Human Capital Formation and Poverty Eradication: Lessons Learned from Evidence-Based Practices and Policies

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Submitted to the
United Nations Expert Group Meeting:
Strategies for Eradicating Poverty to Achieve Sustainable Development for All
June 1, 2016

Introduction

The 2030 Agenda for Sustainable Development sets out ambitious goals for addressing urgent global priorities. The United Nations and member countries continue to operate with limited budgets and need to identify programs that are effective and cost-effective.

Heading into the Sustainable Development Goals, the world is in a unique and unprecedented position to make investments and policy decision informed by rigorous evidence about what works. For instance, over the past decade the network of Abdul Latif Jameel Poverty Action Lab (J-PAL) affiliated professors have completed over 730 randomized evaluations addressing critical questions in development. Researchers and implementing partners are together growing more sophisticated and better able to use impact evaluation to answer questions previously considered "hard to measure", like the effect of anti-corruption programs.

This paper will review effective strategies for human capital formation and poverty reduction in three key areas: primary education, clean water, and livelihoods. The following sections will highlight each program, summarize the evidence base, discuss how programs are being scaled up, and conclude with policy lessons to help achieve the Sustainable Development Goals.

It goes without saying that the three evidence-based programs described in the following sections are not sufficient in and of themselves to eradicate poverty, nor are they appropriate policy interventions in all contexts. But each may be an effective component of a broader education, water and sanitation, or livelihoods strategy. Any one study is merely a part of the puzzle; policymakers should combine theory, descriptive evidence, and evidence from rigorous evaluations to help make decisions about whether results from effective interventions might be suitable in another context.

To determine whether an evidence-based program might be appropriate in another context, policymakers should unpack the theory of change of an intervention and consider the degree to which basic contextual conditions are similar between the context of the evaluation and the new context. For example, are enrollment rates high but learning levels low? If so, "teaching at the right level" might be a suitable intervention; but if enrollment rates are low, a pedagogical intervention is unlikely to lead to improvements in enrollment and other interventions should be considered instead. Beyond basic conditions, policymakers should also consider whether human behavioral conditions from the original

intervention hold in a new context, as well as whether the program can feasibly be implemented in a new context. Implementation should be monitored to determine whether the program is actually reaching intended beneficiaries.

Primary Education: Teaching at the Right Level (TARL)

Motivation

In recent decades, most regions of the world have achieved near-universal enrollment in primary school. However, for many children, being in school does not guarantee that students are learning. Despite record high enrollment rates, an estimated 250 million primary school age children lack basic reading, writing, and numeracy skills.

In rural India, for example, the 2014 Annual Status of Education Report (ASER) finds that for the sixth year in a row, over 96 percent of children ages 6-14 years were enrolled in school. Yet nearly four out of five students in grade three are more than one grade level behind in reading. Half of children in grade five cannot read a grade two level text and more than half cannot do basic arithmetic (ASER 2015). Similarly, the 2013 Uwezo annual assessment report finds that while 89 percent or more of children in grades 1-3 are enrolled in school in Kenya, Tanzania, and Uganda, less than one third of Grade 3 students possess basic literacy and numeracy skills (Uwezo 2013). Similar education surveys and measurement tools have found comparable learning levels among children in in Mali, Pakistan, and Senegal.

Can more inputs boost student learning? Even if students are attending and motivated to learn in school, they may lack the basic resources to complement their efforts. One seemingly intuitive way to improve learning outcomes would be to spend more on these inputs, and there is a correlation between educational inputs and student learning. However, across four different types of resources provided to schools, there is little evidence to suggest that such investments are *causally* associated with improved learning for the majority of students, demonstrating the importance of impact evaluations where correlational studies may lead to misleading conclusions. Inputs are of course a component of effective learning environments, but adding inputs are not sufficient to improve learning without additional reforms.

Intervention

"Teaching at the right level" (TaRL) is a pedagogical approach that involves evaluating children using a simple assessment tool and then grouping the students according to learning level rather than age or grade. Each group is taught starting from its current competency level using level-appropriate learning activities and materials. Throughout the entire process, teachers assess pupils' progress through ongoing, simple measurement of their ability to read do basic arithmetic

While the implementation of this model can take many forms (e.g. with government teachers or lightly trained volunteers/paraprofessional teachers; during the school day or outside of school hours), there are three key components that are consistent across the various programs studied: 1) students' learning levels are assessed at the beginning of the school year or program, 2) students are grouped based on their learning levels, and 3) students are taught in these groups using level-appropriate materials rather than following a curriculum they are not yet prepared to learn.

Evidence

"Teaching at the right level" has been implemented using several models in multiple settings, and several studies provide rigorous evidence on how classes and teaching methods that are adapted to children's learning levels can improve learning outcomes. Programs that match the level of instruction to students'

initial learning level are very effective, raising test scores by between 0.07 and 0.28 standard deviations, and the most consistently cost-effective, at improving student learning.

One of the first programs to be evaluated was a targeted tutoring program in India, which brought in lightly trained tutors to work with the lowest-performing students in rural schools. At the end of the second year, students saw an average increase in test scores of 0.28 standard deviations, while initially low achieving students saw a gain of 0.40 standard deviations. Because the program relied on modestly paid local volunteers and used whatever space was available (free classrooms, playgrounds, or even hallways when necessary), it was a very low-cost intervention, achieving a 0.30 standard deviation improvement in math and language test scores for every US$10 spent (Banerjee et al 2007).

A supplementary reading camps program led by community volunteers outside of school hours was also highly effective. After one year, children who could not read anything prior to the program were 7.9 percent more likely to be able read at least letters. Those in the treatment villages who could read only letters at the beginning of the program were 3.5 percent more likely to read at least words or paragraphs, and 3.3 percent more likely to read stories. Children who began the program unable to read anything and attended the camp were 60 percentage points more likely to be able to read letters after a year than similar children in a comparison village (Banerjee et al 2010).

Another program called "Read India" was evaluated under several different implementation models. Several of the models implemented through government teachers did not have significant impacts as teachers continued to focus on other tasks, such as completing the standard curriculum, maintaining attendance registers, or managing school meals. Providing materials alone and teaching training and materials had no effect on learning outcomes. The in-school volunteer intervention in in Uttarakhand also had no effect, apparently because volunteers were asked to substitute for the teachers or were prevented from doing their job. However, the interventions that created a dedicated time to focus on teaching at the right level yielded more positive results. Summer camps raised math and reading test scores by 0.08 SDs while the outside-of-school volunteers improved test scores in all five areas tested and increased overall scores by 0.11 standard deviations (Banerjee et al 2015).

While many of the previous evaluations have been implemented in settings that involve non-governmental organizations, others have looked at the effect of teaching at the right level interventions when implemented by government civil service teachers in public schools. Indeed, these models have the most potential for a large-scale, sustained impact on student learning.

In Haryana, researchers evaluated the Learning Enhancement Program (LEP), which provided tools and allocated an hour within the school day schedule to enable civil-service teachers to focus their teaching at each child's competency level. Being in an LEP school had a large effect on students' Hindi learning outcomes. On oral Hindi test, students scored 0.15 standard deviations higher. On the written Hindi test, students scored 0.14 standard deviations higher relative to the comparison group. These findings provide strong evidence for the positive impact of teaching at the right level even when integrated into a formal school system, and when operated on a large scale (Duflo, E. et al 2015).

In Ghana, the Teacher Community Assistant Initiative (TCAI), recruited teaching assistants from local communities and placed them into government primary schools. In-school and after-school remedial assistant significantly improved children's basic skills in numeracy and literacy on average (Duflo, A. et al 2015).

An evaluation in Kenya found that placing students in different classes by learning level ("tracking") improved test scores for students at all levels, including lower-achieving students. If a school already has more than one class per grade, then re-assigning students based on their performance is a very cost-

effective intervention, producing a cumulative test score gain of 3.38 standard deviations per US$10 (Duflo, E. et al 2011).

Scale-up

Pratham, one of the largest education-focused NGOs in India, has partnered with J-PAL affiliated researchers to evaluate and refine the TaRL approach, which now reaches millions of children across India. At its peak in the summer of 2008 Pratham's flagship "Read India" campaign, which aims to improve basic literacy and numeracy for children in rural India, covered over half of the 600 districts in the country and mobilized 450,000 volunteers to reach nearly 34 million children across 19 states. Pratham has since consolidated its programming to work with students more intensively over the course of the school year. Since 2010, 13.8 million students have participated in programs based on TaRL implemented directly by Pratham or in partnership with state governments in India.

Policy implications

To ensure inclusive and equitable quality education and promote lifelong learning opportunities for all, policymakers should consider supporting education programs that focus on basic skills and direct instruction toward children's actual learning levels. Rigorous evidence has shown that these are the most consistently effective and cost-effective ways to improve learning outcomes. There are many different ways to improve targeting of instruction: classes can be divided by initial achievement level; volunteers can pull struggling students out of the classroom for more targeted instruction during the school day or can hold extra sessions after school hours; or computers with software that adjusts to the level of the students can be added to the classroom. Each of these programs can be delivered relatively inexpensively and have been shown to substantially improve test scores.

Clean water: Point-of-use chlorine dispensers

Motivation

More than 780 million people worldwide lack access to safe drinking water, a major contributor to diarrheal disease (United Nations 2012). The WHO estimates that safer drinking water could prevent 1.4 million child deaths from diarrhea and 860,000 deaths from malnutrition (WHO 2008). Practices from handwashing to water source protection are proven to reduce diarrhea episodes, yet the adoption of such practices has been slow in regions across the developing world.

Intervention

Chlorination is an effective way to disinfest water and reduce diarrhea episodes. Chlorine disinfects drinking water against most bacteria while protecting water from recontamination. Chlorinating water also means that people do not need to boil their water to disinfect it, saving time and natural resources.

A common approach is to encourage populations to adopt chlorination via promotional campaigns and the sale of chlorine bottles through the private sector, but take-up is low under distribution models that rely on households to purchase individually-packaged chlorine. In Kenya, for example, where chlorine is relatively cheap ($0.30 for a family of five for a month), less than 10% of the population purchases chlorine each month despite extensive promotion. Low-take up could be due to a number of factors, including the price of chlorine and whether people remember to chlorinate their drinking water at least 30 minutes before consuming.

Point-of-collection chlorine dispensers are a low-cost, evidence-based innovation to increase access to safe drinking water. Installed directly at community water sources, these dispensers provide a visual reminder to use chlorine and are calibrated to deliver a precise dose of chlorine solution to treat the most

commonly used water transport containers. The public nature of the dispenser system also contributes to peer learning and habit formation.

Evidence

From to 2004 to 2008, researchers conducted a suite of randomized evaluations to investigate households' use of chlorine in rural Kenya. First, they measured how variations in price, marketing, and packaging of individual bottles of chlorine affected demand for chlorine in retail outlets and when sold door-to-door. Small fees caused big reductions in take-up, and did not promote use. Compared to free distribution, the percentage of households using chlorine in their water fell by 52 percentage points when households had to purchase the disinfectant. However, there was little difference in take-up between offering coupons for half-price chlorine ($0.15) and charging full price ($0.30). Families with young children, a group particularly vulnerable to the negative effects of diarrhea, were no more likely to buy subsidized chlorine than families without small children, suggesting charging fees is not a reliable way to help target health products to those who need them most. Researchers also found that the use of chlorine was not sustained over time.

In a second phase of the evaluation, researchers designed and tested a point-of-collection chlorine dispenser system that provided a free supply of chlorine at local water sources. The dispenser system was designed to boost take-up by making water treatment convenient, providing a visual reminder, and encourage peer learning and habit formation by making the decision to use chlorine public. Point-of-collection water chlorination, in combination with encouragement from community promoters, dramatically increased access to safe water compared to marketing bottled chlorine through retail outlets. Chlorine dispensers, in combination with paid promoters, increased take-up by 53 percentage points. Take-up was sustained 30 months into the program, even after payments to promoters had ended (Kremer et al 2011).

Scale-up

Based on evidence from randomized evaluations, Evidence Action is scaling up point-of-collection chlorine dispensers in east Africa through its Dispensers for Safe Water Initiative. To date, over 24,000 dispensers have been installed across Kenya, Malawi, and Uganda. According to Evidence Action, over 4.5 million people have access to chlorine dispensers in their communities. Based on adoption rate, approximately 2.5 million people actively use chlorine to treat their drinking water.

To ensure that access to chlorine dispensers remains free to users, Evidence Action has developed an innovative, carbon credit financing scheme to cover the costs of service delivery. Chlorination via dispensers allows people to drink safe water without having to boil it, which in turn averts carbon emissions from burning firewood. Evidence Action bundles and sells carbon credits to generate revenue for the program, thereby ensuring its long term sustainability.

Policy implications

To achieve Sustainable Development Goal 6, ensure availability and sustainable management of water and sanitation for all, the efficacy of free point-of-collection chlorine dispensers should be considered in contexts with contaminated water or no piped connection to households. In addition, policymakers should be cognizant of the evidence on pricing for preventive health products. Relative to free distribution, charging even very small user fees substantially reduces adoption of preventive health products. There is no evidence that the act of paying for a product makes a recipient more likely to use it.

Productive livelihoods: Graduation from Ultra-Poverty

Motivation

More than one-fifth of the world's population lives on less than US$1.25 per day. Many of these families depend on insecure and fragile livelihoods, including casual farm and domestic labor. Their income is often irregular or seasonal, putting laborers and their families at risk of hunger. There is an emerging international consensus to drive the share of the world's population living in ultra-poverty to zero by 2030, made clear in the in the recently adopted 2030 Agenda for Sustainable Development as a goal, which aims to "promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all". Achieving this goal will require the poorest of the poor to shift to more secure and sustainable livelihoods.

Self-employment is often the only viable alternative to menial labor for the ultra-poor. Yet many lack the necessary cash or skills to start a business that could earn more than casual labor. To alleviate these constraints, several international and local nongovernmental organizations support programs that foster a transition to more secure livelihoods.

Intervention

The Graduation approach combines complementary approaches into one comprehensive program intended to help spur a sustainable transition to self-employment.

- Productive asset transfer: One-time transfer of a productive asset such as a cow, goat, or supplies for petty trade.
- Technical skills training: Training to manage the productive asset.
- Consumption support: Regular cash or food support for a few months to a year.
- Savings: Access to a savings account, or encouragement to save.
- Home visits: Frequent home visits by implementing partner staff to provide accountability, coaching, and encouragement.
- Health: Health education, health-care access, and/or life skills training.

This particular approach was designed by BRAC and has since been adapted in eight countries with support from the Consultative Group to Assist the Poor (CGAP) and the Ford Foundation. Researchers conducted randomized evaluations of the program in Bangladesh, Ethiopia, Ghana, Honduras, India, Pakistan, and Peru.

Evidence

The Graduation program caused broad and lasting economic and non-economic impacts (Bandiera et al 2013; Banerjee et al 2015).

Every group of economic outcomes improved significantly relative to the comparison group immediately after the two-year program ended (endline 1), and all economic outcomes saw similar gains a year after program activities ended (endline 2). These results were not driven by any one country or by any one outcome variable within each index. Indeed, most individual variables showed significant impacts after the Graduation program ended.

The Graduation program increased ultra-poor households' consumption (food plus non-food expenditures), a common measure of well-being. Pooled estimates of participants' per capita consumption from the six replication studies increased 0.12 standard deviations (5.8 percent) at endline 1 relative to comparison households. At endline 2, the impact persisted and per capita consumption

increased 0.12 standard deviations (4.9 percent). Direct consumption support alone does not account for these increases, as consumption support lasted for no more than two years in any program

Consistent with increasing food expenditure, household members were able to afford two meals per day more often. Across the six sites, a pooled index of food security increased 0.11 standard deviations at endline 1, and 0.11 standard deviations at endline 2, meaning that families experienced fewer days in which a member of the household skipped meals or went a whole day without food.

Transferring a productive asset increased household assets: despite being free to sell these assets after the program ended, treated households continued to own more livestock than households in the comparison group. Total assets increased significantly in all sites at endline 1—two years after the assets were transferred—with the exception of Honduras, and at endline 2, with the exception of Honduras and Peru. That increased asset holdings should persist after program assistance was withdrawn in most countries shows that targeted poor households successfully operated their businesses independently. Further demonstrating the effects of the program, targeted women in Bangladesh increased land ownership by 38 percent, a key security asset in rural communities.

The improvements in well-being were mostly the result of increases in self-employment income. Injecting a combination of productive assets and relevant skills training led to an increase in basic entrepreneurial activities, primarily concentrated on livestock and activities like petty trade.

Graduation also led to some improvements in psychosocial well-being. Happiness, stress, women's empowerment, and some measures of physical health and political engagement improved for participants at some sites. The effects on women's empowerment and physical health were no longer statistically significant one year after all program activities ended.

These effects were consistent across multiple contexts and implementing partners, suggesting ultra-poor households may face similar constraints in different countries. The program's positive results on economic well-being, which range from very economically significant to moderately so, are not driven by any one country.

Cost-benefit calculations confirm that Graduation was cost-effective, as long-run benefits for the ultra-poor outweigh the Graduation program's up-front costs.

Table 1. Graduation program costs and returns by country

Country	Total Program Cost	Returns
Bangladesh	$1,483	244%
Ethiopia	$4,157	260%
Ghana	$5,408	133%
Honduras	$3,090	-198%
India	$1,455	433%
Pakistan	$5,962	179%
Peru	$5,742	146%

In the three countries where spillovers were measured—Ghana, Honduras, and Peru—researchers did not find strong evidence that the program affected comparison households in communities where some households received the program. This finding suggests that the program did not measurably harm or benefit other ultra-poor households that did not participate.

Scale-up

The Graduation approach has been adapted to support a transition to sustainable livelihoods for ultra-poor families in about twenty countries. The seven Graduation adaptations in this bulletin together reached more than seven thousand households, and scale-ups of the approach will reach many thousands more in the coming years. By 2016 the Bangladesh program will have reached 650,000 ultra-poor women, and scale-up of the Graduation program is underway in Pakistan. In Ethiopia, the Graduation approach is being incorporated into the national Productive Safety Net Program, which will reach an estimated 675,000 households across the country with a livelihoods program based on the Graduation program tested as part of this research. Based on rigorous evidence of the impact of the Graduation approach, Development Innovation Ventures has committed funding to expand the program to several states in India through a foundation established by Bandhan, the implementing partner on the evaluation in India.

Policy implications

Policymakers seeking a program to sustainably improve the lives of the ultra-poor should consider investing in the Graduation approach, an effective way to spur a transition into self-employment. Together, evaluations of Graduation suggest that a "big push" intervention caused broad improvements in key dimensions of economic and noneconomic well-being in most countries where it was tested. Many of these effects were sustained even after assistance was withdrawn—most outcomes persisted one to two years after the program ended, and some grew stronger over time. These findings are consistent with other similar studies (Blattman et al, 2014; Blattman et al, 2016).

Long-run benefits of the Graduation approach outweigh up-front costs. Comparing the program's economic benefits to its total costs, researchers find a positive rate of return three years after the asset transfer in all contexts except Honduras, ranging from 133 to 433 percent.

The Graduation approach may be more effective in creating sustained change than alternative approaches that target the ultra-poor, such as cash transfers, though more research is needed to compare the long-term evolution of impacts for cash transfers and for programs like Graduation (Haushofer & Shapiro, 2013). More research is also needed to shed light on which components of the Graduation program drive results.

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