Unit Costs and their Determinants

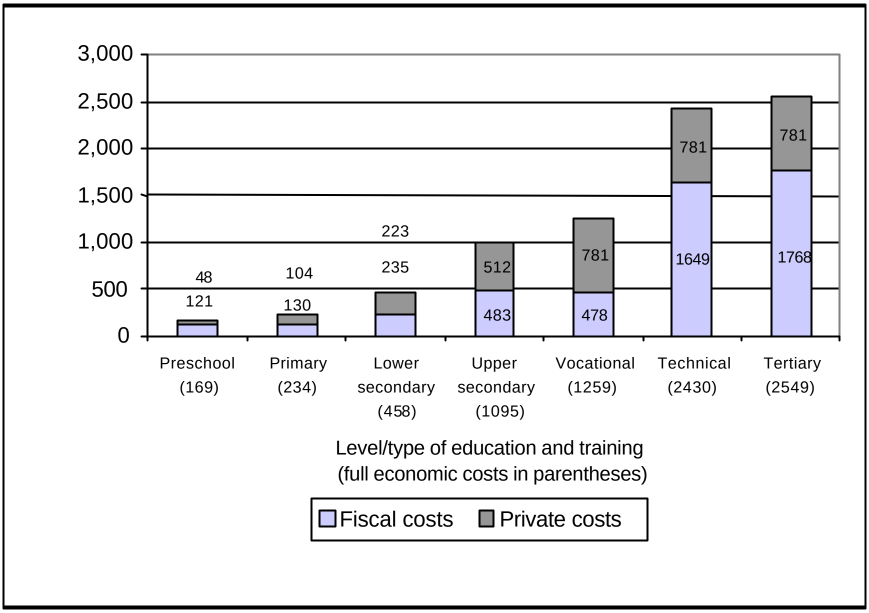
Statistics on unit costs are an important guide to policymakers. Particularly important are unit costs by level of education (i.e., preschool, primary, secondary, and tertiary), though sometimes statistics are also needed for particular subjects (e.g., science or languages), for different streams (e.g., academic or technical), and for different parts of a country (e.g., different provinces).

Meanings and Examples

Most commonly in the present context, the term unit cost means the cost of a school place occupied by a single student for one year (Coombs and Hallak 1987, 51). However, this definition says nothing about attendance (i.e., whether pupils actually occupy the spaces allocated to them). Nor does the definition say anything about the quality of teaching or learning. Pursuit of qualitative dimensions might suggest a need to calculate the costs of changes in knowledge, skills and/or attitudes rather than mere provision of school places. Moreover some analyses focus on the unit costs per graduate, which requires inclusion of repetition and dropout rates in the calculation.

Figure 2 provides an example of the ways in which unit costs may be portrayed by giving data from Viet Nam. This particular figure is especially valuable because it shows private costs as well as public ones (which are here described as fiscal costs). The general progression in unit costs, from preschool to tertiary, matches patterns in other countries. Among the striking

Figure 2: Annual Costs Per Student, by Level, Viet Nam, 1994
(Dong '000)



Note: Data refer only to public institutions.

Source: World Bank 1997d, 68.

Table 9: Estimated Recurrent Unit Costs by Level, PRC, 1994

	Recurrent unit cost to govt. (Yuan)	Personnel (%)	Total recurrent unit cost (Yuan)	Personnel (%)
General elementary	238	92.3	340	73.8
Vocational secondary	842	80.6	1,307	57.5
General secondary: Junior	451	88.7	645	69.0
General secondary: Senior	883	84.2	1,296	63.3
Apprentice school	1,188	63.3	1,912	48.9
Specialized secondary	1,901	66.1	2,588	54.7
Regular higher education	5,048	59.1	6,022	54.9

Source: Jiang 1996, 29.

Table 10: Unit Recurrent Costs per Full-Time Equivalent in Higher Education, Viet Nam, 1993-1995
(Dong '000)

Field of study	***1993***	***1994***	***1995***
General	997	1,466	1,765
Agroforestry	2,191	3,095	5,201
Medicine	1,959	2,792	2,860
Economics and Law	783	1,008	901
Art, Culture, and Sport	1,632	2,469	2,993
Teacher Training	1,431	1,891	1,866
Science and Technology	1,272	2,078	1,577
All higher education	1,289	1,818	1,812

Source: World Bank 1997d, 49.

features of the Viet Nam data are that unit costs in technical education are almost the same as those in tertiary education. Similar patterns have been found in Lao PDR (Mingat 1996). Table 9 provides another example with data from the PRC. Estimated total recurrent unit costs in vocational secondary education were 4.3 times the level in general elementary education, while the figure for regular higher education was 17.7 times the figure for general elementary education.

Table 10 takes levels of disaggregation one stage further by indicating unit costs per full-time equivalent (FTE) student in various specializations of higher education in Viet Nam. The statistics show fluctuations in the relative proportions over the three-year period, though consistently show agroforestry as having the highest unit costs, and economics and law as having the lowest. Differences reflected the sizes and locations of institutions as well as equipment and other needs. The fact that teacher training had higher unit costs than science and technology is unusual, and reflects questionable formulas for allocating government funds (World Bank 1997d, 46-51).

Table 11, taking another example from the PRC, shows unit costs in primary and junior secondary education in eight provinces. As in most other countries, junior secondary has substantially higher unit costs than primary education. This chiefly reflects the fact that junior secondary teachers are paid higher salaries, though also reflects differences in buildings and learning

Table 11: Unit Costs by Level and Province, PRC, 1995
(Yuan)

Province	*Primary*	*Junior secondary*
Beijing	1,015	1,923
Shanghai	1,435	1,903
Guangdong	704	1,236
Zhejiang	679	970
Sichuan	343	592
Shaanxi	261	589
Jiangxi	284	441
Guizhou	186	385

Source: Min 1997, 150.

materials. Even more striking are the interprovincial variations. Average unit costs at the primary level in Beijing are over five times the costs in Guizhou.

Planners may also wish to know the unit costs of institutions of different types at the same level. In Nepal, for example, unit recurrent costs of government-aided secondary schools in 1992 were NRs2,098 compared with NRs1,545 in community secondary schools and NRs6,008 in the private sector (World Bank 1994b, 58).

Goals, Determinants, and Manipulable Variables

An initial question for policymakers who have reviewed statistics such as those presented in Tables 9-11 is whether they should seek to hold unit costs constant, decrease them, or increase them. Unit costs can also be described as unit expenditures. The authorities in the PRC might consider, looking at Table 11, that expenditures in Guizhou Province should be raised rather than lowered, in order to reduce regional inequalities. Much depends on the policymakers' dominant goals – and, of course, on available resources.

Further scrutiny of statistics such as those in Tables 9-11 would require distinction between recurrent and capital costs. Education remains a strongly labor-intensive activity, especially at the lower levels. Despite efforts in some contexts, only in unusual circumstances have teachers even partly been replaced by machines. Because of that, as illustrated by Table 9, the proportion of salaries in unit costs is typically very substantial. Capital costs, in the form of buildings and equipment, tend to become more visible at higher levels of education. The chief explanations for greater unit costs at higher levels of education and in some specialties are that the teachers are paid more, class sizes tend to be smaller, and buildings and equipment are more elaborate, particularly in some specialties. In Lao PDR, for example, teachers' salaries formed 83.8 percent of public recurrent costs at primary level, but 80.6 percent at junior secondary level, 35.5 percent in teacher education, 34.1 percent in higher education, and only 28.7 percent in technical/vocational education (Mingat 1996, 16).

These remarks already indicate some manipulable variables. Since teachers' salaries are generally the largest single item in education expenditures, they are a sensible place to begin analysis. In Singapore, teachers are considered to be well paid in comparison with other professions, especially at the starting point on the salary scale. However, teachers in Cambodia are paid so poorly that an official salary is inadequate even for one person to live on, let alone a whole family. That is not to say that the Government of Singapore should leap to reduce teachers' salaries and that the Cambodian Government should immediately increase them. The authorities in Singapore are not under strong pressure to reduce salaries because they have regular budget surpluses; and in any case, they consider it important to maintain the attractiveness of the teaching profession in comparison with other occupations. The Cambodian Government, by contrast, would certainly like to increase teachers' salaries; but that move would create a massive wage bill which would in turn demand mechanisms for increased generation of revenue and/or redistribution of existing expenditure, which are not easy to accomplish.

These remarks also raise questions about cross-national analysis of unit costs. Such analysis highlights the fact that a primary school child in Singapore is the beneficiary of vastly more abundant resources than a child in Cambodia, which in turn may provide leverage for international aid of various sorts. However, beyond such observations, cross-national analysis of unit costs may be of limited value. Similar comments apply to cross-national tables on unit expenditures on education as a proportion of per capita GNP (see e.g., Tan and Mingat 1992; UNESCO 1998). Such tables may provide another indicator of the relative emphasis that governments place on education; but it may be arguable that education in poor countries is underresourced even when it receives per unit the same proportion of GNP per capita as in rich countries.

If policymakers and planners find that they must, for fiscal or other reasons, largely take teachers' salaries as fixed, they may still seek to secure maximum benefits from teachers by encouraging high productivity (Buckland 1998; Mehrotra and Buckland 1998). This point links to issues of morale, support, supervision, and availability of complementary inputs such as books and teaching materials. Planners may also adjust unit costs by varying the number of hours teachers are expected to work. Table 12 reports data on teachers' weekly hours of instruction in public primary schools in 77 countries. The statistics are based on official loads, or, in some cases, reported actual average loads. Regional aggregates are quite similar, but within regions are some striking variations. In the Asian and Pacific region, the range is from 18.0 hours in Japan to 36.0 hours in Bangladesh.

Such figures may be supplemented with statistics on the duration of school years. Table 13 shows data on the official numbers of class hours during the first four years of public primary education in 10 Asian and Pacific countries. Again the variation is striking, with the Philippines at the top and Japan with the Republic of Korea at the bottom. This contrast is especially striking given the reputations that Japan and the Republic of Korea have for much greater achievements in teaching and learning than the Philippines.

Realizing that these figures tell only part of the story, the next question for planners would be precisely what the teachers do in the times they are officially working and in the hours available each year. Planners would also want to know how far the official hours translate into actual hours, and how far they are

Table 12: Primary School Teachers' Weekly Hours of Classroom Teaching, by Country and Region

Country	Hours
Sub-Saharan Africa	
Angola	26.0
Benin	28.0
Burkina Faso	30.0
Cameroon	27.5
Chad	25.0
Congo	27.0
Côte d'Ivoire	30.0
Ghana	22.5
Guinea	30.0
Madagascar	23.0
Mali	26.5
Mauritania	30.0
Sudan	24.0
Swaziland	29.0
Togo	28.0
Tanzania	16.0
Uganda	22.0
Zaire	27.0
Zimbabwe [a]	29.0
Average	*26.3*
Asia and Pacific	
Afghanistan	24.0
Australia	23.0
Bangladesh	36.0
PRC	19.0
Japan	18.0
Korea, Rep. of	26.5
Lao PDR	25.0
Myanmar	25.0
Philippines	31.5
Thailand	25.0
Average	*25.3*
North and South America	
Argentina	22.5
Belize	27.5
Brazil [a]	25.0
Canada [a]	41.0
Chile	30.0
Costa Rica	20.0
Cuba	25.0
Ecuador	25.0
Haiti	20.0
Honduras	25.0
Mexico	20.0
Nicaragua	25.0
Panama	26.5
Paraguay	20.0
Peru	30.0
Uruguay	20.0
Venezuela	25.0
Average	*25.1*
Central Europe and Former Soviet Union	
Belarus	27.0
Bulgaria	20.0
Croatia	19.0
Czech Republic	23.0
Hungary	20.0
Poland	18.0
Slovakia	22.0
Uzbekistan	14.0
Former Yugoslavia	24.0
Average	*20.8*
Middle East and North Africa	
Algeria	30.0
Egypt [a]	24.0
Iran	28.0
Kuwait	20.0
Libya	20.0
Oman	17.0
Qatar	32.0
Saudi Arabia	18.0
Syrian Arab Rep.	30.0
Tunisia	25.0
Turkey	18.0
U. Arab Emirates	34.0
Average	*24.7*
Western Europe	
Austria	20.0
Denmark	18.7
France	24.0
Germany	26.5
Italy	22.0
Luxembourg	23.5
Malta	27.5
Norway	22.5
Portugal [a]	35.0
Spain	25.0
Average	*24.5*
Average for 77 countries: 24.8	

[a] Hours devoted to other education activities are also included.

Source: Amadio 1997, 3.

Table 13: Official Class Hours during the First Four Years of Primary Education

Country	*Grade 1*	*Grade 2*	*Grade 3*	*Grade 4*	*Total*
Philippines	1,000.0	1,000.0	1,133.0	1,200.0	4,333
New Zealand	1,000.0	1,000.0	1,000.0	1,000.0	4,000
Australia (average)	1,000.0	1,000.0	1,000.0	1,000.0	4,000
Malaysia (estimate)	902.0	902.0	902.0	963.5	3,670
Singapore	893.0	893.0	893.0	893.0	3,572
Viet Nam	840.0	840.0	840.0	840.0	3,360
Sri Lanka	760.0	760.0	760.0	1,045.0	3,325
Indonesia (estimate)	570.0	570.0	962.5	1,013.0	3,116
Japan	637.5	682.5	735.0	761.3	2,816
Korea, Republic of	506.5	544.0	589.0	612.0	2,252
Average	810.9	819.2	881.5	932.8	3,444

Source: Amadio 1997, 6.

eroded by absenteeism and by noneducation activities. Some information on these matters is available in some countries, though data have not been systematically compiled in cross-national formats comparable to Table 12. Nevertheless, these observations make the point that planners have variables that can be manipulated.

Another important variable is the pupil/teacher ratio. Table 14 shows a wide range in pupil/teacher ratios at the primary level. According to these figures, the average in the PRC was only 22 but in Bangladesh it reached 63. Pupil/teacher ratios in the PRC are even lower at the junior secondary level, standing at just 15:1 in 1991. However, the PRC Government raised pupil/ teacher ratios as the 1990s progressed. Between 1991 and 1998, the primary school pupil/teacher ratio improved from 22:1 to 14:1 (PRC 2000, 53). An increase in pupil/teacher ratios is one way to permit an increase in teachers' salaries, which is a goal of the PRC Government.

The question about the optimal size of classes does of course have a pedagogical dimension as well as a financial one. Research does not show a strong or consistent correlation between class size and student learning within the range 25-40 pupils (Bishop 1989, 73-4), and technical criteria might therefore encourage policymakers to opt for the upper end of that scale. However, few people would advocate pupil/teacher ratios of the scale evident in Bangladesh. Moreover, in all contexts other factors must also be considered in decision making, including teacher morale, which tends to diminish as class sizes grow. Similar remarks apply to such arrangements as double-shift schooling. Research does not indicate that single-shift schools necessarily produce better student learning than double-shift schools; but political forces arising from public perceptions are also important factors in policy making (Bray 1992b).

Planners in some systems should also look carefully at the number of nonteaching staff at different levels in education systems. Returning to the figures for Lao PDR cited above, one reason why the proportion of recurrent expenditures consumed by teachers was not higher was that institutions had

Table 14: Primary School Pupil/Teacher Ratios and Teachers' Salaries as a Multiple of Per Capita GDP in Selected Developing Member Countries, Around 1992

Country	*Pupil/Teacher ratio*	*Teachers' salary as multiple of per capita GDP*
Bangladesh	63:1	3.2
Bhutan	31:1	4.9
China, People's Republic of	22:1	1.3
India	48:1	3.3
Indonesia	23:1	2.7
Lao People's Democratic Republic	30:1	1.7
Nepal	39:1	3.2
Pakistan	41:1	4.0
Philippines	34:1	1.8
Sri Lanka	29:1	1.3

Source: Chuard and Mingat 1996, 5.

many nonteaching staff. At the primary level, they consumed only 9.0 percent of the public recurrent budget, but in technical/vocational education they consumed 13.8 percent, while corresponding figures for preschools and teacher education were 16.4 and 35.5 percent (Mingat 1996, 16).

The chief reason for manipulating these and other variables should be to secure for education systems the maximum efficiency in which optimal output is gained from the available inputs. Other tools which planners can consider in such a goal include operating multigrade teaching and biennial/triennial intakes for small schools in remote areas, provision of boarding to make schools larger, and use of self-instructional materials for at least part of the curriculum (Windham 1988; Bishop 1989; Chapman 1993; Kumar 1995). Most of these tools have been widely known for decades, and it might be thought that if they have not been applied already then little scope exists for using them now. Such a remark would have some validity; but even a casual survey shows instances in which proposals that previously fell on infertile ground have taken root when reintroduced because the frameworks of decision making and implementation have changed. In the centrally planned economies of the Soviet Union, for example, cost analysis of the type that was routinely undertaken in capitalist societies was relatively rare. Deyoung and Balzhan (1997, 448), commenting on circumstances in Kazakhstan, highlight the value of an education sector survey in the mid-1990s which was based on concepts that are commonplace in most other parts of the world but that were very different from the traditions that had prevailed locally:

> Resource issues ... have been compounded in Kazakhstan by the fact that the costs of delivering well-coordinated and essential education services using some criteria of system-wide efficiency were never determined here or in most former Soviet Republics.

Even in countries that have undergone less dramatic transition, the fact that individuals, cultures, and school systems change means that existing toolboxes may usefully be reviewed to see if tools can be found to improve efficiency. Taking the example of change in education systems, societies, which at one point in history aim to reach remote populations and get children into school by offering boarding places may find at a subsequent point in history that populations have grown, enrollment rates have risen, and large boarding schools could usefully be replaced by smaller day schools which are closer to pupils' homes.

Questions should also be raised about the cost-effectiveness of building designs. To many casual observers, the physical form of a school is the most visible and is therefore taken to be of great importance. However, studies of the effectiveness of teaching and learning indicate that once basic needs are satisfied, further investment in construction is unlikely to repay strong dividends in improved teaching and learning. The portfolios of education architects now contain many designs that can achieve clean, safe, bright, and well-ventilated classrooms at reasonable cost. Community decision making does not always lead to the best designs and to maximum cost-effectiveness; but experience in many countries has shown that costs can be kept down by making good use of local materials and community inputs.

Two final remarks make a link back to the enrollment rates highlighted earlier. First, planners should in general assume that at the level of basic education, the unit costs of reaching the last few percent as enrollment rates rise will be higher than the unit costs at lower enrollment rates. This is because of the additional costs incurred in reaching marginalized populations (Tsang 1994). Such children may live in remote areas, be handicapped, or be simply unwilling to attend school and thus require persuasion. Second, most Asian systems of education are moving or have moved from mass primary to mass secondary education, and some are moving to mass tertiary education. In general, the financial burden of these moves becomes progressively steeper because the unit costs are greater at higher levels.

Dropout and Repetition Rates

When the focus shifts to the cost of producing graduates from segments of school systems, as opposed to the cost of providing a place for a student for a single year, the significance of dropout and repetition rates comes into focus (Fiske 1998).

Some school systems in Asia have greatly reduced their dropout rates, and have thus improved the efficiency in production of school graduates. Table 15 shows substantial increases in the proportions of Grade 1 pupils reaching Grade 4 in seven countries, while Table 16 provides further details on the situation in Indonesia. In the latter, the number of years wasted by pupils dropping out of primary school is estimated to have been reduced from 1,362,000 in 1976 to 801,000 in 1996. Similar reductions were evident at junior and senior secondary levels, and were complemented by improved promotion rates and thus reduced repetition.

However, the gains in other school systems may not be so impressive, and many systems in the region display considerable inefficiencies resulting from dropout. In Bangladesh, for example, only 52 percent of pupils entering Grade 1 in the early 1990s reached Grade 5 (Loxley 1997, 24). In Nepal the figure was 50 percent, and in Bhutan it was 32 percent. These figures suggested that renewed efforts were needed to reduce dropout rates and

Table 15: Percentage of Grade 1 Pupils Reaching Grade 4, Selected Countries

Country	*Around 1980*	*Around 1990*
Bangladesh	32	51
China, People's Republic of	75	89
India	45	68
Indonesia	75	88
Malaysia	99	98
Pakistan	42	52
Philippines	66	79
Sri Lanka	99	99
Thailand	86	91

Source: Mingat 1995, 11.

Table 16: Indicators of Internal Efficiency, Indonesia, 1976 and 1996

	Primary		Junior secondary		Senior secondary	
	1976	1996	1976	1996	1976	1996
Average study time for graduates	6.53	6.38	3.09	3.02	3.10	3.02
Promotion rate	85.20	90.30	89.60	96.20	90.20	93.70
Input-output ratio	0.71	0.81	0.83	0.92	0.84	0.90
Pupil years wasted by repetition ('000)	1,530	954	163	32	180	28
Pupil years wasted by dropping out ('000)	1,362	801	408	216	374	265

Source: Wirjomartono et al. 1997, 26.

improve efficiency. A good starting point for most systems would be publicity campaigns to explain to teachers why the authorities see dropping out as a problem. Dropout rates are influenced by out-of-school factors, such as general poverty and parents' perceptions of the role of schooling in improving the quality of lives. However, in-school factors are also important. Many teachers see dropping out (or pushing out) as a solution rather than a problem, because it is a way to reduce class sizes and remove pupils who are considered troublesome. In some countries, workshops have been used as an effective way to tackle this issue.

The question whether, and to whom, dropping out should be considered a problem or a solution may also apply to repetition. Despite the efforts of many educators and international agencies, repetition rates remain very high in some systems. Often, children are asked to repeat classes for well-intentioned reasons, including maintenance of overall education standards and strengthening the learning foundation for individual children. However, in many cases repetition does not achieve its objectives. Children who have to repeat classes are wasting their lives and raising unit costs for the government and society. Also, children who have to repeat classes are more likely than other children to drop out. A better approach, therefore, is to reduce repetition to a minimum. Such a policy can be justified on education as well as economic grounds (Eisemon 1997).

Technologies – New and Old

New technologies have enormous power to reshape education. Radio and television broadcasts have been widely used in education for some decades; but recent years have brought considerable additional focus on computers and the Internet. The relative cost of computers continues to fall significantly, with the ratio of price to performance falling exponentially. Singapore is among the countries that have made major thrusts in information technology, expecting classroom teachers to make use of computers in their daily lessons. Hong Kong, China is not far behind, and has sent delegations to Singapore to see what can be learned. The Malaysian Government has also embarked on an ambitious program to provide computer literacy for everyone: rich, poor, urban, and rural.

However, policies and strategies are not always straightforward. New technologies can be costly and more complex than they appear at first sight, and they can create new inequalities. Perraton (1994, 1997) is among the people who have addressed this topic, and has stressed that there is no substitute for school. Children need to learn within a social environment, and there is ample evidence that those who do not go to school are disadvantaged when compared with those who do. It follows that the major role of the various technologies is to strengthen schools, not to provide an alternative to them. Care is needed to ensure that existing school provision is not compromised by the diversion to new technologies of resources much needed by schools.

Perraton and Creed (2000) add that there is a severe shortage of hard data on costs and outcomes in this domain. It is clear, however, that the fundamental nature of costs in the domain of technology is different. Whereas in conventional education by far the greatest costs are in staffing, the use of technology demands significant additional costs for computer hardware and software, and for the management of distance education programs. This has four major consequences:

- Because technology requires different kinds of expenditure, the costs of classroom teaching cannot easily be compared with the costs of technology-based teaching. Planners need to know about scale – such as the number of students listening to a broadcast – before they can calculate a cost per student for each learning-hour.
- Since many technologies demand centralized and up-front investment in the production of teaching materials, their costs may be acceptable only if they have large audiences. A radio program or a piece of computer software that costs $50,000 to produce is likely to be uneconomic for an audience of 10, but may be more economic for an audience of 100,000. This fact militates against small countries and against countries with decentralized systems.
- Technology can significantly reduce the costs of education only where it substitutes for teachers. If it is used in the classroom to support or enhance teachers' work with no reduction in the quantity or quality of the teaching force (as reflected in their pay), then technology is most likely to increase education costs.
- Technologies seldom stand alone. Computers in school require support from teachers and technicians; most interactive radio projects assume that there is a teacher in the classroom; and effective distance education usually requires student-support systems of various kinds. These human elements do not allow for the economies of scale that mark the use of communication technology considered by itself.

Enlarging on the mix of inputs, Hülsmann (1999, 81) observes that "text is all important." No matter what the medium, he points out, the fact that educators usually start with a text means that its development always forms a core cost. Moreover, text is generally the most cost-effective medium with the lowest cost per student learning-hour. Table 17 shows figures on development costs per student learning-hour by medium for various materials in the

Table 17: Development Costs of Materials per Student Learning-Hour, by Medium, United Kingdom, 1996

Medium	*Cost per student learning-hour (£)*	*Ratio to print cost*
Print	500	1
Radio	27,000	x50
	15,000	x30
Television	125,000	x250
	90,000	x180
Video	84,000	x170
	18,000	x36
Audio	17,000	x34
CD-ROM	20,000	x40

Source: Hülsmann 1999, 81.

United Kingdom. Video and audio cassettes have considerably higher development costs, and have often been treated by course developers as add-ons that increase the interest and attractiveness of courses and distinguish them from simple correspondence courses. The development costs of text are the same whether presented in print or on screen, so long as the text is not re-edited in hypertext. If the text is simple, with no further facilities such as search capacities, both learners and providers tend to prefer the printed format. The effectiveness of providing enhancements to text depends on the learning objectives. Increased interactivity increases demand on student time so that, for example, hypertext formats are not always seen as an advantage to students and may also disorient them.

Perraton and Creed (2000) add the point that primary education in most countries, and particularly poor ones, is already a low-cost activity. Because of this, few technology-based projects can be justified on the grounds of cost-reduction. Indeed, most of the dramatic stories about widening access in poor countries rely on low technology. Box 3 mentioned the nonformal programs operated by the Bangladesh Rural Advancement Committee (BRAC), which is one widely noted example of a substantial increase in the supply of basic education. Other oft-cited cases are the “escuela nueva” in Colombia and the EDUCO scheme in El Salvador (Rugh and Bossert 1998; Sawada 1999). These programs have relied on community partnership and alternative management structures rather than on high technology.

Nevertheless, Potashnik and Adkins (1996, 2) argue that pilot initiatives can and should be embarked upon, even in societies with too few textbooks and inadequate sanitation facilities. Their assertion is that the introduction of information and communications technology should not wait until a country has reached some predetermined state of economic or education development:

> Even in countries that do not believe in the cost-effectiveness of information technology as a tool for mass education, it is important that they begin acquiring experience using this technology for educational purposes. Otherwise, educators in developing countries will be marginalized in the international dialogue in education. Short-term concerns

for equity at the national level must be balanced by longer-term concerns for equity at the international level.

Moreover, at secondary and tertiary levels of education, unit costs of conventional education are usually considerably greater than at the primary level. This means that new technologies may be attractive as avenues to alternative modes of delivery. Like their counterparts in other regions, many Asian tertiary institutions have made increasing use of distance learning a supplement to, or a replacement for, face-to-face teaching. Since the early 1980s, distance education has expanded rapidly in Bangladesh; PRC; Hong Kong, China; India; Indonesia; Japan; Republic of Korea; Pakistan; Philippines; Sri Lanka; Thailand; and Viet Nam (ADB 1987, 1990, 1997c; Dhanarajan 1996; Wong 1993). Eight of the 18 autonomous distance education universities listed by Moore (1992) were located in Asia. Three of them were highlighted as being among the largest in the world, namely the Indira Gandhi National Open University founded in India in 1985, the Sukhothai Thammathirat Open University founded in Thailand in 1978, and the Allama Iqbal Open University founded in Pakistan in 1974. In addition, the PRC has a whole system of radio and television universities, numbering 45 in 1997/98 (Ding 1999, 182). Smaller in absolute scale, but nevertheless of considerable significance, is a distance education system operated by the University of the South Pacific for its 12 member states.

Table 18 presents some comparative figures on unit costs in distance

Box 3: Internal Inefficiency in Education Systems – Lessons from Bangladesh

Many education systems in Asia have low rates of internal efficiency. In Bangladesh, production of a secondary school graduate in theory requires 10 successive years of schooling. A World Bank study (1996, 6) estimated that in government schools this should require a total cost of Tk14,860. However, high dropout and repetition push the actual investment per graduate to 21.3 years and a cost of Tk34,577. This is equivalent to a waste per graduate of Tk19,717 or 132 percent higher than the standard cycle cost. Thus for every taka spent on primary and secondary education, another Tk1.32 were wasted due to system inefficiency.

Dropout rates also substantially raised the unit costs of graduates from government-run nonformal programs. During the early 1990s, in the Integrated Non-Formal Education Program (INFEP) the dropout rate averaged 20 percent in two-year programs for children and adolescents, 20 percent for the one-year program for adults, and 5 percent for one-year preprimary programs. However, the dropout rate in the three-year programs for adolescents offered by the nongovernment Bangladesh Rural Advancement Committee (BRAC) averaged just 5 percent, and was only 2 percent in the children's program. The sharp difference between government and nongovernment schemes appeared to be partly related to differences in teacher training and supervision. BRAC teachers had more training, and their supervisors were in the field more often. In some cases it is worth investing more in education systems to improve their efficiency.

Table 18: Distance Universities in Asia: Cost and Effectiveness Data

Country/Institution	*Type of cost*	*Cost per student* Distance (1)	Conventional (2)	*(1)/(2) (%)*	*Measure used*	*Rate (%)*
Thailand: Sukhothai Thammathirat Open University	Average cost per student	B7,023	B49,957	14.1	Percent dropouts	50.0
Pakistan: Allama Iqbal Open University	Average cost per student, 1988 estimate	PRs4,585	PRs20,960	21.9	Mean rate of dropouts for all courses	42.5
China Radio and Television University	Average cost per student, 1981	Y1,000	Y2,000	50.0	Percent graduated in 1982 from 1979 enrollees	69.0
Korea Air and Correspondence University	Total cost per student per year, 1981	$125	$1,250	10.0	Percent dropouts after first year of study	50.0

Source: World Bank 1994a, 34.

education and conventional methods for four Asian institutions. In all cases, the unit costs in distance education appear substantially lower than those in conventional institutions. However, these costs are per student rather than per graduate. Dropout rates are generally higher in distance education programs; though, as noted by Hülsmann (1999, 75), many students in distance education are chiefly concerned with the content of specific modules and do not aim to earn degrees.

While policymakers should take seriously the opportunities offered by new technologies and by distance education, they should not be dazzled by them. Again, the words of caution expressed by Perraton and Creed (2000) about the paucity of empirical research on costs and effects should be borne in mind. Needed research would include examination of the relative qualities of the two modes of delivery, and of the labor market outcomes of graduates from distance-education programs. Dhand (1996) has highlighted serious deficiencies in the effectiveness of B.Ed. degrees offered by distance education in India, and it is likely that many of Dhand's remarks find a resonance in other contexts. Moreover, although some technologies appear to reduce unit costs, this is partly because costs have been shifted. Where teaching materials are available on the Internet, the cost of computer time, telephone charges, print, collating, and paper fall on the receiving institution. As conventional printing allows major economies of scale, even after allowing for distribution, the absolute costs of making print material available to any one school may be increased by Internet use. Because schools vary in their wealth, decentralizing expenditure in this way is likely to decrease rather than increase equity between them (Perraton and Creed 2000, 78).

Further, technologies require humans to operate them, which in turn demands investment in training to secure skills and change attitudes. There is little reason to assume that these costs will decline: indeed, the growing complexity of many technologies may mean that they will increase. Also, human investments are more costly, and somewhat less reliable, than the investments in machines. Thus in many settings the old technologies of exercise books, pencils, and textbooks remain the most important and cost-effective domains for investment, especially at the level of basic education.