Textbooks and Educational Development

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CONTENTS

I. The Importance of Textbooks in Education ................. 1
II. The Availability of Textbooks ............................ 5
III. Public Expenditure on Education and Textbooks .......... 8
IV. World Bank Lending for Textbook Provision ............... 16
V. The Quality of Textbooks ................................. 18
V. Using Textbooks to Improve Educational Quality .......... 22

Tables

Table 1: Summary of Research Findings on the Effects of Textbook Availability on Student Achievement in Developing Countries ......................... 3
Table 2: Summary Table of Textbook Availability Derived from Reports ........ 7
Table 3: Expenditures on Teacher Salaries in Relation to Government Recurrent Expenditures on Primary Education, in the 1980s .................... 12
Table 4: Central Government Expenditures on Teaching Materials ............... 13
Table 5: Cost in Pupil Years of Producing One Fifth Grade Graduate .......... 14
Table 6: Benefit-cost ratios for selected educational investments in Brazil .................................................. 15
Table 7: Distribution of Textbook Components in Education Projects, by Fiscal Year .............................................. 16
Table 8: Distribution of Textbook Components in Education Projects, by Region, FY63-90 ..................................................... 17
Table 9: Stages of Improvement in Educational Quality ........................ 25

Figures

Figure 1: Median Public Expenditures on Education as a Percentage of GNP, by Country Income Level, 1965-85 ................................. 9
Figure 2: Median Public Recurrent Expenditures Per Primary Pupil, by Country Income Level, 1965-85 ................................. 10
Figure 3: Median Public Recurrent Expenditures Per Pupil as a Percentage of GNP, by Country Income Level, 1965-85 ............................. 11
Boxes

Box 1: Examples of the Impact of Adjustment on Education..........................13
Box 2: Textbook Provision: Mexico, Lesotho, and Brazil.........................20
Box 3: Unit Costs of Textbook Provision..............................................21

References
I. The Importance of Textbooks in Education

Why Textbooks are Important

Teachers, school administrators, and parents have long recognized the critical importance of textbooks in providing good quality education. Textbooks define the scope of the curriculum through selection of subject material, and influence the pedagogy and classroom behavior through structuring the sequence for instruction and providing questions and exercises. In developing countries, particularly where teachers are poorly educated and inadequately trained, textbooks are crucial in implementing what gets taught and how it is taught in school.

Empirical Evidence

The positive effects of the availability of textbooks on learning outcomes in developing countries have been well documented. As early as 1978, a World Bank review of research found that "the availability of books was the most consistent factor in predicting academic achievement." This finding has been confirmed by subsequent research:

- Nicaraguan pupils who were given textbooks scored about 10% higher on a mathematics test than the control group which did not have textbooks.¹

- In the Philippines, first- and second-grade pupils were provided textbooks according to two different ratios: (i) one textbook per pupil, and (ii) one textbook for two pupils. A comparison group was drawn from pupils in the previous year when ten pupils shared one textbook. Both experimental groups scored about 10% higher than the control group on tests of science, mathematics and the Philippine national language.²

- In Brazil, second- and fourth-grade pupils who were given textbooks scored higher in tests of mathematics and Portuguese

¹ Heyneman, Farrell and Sepulveda-Stuardo, "Textbooks and Achievement in Developing Countries: What We Know," Journal of Curriculum Studies, 13 (3), 1978.


than those who did not have textbooks.  

- In Fiji, the "Book Flood" experiment for teaching English as a second language stood out as an impressive example. In 1980, fourth- and fifth-grade teachers in eight rural schools were provided 250 high-interest and illustrated story books in English. Their students' performance in English reading and comprehension tests showed significant and sustained improvement.

- An analysis of a Thai national sample of eighth-grade mathematics classrooms (99 teachers and 4,030 students) found that textbooks affected achievement by substituting for additional post-secondary mathematics education of teachers, and by delivering a more comprehensive curriculum.

In sum, textbooks are the educational input most consistently associated with gains in student learning. (Also see Table 1 for the 1985 survey of research by Fuller).

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How Textbooks Facilitate Teaching and Learning

These results come as no surprise to those who are deeply involved in the education enterprise. When textbooks are available, there is no need to waste valuable time on copying text on and off the chalkboard, thus allowing teachers to use the time-on-task to engage students in active learning. Therefore, sufficient availability of textbooks enables teachers to pursue a much wider range of instructional activities, including assigning reading to develop pupils' skill of learning on their own; engaging them in discussion; assigning homework to solidify learning; and organizing group work to encourage participation. Furthermore, in many rural areas where multi-grade classes are the pre-dominant mode of schooling, the most effective way to meet the diverse learning needs of children of different ages is often to organize group activities around a variety of topics in the textbooks.

From the perspective of pupils, textbooks are essential vehicles for the development of reading and writing skills, for catching up on what they do not understand in class, and, at times, for learning what have not been taught by their teachers. In other words, textbooks help pupils become independent learners.
From the perspective of parents, textbooks are concrete expression of the school curriculum. With the availability of textbooks, literate parents can monitor their children's academic progress much more effectively. Parental attention, in turn, often stimulates higher learning outcomes of children.
II. The Availability of Textbooks

Although the importance of textbooks to the teaching and learning process has been widely recognized, shortage of textbooks persists in developing countries. Today, in many countries, the ratio is still below what is often taken to be the minimum standard of one textbook for two pupils:

- In Northeast Brazil, 23% of all schools received only one first grade textbook before a World Bank-supported textbook project was launched in 1980.7
- In the Dominican Republic in the mid-1980s, fewer than 20% of eighth grade pupils in public schools had mathematics textbooks.8
- In Botswana in 1989, fewer than 20% of primary school students had access to science or social studies texts.9
- In Malawi in 1988, fewer than 30% of primary pupils had textbooks.10
- In Guatemala, only 25% of pupils had textbooks in 1974; but since no books were produced for ten years, textbooks were virtually absent in classrooms.11

A recent review of surveys on the availability and quality of primary textbooks in reading/language arts, mathematics and science in 22 countries12 regarded as low-income economies13 found that, on average, one textbook was

---

7 Armitage et. al., "School Quality and Achievement in Rural Brazil."

8 Luna and Gonzales, "The Underdevelopment of Mathematics Achievement: Comparison of Public and Private Schools in the Dominican Republic." (Santiago: Centro De Investigaciones UCMM, 1986).


11 World Bank data.


13 Low-income economies are those countries with a GNP per capita of US$545 or less in 1988. Lower middle-income economies had a GNP per capita of less than US$2,200, upper middle-income economies less than US$6,000, and high-income economies more than US$6,000.
available to three or four students. When urban/rural pupil-to-book ratios were compared, the disparity was significant. In Nigeria, for example, three pupils shared two language textbooks in the urban area, but fifty students shared one textbook in the rural area. In the case of mathematics textbooks, the pupil-to-books ratio was 2:1 in Nigerian cities, and 90:1 in the countryside. (See Table 2).

Many countries which have requirements for half a dozen or even a dozen textbooks per pupil provide books in only one or two subject areas, or in some grades but not in others. In Tanzania, for example, mathematics textbooks are available for grades 1, 2, 3, 6 and 7, but not for grades 4 and 5. These discrepancies disrupt the curriculum and undermine the quality of education.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bukina Faso</td>
<td>1-6</td>
<td>6:5</td>
<td>1:1 (Urban) 5:4 (Rural)</td>
<td>-</td>
<td>-</td>
<td>Parent purchase</td>
</tr>
<tr>
<td>Central African Rep.</td>
<td>1-6</td>
<td>9:1</td>
<td>4:1 (Urban) - (Rural)</td>
<td>-</td>
<td>-</td>
<td>Free state supply</td>
</tr>
<tr>
<td>China</td>
<td>1-6</td>
<td>1:1</td>
<td>1:1</td>
<td>1:1</td>
<td>1:1</td>
<td>Free state supply</td>
</tr>
<tr>
<td>The Gambia</td>
<td>1-6</td>
<td>2:1</td>
<td>5:2</td>
<td>3:2</td>
<td>3:2</td>
<td>Free state supply</td>
</tr>
<tr>
<td>Ghana</td>
<td>-</td>
<td>4:3 (Urban) 2:1 (Rural)</td>
<td>4:3 2:1</td>
<td>-</td>
<td>-</td>
<td>French Co-op. Agency supply</td>
</tr>
<tr>
<td>Guinea</td>
<td>-</td>
<td>-</td>
<td>2:1</td>
<td>2:1</td>
<td>2:1</td>
<td>French Co-op. Agency supply</td>
</tr>
<tr>
<td>Madagascar</td>
<td>-</td>
<td>5:2 (Rural)</td>
<td>5:2</td>
<td>-</td>
<td>-</td>
<td>French Co-op. Agency supply</td>
</tr>
<tr>
<td>Malawi</td>
<td>1-8</td>
<td>7:4</td>
<td>2:1 3:2</td>
<td>2:1</td>
<td>-</td>
<td>Free state supply</td>
</tr>
<tr>
<td>Mozambique</td>
<td>1/3/5</td>
<td>2:1</td>
<td>5:3</td>
<td>3:1</td>
<td>5:3</td>
<td>Parent purchase</td>
</tr>
<tr>
<td>Niger</td>
<td>1-6</td>
<td>3:1</td>
<td>3:1</td>
<td>-</td>
<td>-</td>
<td>Free state supply</td>
</tr>
<tr>
<td>Pakistan</td>
<td>1-6</td>
<td>10:7 (Rural)</td>
<td>10:7</td>
<td>Very few</td>
<td>Very few</td>
<td>Free state supply</td>
</tr>
<tr>
<td>Rwanda</td>
<td>-</td>
<td>8:1</td>
<td>6:1 9:1</td>
<td>9:1</td>
<td>-</td>
<td>Parent purchase</td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>1-6</td>
<td>-</td>
<td>2:1 (Grade 1)</td>
<td>2:1 (Grade 1)</td>
<td>2:1 (Grade 3)</td>
<td>Free state supply</td>
</tr>
<tr>
<td>Tanzania</td>
<td>1-7</td>
<td>22:1</td>
<td>3:1</td>
<td>5:1</td>
<td>76:1</td>
<td>Free state supply</td>
</tr>
<tr>
<td>Uganda</td>
<td>1-7</td>
<td>2:1 (Rural)</td>
<td>2:1</td>
<td>2:1</td>
<td>2:1</td>
<td>Free state supply</td>
</tr>
<tr>
<td>Zaire</td>
<td>1-6</td>
<td>3:1 (Rural)</td>
<td>3:1 (Grades 3-6)</td>
<td>-</td>
<td>-</td>
<td>School purchase</td>
</tr>
<tr>
<td>Liberia</td>
<td>1-6</td>
<td>2:1 (Urban) 10:1 (Rural)</td>
<td>5:4 (Urban) 1:5 (Rural)</td>
<td>2:1 8:1</td>
<td>4:1 22:1</td>
<td>World Bank project supply</td>
</tr>
<tr>
<td>Nigeria</td>
<td>1-6</td>
<td>3:2 (Urban) 70:1 (Rural)</td>
<td>4:3 (Urban) 50:1 (Rural)</td>
<td>2:1 90:1</td>
<td>-</td>
<td>Free in north. Parent purchase in south</td>
</tr>
<tr>
<td>Papua New Guinea</td>
<td>1-6</td>
<td>2:1 (Urban) 3:1 (Rural)</td>
<td>1:1 (Urban) 2:1 (Rural)</td>
<td>3:1 (C...-al)</td>
<td>-</td>
<td>Free books to state schools</td>
</tr>
<tr>
<td>Tunisia</td>
<td>1-8</td>
<td>1:1 (Urban)</td>
<td>1:1</td>
<td>1:1 (Urban)</td>
<td>1:1</td>
<td>Parent purchase</td>
</tr>
<tr>
<td>Turkey</td>
<td>1-6</td>
<td>1:1 (Urban)</td>
<td>1:1</td>
<td>1:1 (Urban)</td>
<td>1:1</td>
<td>Parent purchase</td>
</tr>
</tbody>
</table>

One of the principal causes of non-availability and poor quality of textbooks in many low- and lower middle-income countries is public budget constraints, which limit the capacity of the Ministry of Education to publish and distribute textbooks. Falling real incomes constrain the capacity of parents to purchase them. This section will review some general trends of educational spending and examine how the education budget process affects investments in textbooks.\textsuperscript{14}

**General Trends of Educational Expenditure**

Developing countries typically invest less of their gross national product (GNP) in education and training than developed countries. The median public expenditures on education as a percentage of the GNP from 1965 to 1985 were about 3% for low-income countries and nearly 4% in middle-income countries, as compared with 6% for industrial countries; although the school-age population in low-income countries is 75% larger. (See Figure 1.)

The global economic crises in the 1970s and 1980s, which were caused by oil shocks, deteriorating terms of trade, rising demand for public services, and natural disasters that hit agriculture particularly hard, have severely affected developing countries' budgets and the availability of foreign aid. Many developing countries tried to sustain public expenditure levels through external borrowing, but were eventually forced to implement economic policy reforms and curtail public spending. The social sectors, including education, did not escape the effects of these adjustment policies.

Average trends in per-pupil expenditure varied considerably between countries at different income levels. Recurrent education expenditures per primary pupil declined by 25% from $41 in 1975 to $31 in 1985. Over the same period, however, middle- and high-income nations stepped up spending levels. Between 1965 and 1985, per pupil expenditures increased from $73 to $102 in lower middle-income countries, from $194 to $297 in upper middle-income countries, and from $825 to $1,551 in high income countries. The education investment gap is widening between developed and developing countries. In 1965, industrial countries spent 14 times more on each primary pupil than did low-income countries; in 1985, they spent fifty times more. (See Figure 2).

In low-income countries, recurrent per-pupil expenditures as a percentage

of GNP per capita also fell from 20% in 1965 to under 12% in 1980. Over the same period, this indicator remained fairly stable in lower middle-income countries, rose from 10.6% to 12.5% in upper-middle income countries, and increased from 11.7% to 17.6% in high-income countries. (See Figure 3).

Figure 1 Median Public Expenditures on Education as a Percentage of GNP, by Country Income Level, 1965-85

Source: Lockheed & Verspoor (1990)
Figure 2 Median Public Recurrent Expenditures Per Primary Pupil by Country Income Level, 1965-85

Figure 3  Median Public Recurrent Expenditures Per Pupil as a Percentage of GNP, by Country Income Level, 1965-85

The Consequences of Public Budget Constraints

The impact of public expenditure reduction on educational spending has been exacerbated by two features of the educational expenditure. First, because education is a labor-intensive enterprise, the component of capital investment in the education budget is usually low, but that of recurrent spending is very high. Much of the recurrent spending goes for teachers' salaries, and, usually, only a small portion of the budget is allocated for the provision of books, educational supplies and teacher training. For example, in the 1980s, the median percentage of the education budget spent on teachers' salaries ranged from 95.3% for low-income countries, 91% for lower middle-income countries, to 76.1% for high-income countries. (See Table 3). Therefore, a reduction in spending means in education more than cutting the investment budget and postponing new construction; it immediately affects the day-to-day operation of the entire system.

Table 3  Expenditures on Teacher Salaries in Relation to Government Recurrent Expenditures on Primary Education, in the 1980s

<table>
<thead>
<tr>
<th>Country Income Level</th>
<th>Median Percentage Spent on Teachers' Salaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>95.3</td>
</tr>
<tr>
<td>Lower Middle</td>
<td>91.0</td>
</tr>
<tr>
<td>Upper Middle</td>
<td>87.9</td>
</tr>
<tr>
<td>High</td>
<td>76.1</td>
</tr>
</tbody>
</table>


Second, because of the rigidity in the structure of salaries, the initial cut in recurrent expenditure usually targets the non-salary recurrent expenditure for textbooks, instructional materials and in-service teacher training. (See Box 1.) The effects of public budget constraints on the availability of educational materials have been severe. The average central government expenditure for educational materials per student in 1985 was about 80 cents in low-income countries, $1.8 in lower middle-income countries, and $5.5 in upper middle-income countries, as compared with $52.4 in high-income countries. (See Table 4.)
Box 1: The Impact of Adjustment on Education

A study of countries undertaking structural adjustment in 1979-83 found that 68% of them reduced educational expenditure, while defense spending was the most protected budget. In Central African Republic, Costa Rica, Jamaica, Kenya, Malawi, and Mauritius, public spending on education as a percentage of GNP declined by 0.8%, almost twice the reduction experienced by lower-middle income countries in general.

Countries typically responded to the financial crisis by cutting expenditure on items least likely to arouse opposition by their absence, and by avoiding the nominal reduction of teachers' salaries and the retrenchment of staff that can cause a political uproar. Instructional materials, school supplies, and travel were the first to be cut with adverse impact on teaching, supervision, and administration.

In Zambia, for example, teachers' salaries continued to increase from 81% of primary education expenditure in 1974 to 91% in 1983, an increase achieved at the expense of instructional materials and administrative support. Over the same period, per primary pupil expenditure declined by 37% in real terms, as the expansion in enrollment was not matched by a proportionate increase in the teaching service.

Sources: Pinstrup-Anderson, Jamarillo, & Stewart (1987); Auerhan et al. (1985); and Lockheed & Verspoor (1990).

Table 4 Central Government Expenditures on Teaching Materials

<table>
<thead>
<tr>
<th>Country Income Level</th>
<th>Average Expenditure per primary pupil (1985 $)</th>
<th>Number of Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>0.8</td>
<td>18</td>
</tr>
<tr>
<td>Lower Middle</td>
<td>1.8</td>
<td>18</td>
</tr>
<tr>
<td>Upper Middle</td>
<td>5.5</td>
<td>15</td>
</tr>
<tr>
<td>High</td>
<td>52.4</td>
<td>9</td>
</tr>
</tbody>
</table>

Average is weighted by country-level primary student enrollments.

Finally, currency devaluations, which often form part of the adjustment package to curb inflation and stimulate exports, have had the effect of raising the prices of all imported educational supplies, including paper for textbooks and other educational materials. This certainly has affected a country's capacity to provide textbooks for its children.

Reductions in public expenditures thus severely affect the quality of education. Spreading resources more and more thinly has a high cost in terms of education effectiveness. Dropout and repetition from primary schools are so high in low-income countries that they have to pay for as many as nine years of education simply to produce one fifth-grade graduate. (See Table 5.) This inefficiency accounts for as much as 30% of the primary education budget in many countries, a huge percentage at any time but especially in times of austerity. Investments in textbooks and instructional materials can shorten the time for a pupil to progress through primary school, resulting in significant savings amounting in the case of Northeast Brazil to as much as four dollars for each dollar invested. (See Table 6.)

Table 5: Cost in Years of Producing One Fifth Grade Graduate in Developing Countries

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>8.8</td>
<td>8.6</td>
<td>9.0</td>
</tr>
<tr>
<td>Lower middle</td>
<td>7.6</td>
<td>7.4</td>
<td>7.2</td>
</tr>
<tr>
<td>Upper middle</td>
<td>6.5</td>
<td>6.4</td>
<td>6.3</td>
</tr>
<tr>
<td>High</td>
<td>6.0</td>
<td>5.6</td>
<td>5.4</td>
</tr>
</tbody>
</table>

Source: UNESCO
Table 6: Benefit-cost Ratios for Selected Educational Investments in Brazil (fourth grade)

<table>
<thead>
<tr>
<th><em>Dollars saved per dollar invested in:</em></th>
<th>Rural Northeast Brazil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software (textbooks, school supplies)</td>
<td>4.03</td>
</tr>
<tr>
<td>Hardware (furniture, electricity, running water)</td>
<td>2.39</td>
</tr>
<tr>
<td>In-service teacher training by distance education</td>
<td>1.88</td>
</tr>
</tbody>
</table>

* The estimated cost of years saved valued at $30 per student year.

Source: Lockheed & Verspoor (1990)

To raise low and lower middle-income countries to the material input level of upper middle-income countries would require spending an additional four to five dollars per pupil, costing as much as one billion dollars a year in the next ten years. For low-income countries, this five-dollar increase would raise the primary education budget by 20% and the total education budget by 10%, a significant investment that few countries can afford without adjustment in national or sectoral budget priorities. For lower middle-income countries, this budget increase would be less dramatic, representing only a 4% increase in the primary education budget and a 2% increase in the total education budget.

The severe impact of reduction in education expenditure on the quality of education in times of economic uncertainty thus warrants urgent attention. It is absolutely critical that resources be found to assist the low- and lower middle-income countries in establishing reasonable standards of quality in their education system. The World Conference on Education For All has resulted in an impressive recommitment of the international community to educational development. Ensuring the availability of textbooks is the obvious first step. The return on these investment is very high especially in the poorest countries.
IV. World Bank Lending for Textbook Provision

Today, financing for textbook provision is central to the World Bank's lending for education. In the 1960s and early 1970s, however, the contribution of textbooks and educational materials to education was not fully appreciated, with the result that support for these inputs was rarely integrated to broader programs for improving instructional quality. The provision of textbooks was often an isolated, unsupported input.

With the gradual realization of the importance of textbooks in educational quality, the Bank has paid increasing attention in its lending to the provision of textbooks. At present, textbooks are almost always provided in conjunction with other elements of educational change such as curriculum modification, teacher training, and development of institutional capacity to provide textbooks.

From FY63 to FY90, the World Bank financed a total of 396 educational projects, of which 124 projects had textbook components. These ranged from textbook feasibility studies, buildings textbook offices, technical assistance, and the production of supplementary educational materials to the preparation, provision, and distribution of textbooks.

The proportion of textbook projects in Bank lending has been increasing steadily, from less than 10% before 1978 to 32% in FY79-83. In FY84-88, 52% of the education projects included a textbook component. In FY89-90, 71% of the projects of that fiscal year had textbook components. (See Tables 7 and 8.)

Table 7: Distribution of Textbook Components in Education Projects by Fiscal Year

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>No. of Projects</th>
<th>Projects with Textbook Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Before 74</td>
<td>89</td>
<td>5</td>
</tr>
<tr>
<td>74-78</td>
<td>85</td>
<td>14</td>
</tr>
<tr>
<td>79-83</td>
<td>90</td>
<td>29</td>
</tr>
<tr>
<td>84-88</td>
<td>91</td>
<td>47</td>
</tr>
<tr>
<td>89-90</td>
<td>41</td>
<td>29</td>
</tr>
<tr>
<td>Total</td>
<td>396</td>
<td>124</td>
</tr>
</tbody>
</table>

Source: World Bank data.
Table 8: Distribution of Textbook Components in Education Projects, by Region, FY63-90

<table>
<thead>
<tr>
<th>Region</th>
<th>Total Projects</th>
<th>Projects with Textbook Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Africa</td>
<td>139</td>
<td>48</td>
</tr>
<tr>
<td>Asia</td>
<td>108</td>
<td>43</td>
</tr>
<tr>
<td>EMENA</td>
<td>81</td>
<td>14</td>
</tr>
<tr>
<td>LAC</td>
<td>68</td>
<td>19</td>
</tr>
<tr>
<td>Total</td>
<td>396</td>
<td>124</td>
</tr>
</tbody>
</table>

Source: World Bank data.

Nonetheless, with the exception of three textbook projects in the Philippines and Indonesia, textbook components have been only one am\several in Bank educational projects. Textbook components accounted for less than 10% of the project cost in half of the projects, and between 10% and 40% in the other half. Almost all textbook components represent less than 25% of project costs.

The Bank's broad support for textbook projects has generally improved the situation of textbook availability. More recent textbook projects have tended to look not only at book authorship, publication, and production but also at distribution, affordability and system maintenance, with the aim of developing sustainable systems.
V. The Quality of Textbooks

Besides availability, an equally important problem that has long been neglected but requires urgent attention is the quality of textbooks, in terms of both content and pedagogy, as well as production standards. The review of surveys on textbook availability and quality has found that many textbooks in developing countries are full of factual and grammatical inaccuracies. They are poorly illustrated, and the text language is often too difficult for children of the targeted age-group.

A recent Bank-commissioned study examined mathematics and reading/language books for pupils for grades one, three, and five in fifteen developing countries with the objective of identifying the cognitive skills taught at each grade level. Using refined versions of Dossey's (1988) levels of mathematics proficiency and Chall's (1983) reading stages to identify the skills and their developmental order, the study has the following conclusion:

"The results of the analysis of mathematics textbooks revealed that "number skills" were emphasized apparently at the cost of other mathematics skills (measurement, pictorial representation, shape, and money) and this was particularly marked in grade 1 textbooks which also neglected early work in mathematics. In general, the mathematics books required pupils to undertake work which was above expectations for the grade....The analysis of the reading/language arts books revealed some unrealistically high expectations of the level of work pupils were able to tackle, particularly in view of the paucity of "pre-reading" activities and of the later "immersion in books" in developing countries. The grade 1 textbooks used in lower middle-income countries emphasized pre-reading skills more than the other countries...."17

In short, poorly prepared pupils taught by poorly trained teachers are confronted with textbooks that are often more difficult than those used in economically more endowed countries. This often results in failure and frustration from which many never recover.

In addition, textbooks in developing countries have a wide variety of physical production standards, from very poor ones in Pakistan and Turkey to very high ones in Sierra Leone after implementation of a World Bank-supported textbook project. In the former cases, textbooks do not last for one school

15 Paxman, Denning and Read, "Analysis of Research on Textbook Availability and Quality in Developing Countries."

16 Cope, Denning and Ribeiro, "Content Analysis of Reading and Mathematics Textbooks in Fifteen Developing Countries." processed. (London: Book Development Council, 1989).

17 Ibid, p. i.

18 Paxman, Denning and Read, "Analysis of Research on Textbook Availability and Quality in Developing Countries."
year, and parents have to buy them several times during a year, or pupils have to go without them.

Furthermore, the quality of editorial, design, and layout also exhibits a great variation, ranging from black-and-white textbooks prepared by untrained and inexperienced units to four-colored professionally designed textbooks published by commercial publishers. Experience suggests that poor physically quality are not attractive to children, and that poor sequencing of material and inappropriate levels of difficulty discourage learning.

In sum, the mere emphasis on provision can no longer be sufficient, and investments will be necessary to enhance the effectiveness of textbooks. The quality of a textbook will be determined first and foremost by its content and pedagogy. For textbooks to make an impact on teaching and learning, urgent attention must be paid to the sequencing of material, introduction of progressively complex cognitive skills, and improvement of readability of texts. No less important is the need to ensure the minimum physical production standards. There is a range of options in textbook design affecting the choices for the quality of cover, paper, and the number of colors. Provided a country selects a strategy that fits its particular socio-economic and educational situation, it is possible for all countries to provide basic textbooks to their children. (See Boxes 2 and 3).
Box 2: Textbook Provision: Mexico, Lesotho, and Brazil

There are cases of successful provision of textbooks. The Mexican government, which viewed education as an investment rather than an expense, nationalized the publication of textbooks for primary schools in 1959. Since then, it has been providing free textbooks for primary schools. Distributed through a system of railroads, trucks, and even mules, textbooks have been made available to remote rural areas. In terms of cost, the production and distribution of free primary school textbooks in 1980 accounted for less than 0.5% of the total budget for education, a relatively insignificant investment that has yielded significant learning outcomes. Today, most of the textbooks are well illustrated and in four colors, although they are printed on newsprint and are designed to last for only a year. Mexico's free textbook program has been considered "a unique accomplishment for a developing country with limited resources."

The textbook project in Lesotho is another example of how textbooks can be made available with the support of external donors and using a revolving fund. In 1987, it was estimated that about 70% of the primary students in Lesotho could not afford to buy textbooks. Supported by USAID and World Bank funds, the textbook project was set up to provide for the purchase and distribution of textbooks and workbooks in core subjects to all primary school children. A revolving fund was established for pupils to rent their books and pay only a fraction of the full cost of buying them. Pupils from very poor families could apply for exemption from book rental fees. The revolving fund has been used to provide for the replacement of books after the credit period has expired. This financing method, among other institutional building and distributional arrangements, enabled the objective of providing textbooks in core subjects to be met.

The World Bank-assisted project in Northeast Brazil, the poorest region in the country, is another success story. In 1980, targeted schools were provided a package of inputs, including software (textbooks, writing materials, and school supplies), hardware (furniture, new or repaired facilities, electricity, and running water), and teacher training. Evaluations show that investments in these cost-effective inputs boost student learning and reduce repetition and dropout. An investment of $1 in textbooks and writing materials shortens the average length of time for a student to progress from the second grade to the fourth by almost two months, thereby reducing the total costs of producing a fourth grade student. Savings from investments in software are four times the original cost of the investment, those from investments in hardware are 2.39 times, and those from investments in distance in-service teacher training are 1.88 times. Spending $5 per pupil ($1.5 on textbooks, $1.5 on writing materials, and another $2 for teacher training) could result in a 27% improvement over the average achievement score of pupils not provided these inputs.

Box 3: Costs of Textbook Provision

Textbook provision is within the affordable range for many low-income countries. This is illustrated by recent projects in two widely disparate countries (one, a large country in sub-Saharan Africa, the second, a small Pacific island country):

<table>
<thead>
<tr>
<th>Country</th>
<th>Quantity</th>
<th>Pupil:Book Ratio</th>
<th>Average Cost Per User Per Year ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tanzania</td>
<td>11,190,000</td>
<td>3:1</td>
<td>0.11</td>
</tr>
<tr>
<td>Vanuatu</td>
<td>130,000</td>
<td>2:1</td>
<td>0.32</td>
</tr>
<tr>
<td><strong>Secondary</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tanzania</td>
<td>480,000</td>
<td>2:1</td>
<td>0.83</td>
</tr>
<tr>
<td>Vanuatu</td>
<td>49,000</td>
<td>1:1</td>
<td>0.79</td>
</tr>
</tbody>
</table>

Source: Cost estimates in World Bank Education Project Appraisal Reports.
VI. Using Textbooks to Improve Educational Quality

Framework for Publishing for Developing Countries

No country can escape the need to ensure the availability of an adequate supply of textbooks. In publishing for the developing world, it is imperative to take into consideration the levels of educational development of a country. What is appropriate content in one country may not be so in another country. There is a range of options that every country must consider.

More than 20 years ago, Beeby conceptualized educational development as a four-staged growth process, moving from pre-professional to formal, transitional and professional phases. His model can be linked with Hall's notion of in-service teacher training that proceeds from non-use, mechanical use, routine use to refinement and integration of instructional materials. These two models can be quite useful in providing the framework for developing appropriate textbooks for developing countries. In the application, three principles are of critical importance:

- In educational development, the teacher is both the critical resource and a major constraint; to help the teacher's professional development is the key to success.
- Educational development is a cumulative process; progression from one phase to the next depends on the teacher's mastery of the subject area and instructional techniques in the previous stage.
- Improvement is determined by the extent to which the teacher uses the innovations effectively, which will be greatly helped through a comprehensive package including textbooks, writing materials, in-service training, and professional support.

The pre-professional stage (or Dame School in Beeby's words) is often characteristic of the most deprived schools in low-income countries. Teachers are poorly educated, untrained, and unmotivated, with questionable mastery of the subject content. The curriculum has narrow subject content, and is unfamiliar to teachers. Drop-out in early grades is high.

Often, only one textbook is available per class; other instructional

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materials are absent. Teaching techniques include recitation and copying the texts on and off the blackboard; the emphasis is on rote memorization. Supervision is sporadic, and support is rare. Teachers are unaware of alternative methods of instruction. The per-pupil expenditure for textbooks and materials is often one dollar or less per year.

To introduce change in this stage entails strengthening supervision and support; bringing order to the school; providing highly structured teacher's guides, textbooks, and basic instructional materials; training teachers in the subject matter and a few basic teaching techniques; and helping them see the possibility of improvement.

In the stage of formalism, teachers have basic general education, but little professional training. They have moderately mastered the subject matter, and have incidental contact with colleagues through in-service training. They are also a little more interested in professional improvement, but can be easily discouraged. The curriculum is highly structured, emphasizing the three R's. Standards are imposed by examinations. Repetition is accepted as a means to maintain uniformity. Textbooks are used in a mechanical fashion.

A total of one or two textbooks (most of them in core subjects) are available for every pupil in core subjects. However, other instructional materials are minimal, and expenditure for textbooks and materials is often two dollars or less per pupil per year. Teaching emphasizes memorization and adheres closely to syllabi and curriculum sequences. Instructional techniques are rigid and uninspiring. Supervision is occasional and stresses compliance with rules and procedures. In-service training is available only infrequently, focusing on dissemination of structured programs and standardized application of curricula and materials. Teachers are uncertain about innovations, and partially adapt them according to their personal and professional capacity and motivation.

In this stage, innovations should aim at broadening the curriculum; increasing the availability of textbooks; providing teachers' guides and textbooks to set standards; providing performance feedback through tests and examinations; and increasing competence of teachers through training, supervision, and school-level support.

In the stage of transition, teachers have adequate general education and training, and have mastered the subject matter. They also have occasional contact with colleagues, and are interested in improving student performance. Curricular goals are broader, but syllabi are still heavily dominated by examination. Little attention is paid to the emotional and creative development of children. The use of textbooks has become routine.

Textbooks and instructional materials are available, and selective use of them begins to occur. The per-pupil expenditure on textbooks and materials is about five dollars per year. The school may also have a small library. While memorization still plays an important role, there are attempts to introduce problem-solving strategies. Medium-term planning helps teachers use textbooks and materials in a more goal-oriented way. Some tracking of students may occur. Supervision becomes more frequent and is less oriented towards compliance. In-service training is also more frequent, emphasizing the application of teaching. While teachers are skeptical about immediate
effects, they are willing and able to make honest efforts to adapt innovations for the ease of classroom management and standardized application.

Under this condition, improvement programs should focus teaching more on understanding, introduce some diversity and flexibility in the curriculum, pay some attention to emotional/creative development, and promote professional exchange between teachers.

In the stage of full professionalism, teachers are well educated and well trained. They have good subject mastery and frequent contacts with colleagues, and are interested in improving student performance. Meaning and understanding are emphasized in a wider curriculum. Allowance is made for variation in content and methods. Considerable attention is paid to pupils' emotional and creative development. Textbooks are fully integrated in this teaching of "meaning and understanding."

Textbooks are broadly available, with supplementary reading materials and reference books. The per-pupil expenditure on textbooks and materials is likely to range from over fifty to one hundred dollars. The school library is well-stocked. A variety of instructional materials is used to develop habits of learning, and the ability to investigate new ideas. Longer-term instructional planning allows teachers to adapt materials and curriculum sequence to student needs. Individualized and multi-group instructions are possible.

The school principal becomes a source of pedagogical support, and external assistance is available as needed. Training emphasizes the development of professional skills, allowing teachers to select appropriate instructional approaches in each situation. Teachers are willing to try alternative strategies, and confident in their own ability to meet the needs of particular groups of students. At this stage, it is possible to make innovation a permanent feature of the system. (See Table 9.)
<table>
<thead>
<tr>
<th>Teachers</th>
<th>Curriculum</th>
<th>Textbooks</th>
<th>Teaching Techniques</th>
<th>Supervision/Support</th>
<th>Response to Innovation</th>
<th>Possible Change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-professional</strong>&lt;br&gt;Poorly educated, untrained &amp; unmotivated, with questionable mastery of content.</td>
<td>Narrow content, with emphasis on 3 Rs; low standards &amp; high wastage.</td>
<td>One textbook per class used by teacher; near total absence of instructional materials. Less than $1 per pupil per year.</td>
<td>Recitation and role learning.</td>
<td>Sporadic supervision; emphasis on control; absence of support.</td>
<td>Ignorant of innovation.</td>
<td>Provision of textbooks, teachers' in-service training in subject matter &amp; basic techniques.</td>
</tr>
<tr>
<td><strong>Formalism</strong>&lt;br&gt;Lower secondary education with little training, &amp; moderate subject mastery.</td>
<td>Highly structured &amp; exam-oriented; high repetition.</td>
<td>1 or 2 textbooks per pupil in core subjects. $2 per pupil per year.</td>
<td>Rote memorization; rigid use of single technique.</td>
<td>Occasional supervision; emphasis on compliance; infrequent in-service training.</td>
<td>Uncertain about how to apply innovation.</td>
<td>Broaden curriculum; increase subject matter use textbooks guides to standards.</td>
</tr>
<tr>
<td><strong>Transition</strong>&lt;br&gt;Secondary education, with adequate subject mastery, &amp; occasional professional contact.</td>
<td>Broader curricular goals.</td>
<td>Several textbooks for every pupil. $5 per pupil per year.</td>
<td>Beginning to use the approach of learning-by-doing.</td>
<td>More frequent supervision &amp; in-service training.</td>
<td>Willing to try new methods.</td>
<td>Focus on understanding; diversify curriculum; promote professional exchange.</td>
</tr>
<tr>
<td><strong>Professional</strong>&lt;br&gt;Well-educated, well-trained, &amp; motivated.</td>
<td>Emphasis on meaning &amp; understanding; attention to emotions &amp; creativity.</td>
<td>Broad availability of textbooks &amp; materials. More than $50 per pupil per year.</td>
<td>Inquiry approach.</td>
<td>Principal is a source of support. Regular in-service training is provided.</td>
<td>Focus on student needs.</td>
<td>Innovation becomes permanent.</td>
</tr>
</tbody>
</table>

Conclusions and Recommendations

A general lesson that can be drawn from the above discussion is that in designing a textbook project for a particular phase of development of the educational system, it is important to take into consideration the resource availability, curriculum requirements, the levels of teacher professionalism, the degrees of supervision and support, and the availability and utilization of textbooks and other instructional materials. These ambitious innovations can be introduced only gradually and over an increasingly large area at appropriate times.

For textbook projects trying to support programs that aim at moving an education system from the pre-professional stage to the mechanical stage, supplying textbooks to all schools using an existing curriculum content would often be appropriate. Since poorly educated teachers depend heavily on textbooks for guidance, serious attention need to be paid to the academic and pedagogical quality of the textbook, to ensure factual and grammatical accuracy, to ease in progressively complex concepts, as well as to pitch the levels of difficulty and readability at the right level for the targeted age-groups. Attention should also be paid to the editorial and design quality to make textbooks attractive to both teachers and students.

Once minimum teacher training, basic instructional materials, and basic disciplines and supervision structures have been in place, some diversity in instructional techniques can be introduced. Textbooks and teachers' guides are the essential instruments to help teachers overcome their uncertainty and become more confident in their subject mastery and classroom management.

When the teachers have gained sufficiently in subject mastery and self-confidence, they can be given more latitude to adapt the syllabi to accommodate the diverse needs of pupils. At this stage, there is a growing demand for more diversified instructional materials and textbooks.

To move from the routine stage to that of full professionalism, the curriculum objectives will increasingly emphasize self-directed inquiry. As instruction becomes individualized, a large supply of textbooks and reference materials are required to accommodate the variety of learning needs and instructional approaches.

In conclusion, textbooks have an important contribution to make to the improvement of instructional quality in all stages of educational development. To maximize their potential contribution, they must be designed to fit the specific conditions prevailing in each country. Fortunately, textbooks represent a highly flexible educational technology and they can be adapted to fit the financial possibilities and instructional needs of countries at different levels of development.
REFERENCES


Haron, I. "Social Class & Educational Achievement in a Plural Society:


Schiefelbein, E. and Simmons, J. "Determinants of School Achievement: A Review


