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Policy Insight

The Cost-Effectiveness of Education Interventions in Poor Countries



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What We Don't Know

In recent years, both critics and advocates of foreign aid have increased their demand for evidence on what works in development. A 2006 Center for Global Development report states, "After decades in which development agencies have disbursed billions of dollars for social programs . . . it is deeply disappointing to recognize that we know relatively little about the net impact of most of these social programs."¹ Bill Gates put it succinctly: "Success depends on knowing what works."²

At the same time, the quality of many program-impact evaluations has been improving. Randomized trials of development interventions are becoming more common. Consider, for example, a randomized trial that showed major impacts of a cash transfer program to poor families in Mexico, or another that showed striking impacts of providing deworming medication on school attendance in Kenya.³ A multitude of other studies use quasi-experimental methods to imitate randomized trials. Randomized assignment of treatment in a program allows simple, clear assignment of causality: Differences in outcomes between treatment and comparison groups are attributable to the intervention.

With this growing collection of experimental and quasi-experimental studies on education inputs, we should be better able to answer, How do we best improve children's education in poor countries? Based on research in progress, this *Policy Insight* aims to illustrate and extend the use of a simple yet useful way of summarizing information from multiple evaluations, namely, through a cost-effectiveness analysis. We apply such analysis to education programs in poor countries and make recommendations for future studies to enhance their usefulness

to policymakers. Studies will inform policy debates much more if they include consistent reporting of data on outcomes, program costs, etc., as well as comparable methods or techniques.

For our analysis, we culled dozens of studies that examine education interventions in low-income settings: studies examining scholarship programs, conditional cash transfers, microlending, the provision of such resources as school meals or extra textbooks, and much more. Determining which interventions give the biggest bang for the buck proves to be far from straightforward. Here, we offer a brief discussion of some of the key issues involved in comparing alternative interventions, or different classes of interventions, and present the results of an illustrative cost-effectiveness analysis of education interventions.

The main goal of our analysis is to illustrate the use of a simple technique that has the potential to move more research into the hands of policymakers, not to come up with a list of top interventions per se. (Creating such a list would require a careful exploration of uncertainty in the estimates of benefits, along with many other considerations.) In performing this analysis, we provide suggestive evidence on broad classes of interventions that have proven cost-effective in specific situations. Similar exercises have been carried out before by Kremer (2003) and Glennerster (2005), but only for randomized trials. We include quasi-experimental evaluations, as well as more recent randomized trials.

What Do You Want to Change?

The first challenge in comparing these studies is determining the appropriate goal of an education intervention. In the studies we examined, the outcome of interest varied almost as much as the interventions themselves, with 14 of 38 studies examining enrollment, 15 looking at test scores, 9 looking at attendance, and a few stray studies examining other outcomes (such as teacher absenteeism or teen pregnancy). We focus on interventions that measure

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1 Evaluation Gap Working Group, 2006.

2 Quoted in Evaluation Gap Working Group, 2006.

3 For detailed bibliographic information on these and the other studies mentioned in this paper, see Evans and Ghosh (2008).

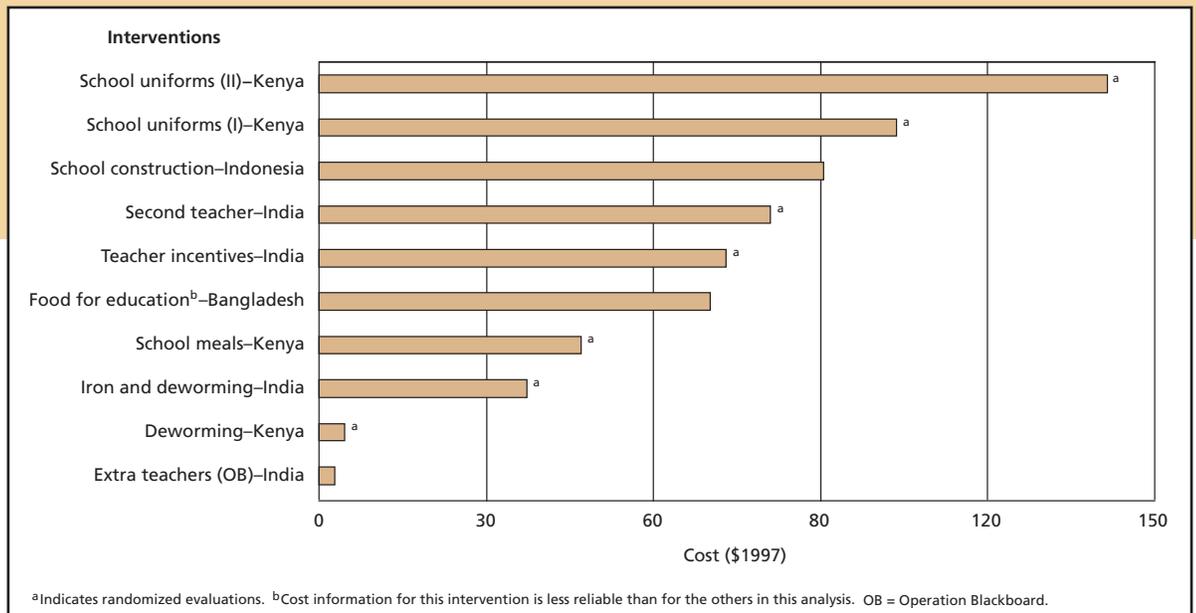


Figure 1. Program Costs for an Additional Year of School Participation

school participation and/or test scores as outcomes: School participation is one of the most common outcomes, and test scores are some of the most interesting. (School participation is a combined measure of average attendance and drop-outs, where dropping out simply counts as zero participation.)

How Much Will It Cost?

The governments of poor countries and the international donors seeking to help them need interventions that are not only effective, but also *cost-effective*. Unfortunately, cost reporting in the studies in our analysis is irregular; in some cases, we had to contact the authors to obtain cost estimates. We convert all costs to a common currency (1997 U.S. dollars) and do our best to make them consistent, leading to a per-child (or per-household) cost estimate for most interventions.

The reported cost estimates are surely subject to measurement error. Also, costs of similar interventions could vary across countries and across different institutional and social setups. Finally, since a single intervention might affect multiple outcomes, such as poverty and schooling, the overall effectiveness of a program will be understated in coming up with a cost-effectiveness estimate for schooling alone. Again, our aim in this analysis is to provide an approximate sense of the cost-effectiveness of different classes of interventions, not to come up with a menu of best possible interventions.

So, What Do We Know?

1. Ensuring school participation. What are the costs of alternative interventions that seek to ensure that a child remains in school for an additional year?

Our main findings from the cost-effectiveness analysis for school participation are presented in Figure 1, and we briefly discuss the results below. (All costs are given as the cost per child or household to induce an additional year of schooling.) Operation Blackboard (OB), implemented in India, sought to provide primary schools with basic inputs (such as blackboards and books) and an extra teacher. While this program had multiple components, providing an additional teacher (after ensuring basic inputs) had a per-child cost of only around \$3. A primary school-based health program in Kenya providing medication to eliminate intestinal worms was similarly cost-effective, at less than \$5 per child. Note that this intervention primarily targeted a health outcome, which in turn affected schooling. Hence, the overall benefit from this program is obviously greater than the gain in schooling alone.

There are several programs that appear to be moderately cost-effective in improving school participation. These include such diverse interventions as distribution of iron supplementation and deworming drugs to preschool children in India (\$37 per child); a school-meals program in Kenya that provided subsidized breakfast on every school day (\$47); a food-for-education program in Bangladesh under which participating households received monthly food rations as long as they sent their children to school (\$70); providing financial incentives to teachers based on their regular attendance at school in India (\$73); providing a supplementary teacher at nonformal schools in a tribal area of Rajasthan in India (\$81); a school-construction program in Indonesia (\$90); distributing free school

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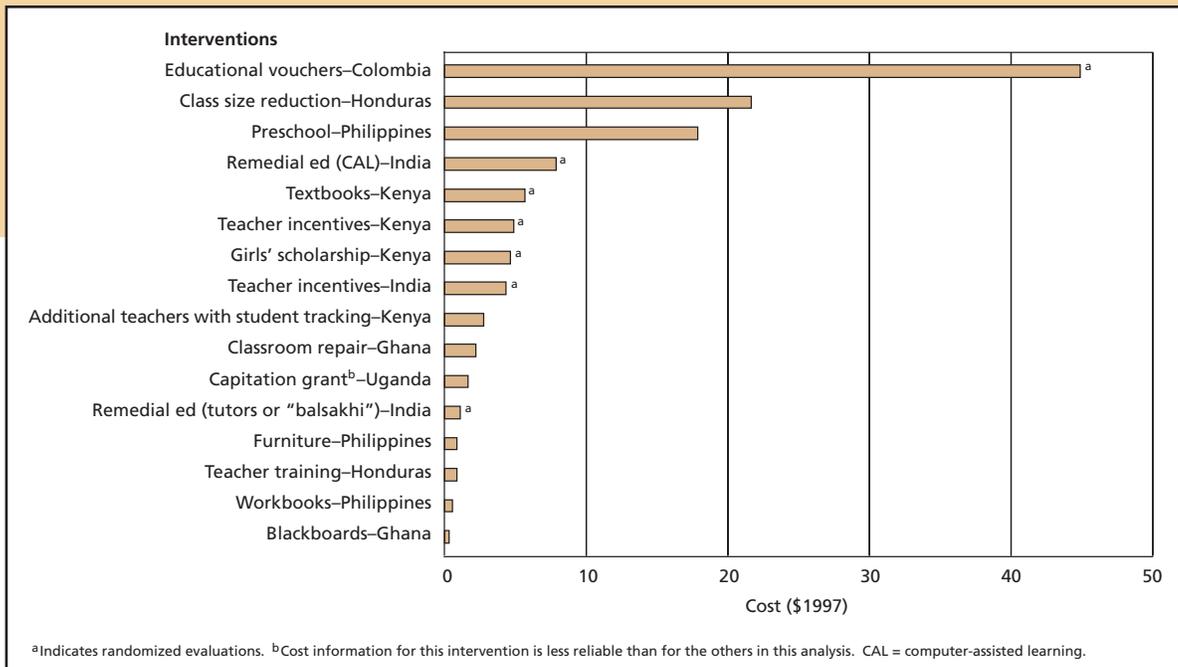


Figure 2. Program Costs per 0.1 Standard Deviation Improvement in Test Scores

uniforms to primary school children in Kenya (\$104); and providing nonteacher inputs, such as uniforms, textbooks, and classroom construction, in Kenya (\$142 per child for uniforms).

Other interventions (excluded from Figure 1) top the cost scales in inducing school participation. For instance, a Colombian vouchers program that provided scholarships to poor students for attending private secondary schools costs nearly \$750 per child. Mexico's original conditional cash transfer program (PROGRESA) was similarly expensive, at about \$860. A microenterprise lending program in Guatemala turns out to be even costlier, at nearly \$1,800 per household (although, again, the benefit from these programs is greater than in schooling alone).

2. Improving test scores. Among interventions seeking to improve student performance or test scores (Figure 2), several programs are extremely cost-effective. (All costs listed here are the cost per child for a 0.1 standard deviation improvement in total test scores.) For instance, a remedial education program in India costs only about \$1 per child. This program recruited young women (*balsakhi*) from the community to teach basic literacy and numeracy skills to children lagging behind in government schools. Similarly, providing increased training to teachers in rural Honduras, or providing workbooks to students or spending on classroom furniture (both in the Philippines) were equally cost-effective, at less than \$1 per child. Providing blackboards and repairing classrooms in

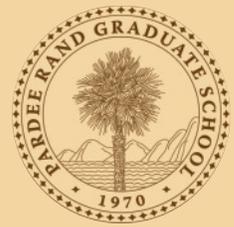
rural Ghana also led to significant gains in achievement, with per-pupil costs of only around 10 cents and \$2, respectively. A capitation grant program in Uganda was bolstered by simultaneous newspaper advertisements on the timing and amount of funds distributed to the districts. The newspaper campaign enabled schools and parents to monitor local officials responsible for allocating funds to schools, thereby increasing the actual amount of grants reaching schools. This program also had a low per-pupil cost of about \$1.50 per 0.1 standard deviation increase in test scores. Hiring additional teachers in Kenya and—in some schools—tracking students by ability led to a 0.1 standard deviation increase in test scores for less than \$3 per child.

Among interventions that are similarly cost-effective in improving student performance are a teacher incentive program in India that was based on the teachers' regular attendance at school (\$4), providing textbooks or scholarships to students from poor families in Kenya and also giving incentives to teachers (\$4–\$6), and another remedial education program in India involving computer-assisted learning (\$8). Programs that were less cost-effective include class-size reduction in Honduras (\$22), preschool programs in the Philippines (\$18), and the Colombian vouchers program (\$45).

What Else Is Going On?

Does it matter that the ultra-cost-effective deworming program was carried out in an area with extremely high intestinal worm burdens? Would

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the same interventions that work in Kenya, where 80 percent of children are enrolled in primary school, work in Niger, with just 40 percent? The cost-effectiveness of a particular intervention will depend on the socioeconomic and cultural setting in which that program is being implemented. Also—as we’ve seen—cost-effectiveness varies wildly depending on the specific educational outcome. For example, the same teacher incentive program that is highly cost-effective for improving test scores (at \$4 per child) is much less competitive when it comes to improving school participation (at \$73 per child).

Just as not all interventions are created equal, not all evaluations are created equal. Several studies comparing a randomized trial to quasi-experimental methods examining the same data show significant weaknesses of the latter class of methods (see Kremer [2003] for two such examples). In our sample, we found that nonexperimental methods appear slightly more cost-effective, likely because they mistake preexisting differences between schools for impacts of programs. (Imagine, for example, comparing a school with an excellent student-textbook ratio with a school with a poor ratio and finding that the school with lots of textbooks had better test scores: It is easy to imagine other, unmeasured factors that might be driving those test scores besides books.)

Further, many programs confer a broad range of benefits across sectors: Deworming not only improves school attendance but also improves children’s health, and school meals improve nutrition in addition to creating an incentive to come to class. Likewise, cash transfer programs and micro-enterprise lending—which primarily aim to reduce poverty—exhibit significant education impacts. So the *overall* effectiveness of some of the programs is likely to be understated in these cost-effectiveness estimates. This analysis would be useful for a minister of education but not so much for a more broadly charged minister of social development.

What Can We Conclude?

While certain classes of interventions come across as being cost-effective in improving participation—for example, school-based health programs, school-quality investments, and food aid—these results should be interpreted carefully, keeping the specific socioeconomic, institutional, and disease environments of a country in mind. A wide range of interventions seem to work similarly well for improving test scores at a low cost in developing countries, mostly by providing instructional inputs or improving instructional quality.

Despite the difficulties of comparing across interventions, policymakers are better off with clear, consistently reported evidence of what has worked in other contexts, which can help them decide which interventions (after consideration and adaptation) seem most likely to work in theirs. As researchers and policymakers both continue to explore what works, improved consistency in reporting costs and benefits will dramatically improve the value of this body of evidence.

Further Reading

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