

#### Selection IV.A.4. Interpreting Recent Research on Schooling in Developing Countries\*

Table 1 summarizes the effects of five educational inputs on student performance in developing countries on the basis of ninety-six studies: teacher-pupil ratio; teacher education, experience, and salary; expenditure per pupil. A more recent review (Velez, Schiefelbein, and Valenzuela 1993) contains a larger number of studies, but the general conclusions are the same. Table 1 shows which inputs have a statistically significant correlation (by sign of coefficient or direction of effect) and which are statistically insignificant. (The insignificant findings, unfortunately, cannot be divided by direction of effect.) In all cases, the reported correlations are those that hold after allowing for differences in the family backgrounds of students and in other educational inputs.

The evidence provides no support for policies to reduce class size. Of the thirty studies investigating teacher-pupil ratios, only eight find statistically significant results supporting smaller classes; an equal number are significant but have the opposite sign; and almost half are statistically insignificant. These findings qualitatively duplicate those in the U.S. studies, but are particularly interesting here. Class sizes in the developing-country studies are considerably more varied than those in the U.S. studies and thus pertain to a wider set of environments, providing even stronger evidence that the enthusiasm for policies to reduce class size is misplaced.

The effect of the teachers' experience yields results that are roughly similar to findings for the United States. Although 35 percent of the studies (sixteen out of forty-six) display significant positive benefits from more teaching experience (the analogous figure for the United States is 29 percent), the majority of the studies—twenty-eight out of forty-six—found this input statistically insignificant.

The results for teacher education, on the other hand, diverge in relative terms from those seen in the U.S. studies, with a majority (thirty-five out of sixty-three) supporting the conventional wisdom that more education for teachers improves student performance. (In the U.S. studies, teachers' education was the least important of all inputs.) Although these results are still surrounded by considerable uncertainty (twenty-six estimates are

insignificant and two display significantly negative effects), they do suggest a possible differentiation by stage of development and general level of resources available.

The evidence on teacher salaries in developing countries contains no compelling support for the notion that higher wages yield better teachers. Because these results aggregate studies across different countries, school organizations, and labor markets, however, it is difficult to take these results too far. For policy purposes, one would generally want information on what happens if the entire salary schedule is altered (as opposed to simply moving along a given schedule denominated, say, in experience, education, or some other attribute of teachers). But it is not possible with available studies to distinguish between the two effects.

Data on total expenditure per pupil are rarely available in analyses of developing countries, but the twelve studies that include such estimates are evenly split between statistically significant and statistically insignificant. Given questions about the quality of the underlying data, not too much should be inferred from these findings.

One of the clearest divergences between the findings in developing and industrial countries is the effect of facilities, suggesting that differences in the school environment are of some importance in developing countries. Twenty-two of the thirty-four investigations support the provision of quality buildings and libraries. The specific measures of facilities vary widely, however, so the interpretation almost certainly depends on local conditions.

Several other factors have been investigated in the course of the developing-country analyses, including an assortment of curriculum issues, instructional methods, and teacher training programs. Many of these inputs, however, are difficult to assess here because of the multicountry evidence and the probable importance of local institutions. One input—the provision of textbooks—has received widespread endorsement, although this support is as much for conceptual reasons as for solid empirical ones. The relationship of textbooks and writing materials to student performance is found to be important with reasonable consistency in developing countries, but relatively few studies are available (Lockheed and Hanushek 1988; Lockheed and Verspoor 1991). Investigations of technological or organizational differences have shown mixed results. In three extensive investiga-

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**Table 1.** Summary of Ninety-six Studies on the Estimated Effects of Resources on Education in Developing Countries

| Input                 | Number of studies | Statistically significant |          | Statistically insignificant |
|-----------------------|-------------------|---------------------------|----------|-----------------------------|
|                       |                   | Positive                  | Negative |                             |
| Teacher-pupil ratio   | 30                | 8                         | 8        | 14                          |
| Teacher's education   | 63                | 35                        | 2        | 26                          |
| Teacher's experience  | 46                | 16                        | 2        | 28                          |
| Teacher's salary      | 13                | 4                         | 2        | 7                           |
| Expenditure per pupil | 12                | 6                         | 0        | 6                           |
| Facilities            | 34                | 22                        | 3        | 9                           |

Source: Harbison and Hanushek 1992.

tions in Nicaragua, Kenya, and Thailand, interactive radio teaching, an approach to "distance education," has been found to be effective in teaching children in sparse settlements in rural areas. This result should not be generalized to all new technologies, however. In particular, there is little evidence at this time to support the widespread introduction of computers (Lockheed and Verspoor 1991). . . .

My own interpretation of existing evidence, based on results for both the United States and developing countries, is that schools differ in important ways, but we cannot describe what causes these differences very well. To take one example, Hanushek and Lavy (1994) investigated differences in the quality of schools across a sample of primary schools in Egypt. We defined school quality implicitly. After allowing for individual differences among students in achievement and in parental education, we labeled schools that had large gains in student achievement in a given year as high-quality schools; those with small gains, low quality. A continuous measure of school quality was developed by looking at growth in student achievement (after considering family and other influences on achievement growth). This exercise found enormous differences in the sixty sample schools. Table 2 shows the variation in the quality of schools by looking at achievement relative to a randomly chosen base school. The worst school shows an average achievement gain that is 62 percent below the base school, while the best school is 30 percent above. These results indicate dramatically that schools do differ in quality and that the difference is enough to be relevant to policymaking.

At the same time, measured attributes of teachers and schools explain only a small portion of these differences. From our estimation, only 16 percent of the variance in school quality is related

to teacher attributes (such as education and gender) and school attributes (such as class size and facilities). Although we did not look further, I seriously doubt that adding more detailed measures of resources, or of pedagogy, or of curricular differences would have allowed us to explain the differences much more fully.

A similar approach undertaken in rural Brazil (Harbison and Hanushek 1992) pointed to very similar conclusions: schools show very large differences in their ability to improve student achievement, but these differences are not highly correlated with measured characteristics of teachers and schools.

In short, the findings summarized in Table 1 do not indicate that schools and teachers are all the same. Large differences exist, even though these differences are not captured by the simple measures commonly employed. Neither, it appears, are they captured by more detailed measures of classroom organization or pedagogical approach. This leads me to conclude that the educational process is very complicated and that we do not understand it very well. We cannot describe what makes a good or bad teacher or a good or bad school. Nor are we likely to be able to describe the educational process very well in the near future. My view is that we should learn to live with that fact: living with it implies finding policies that acknowledge and work within this fundamental ignorance.

### Quality Versus Access

A third major aspect of current research relates to the importance of school quality and particularly to the perceived policy tradeoff between quality and access. The traditional concern goes something like this: given limited budgets for schools, and the commonly accepted twin objectives of expanding access and improving quality, policymak-

ers face a particularly unpleasant dilemma. They must choose between expanding the availability of education or providing high-quality schools.

A second way of viewing these policy concerns, while apparently different, is actually quite closely related. Analyses of labor market implications and the rate of return to schooling in developing countries suggest strongly that schooling is a very good investment. A year of schooling typically shows a 25–30 percent real rate of return, which appears noticeably better than that of other investment alternatives. At the same time, school completion rates in low-income countries are very low (Lockheed and Verspoor 1991). These two facts are inconsistent. If education yields such a high rate of return, why are people not taking advantage of it?

Emerging analyses of school quality have something to say about both elements of education policy. I believe that the common conception of a simple tradeoff between access and quality is misleading—if not wrong; and I think that low school quality may frequently be an important explanation for the widespread failure to take advantage of the apparently high returns available from education.

The central theme here is that school quality is directly related to students' decisions about attending school and schools' decisions about promoting students. High-quality schools raise student achievement and speed students through primary (and perhaps secondary) school, thus saving costs. Additionally, students respond to higher school quality with lower dropout rates: they tend to stay in good schools and drop out of poor ones.

Both of these mechanisms indicate a direct relationship between the quantity of schooling attained and the quality of that schooling. Thus, studies of the rate of return to schooling that consider only the quantity of schooling produce a misleading estimate of the potential gains. Estimates of the rate of return to schooling that do not account for quality differences will systematically overstate the productivity gains that are associated with additional years of schooling, because the estimates will include quality differences that are correlated with quantity. The evidence shows that those who do not complete a given level tend to have attended poorer schools. If a policy simply pushes students to stay in school but makes no changes in the fundamental quality of the schools, the new school completers will get only the returns associated with years of schooling and not with quality. Thus, their rate of return on their investment in schooling will not be as high as the estimates suggest.

Many countries, concerned about very high grade repetition rates, directly intervene to ensure

**Table 2.** Distribution of Estimated School Quality in Egyptian Primary Schools

| Distribution | All schools | Rural | Urban |
|--------------|-------------|-------|-------|
| Mean         | -.084       | -.111 | -.057 |
| Minimum      | -.62        | -.62  | -.52  |
| Maximum      | .30         | .30   | .21   |

*Note:* Values indicate the average proportional achievement gain of a school in comparison with that of the arbitrarily chosen base school, Taha Hussein School.

*Source:* Hanushek and Lavy 1994.

regular promotion through school (Lockheed and Verspoor 1991), but they typically ignore school quality. Neglecting the quality of schools is a serious mistake. In studying primary school students in the rural northeast of Brazil, Ralph Harbison and I discovered a very direct relationship between what a student knows and the student's promotion probabilities. Students who learn more than the curriculum requires (as measured by specifically designed tests) are significantly more likely to be promoted through primary school than those who do not learn what is expected. Schools, not surprisingly, have an important impact on student achievement. These findings suggest that policies that improve the quality of schools—that is, that enhance student achievement—will simultaneously lead to more rapid progress by students through the grades.

The magnitude of the overall effects of improving school quality, when converted to a monetary metric, is remarkable. Hanushek, Gomes-Neto, and Harbison (1994) summarize the expected savings from two simple policies—improving the availability of textbooks and writing materials (software) or improving components of the facilities (hardware). They show that if \$1 is invested in useful resources such as textbooks, an immediate savings of more than \$12 is obtained from speeding students through school. (These savings are pure efficiency savings from getting through school more quickly and include none of the increased productivity benefits that typically justify schooling investments; increases in future productivity simply reinforce the efficiency gains.) Where facilities are lacking, each \$1 improvement has an expected cost saving of more than \$3.

These estimates of the savings that can be expected from quality improvements are subject to some uncertainty. Nonetheless, the lowest plausible savings still indicate substantial efficiency gains from improving the quality of schools. The availability of books and writing materials and

school facilities is consistently important for student achievement and promotion.

These results highlight the importance of providing minimal resources for schools and are consistent with previous findings about the importance of basic textbooks, materials, and facilities. But these estimates—as startling as they are—may not represent the largest opportunities and are really lower-bound estimates of the potential for change. Specifically, all the research points to the importance of the teacher. Because the variations in teacher quality appear to be much more important than the variations in software or hardware, the savings from ensuring the former would almost certainly exceed those obtained from improvements in the latter. Unfortunately, because we do not know how to hire particularly effective teachers—nor what it would cost—we cannot calculate straightforward benefit-cost ratios.

Grade repetition is not entirely bad, because students do learn more with each time through the same grade, but it is an expensive way to improve student learning (Gomes-Neto and Hanushek 1994). One alternative explanation is that repetition reflects demand-side factors—that is, student choices that lead to low attendance during each school year. Little is actually known about attendance patterns, but anecdotal evidence suggests that normal crop cycles and requirements for children to work in the fields at planting and harvest times may be important in some settings. Such attendance patterns could severely constrain the chances of completing a given grade, at least in the likely absence of well-integrated, self-paced instruction. Dealing with these issues might require different policies aimed at lessening the current consumption constraints of families. In any event, however, the continued production of low-grade schools is no more effective in the face of such demand-side influences than without them.

In work on Egypt, Hanushek and Lavy (1994) pursue a related question: whether school quality affects students' decisions to drop out. In that analysis, the school quality estimates (Table 2) were included as one of the determinants of the decisions of individual students. Additionally, the analysis considered the students' own achievements and abilities as well as their earnings opportunities outside of school. If we hold achievement and opportunities constant, students going to high-quality schools are much more likely to stay in school than those going to low-quality schools. This makes sense. If a student is not going to get anything out of school, why waste the time?

The magnitude of the effect is particularly important. The primary schools sampled had average dropout rates in 1980 of 9.3 percent. If all the schools were at the quality level of the best one, the dropout rate would fall to 3.2 percent or less, a decline that indicates the huge impact of quality on school attainment.

Research in Brazil and Egypt points to similar conclusions. School quality has large and direct effects on school access and school attainment. These effects are complements, not substitutes, as suggested by the simple budgetary analysis that is commonly employed. And the research in both countries indicates that quality adds a dimension that is extremely important in thinking about schooling in developing countries. Finally, efforts to pursue quality improvement must confront the policy challenges described in the earlier sections. Inefficiency and general lack of knowledge about the production function in education imply that dealing with quality will require new and innovative approaches.

These conclusions are supported in Glewwe and Jacoby (1994), whose work on Ghana shows the direct relationship between school quality and school attainment. Improving the schools (in this case, the facilities) tends to hold students in school longer, other things equal. The authors do not obtain estimates of the total effects of school quality (as was done for Egypt), but the indication that measured effects have this influence confirms the quantity-quality correlation. This correlation in turn confirms the bias in rates of return flowing from analyses that ignore variations in school quality. . . .

## Conclusions

The research into the educational process, both in the United States and in the developing world, promises some very distinct payoffs. In policy dimensions, we appear to have learned a great deal. At the same time, the results do not always conform to what was expected. Research conclusively demonstrates an inefficiency in the current organization of schools. Resources are being spent in unproductive ways—ways that do not contribute to improving student performance. Correcting these inefficiencies is not simple. There is no blueprint for a model school that can be reproduced and handed out to policymakers, and such a blueprint is unlikely to be developed in the near future. Instead, we must turn to new organizations and new incentives if we are to improve schools.

Research suggests that the most likely path to improvement involves the introduction of performance incentives. Although several ways to introduce incentives have been suggested, none has been tried extensively. An extensive and systematic program of experimentation and evaluation is thus in order.

Finally, the evidence underscores the importance of establishing good schools. Although translating this goal into policy will be difficult, there are powerful reasons to believe that providing quality schools should be very high on the policy agenda. The continued expansion of low-quality schools—often thought to be a step on the path both to high access and to high-quality schools—may actually be a self-defeating strategy.

#### References

- Glewwe, Paul, and Hanan Jacoby. 1994. "Student Achievement and Schooling Choice in Low Income Countries: Evidence from Ghana." *Journal of Human Resources* 29(3):841–64.
- Gomes-Neto, João Batista, and Eric A. Hanushek. 1994. "Causes and Consequences of Grade Repetition: Evidence from Brazil." *Economic Development and Cultural Change* 43(1):117–48.
- Hanushek, Eric A., João Batista Gomes-Neto, and Ralph W. Harbison. 1994. "Self-financing Educational Investments: The Quality Imperative in Developing Countries." University of Rochester, Department of Economics, Rochester, N.Y. Processed.
- Hanushek, Eric A., and Victor Lavy. 1994. *School Quality, Achievement Bias, and Dropout Behavior in Egypt*. Living Standards Measurement Study Working Paper 107. Washington, D.C.: World Bank.
- Harbison, Ralph W., and Eric A. Hanushek. 1992. *Educational Performance of the Poor: Lessons from Rural Northeast Brazil*. New York: Oxford University Press.
- Lockheed, Marlaine E., and Eric A. Hanushek. 1988. "Improving Educational Efficiency in Developing Countries: What Do We Know?" *Compare* 18(1):21–38.
- Lockheed, Marlaine E., and Adriaan Verspoor. 1991. *Improving Primary Education in Developing Countries*. New York: Oxford University Press.
- Velez, Eduardo, Ernesto Schiefelbein, and Jorge Valenzuela. 1993. "Factors Affecting Achievement in Primary Education." HROWP Working Paper 2. World Bank, Department of Human Resources Development and Operations Policy, Washington, D.C.

