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Realizing Education's Promise

A new report focuses on improving the quality of education as a means to equip young people for life and work in a time of rapid change

Schooling is not the same as learning, emphasizes the World Bank's newly released *World Development Report 2018*. In Kenya, Tanzania, and Uganda, when grade 3 students were asked recently to read a sentence such as "The name of the dog is Puppy" in English or Kiswahili, three-quarters of the students did not understand what it said. In rural India nearly three-quarters of students in grade 3 could not solve a two-digit subtraction such as 46–17, and half still could not do so by grade 5. Although the skills of Brazilian 15-year-olds have improved, at their current rate of improvement they will not reach the OECD average score in math for 75 years. In reading it will take more than 260 years. And these are all countries that have measured learning and made the results public; in too many other countries the problem remains hidden.

Schooling without learning is not just a wasted opportunity, but a great injustice: the children whom society is failing most are the ones in greatest need of a good education to succeed in life. Within countries, learning outcomes are almost always much worse for the disadvantaged. In Uruguay poor children in grade 6 are assessed as "not competent" in math at five times the rate of wealthy children. Moreover, such data are for children and youth lucky enough to be in school. Together,

these severe shortfalls constitute a *learning crisis*.

The report argues that low learning is not inevitable; when improving learning becomes a priority, great progress is possible. In the early 1950s the Republic of Korea was a war-torn society held back by very low literacy levels; by 1995 it had achieved universal enrollment in high-quality secondary education, with its young people performing at the highest levels on international learning assessments. Vietnam surprised the world when the 2012 results from international assessments showed that its 15-year-olds performed at the same level as those in Germany—even though Vietnam was a lower-middle-income country. Between 2009 and 2015, as a result of concerted policy action, Peru achieved some of the fastest growth in overall learning outcomes. And in Liberia, Papua New Guinea, and Tonga early-grade reading improved substantially within a very short time, thanks to focused evidence-based efforts.

The learning crisis has three main dimensions. First, the *poor learning outcomes* themselves: low levels of learning, high inequalities (across income, gender, and other characteristics), and slow improvements in learning. Second, the *immediate causes* of the crisis, seen in the various ways that the teaching-learning relationship breaks down—such as when students are hobbled by a lack of early nutrition, teachers are unprepared or unmotivated, materials and technology don't improve learning, and school

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Investing in School Readiness

Children in rural Indonesia can follow different pathways of early childhood education. Which of the pathways is most cost-effective?

Many developing countries are increasing their investments in early childhood education because it improves children's readiness for school. Given the wide range of programs that already exist in some countries—and even in local settings within countries—one of the challenges facing policy makers is deciding what to fund.

Policy makers might begin by looking at the existing evidence on effective early childhood programs. But the vast majority of research efforts measuring the effectiveness of early childhood education in developing countries are evaluation studies. As a result, they typically compare children who attended preschools with those who never attended—or compare children who attended preschools with improved quality to those who attended unimproved preschools. Comparisons like these provide evidence supporting investment in high-quality preschools. But they may not adequately capture the reality of many local settings where children can enroll in different types of early childhood programs, at different ages, and for different lengths of time.

Take Indonesia, where a variety of early childhood services are available. Some offer primarily play-based care (*kelompok bermain*, or playgroups), while others focus more on academic preparation for primary school (*taman kanak-kanak*, or kindergartens). Despite formal guidelines about the intended age group and length of programs, families make personal decisions about early education pathways and choose where, when, and for how long to enroll their children in early childhood programs.

A recent paper by Nakajima, Hasan, Jung, Brinkman, Pradhan, and Kinnell shows that even among a sample of poor, rural villages in Indonesia, there

is considerable variation in the pathways of early childhood education. And unsurprisingly, the authors find that these pathways are highly correlated with family and community characteristics. For example, mother's education level, family income, and the quality of early childhood services in the community are all positively correlated with the probability of children's enrollment in *both* playgroup and kindergarten rather than only in playgroup or only in kindergarten.

This self-selection into different pathways of early childhood education has potential longer-term consequences. Using data collected as part of an impact evaluation in rural Indonesia, the authors examine how the sequence, timing, and duration of attending different types of early childhood education (between ages three and five) predict subsequent academic outcomes in primary school (between ages six and nine). The primary school test score of children who enrolled in playgroup then kindergarten is about one grade level above that of their peers who never enrolled in any early childhood education (with child, family, and community characteristics held constant). Moreover, children who enrolled in the full sequence of both playgroup and kindergarten were about one semester ahead of their peers who enrolled only in kindergarten or only in playgroup.

Enrollment in playgroup then kindergarten also appears to have advantages for cost-effectiveness. For every \$100 spent on early childhood education, there are measurable gains in primary school test scores only when children enroll in a combination of playgroup and kindergarten at the intended ages—that is, when the children enroll in playgroup at ages three and four followed by kindergarten at ages five and six. This suggests that focusing on providing young children with access to both playgroups and kindergartens at the appropriate ages can optimize public investments in early childhood education. With the current policy discussions in Indonesia

centered on making a single year of preprimary education compulsory, these findings are timely.

In the Indonesian context, the added benefit from enrolling in playgroup then kindergarten is probably due to the different curricula used in each of these program settings. Child development research has shown that children's development is best supported when they receive increasingly complex, differentiated learning experiences. Play-based learning helps children develop their fine and gross motor skills, develop language and socialization skills, and become creative problem solvers. But the playgroups in the study were not designed to provide multiple years of unique, developmentally appropriate learning. As a result, children who subsequently enroll in kindergarten are more likely to avoid redundancy in their learning experiences by having exposure to different, more academically focused curricula.

The results of the authors' analysis show significant disparities in early learning outcomes by different pathways. Children from the most socially disadvantaged backgrounds were significantly less likely to receive adequate exposure to a combination of play-based learning and academic preparation to help them succeed in primary school. Yet it is precisely these children for whom this intervention is likely to be most effective. The results suggest the importance of policy aimed at leveling the playing field in early childhood education—to ensure that children from the most socially disadvantaged backgrounds arrive at primary school ready to learn and have an equal chance of performing well.

Nozomi Nakajima, Amer Hasan, Haeil Jung, Sally Brinkman, Menno Pradhan, and Angela Kinnell. 2016. "Investing in School Readiness: An Analysis of the Cost-Effectiveness of Early Childhood Education Pathways in Rural Indonesia." Policy Research Working Paper 7832, World Bank, Washington, DC.

Can Participation by Parents Improve School Quality?

A study in Niger shows that grants can increase parent participation in school management—but this increased participation may not improve school quality

Thanks to an unprecedented effort to expand education, access to schooling has increased dramatically in poor countries over the past two decades. But the quality of education is often low. One common strategy for improving quality is to increase the participation of parents and the community in school management and oversight. Community-based management programs have been implemented in more than 20 countries, both developed and developing.

The success of these programs depends on parents having the time, energy, and capacity to effectively participate in school management. Given the cost of the programs, it is important to understand under what circumstances those conditions might be met.

Based on a field experiment in Niger, a recent study by Beasley and Huillery provides evidence that parents were willing to increase their participation in school management, but that this participation did not necessarily lead to improved educational quality. The experiment tested a program in which the Ministry of Education, working in partnership with the World Bank, gave grants to school committees with the aim of increasing parents' involvement in school management. The program took place in rural regions of the country, a context where parents have limited capacity and authority because education levels among adults are extremely low and the education system is hierarchical and centralized. The experiment involved 1,000 schools, of which 500 received the grant and the other 500 did not (serving as controls). The first grant arrived in late 2007, and the evaluation ended in 2009.

The results show that, overall, the grant program had a positive impact on parents' involvement and

responsibility: communities with the grant participated more and took on more responsibilities than those without the grant, though most did not monitor teacher attendance. Parents did not reduce their own contributions in response to the grant.

The impact on school management was mixed. Cooperation between school stakeholders improved, but overall accountability did not change. Spending showed both expected and unexpected changes. There was more spending on infrastructure, but also on school festivals and playground equipment. Most unexpectedly, there was increased investment in agricultural projects, which were probably not educational but intended to make a profit.

However, different school contexts led to different impacts. First, in situations where the school committee was educated or had experience in another community organization—both of which are proxies for real authority—parents increased their monitoring of teacher attendance in response to the grant (though this did not mitigate the negative effect of the grants on teacher attendance). Second, in small (one-teacher) schools, school committees spent on items that benefited the teacher, and in these schools teacher attendance increased in response to the grant. These results together suggest that teachers' response to parents' participation depends on whether parents are acting in opposition to the teachers or in alliance with them. Third, while rural schools used some of the grant to invest in agricultural opportunities, urban schools did not but invested in school infrastructure instead.

School quality did not improve with these changes in the short term. There were subsequent improvements in infrastructure and health resources as well as an increase in participation at the lowest grades, with fewer dropouts in 2007/08 and higher enrollment in grade 2 in 2008/09. But there is no evidence of a change in test scores. Moreover, there is some evidence that teachers reduced their effort in

response to the grant. This may be because some teachers have a preference for a centralized government and were reluctant to collaborate with parents, especially when parents did not spend the grant money on projects that made the teachers' lives easier.

The authors highlight barriers that communities may face when making school management decisions. Parents will not always make optimal spending and management decisions to improve quality—in particular, parents may lack information about how schools work. Cooperation (rather than confrontation) between parents and teachers may be key, but it can be difficult to establish. Finally, putting pressure on teachers to improve service quality may be very difficult because formal authority (the right to make decisions) need not imply real authority (effective control over decisions); parents' authority depends on their power relative to teachers.

Community participation may not be effective if communities have no actual power. Authority and capacity are important prerequisites for parents to successfully undertake the difficult aspects of management and improve school quality.

Elizabeth Ruth Beasley and Elise Huillery. 2017. "Willing but Unable? Short-Term Experimental Evidence on Parent Empowerment and School Quality." *Policy Research Working Paper 8125*, World Bank, Washington, DC.

Does More Time in School Improve Learning Outcomes for Students?

Simply extending the time students spend at school may do little to improve their learning outcomes. The answer? Full-time teachers

Rio de Janeiro's municipal network of public schools, the largest in Brazil, combines different models of full-time education alongside the part-time schools that still make up the majority of school units. Taking advantage of this diversity of full-time experiences, a recent paper by Cruz, Loureiro, and Sa examines the impacts of these arrangements on student learning outcomes.

The full-time school program in Rio de Janeiro—called the Single-Shift program—extends the time students spend in school each day while also seeking to improve the quality of the education provided. Unlike the model prevailing in most Brazilian public schools, in which the school day is split into two shifts of about four hours each (with each student attending one shift or the other), the Single-Shift program uses a format in which students attend a seven-hour daily shift.

Beyond the seven-hour shift, some of the Single-Shift schools have introduced additional features and become certified (in 2015, of the 172 Single-Shift schools in Rio, 42 were certified). One such feature is that all teaching staff dedicate 40 hours of their weekly working hours to a single school. (While having all teachers under 40-hour contracts is a requirement for certified middle schools, this is a goal rather than a requirement for certified elementary schools.)

In certified Single-Shift schools, teachers teach for seven hours daily and collectively take one hour a day to plan the next day's lessons and discuss issues relating to particular students or classes. That is, time is reserved each day for all teachers to spend together while planning their lessons. This feature of the certified model has resulted in changes in several other aspects, including teachers' working hours and curricular guidelines.

The certified model also includes an innovative curricular matrix as well as focused in-service teacher training to prepare teachers for this new approach. The curricular matrix has two parts. One consists of the common courses for all schools—including Portuguese, math, and general curricular requirements. The other is a diversified part—with directed study, "life project" classes, and electives designed in accordance with the expertise of each school's teachers. In developing the certified model, Rio's Municipal Secretariat of Education also sought to create schools that would develop youth leadership abilities through the curricular material, by using discussions and practices related to socioemotional skills.

Applying a rigorous analytical approach, the authors investigate whether students who have attended Single-Shift schools had greater increases in learning than they would have had if they had not attended such schools. The authors use two indexes to measure learning outcomes, the IDEB (the national Education Development Index) and the IDERio (a similar index for the Rio de Janeiro municipality). Both indexes are based on student performance on a standardized test (for the IDEB, the nationwide Prova Brasil, taken in the fifth or ninth grade, and for the IDERio, the municipality-wide Prova Rio, taken in the third and seventh grades) as well as the passing rate for the cycle (from first through fifth grades or from sixth through ninth).

The analysis indicates that the certified Single-Shift program has had positive effects. The results are positive and significant for certified Single-Shift middle schools. For noncertified Single-Shift middle schools, however, the analysis shows nonsignificant results—and even negative results in some specifications. This suggests that merely extending the school day does not generate positive impacts on student performance. The results for the elementary schools are less interesting. The positive effects that the

authors find in the Single-Shift schools appear to come from an artificial decrease in age-grade distortion (that is, in the proportion of students who are more than two years older than the target age for their grade).

These results suggest that the certified Single-Shift model implemented in Rio de Janeiro is successful in improving student performance. But simply extending the daily time in school to seven hours does not seem to have the same positive impact on student performance without a structured organization for what is done in those seven hours—such as that established through the certified model's curriculum, teacher training, and requirement that teachers dedicate 40 hours a week to the school.

The paper adds to the literature on the impact of full-time schools in developing countries. The findings of previous studies do not indicate conclusive effects for the full-time school model; more time in school does not necessarily translate into student learning and performance. In contrast, this paper finds that when the extra time is organized with a structured curriculum, full-time teachers, and focused teacher training, it may have a significant impact on student achievement.

Tassia Cruz, Andre Loureiro, and Eduardo Sa. 2017. "Full-Time Teachers, Students, and Curriculum: The Single-Shift Model in Rio de Janeiro." Policy Research Working Paper 8086, Impact Evaluation series, World Bank, Washington, DC.

How Does Partnering with the Government Affect Low-Cost Private Schools?

Governments are increasingly partnering with the private sector to provide education to low-income students. Is this a good policy?

The government of Uganda abolished secondary school fees in 2007. Over the next five years student enrollment in secondary grades increased by 25 percent. But the number of classrooms and teachers in public schools increased at a much slower pace, leading to large class sizes and high student-teacher ratios. The situation is similar in several other Sub-Saharan African countries that have abolished school fees for basic education. One common solution is to form public-private partnerships (PPPs) in which the government enters into contracts with private schools to deliver services to low-income households.

Are PPPs a good solution? What quality of education do these schools provide to low-income students? And how does partnering with the government change the private schools themselves? A recent paper by Barrera-Osorio, de Galbert, Habyarimana, and Sabarwal attempts to answer these questions by evaluating a PPP program for secondary schools initiated in 2007 by the government of Uganda.

Uganda's PPP program is open to all certified private schools charging low fees and meeting a set of quality benchmarks. These low-cost private schools can enter into a contractual arrangement with the Ministry of Education under which they receive a fixed grant per eligible student enrolled. To evaluate the impact of the program on participating schools, the paper uses a randomized phase-in approach. A set of 101 private schools that applied for the program in 2011 were randomly divided into two groups: half received the PPP program in 2011 (the treatment group), and the other half received the program only in 2012 (the control group). The impact of the program was estimated by comparing outcomes in these two groups.

The paper shows that the PPP program absorbed large numbers of eligible students: student enrollment in participating schools increased by about 35 percent on average. Contrary to the hypothesis that PPP arrangements might make private schools less responsive to parents, the paper finds no adverse effects on the governance of participating schools. While the program influences the topics discussed at meetings (with head teacher and teacher salaries discussed more often in PPP schools), school ownership and control remain unchanged. And a PPP arrangement increases the likelihood that a low-cost private school continues to operate (rather than shutting down).

Moreover, partnering with the government appears to have a positive impact on student performance in low-cost private schools. Students enrolled for more than a year in a PPP school have test scores in math, English, and biology that are in the range of 0.07 to 0.16 standard deviations better than those of students in nonparticipating private schools.

Why do students perform better in low-cost private schools that partner with the government? The paper offers two explanations.

First, participation in the PPP program leads to somewhat better teacher performance and inputs in low-cost private schools. During unannounced visits a larger share of teachers in participating schools were found to be present in school and in class teaching. In an environment where teachers typically work in several schools at a time, this means that being in a PPP program allows a low-cost private school to induce a greater teacher commitment. The program also increases the likelihood of a school having a science laboratory.

Second, and more importantly, once a low-cost private school enters into a PPP arrangement, it appears to attract students from more educationally favorable backgrounds. Students in PPP schools appear to be more likely to come from a household that is

smaller; is more invested in children's schooling (with parents reported to be more likely to visit their children's school); and has more educated parents (with students in PPP schools reporting a higher education level for their father). Students in PPP schools also had better scores on the exams taken at the end of primary school.

While the data are not well suited to reliably establishing who is driving the "selection" of students, the preponderance of evidence suggests that it is households and not schools. In other words, parents from more educationally favorable backgrounds are choosing to send their children to low-cost private schools participating in the PPP program.

What does this mean for policy? The paper shows that the PPP program in Uganda is able to use the private sector to help absorb a larger secondary student population without adversely affecting the quality of education. But the PPP program also leads to a selection of students in participating schools who tend to be from more educationally favorable backgrounds—a selection most likely driven by households. This means that to understand the full implications of the PPP program, further study is needed to investigate how it affects neighboring schools—both public and private.

Felipe Barrera-Osorio, Pierre de Galbert, James Habyarimana, and Shwetlena Sabarwal. 2016. "Impact of Public-Private Partnerships on Private School Performance: Evidence from a Randomized Controlled Trial in Uganda." Policy Research Working Paper 7905, World Bank, Washington, DC.

Making Teachers Better: What We Know and How to Learn More

Teacher training programs that matter for promotion and provide complementary materials are more effective. A new instrument will help us continue to learn what works

The quality of education in low- and middle-income countries is lower than it should be. Teachers are the most important input to student learning. These two statements are well established. The question emerges, How can the current set of teachers become better?

Programs providing on-the-job training to teachers—known as professional development programs—are common interventions aimed at improving the quality of teaching. Recent reviews of the evidence indicate that some of the most promising interventions to improve student learning are such programs. But experienced professionals will report that much of the teacher training now being provided is ad hoc, overly theoretical, and ultimately ineffective. Both are true. Some professional development programs have led to major learning gains, such as one in Liberia that trained teachers and gave them materials to work with, and one in Uganda that provided practical training and follow-up mentoring. But many probably deliver no gains at all.

In a recent paper Popova, Evans, and Arancibia sought to identify the common characteristics of successful professional development programs

for teachers in low- and middle-income countries. Yet in the course of that analysis the authors realized that many evaluations do not report the characteristics of their programs in a consistent way. The authors therefore propose a standardized instrument for reporting on professional development programs for teachers—the In-Service Teacher Training Survey Instrument (ITTSI)—and use it with the 26 programs they identified.

What characteristics are likely to matter? The instrument includes sections on *content* (Does the training focus on upgrading math knowledge? Or on pedagogical skills?), *delivery* (Is it a lecture series or a mentoring program? How long does it last?), *overarching aspects* (Does it have any bearing on a teacher's professional status? What is targeted at particularly low-performing teachers?), and even *perceptions* (What did teachers and trainers believe was most and least effective about the program?). Altogether, the instrument includes 73 simple indicators.

Evaluations varied dramatically in what they reported (figure 1), so the authors interviewed as many program implementers as possible to fill in the data. After interviews, information on virtually all the indicators was available. In other words, implementers know all these characteristics of their programs; researchers just do not report them consistently. If researchers were to begin using the proposed instrument, future analysis of the latest evidence on what works in

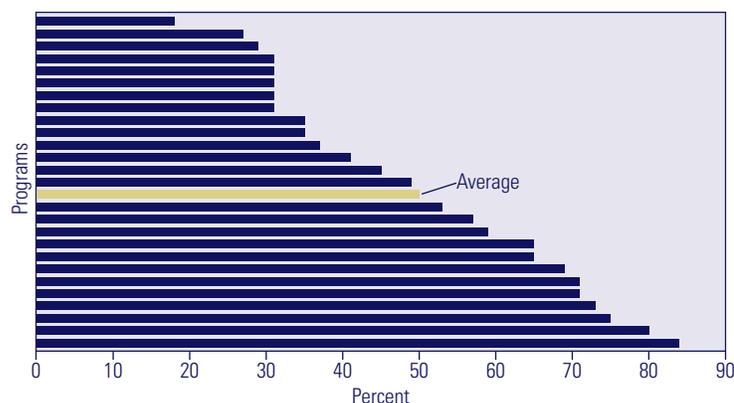
professional development for teachers would be much more effective.

Based on the 26 programs, what do the most successful ones look like? Those that lead to greater student learning gains include programs that have implications for teachers' salary or promotion. They also include programs that provide complementary materials to enable teachers to implement the methods in which they have been trained. Other results (less definitive because of the limited sample of programs) suggest that programs with follow-up visits to teachers in schools lead to larger gains, while those without a specific subject focus ("student-centered pedagogy" rather than "pedagogy for geometry," for example) lead to smaller ones.

Implementers also commonly report conducting follow-up visits and designing programs in response to local needs as key to effective professional development. All this complements evidence from high-income countries, which indicates that more specific, practical training, sustained over time and with follow-up visits to teachers in schools, translates into larger improvements in student learning.

Professional development for teachers uses an enormous amount of financing. Of more than 170 World Bank projects with education components in the early 2000s, nearly two-thirds included professional development. Virtually every ministry of education dedicates resources to it. For governments, this suggests the importance of ensuring that professional development translates into gains for students in the classroom. It also suggests the value of documenting their innovations so that future administrations and neighboring countries can learn from their experience.

Figure 1. Share of ITTSI Indicators Reported by the 26 Program Evaluations



Anna Popova, David K. Evans, and Violeta Arancibia. 2016. "Training Teachers on the Job: What Works and How to Measure It." Policy Research Working Paper 7834, World Bank, Washington, DC.

Improving Service Delivery for Better Education and Health Outcomes in Uganda

Efforts to improve education and health services in Uganda appear to have paid off—though gains continue to lag in poorer areas

Since 1997 the government of Uganda has implemented a series of policies to improve education and health outcomes, with a focus on disadvantaged groups. On the supply side, policies have aimed to improve both the access to and the quality of services. These policies include building and renovating schools and health centers; purchasing adequate instructional materials; training, hiring, and retaining teachers and health workers; ensuring the availability of drugs in health centers; tackling absenteeism among teachers and health workers; providing incentives for staff to work in areas hard to reach or hard to stay in; and implementing curriculum and other changes.

There have also been notable interventions on the demand side. These have included making primary and, later, secondary schooling free; implementing and expanding school feeding programs; launching the “mama kit” program to reduce out-of-pocket costs for deliveries in health facilities; and rolling out national immunization days.

While there has been progress in many areas, challenges remain. In particular, there is a concern that the increase in access may have been achieved at a cost in terms of the quality of the services being provided. As a result, quality of service delivery has become a concern for many stakeholders, including households and government and development partners.

Until recently, limited evidence was available to support the policy debate on quality of service delivery in Uganda, especially in education and health. To fill the data gap, the World Bank together with partners implemented a Service Delivery Indicator (SDI) survey in 2013. As in other countries where the SDI survey has been implemented, the survey in Uganda

applied a rigorous methodology to collect robust evidence on the quality of primary education and basic health services. To provide a basic diagnostic of the quality of these services, a new paper by Tsimpo, Etang, and Wodon relies on the SDI survey as well as another nationally representative survey (the Uganda National Household Survey of 2012/13, which has a community module providing data on education and health facilities).

The authors’ analysis suggests that despite the government’s efforts, the quality of basic services remains low, especially for those living in poorer areas. This has implications for development outcomes.

While access to education has increased nationally, learning outcomes remain weak, especially in disadvantaged areas. Students in poorer areas tend to perform less well on standardized tests for English, numeracy, and nonverbal reasoning. This appears to be in part because of lower-quality inputs in schools in those areas, including teaching practices that engage students too little and a limited knowledge base among teachers. Teacher absenteeism—when a teacher either is not in school or is in school but not in the classroom—is also a concern.

Similar issues are observed in the health sector, though with some differences. The correlation between the welfare level of communities and the quality of some of the inputs in health facilities is weaker than for education. As an example, unlike what is observed in schools, there is no apparent correlation between health workers’ absenteeism and the welfare level of communities, and the availability of drugs is not necessarily lower in poorer areas. On the other hand, substantial differences remain in the availability of electricity, piped water, toilets, an ambulance, a microscope, a thermometer, a weighing scale, a blood pressure machine, or kits to test for malaria or HIV—with lower-quality inputs in poorer areas. And as is the case for education, health workers’ knowledge is limited, with only a small share able

to diagnose five key conditions in patients and the accuracy of diagnoses again weaker in poorer areas.

Another important finding is that while the quality of service delivery as well as education and health outcomes tend to be lower in poorer communities, households in these communities tend to be at least as satisfied with the services they receive as are households in better-off areas. This suggests that expectations of quality and the ability to discern poor quality are likely to be low in poorer areas, implying that simply looking at satisfaction with services in traditional household surveys is unlikely to lead to robust measures of service quality.

None of these findings are especially surprising, and research for other countries using SDI surveys tends to yield similar findings. But at the country level, this type of analysis is useful to identify aspects requiring improvement in the provision of education and health services, especially in disadvantaged areas. Furthermore, by repeating this type of survey over time, countries can assess their progress in improving services in more robust ways. The good news is that the analysis of the data for Uganda suggests that better quality of service delivery does indeed tend to lead to better education and health outcomes for the population.

Clarence Tsimpo, Alvin Etang, and Quentin Wodon. 2017. “Education and Health Services in Uganda: Quality of Inputs, User Satisfaction, and Community Welfare Levels.” Policy Research Working Paper 8116, World Bank, Washington, DC.

Building More Schools: The Effects on Equality of Opportunity in Education

A new study finds that an increase in local schools in Jordan has led to greater intergenerational mobility in education—especially for women

Jordan has pursued policies aimed at greatly expanding its supply of public basic and secondary schools, and the country had one of the world's biggest increases in educational attainment between 1980 and 2010. But has the increase in the local supply of schooling improved the equality of opportunity in education? That is, has it led to greater educational attainment even among those whose parents are relatively uneducated?

A recent paper by Assaad and Saleh examines how the enhanced local supply of schooling in Jordan has affected the association between children's schooling and that of their parents—or the intergenerational mobility in education. The authors use a unique data source, the 2010 Jordan Labor Market Panel Survey, which includes information on parents' schooling for every adult in the sample, along with the 2010 school census produced by the Ministry of Education. The school census provides the subdistrict, type, and date of establishment for every school in Jordan, making it possible to measure the local supply of each type of school in each subdistrict in every year. Individuals' exposure to the supply of public schooling is then determined by the number of sex-appropriate basic (or secondary) public schools (per 1,000 individuals) available to them in their subdistrict of birth at the time they were of the appropriate age to enroll in that school level (age 6 for basic and 15 for secondary). The richness of the data set makes it the first in the Middle East to allow such a study.

The authors identify the effect of local school supply on intergenerational mobility in education by exploiting the variation in the supply of public basic and secondary schools across cohorts and subdistricts of birth. Their analysis controls for all unobserved

time-invariant characteristics of subdistricts, period effects that differentially affect individuals in different cohorts, and the time-varying characteristics of the governorate of birth that may drive both the local public school supply and the educational attainment of individuals in a given year of birth.

By first analyzing intergenerational mobility across cohorts, the authors establish that mobility has increased significantly in Jordan over time, and more so for women than for men. And they find that the increased supply of public basic schools has improved intergenerational mobility, especially among females, but that the increased supply of secondary schools has not done so.

Indeed, the authors find that an increase in the local supply of basic schools reduces the intergenerational persistence of educational attainment for women three times as much as it does for men. Increasing the supply of sex-appropriate basic schools by one standard deviation (approximately 0.19 schools per 1,000 people for males and 0.13 schools per 1,000 people for females) reduces the father-son and mother-son associations of schooling attainment by 18–20 percent, while it reduces the father-daughter association by 44 percent and the mother-daughter association by 33 percent.

Moreover, the increased supply of basic schools significantly enhances the schooling attainment of the children of uneducated parents, with the effect being larger for females than for males. These effects are due primarily to the availability of mixed schools for both boys and girls.

Overall, the findings suggest that the local supply of basic schools is a binding constraint on both the educational attainment and the intergenerational educational mobility of Jordanians, with the constraint being more binding among females than males. The larger effect for women can be explained by the fact that girls in a conservative social setting such as that of Jordan are more constrained geographically and are often unable to

go to school in a jurisdiction different from their own.

With respect to local secondary schools, the authors find that a greater supply increases schooling attainment for male children of uneducated parents, with the effect stemming from both boys' and mixed secondary schools. But it has no statistically significant effect for females. Moreover, the effect shows no variation across different levels of parents' education for either males or females. This suggests that in the absence of public secondary schools, even educated parents have few options for sending their children to secondary school, given the relative absence of private secondary schools outside the capital city of Amman. Thus both educated and uneducated parents are equally constrained by the local supply of public secondary schools.

This research shows that a more progressive government policy to construct more public basic schools and to equalize the supply of basic schools across jurisdictions does in fact contribute to greater equality of opportunity in education. It remains for future research to determine whether it is better in a socially conservative setting such as Jordan to establish single-sex schools or mixed schools if the objective is to improve the educational attainment of girls.

Ragui Assaad and Mohamed Saleh. 2016. "Does Improved Local Supply of Schooling Enhance Intergenerational Mobility in Education? Evidence from Jordan." Policy Research Working Paper 7825, World Bank, Washington, DC.

Predicting School Dropouts in Guatemala and Honduras

Using administrative data from a developing country, a fairly simple model can predict which students are most likely to drop out

In countries across Latin America, primary enrollment has become almost universal and secondary enrollment has grown substantially in the past two decades. But attainment continues to fall short of aspirations. The high rates of enrollment in early grades quickly decline as students drop out before completing a full course of basic education. In Guatemala and Honduras, for example, education is compulsory through the ninth grade, but nearly 40 percent of sixth graders drop out before getting there.

The high dropout rates raise important concerns. Global evidence suggests that, on average, dropouts earn less and experience more social and economic challenges than their peers who have completed more years of education.

Policy makers' ability to effectively address these consequences depends on their ability to answer a fundamental question: Who is most likely to drop out? This question may appear easy to answer in countries with high dropout rates, because one might assume that dropouts are concentrated in particularly disadvantaged or dysfunctional schools or among students with particular characteristics. But dropouts are often spread across schools and not readily identifiable by single characteristics. In Guatemala more than half the sixth-grade students who drop out in the transition to lower secondary are spread across the 70 percent of primary schools in which the dropout rate is below 50 percent. And while half the students who score in the lowest quartile on a sixth-grade standardized exam drop out, so do 20 percent of those who score in the highest quartile.

But recent research is providing an increasingly sound empirical base for accurately predicting who will drop

out. This research is based largely on the rich administrative data available in the United States, where more than 30 states have some form of early warning system in place. Similarly, most European countries monitor early warning signs of potential dropout through their information management systems, primarily at the school level but in some cases nationally.

Solving the problem of how to predict dropouts is now also becoming possible in many middle-income countries that have invested in setting up information management systems in recent years—through the use of routinely collected student-level data. In both Guatemala and Honduras student- and school-level data are now digitized in networked administrative databases thanks to the efforts of the ministries of education in these countries. These data allow the tracking of students over time and, in Guatemala, can be directly linked to standardized test data.

A new paper by Adelman, Haimovich, Ham, and Vazquez uses these administrative data from Guatemala and Honduras to estimate early warning models of dropout for primary and secondary school students. This involves two steps. First, the authors estimate linear probability models to predict the likelihood of dropout for each student. Second, they employ an algorithm to select the probability cutoff used to identify students most at risk of dropping out. The optimal cutoff is chosen to minimize the distance to the “perfect prediction” (with 100 percent true positives and no false positives). The authors also conduct different validation exercises that show that their models perform quite well out of sample.

Using this methodology on student-level panel data, the authors are able to accurately identify about 80 percent of the sixth-grade students who dropped out within the next year in Guatemala and Honduras—a level of performance comparable to those of models used in the United States. These early warning models, which are

based on routinely collected data and relatively simple analytical techniques, could feasibly be implemented in a wide range of country contexts.

By providing an accurate means of targeting, these models could substantially improve the cost-effectiveness of dropout prevention programs. In a simple simulation of a modest program, the authors show that using the models to target students, rather than targeting poor municipalities or high-dropout schools, could reduce the misallocation of resources by between 30 and 80 percent.

Previous studies have provided substantial evidence that dropout can be accurately predicted using high-quality administrative data in the United States as well as Europe. But no previous studies are known to have investigated this question in a developing country. The authors' paper thus provides one of the first applications of dropout prediction methodologies to the education systems of lower-middle-income countries.

Melissa Adelman, Francisco Haimovich, Andres Ham, and Emmanuel Vazquez. 2017. “Predicting School Dropout with Administrative Data: New Evidence from Guatemala and Honduras.” Policy Research Working Paper 8142, World Bank, Washington, DC.

Teachers' Effectiveness in Pakistan and the Link to Wages

Teachers are key to the quality of learning, but their effectiveness is difficult to predict and not linked to their wages in the public sector

Extensive research from the United States clearly establishes the importance of good teachers for students' learning outcomes. It also shows that predicting teacher quality is difficult. Unfortunately, we don't know whether these findings also apply to low-income countries. Filling this gap is critical: student learning in these countries is poor, and teacher salaries account for 80 percent of recurring education expenditures. Increasingly, countries are asking how to recruit and retain high-quality teachers.

In a new paper Bau and Das investigate these issues using a unique data set on primary school students and their teachers in both public and private schools in Punjab, Pakistan, for 2004–07. The data track students through primary school, matching them to the teachers who taught them in each year. One novel aspect of the data set is that it includes scores on primary-school-level tests in Urdu, English, and math for both students and teachers.

Using student test score data, the authors calculate a value added (as a proxy for productivity) for each teacher: an estimate of the test score gains that a random student would receive if assigned to that teacher. These estimates show that moving a student from a teacher at the 5th percentile to one at the 95th would increase the student's test scores by 0.5 standard deviations—the equivalent of more than a year of school.

So teachers clearly matter. But as in the United States, predicting their effectiveness is hard. The authors find that only teachers' content knowledge (as measured by their scores on the primary school tests) and their first two years of experience predict their value added. Neither a bachelor's degree nor teacher training—two factors

often used in teacher recruitment—is associated with value added.

Are there teacher characteristics that predict higher salaries in Pakistan? The authors examine this issue in both the public and private sectors. Results show that having a bachelor's degree positively predicts wages in both sectors. And in the private sector, teachers with higher value added are paid more. In the public sector, however, there is no relationship between teacher value added and wages. These findings suggest that teacher value added is at least somewhat observable and that the private sector identifies and rewards better teachers with higher wages. In contrast, higher wages in the public sector are not associated with higher teacher value added.

This lack of an association between teacher productivity and wages suggests that the public sector does not reward better teachers with higher wages. But this does not mean that increasing teacher wages would not attract higher-quality applicants for teaching positions.

A change in hiring practices in Punjab makes it possible to assess how teacher wages affect the quality of applicants. In 1998 Pakistan initiated unanticipated nuclear tests, which led to international sanctions on the country and tighter budget constraints in the province. As a result, teacher hiring was largely frozen for three years. When hiring resumed, almost all new teachers were hired under temporary contracts with 35 percent lower salaries. With the caveat that the new teachers' contract status may have increased accountability, the authors compare the productivity of teachers hired right before the nuclear tests with that of teachers hired right after hiring resumed to see whether lower salaries attracted worse teachers.

The results show no negative effect of being hired at a lower salary on teacher productivity. Indeed, when the authors account for the fact that teachers are observed at different levels of experience, contract teachers

performed better than permanent ones.

The fact that reducing teacher salaries by 35 percent had no adverse effects on student outcomes might seem surprising. But comparing public and private sector teachers' salaries helps illustrate why this is so: there is virtually no overlap, with public sector teachers making about five times as much on average as private sector teachers. This large public sector premium is not unique to Pakistan. According to a recent study using data from 52 countries, these premiums are larger in low-income countries than in high-income ones.

Altogether, these results suggest that calls to improve student learning by raising teacher wages, while keeping the same hiring and pay structure in place, are misguided. Redesigning compensation systems for government employees is complex enough as it is; one issue that policy makers need not worry about is that teacher salaries are too low to attract talented teachers.

Natalie Bau and Jishnu Das. 2017. "The Misallocation of Pay and Productivity in the Public Sector: Evidence from the Labor Market for Teachers." Policy Research Working Paper 8050, World Bank, Washington, DC.

This article is adapted from a longer version that appeared in VoxDev on September 8, 2017, at <http://voxdev.org/topic/health-education/labour-market-teachers-pakistan-pay-and-effectiveness>.

Going Beyond Schooling to Improve Workforce Skills

What does it take to succeed in the labor market in developing countries? Cognitive skills matter above and beyond educational attainment

Driven by evidence that a skilled labor force is critical to economic development, low- and middle-income countries worldwide are investing in strategies to improve workforce skills. Beyond the benefits at the national level, are there economic payoffs for individuals from being more skilled? And are certain types of skills associated with higher returns?

To assess the economic returns to skills, earlier econometric studies commonly used individuals' level of schooling as a proxy for skills. But using schooling measures alone systematically underestimates cognitive skills learned outside school and misses the contributions of other types of skills. More recent studies, based mainly in OECD countries, go beyond schooling to measure cognitive or noncognitive skills. But this newer evidence on returns to skills, especially those necessary for success in technology-rich environments, is scarce in low- and middle-income countries.

A recent paper by Valerio, Sanchez Puerta, Tognatta, and Monroy-Taborda adds to the evidence in developing countries and contributes to an emerging literature investigating the different contributions of cognitive and noncognitive skills. Using data from the Skills towards Employability and Productivity (STEP) survey, the study investigates the extent to which there is an independent association between earnings and skill types. It draws on survey data for eight countries: Armenia, Bolivia, Colombia, Georgia, Ghana, Kenya, Ukraine, and Vietnam. Its analytical sample includes all employed and self-employed adults who are between the ages of 25 and 64 and are not in school.

To measure cognitive skills, the STEP survey uses literacy and the

complexity of computer use on the job as proxies. Literacy proficiency is defined by a range of skills, from the decoding of written content to the comprehension, interpretation, and evaluation of texts of varying complexity. For the complexity of computer use, four skill levels are defined, ranging from browser-based tasks to basic Microsoft Office functions, basic programming, and advanced programming. To measure noncognitive skills, the survey includes a series of questions to assess personality and behavioral traits—the “Big Five” personality traits (openness, conscientiousness, extraversion, agreeableness, and neuroticism) as well as grit and decision making.

As proxied by literacy proficiency and the complexity of computer use, overall levels of cognitive skills are low in the eight countries. Among the sample population, average literacy proficiency is more than one standard deviation below the OECD average, and about half of those who use a computer at work utilize only basic programming functions such as spreadsheets or bookkeeping. For noncognitive skills, average scores are relatively stable across countries as well as among different demographic groups within each country.

Analysis shows that skills yield significant payoffs in the labor market, even after controlling for education and other relevant individual and family background factors. On average, an increase in literacy proficiency of one standard deviation is associated with an increase in hourly earnings ranging from 9 percentage points (in Colombia, Georgia, and Ukraine) to 19 (in Ghana). Similarly, more complex computer skills bring big earnings premiums in all eight countries. In contrast, the results for noncognitive skills are less consistent across countries. For example, openness, agreeableness, and grit show a significant and positive relationship with earnings in five countries, while in another set of countries agreeableness and conscientiousness show an insignificant or negative association with earnings.

Estimating a model that includes all types of skills, the study finds that computer skills continue to matter most for labor market success, though there is substantial variation across countries. In contrast, the association between literacy proficiency and earnings remains positive and significant only for Ukraine. The association between noncognitive skills and earnings is slightly smaller relative to the results of previous models used in the study, but cross-country patterns remain qualitatively similar.

The study's findings show that cognitive skills matter above and beyond educational attainment—skills encompassing additional dimensions of human capital not usually captured by traditional measures of schooling. The findings underscore the importance of education systems that can produce graduates who are proficient in comprehending, interpreting, and analyzing written texts—skills that provide a foundation for lifelong learning as well as being valued in the labor market. And they point to the need to ensure that the future workforce develops the digital skills to thrive in the workplace as digital technologies continue to spread and countries move toward the technology frontier.

The study also reveals important differences across countries in how different types of skills are valued in the labor market. This suggests a need for further research to provide a more nuanced understanding of the role of skills in labor market success and to support strategies for developing workforce skills that take into account each country's conditions, needs, and goals.

Alexandria Valerio, Maria Laura Sanchez Puerta, Namrata Tognatta, and Sebastian Monroy-Taborda. 2016. “Are There Skills Payoffs in Low- and Middle-Income Countries? Empirical Evidence Using STEP Data.” Policy Research Working Paper 7879, World Bank, Washington, DC.

management is poor. Third, the *deeper system-level barriers*, both technical and political, that pull the various actors away from a focus on learning. The report provides detailed diagnoses of each dimension based on new data and research.

To do better, the report argues that a nation must take action on three fronts.

First, assess learning, to make it a serious goal. Countries need to put in place a range of well-designed student assessments to help teachers guide students, improve system management, and focus society's attention on learning. These measures can spotlight hidden exclusions, inform policy choices, and track progress.

Second, act on evidence to make schools work for all learners. Countries should start by targeting areas with the largest gaps between what happens in practice and what evidence suggests works for learning. The best place to start is these three key areas: prepared learners; skilled and motivated teachers; inputs and management focused on teaching and learning.

Third, align actors, to make the whole system work for learning. Even evidence-based classroom innovation may have little impact if system-level technical and political factors prevent a focus on learning. Countries can escape low-learning traps by acting on three fronts as they implement reforms:

- Deploy *information and metrics* to make learning politically salient (as

the NGO-led ASER and Uwezo programs have done in India and East Africa)

- Build *coalitions* to shift political *incentives* toward learning for all (as Chile did early in its decades-long education reforms, or as Malaysia and Tanzania did recently with collaborative society-wide reform “labs”)

- Use *innovative* and *adaptive* approaches to find out which approaches work best in their context (as Burundi did during postconflict reconstruction).

The payoff is education that delivers: For individuals, it promotes employment, earnings, health, and poverty reduction. And for societies, it drives long-term economic growth, spurs innovation, strengthens institutions, and fosters social cohesion. But these benefits depend largely on learning. Mounting evidence shows that the skills acquired are what equips individuals for work and life, and that it is through learning and skills that education boosts growth. Countries have already made a start by getting so many young people into school; now it is time to realize education's promise by accelerating learning with equity.

World Bank. 2018. World Development Report 2018: LEARNING to Realize Education's Promise. Washington, DC: World Bank. <http://www.worldbank.org/wdr2018>.

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