrollment increased from 55.8 percent in 2009 to 90.3 percent in 2018, the literacy rate has remained largely unchanged (UNESCO Institute for Statistics, 2019). The literacy rate among the Ivorian population aged 15 and older was 48.7 percent in 2000 and 47.2 percent in 2018, and similarly, the literacy rate among the population aged 15–24 was 60.7 percent in 2000 and 58.4 percent in 2018 (UNESCO Institute for Statistics, 2019).

Literacy rates are lowest in rural areas of the country, where only 14 percent of sixth-grade students attain sufficient competency in both math and language (World Bank, 2014). Rural children in particular fail

to realize their academic potential due to two key factors. First, children lack access to quality educational opportunities and developmentally appropriate curricula, for many reasons. For instance, because rural schools are a greater distance from the central government, often requiring travel over poor-quality roads, teachers receive fewer visits from pedagogical advisors and have less opportunity for professional development. In turn, the implementation of policies that target learners at the bottom of the pyramid (BOP) suffer. Second, economic insecurity and exposure to adversity (including child labor and hazardous work) undermine learning. Many rural children are managing the dual demands of school and working on family farms.

Ivory Coast is the largest producer of cocoa in the world. In rural cocoa-producing communities, poverty is rampant and has reached levels as high as 61.2 percent (Fonds monétaire international, 2009), with many households surviving on \$1–2 a day (Institut National de la Statistique du Ivory Coast, 2015). The pressure to produce cocoa often means it is a family affair—it is estimated that 1.3 million school-aged children (out of a population of 3.7 million) are working in cocoa production (Tulane University, 2015), largely concentrated in rural areas. Children’s agricultural responsibilities may interfere with their education, and they may, for example, be forced to drop out of school temporarily during harvest season. In other cases, work may result in fatigue or other negative health impacts, or just leave little time for homework and other school-related tasks.

However, child cocoa farming in Ivory Coast is a multifaceted issue. Contributing to family farming is one of the ways that parents teach their children how to farm cocoa. Child cocoa workers also contribute to the household income which, in turn, often funds their ability to go to school. Moreover, the perceived low quality and irrelevance of the education available to them pushes many children into work, rather than continuing to attend school (e.g., Canagarajah & Nielsen, 2001; Coulombe, 1998; Coulombe & Canagarajah, 1997).

To meaningfully meet the learning goals of all of Ivory Coast’s children, policies need to direct attention to the unique needs of these BOP learners, their parents, teachers, and communities. Practically, this means measuring learning as well as learning inequities (e.g., Learning Gini Index; see Crouch and Slade, this volume) specifically at the

BOP, and requires research aimed at understanding education quality, teacher training and professional support, family systems to support learning, and the unique considerations for learning as a member of an ethnolinguistic minority, among other things, at the BOP.

A number of innovative, research-based programs are currently underway in Ivory Coast, which seek to improve education quality, and in turn, support children's optimal learning outcomes, specifically focusing on the BOP. Broadly, these programs incorporate three strategies: (1) changing classroom structure to better meet children's learning needs; (2) effectively leveraging educational technologies to provide access to quality education for more children; and (3) systematically addressing a major underlying cause of poor school participation and learning outcomes: poverty. Each of these programs showcases a public-private partnership between the Ivorian government and industry, not-for-profit entities, and/or international organizations, with scientific research embedded within program design.

Changing classroom structure to meet learning needs of children at the bottom of the pyramid

In Ivory Coast, children enroll in Grade 1 at six years old, and continue for six grades in the primary-school cycle. There are key underlying assumptions in this structure—namely, that children enroll in Grade 1 at the mandated age of six, that they remain continuously enrolled, and that they master the curriculum at each level to successfully advance to the next grade each year. However, in Ivory Coast, as is the case in many LMICs, many children enroll at different ages. Often, enrollment in Grade 1 happens as young as four years old, or as late as age 10, and is predominantly driven not by official policy on the age of school enrollment, but rather on the availability of family resources to support schooling. Furthermore, because births in rural regions are not always officially recorded, many children do not have a birth certificate, or their birth date is approximate. As a result, a child's true age at school enrollment is not always known.

When children do enroll on time, they may still experience significant gaps in their schooling. They may not remain in attendance for the full duration of the academic year, or stay continuously enrolled each year.

Poor attendance also contributes to grade repetition, which is common in Ivory Coast, and adds to the variability in ages and skills in each grade. Experiencing educational gaps is explicitly tied to experiencing poverty; limited family resources may prevent a child from attending school regularly, and/or enrolling continuously each year. Although public primary schooling is free in Ivory Coast, families still face financial hurdles to sending their children to school. For example, parents may struggle to buy adequate school supplies and uniforms. Parents may also depend on their children for income, either directly or indirectly.

Taken together, variability in age at enrollment, lack of consistent attendance, and high grade-repetition rates negatively impact learning, and these negative factors are more commonly experienced by children at the BOP. Many children finish primary school without acquiring functional literacy and numeracy skills. Practically, this means that many children advance in grades without effectively mastering grade-appropriate skills, which has a cumulative effect over a child's primary schooling—children continue to fall further behind. This also has a larger, systemic impact on primary education, as classrooms become increasingly composed of more children with very different skill levels. The variability in both age and skill levels creates a challenge for teachers, who are unable to simultaneously teach at all the levels required by students in their classrooms, and ensure learning for all. Classrooms that incorporate pedagogical approaches to target a child's actual level are better suited for BOP learners as compared to teaching a curriculum that is too advanced for children. In Ivory Coast, programs adapted to the learning needs of children at the BOP include the "bridging program" and "Teaching at the Right Level" (TARL). These programs are implemented by the National Ministry of Education in partnership with national and international NGOs.

Bridging program: Classrooms for out-of-school children

The policy of free and compulsory education for all children aged 6–16 is enshrined in two main laws, passed respectively in 1995 and 2015. It is still a challenge to achieve in Ivory Coast. In 2013, the number of out-of-school children was estimated at 1,136,993 with a predominance in rural areas (UNESCO Institute for Statistics, 2019). To curb that situation,

the Ivorian government highlighted the need to provide an alternative education offering in its 2016–2025 Education/Training Sectoral Plan, namely bridging classes targeted at this segment of school-aged children.

Bridging classes are remedial emergency lessons based on a speed-learning approach, targeting out-of-school children aged 9–14. Children are taught for eight months with an accelerated curriculum that covers the first two grades of primary school. The approach allows children to catch-up and be reintegrated, following their assessment, into the formal schooling system.

Bridging classes use child-centered and active learning approaches to improve children’s learning outcomes. In Ivory Coast, Save the Children’s globally validated evidence-based *Literacy and Numeracy Boost* approaches are implemented by local NGOs and approved by the Ministry of Education as part of the bridging classes curriculum. The approach has been contextualized to include instruction in local languages in addition to the official language of instruction (French), and map onto the local curriculum. The approach mobilizes teachers, parents, and the community’s engagement to support children inside and outside the school. *Literacy Boost* aims at improving children’s reading skills across five core competencies including letter identification, phonological awareness, vocabulary, fluency and accuracy, and comprehension. *Numeracy Boost* targets three core competencies including numbers and operations, geometry, and measurement.

A pilot bridging project implemented by Save the Children in 2015 in cocoa-growing communities in Ivory Coast has shown significant effects on children’s reading skills across all five core reading competencies compared to a control group. At the end of the project, 70 percent of the girls from the intervention group who scored lower in reading at baseline were able to recognize 10 words (out of 20 words), compared to only 30 percent of girls from the comparison group in a peri-urban environment.

Teaching at the Right Level: Classrooms that target children’s skills

Teaching at the Right Level (TARL) is a pedagogical approach developed by the Indian NGO, Pratham (Banerjee et al., 2007; Banerjee et al.,

2016; Banerji & Chavan, 2016; Akyeampong, Chapter 3 this Volume). The TARL program is a learner-centered approach that supports the acquisition of literacy and numeracy skills in children who have been left behind. By teaching classes as a whole, one assumes that all children have similar skills and can therefore similarly engage with the curriculum. In reality, classrooms in Ivory Coast, and in many LMICs, contain children with very different skill levels and only a few children who have sufficiently mastered the prerequisite skills from earlier grades to learn the course content. The TARL program changes how teaching is done in the classroom. Children are grouped according to their level, and lesson plans are tailored to their needs. The TARL approach starts with a basic assessment of children's learning levels, and then groups for instruction are formed based on a child's level, rather than their grade. Teachers use interactive techniques to teach to the level of each group, rather than lecture-style teaching. As children progress, they can quickly move to more advanced groups that match their skills. Teachers receive professional training and ongoing mentoring throughout the academic year to support the implementation of the TARL program.

In 2017, the Ivorian National Ministry of Education joined Abdul Latif Jameel Poverty Action Lab (J-PAL), Pratham, and Transforming Education in Cocoa Communities (TRECC) to launch TARL in Ivory Coast. The Ivorian model of TARL (Le Programme d'Enseignement Cible; PEC) aimed to (1) test the efficacy of TARL in an Ivorian context, specifically focusing on this first-time French language implementation of TARL, and (2) develop a government-led TARL program, by amassing an understanding of the government's capacity for TARL implementation, using primarily government structures and agents. In the 2018–2019 academic year, a pilot program was launched in 50 schools. In this pilot program, TARL was implemented in the classroom for 90 minutes each day for the duration of the school year. Pilot-program results showed positive impacts. Children's reading and math skills improved significantly and teachers who adopted the TARL assessment methods and teaching tools found them simple and easy to use (Pratham, 2020). However, challenges remain. Teachers appreciated the support of the mentor, an integral part of TARL, but a need for further improvements in the mentorship process was identified. The TARL program has since been expanded for the 2019–2020 academic year, with an additional

150 schools participating in the program. A formal framework for the implementation of TARL at the national level has been created in 2020 (Arrêté N°0067; Ministry of National Education, 2020).

Educational technology to support learning at the bottom of the pyramid

Educational technologies (EdTech) can be leveraged to provide educational access to more children and to maximize learning impact, particularly for vulnerable children in remote rural regions who may not be attending school regularly. Several meta-analyses of educational intervention in sub-Saharan West Africa have found that investments in instructional technologies had the largest impact on children’s learning outcomes in comparison to other investments, including nutritional and health interventions, reducing class sizes, or cash transfers conditional on school attendance (Conn, 2017; McEwan, 2015; Castillo et al. Chapter 4, this Volume). EdTech tools can complement traditional educational models by offering supplementary at-home lessons, resources for teachers, and/or targeted messaging to parents and caregivers. To provide effective support, successful EdTech solutions must be easy to use, engaging, inexpensive, and crucially, leverage technology that is readily available in the target community.

In Ivory Coast, over 50 percent of the population still does not use mobile internet, which can create barriers to access for internet-based remote learning services, such as educational content delivered over smartphones, tablets, or laptops (GSMA, 2017). Many families in rural communities, in particular, lack sufficient internet access to effectively make use of some educational technologies. However, simple mobile phones offer key advantages: mobile phone penetration in Ivory Coast is widespread at 122 percent, and parents (and often children) are already familiar with using simple mobile phones (GSMA, 2017). While many rural families are less likely to own a smartphone or have a mobile internet subscription, teachers, on the other hand, tend to have greater access to smart technologies. Teachers may be more likely to own a smartphone, and therefore, interventions that use mobile internet may be more appropriate. The success of an EdTech program depends on

the target recipient (e.g., the child, parent, or teacher), and their unique access to technology.

We review three EdTech interventions currently implemented in Ivory Coast: Allô Alphabet, Eduq+, and TARL+DIA. Each intervention targets children, parents, and teachers, respectively, and differentially incorporates simple and smart technologies.

Allô Alphabet: Simple mobile technology for literacy

The Allô Alphabet intervention is a child- and parent-facing simple mobile phone literacy program. Allô Alphabet is designed to be accessed at home and complements primary-school children's in-school curriculum. It delivers a French-language literacy program to children using simple mobile feature-phones and existing, widely available 1G and 2G networks that extend to remote, rural regions. This literacy intervention supports children's awareness of the sound structure of the French language and mapping between letters and sounds; these language skills are essential to emergent literacy (e.g., Jasińska & Petitto, 2018). Because many families in rural Ivory Coast are low-literate, Allô Alphabet is designed and implemented as an interactive voice response (IVR) system on simple phones. This follows many others (e.g., Patel et al., 2010; Thies, 2014) in using IVR for low-literate users.

The Allô Alphabet curriculum includes tasks that ask children to identify and manipulate phonemes—the smallest unit of spoken language—and link print to syllable sounds by audio message and SMS. For example: 1) Type the letter that makes the /s/ sound. 2) Do the words coin and pain rhyme? If they do, type 1. If they do not, type 2. The system provides instructions, questions, and feedback via voice messages recorded by an Ivorian researcher, with answers inputted via touchtone. The users call in to a specified number, which immediately ends the call and calls the user back to avoid fees for the users. Parents access a parent module where they can monitor their child's progress through the curriculum.

Since simple mobile phones have high penetration rates in Ivory Coast, most families already have the required technology to access the Allô Alphabet platform. Because parents are already users of the technology, they can also help guide children and troubleshoot any potential issues.

Importantly, using existing technologies can address cultural barriers to tech adoption. For example, distributing a high-value item such as a tablet to a child for use at home has challenges. Parents are unlikely to permit their child to play with an expensive item; indeed, a tablet could be among the most valuable possessions of a household, and it can be culturally inappropriate to permit a low-rank member of the household (child) to use an expensive item; such items may be reserved for only senior members of the household (parent).

A randomized control trial is underway with 1,200 fifth-grade children in the Adzope region of Ivory Coast (Chatterjee et al., 2020; Madaio et al., 2019; Madaio, Tanoh, Seri, Jasińska, & Ogan, 2019; Madaio et al., 2020) for the academic year 2020–2021. This trial is a partnership between the Ivorian National Ministry of Education, an African EdTech industry partner, and a team of Ivorian and international researchers. Allô Alphabet is a valuable model of government-industry-research partnerships that collaboratively design evidence-based solutions, implement and deliver the program, evaluate its impact, and create the structures to support transition to scale.

Eduq+: Using technology to engage parents in children's education

The Eduq+ program is a mobile-phone platform that targets parental engagement and teacher support in education, which is a known predictor of children's academic achievement (Castro et al., 2015). The Eduq+ technology platform engages parents in children's education through behavioral nudges and provides pedagogical support and tips for teachers. Eduq+ sends text and audio messages to mobile phones with suggestions of simple activities that aid children's social-emotional development and learning, but which do not require curricular knowledge of math or literacy (Lichand & Wolf, 2020). For parents, these nudges are designed specifically to increase their engagement in their child's education, including suggesting that they show up in school to monitor teachers. Parents received nudges twice a week for the duration of a school year. Nudges start with a motivating fact, followed by a suggested activity, an interactive message (soliciting feedback), and a growth message.

Using technology to engage parents in their children's education has been shown to be effective for increasing both children's school attendance and grades in Brazil (Bettinger et al., 2020). In Ivory Coast, a randomized control trial of the Eduq+ intervention was conducted in the academic year 2018–2019. 20,000 children and their parents across 100 schools participated in the intervention study; 50 percent of participants received the intervention, and 50 percent of participants served as a control group. The study found that nudges to parents significantly decreased student drop-outs by 2.47 percentage points, a large effect given a base level of 4.7 percent. In schools where parents received nudges, 24 percent of teachers reported that a parent showed up at the school at least once a week, in comparison to 14 percent in the control schools (Lichand & Wolf, 2020). The Ivorian National Ministry of Education is currently exploring a national expansion of the Eduq+ program.

TARL+DIA: Using technology to optimize an already-effective program

EdTech can also be used to enhance existing programs, such as Teaching at the Right Level (TARL), discussed above. There is robust evidence to suggest that teaching to groups of children according to their skill levels has a positive impact on children's learning outcomes, both from RCTs conducted in India, where TARL was first implemented (Banerjee et al., 2007; Banerji & Chavan, 2016), and in sub-Saharan Africa (Duflo, Dupas, & Kremer, 2011; Innovations for Poverty Action, 2018), including Ivory Coast (Pratham, 2020). However, implementation challenges remain. The success of TARL is mediated by the availability of pedagogical advisors who can provide ongoing mentorship and professional support for teachers. Given the remoteness of many rural schools, one key barrier to increasing educational quality even for effective programs is teachers' lack of opportunities for professional development and continuous mentorship and support (Komba & Nkumbi, 2008; Pryor et al., 2012). Current approaches to professional development in Ivory Coast use an in-person teacher-training model, but in-person models are limited in their ability to provide frequent, ongoing support. In rural locations, a visit from a pedagogical advisor requires travel across long

distances and poor road conditions to reach schools. In fact, in Ivory Coast, most schools receive teacher professional support visits from the regional education directive only about two times per year (Jasińska et al., 2017).

Adaptive technology that allows for two-way communication between a teacher and a pedagogical advisor can help to provide ongoing support and development opportunities for teachers in rural communities. A meta-analysis found that adaptive technology-based augmentations to traditional classroom approaches are among the most effective ways to improve educational quality in sub-Saharan Africa (Conn, 2017), above other interventions such as decreasing class size or increasing teacher pay. The current implementation of the TARL program in Ivory Coast has highlighted the need for improvements to teacher mentorship and support. Teachers participating in the TARL program receive in-person training at the beginning of the school year and are typically more motivated to incorporate TARL in their classrooms immediately after their training. Over time, implementation fidelity of the TARL intervention decreases. Teachers in remote rural schools may struggle with aspects of implementation and encounter new challenges they may not feel prepared to meet, leading to gradually reduced and/or poor program implementation. A technology-enhanced implementation of TARL can address these outstanding challenges.

The widespread usage of social media messaging applications (i.e., WhatsApp, Facebook messenger) in LMICs opens up new possibilities for communication between a teacher and a pedagogical advisor. Expert content (i.e., from a master trainer or a pedagogical advisor) shared over messaging applications can reach teachers in remote locations. Moreover, teachers who have access to an expert advisor can receive ongoing support that complements their in-person training. Currently, in Ivory Coast, a pilot program is underway that explores how a human-chatbot hybrid system, DIA (Cannanure, Brown, & Ogan, 2020), implemented over a social media messaging application, can augment the existing TARL program. DIA is powered by artificial intelligence and can learn topic-specific knowledge (such as TARL) from user interactions. However, DIA is a human-chatbot hybrid system, which means that a human, such as a pedagogical advisor or another teacher, can offer support when the AI has no answers. A pilot deployment of

DIA with 38 teachers in Ivory Coast found that the system can support dialogue, understand teachers' smartphone usage, and collect data through conversation interactions (Cannanure et al., 2020; 2022). Teachers were responsive to using DIA, showing regular engagement with the platform despite having irregular connectivity. The pilot study suggests that an AI-powered human-chatbot system may effectively complement, and enhance, an existing educational quality program. An RCT of the DIA-enhanced TARL program is scheduled for the 2020–2023 academic years.

Addressing causes of poor learning outcomes: Poverty

Poverty and poor-quality schooling act in tandem to prevent Ivorian children at the BOP from realizing their learning potential. Interventions that address the quality of education—by changing classroom structures to meet BOP children's learning needs and leverage EdTech to support learning—have been shown to be effective in Ivory Coast. Yet, without robust strategies to reduce poverty—the single most important issue at the heart of the learning crisis facing children at the BOP—other intervention approaches will have limited impact. Reducing poverty by directly providing cash transfers to families can eliminate or reduce some of the barriers to enrollment and attendance.

Cash transfers (CTs) are one of the most extensively implemented and evidence-based approaches to poverty reduction. CTs offer families small amounts of regular money to ease economic hardship and potentially increase the chance that their child will attend school rather than work on a family plantation, or offset the income generated by the child. There is growing evidence that families use cash transfers to enhance household nutrition and economic wellbeing (e.g., Haushofer & Shapiro, 2016; McIntosh, 2018). Conditional cash transfers were actually developed to address child labor and school enrollment, and growing evidence suggests that unconditional cash transfers may have similar effects. Unconditional cash transfers have the added benefit of being relatively easy to implement administratively. One study in Ecuador found that CTs lead families to keep children in school and postpone child entry into the labor market (Edmonds & Schady, 2012). A second study in Nepal found that a CT conditional on education

increased school enrollment and decreased child labor (Edmonds & Shrestha, 2014).

Currently, the Ministry of Solidarity, Social Cohesion and the Fight Against Poverty in Ivory Coast, in partnership with the World Bank, is conducting an unconditional cash transfer program to 127,000 families under the UGP *Filets Sociaux Productifs* initiative (Ministère de la Solidarité, 2019). Households who represent the bottom economic quintile are beneficiaries of the program. Households receive 36,000 XOF (approximately \$65) every three months for a period of three years. The first phase of the program was launched in 2017. Phase 2 of the program, launched in 2020, benefits an additional 75,000 households (55,000 rural, 20,000 urban) in 1,500 villages spanning 21 regions (Ministère de la Solidarité, 2020). A smaller-scale cash transfer program supported by the NGO 100WEEKS (100weeks.org) is also underway. Beneficiaries of the 100WEEKS program receive a weekly unconditional cash transfer (approximately \$10) for 100 weeks alongside participating in a peer-group coaching program that provides training in financial literacy, entrepreneurship, and life skills on a weekly basis (van der Linden, 2018). Cash transfer programs in Ivory Coast vary with respect to the amount, frequency, and duration of transfers, and whether they are implemented by the government, international organizations, NGOs, the private sector, or through partnerships between multiple stakeholder entities. These programs can reduce some of the key financial barriers to learning for children at the BOP.

When cash transfer programs are implemented alongside education interventions, such as the programs discussed above, the potential benefit for children at the BOP is greater. If programs that improve the quality of education are implemented, but school attendance is low, children will not benefit from such interventions. Similarly, if programs that reduce barriers to school attendance are implemented (i.e., poverty reduction strategies), but the quality of education that children receive at school is low, children's learning will not improve. Integrated interventions that simultaneously address the leading causes of poor learning outcomes

among Ivory Coast’s most vulnerable children—poverty and education quality—are more likely to have positive impacts.

Conclusion

This chapter describes several evidence-based interventions in Ivory Coast that aim to improve learning for children at the BOP. These programs focus on changing classroom structures to meet the learning needs of children at the BOP (e.g., bridging classes for out-of-school children, Teaching at the Right Level) and leveraging EdTech to provide low-cost access to education (e.g., Allô Alphabet mobile phone literacy intervention), improve parent and teacher engagement (e.g., Eduq+ behavioral nudges), and enhance existing, effective programs (TARL+DIA human-chatbot hybrid professional support for teachers). The impacts of such programs may be further enhanced if implemented in combination with a poverty reduction strategy, such as providing cash transfers to poor families.

To substantially address the learning challenges faced by children at the BOP, we need to better understand children’s learning in these contexts. This requires rigorous child development and educational research specific to the Ivorian context. The programs reviewed are evidence-based, and many incorporate research that is focused on understanding learning in Ivory Coast specifically. Ultimately, these research insights can inform the design of policy and programming in order to have maximal impact on children’s learning outcomes.

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