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HIGHER EDUCATION IN DEVELOPING COUNTRIES

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Social and economic inequalities are among the most striking features of the modern world. Per capita income is more than 60 times higher among the wealthy industrial countries than it is among low-income economies.[1] The absolute income gap between these country groups was $29,000 in 2002, triple the level of 1960. Disparities in health, education, and the relative status of women have been, and continue to be, pervasive. Huge numbers of people live under conditions of extreme insecurity, raising a complex set of moral, political, social, and economic issues.

In the last century, possessing, accessing, and being able to apply knowledge has become an increasingly vital determinant of national wealth. But during this period, the industrial world has had a virtual monopoly on knowledge generation and a disproportionate share of individuals with higher education. For example, while only 15% of the world's population lives in the industrial countries,[2] those countries account for more than 90% of patents granted[3] and the vast majority of Nobel Prize winners. And while, as of 1995, more than a quarter of the population over age 25 in industrial countries had at least some higher education, the corresponding figure in developing countries was just 6% (Task Force on Higher Education and Society, 2000).

Higher education is the primary engine through which advanced knowledge (as opposed to training) is produced and imparted. Policymakers have tended to view higher education as relatively unimportant compared with other development imperatives such as primary education and health. Yet most developing countries are being buffeted by new powerful forces, including democratization, rapid demographic change, the knowledge and information technology revolutions, and the process of globalization. A central premise of this chapter is that expanding and strengthening their systems of higher education represents a major channel through which developing countries can address these and other global forces, promote their economic and social development, and narrow a wide range of development gaps.

This chapter reviews and assesses the higher education scene in developing countries. It also discusses selected factors that seem to be impeding developing countries from capturing the benefits that higher education can provide.

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Three caveats deserve mention at the outset. First, higher education is not destiny: it is just one set of institutions whose contributions to development are mediated by many other contextual factors. Second, the beneficial effects that can result from rethinking and repositioning higher education will not appear suddenly. The full benefits of any reform initiative will likely take a long time to become evident. Finally, there is considerable heterogeneity among developing countries with respect to their higher education institutions and systems, as well as their social, economic, and political conditions, and their cultures and histories. Notwithstanding these sources of heterogeneity, this generalized examination will focus on higher education issues affecting *most* developing countries.

Characteristics of Higher Education in Developing Countries

This section reviews salient features of the recent history of higher education in developing countries and describes the current range of institutions. It then provides brief surveys of public expenditures on higher education, physical infrastructure conditions, and student demographics.

Historical Overview: The Expansion of Higher Education

Until the disintegration of the major colonial empires in the aftermath of World War II, and for some time after, higher education in developing countries had an elite focus, with students typically pursuing training for positions in the civil service or a few lucrative professions. Aspirations to undertake higher education have, however, expanded in recent decades, and that is closely connected to the expansion of primary and secondary education and rising incomes. Analysis of recent enrollment trends in higher education shows that:

- From 1980 to 1999,[4] the gross enrollment rate for higher education grew from 35% to 60% in industrial countries, but only from 8% to 14% in developing countries.[5] Four regions that were particularly far behind (East Asia and the Pacific, the Middle East and North Africa, South Asia, and sub-Saharan Africa) showed major improvements, but in terms of percentage point increase, the change was largest in the Middle East and North Africa (moving from 11% to 22%) (World Bank, 2003).[6]
- Tertiary attainment rates among the population aged 25 and over have increased sharply over time. Among the high-income countries, they increased from 8% to 26% between 1965 and 1995; among low- and middle-income countries, they increased from 1% to 6%. Nevertheless, as of 1995, only 2% of the population of sub-Saharan Africa (ages 25 and over) had received some higher education. For East Asia and the Pacific, the corresponding figure was only 3%.[7]
- From 1992 to 2002, enrollment in tertiary level institutions is estimated to have grown by 5% per year in developing countries.
- From 1980 to 1994, the share of women enrolled in higher education in the developing world increased from 35% to 40%. From 1990 to 1994, women's enrollment

grew at an average rate of 9.9% per year in sub-Saharan Africa and 6.7% in Eastern Asia and Oceania, compared with only 2.2% in the industrial countries (where more women were enrolled to begin with). Female enrollment is driving much of the increased demand for higher education in developing countries.

Demographic change. During the last 50 years, many countries have been undergoing substantial demographic change, including rapid population growth, changes in the age structure of the population, and declining family size. An examination of current demographic trends permits estimates of the future size and structure of national populations. Information about demographic change, when combined with data on sharply increasing primary and secondary school enrollment rates, indicates that the demand for higher education will increase substantially in developing countries during the next few decades (Task Force on Higher Education and Society, 2000). From 1992 to 2002, the population age group most likely to seek higher education—20–24 year olds—increased by 3.2% per year in sub-Saharan Africa, 1.8% in Asia, and 1.1% in Latin America.

Declining family size is a particularly important determinant of the demand for higher education because families with fewer children typically invest more resources in each child. Although private expenditures on higher education will increase, there will be considerable pressure for increases in public expenditure as well, because otherwise a rapidly growing number of children raised with the expectation of access to higher education will not be able to afford it.

Expansion of secondary education. The gross enrollment ratio for secondary education in low-income countries increased from 18% to 46% between 1970 and 2000; it increased from 27% to 75% among middle-income countries (World Bank, 2004). For those students who manage to overcome all the obstacles that make completion of secondary school difficult, higher education appears to offer a once-in-a-lifetime opportunity: the chance to gain credentials, connections, and skills that will be useful throughout their lives and might lead to a higher income. Increases in secondary school completion have therefore led to a natural, salutary, and unavoidable increase in the demand for higher education.

Other considerations related to expansion. As tertiary enrollments increase, higher education institutions are unlikely to be able to maintain quality without a concomitant expansion in resources. They will need more teachers for the tertiary level and will have to renovate and expand their facilities. Even assuming that such measures are politically and financially feasible, quality may still suffer: since some of the most effective resources and people may already be employed in the higher education system, new additions to the education system may not be as productive as existing resources.

Types of Higher Education Institutions

Institutions of higher education can be categorized according to their level, goals, and funding sources. In developing countries, the apex consists of research universities,

whose academic professionals typically view scholarship as equal to, or more important than, teaching. Students at these institutions, which are usually publicly sponsored, few in number, and prominent as symbols of national achievement and pride, have generally attained the highest academic standards. At the same time, private universities, which are generally not-for-profit and sometimes also of high quality, have also thrived.[8] The next (and wider) rung consists of provincial or regional institutions, where there is somewhat less emphasis on research and more on teaching. The widest rung of the higher education ladder consists of community colleges and polytechnic and vocational institutions. In addition, professional schools at various rungs of the ladder span a wide range of quality, as do postsecondary vocational schools. At the very bottom of the ladder are the so-called "garage universities," which have proliferated in many developing countries in response to the rapidly growing demand for higher education credentials. These institutions—which operate on a private, for-profit basis—are low-quality, unsupervised, transient, and exploitative.

With regard to funding, universities have traditionally been seen as a province of the state, which had responsibility for funding and operations. Although recent years have witnessed a proliferation of for-profit institutions, the absence of quality standards and the financial impulse that drives such institutions have led to severe quality problems in many cases.

Governments face a huge challenge in responding to this often chaotic array of institutions, many of which are new and completely unregulated. Accreditation—whose purpose is to confer public approval of the offerings, method of operation, and results obtained by an educational institution—is a particularly thorny issue that, if left unaddressed, could lead to surfeits of low-quality "degree"-granting organizations and of "graduates" who have not acquired significant new knowledge or mastered new skills.

Public Expenditure

In developing countries, public expenditure on higher education is a contentious issue. The perception that tax revenues emanating from the entire tax base are benefiting only a narrow segment of the populace often provokes opposition to high levels of public spending on a country's universities. Nevertheless, the political power of those with resources has in many cases meant that countries actually spend significant resources on their public systems of higher education.

In sub-Saharan Africa, East Asia and the Pacific, and South Asia, public expenditures on higher education were just 2–3% of gross domestic product in 1995. This is less than other regions (i.e., Eastern Europe and Central Asia, Latin America and the Caribbean, the Middle East and North Africa, and the industrial countries) where the corresponding figure was 5%.[9]

Interestingly, across developing regions, public current spending on higher education as a fraction of total public current spending on education is 16%, with little cross-regional variation. This figure is only slightly below the 18% spending share among high-income countries. However, as total spending on education is much lower among developing countries, it follows that they spend much less on higher education than the high-income countries.

Since 1980, public spending on higher education worldwide has grown at roughly 5% annually. The rate of increase has varied considerably, from nearly 7% in East Asia to only about 1% in Eastern Europe and Central Asia.

Physical Infrastructure

The fragile physical infrastructure of most universities in developing countries impedes research and student learning.[10] Frequently, buildings are crumbling and too small, electricity and telecommunications services are unreliable, laboratories are severely underfunded and antiquated, and libraries lack recent titles. Poor coordination between capital and operating budgets creates problems as funds are allocated for the construction of new facilities, but not for their operation and maintenance. This problem is especially important with respect to new technology for information sharing and communication, as it is estimated that operating costs represent up to three-fourths of the total life-cycle costs of technology investment (World Bank, 2002).

Students

Approximately 71 million university students, nearly 65% of the world's total, are enrolled in universities in the developing world. A little more than half of these are in East Asia and the Pacific, Eastern Europe, and Central Asia. Most of the rest are roughly evenly divided between Latin America and the Caribbean and South Asia.[11] Not surprisingly, developing countries with larger populations tend to have higher enrollment figures. For example, the largest tertiary enrollment figures are for China (12.1 million), India (9.8 million), Indonesia (3.2 million), and Brazil (3.1 million).[12] (For comparison, note that both France and the United Kingdom have just over two million higher education students, and Denmark has 0.2 million.)

In developing countries, those who are not poor have much greater access to primary and secondary education: the number of years of schooling completed decreases at lower ends of the socioeconomic spectrum. For similar reasons, urban university students are much more likely to complete secondary education than rural university students. Consequently, the pool of young people most likely to enter an institution of higher education is disproportionately rich and urban. Compounding the wealth issue are the out-of-pocket costs of a university education and the "opportunity costs" of higher education—i.e., the income that would have been earned while a student is in school instead of working.

Figure 1 shows that gross enrollment ratios in high-income countries dwarf those in developing countries, with sub-Saharan Africa the furthest behind.

Among low- and middle-income countries as enrollment data are available for 2000, the top five countries were Russia, Latvia, Estonia, Belarus, and Poland, with gross enrollment ratios ranging from 64% to 56% (World Bank, 2003), clearly reflecting the considerable emphasis the former Soviet bloc placed on education. At the other end of the scale, gross enrollment ratios of 1% in 2000 are found in Burundi, Djibouti, Mozambique, Niger, and Tanzania. These figures are consistent with the overall low level of resources and human development in sub-Saharan Africa.

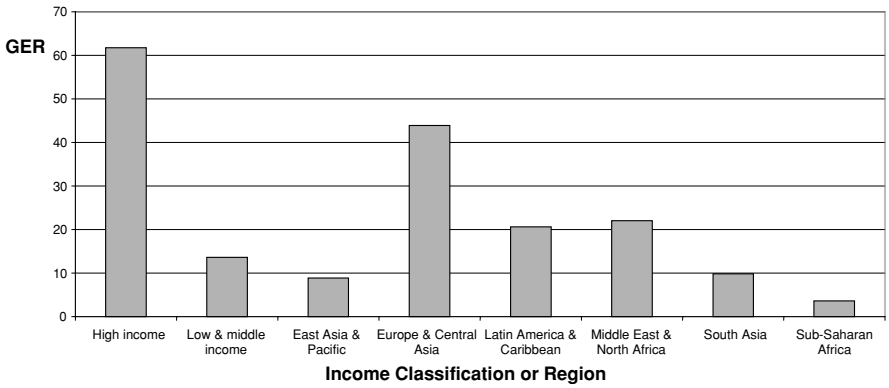

Figure 1. Tertiary gross enrollment ratio (GER) by region.
Note: Data are for 2000 or most recent year. The regional classifications do not include any high-income countries.
Source: World Bank (2003).

Figure 2 plots each country's gross enrollment ratio in the year 1980 (horizontal axis) and the year 2000 (vertical axis). Points on the 45 degree line indicate countries with static enrollment ratios. Points above (or below) the 45 degree line represent countries for which enrollment ratios have increased (or decreased) over time. As the

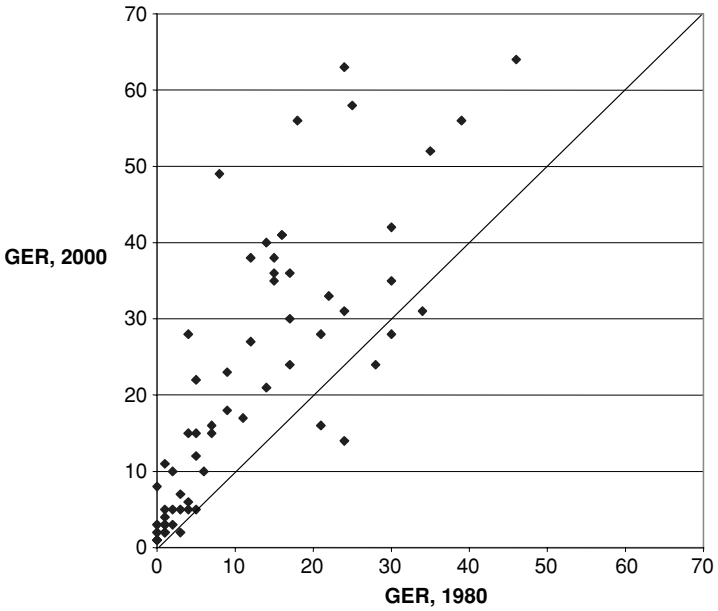

Figure 2. Trends in gross enrollment ratio (GER).
Source: World Development Indicators (2003).

preponderance of data points sit above the 45 degree line, Figure 2 clearly shows that the great majority of developing countries (for which there are data in 1980 and 2000) have improved their gross enrollment ratios over time.

Contemporary Issues

Developing countries face a number of formidable challenges with respect to their higher education institutions and systems. Some of these arise because of external changes such as the world's knowledge and technology revolutions and the process of globalization. Others are more closely connected to internal issues, such as management and organization, curriculum reform, educational finance, and the rapidly growing demand for higher education. This section reviews a number of these issues and considers their implications for higher education in developing countries.

The Knowledge and Technology Revolutions

Technical and scientific knowledge is growing more rapidly than at any other time in human history. For obvious reasons, developing countries have not played a major role as creators of this type of knowledge; at best, they have been successful adaptors. The process of adaptation places a premium on individuals who are able to work in a knowledge-technology centered environment: people with higher education. Their scarcity may mean that low-income countries will fall further behind economically advanced countries. The industrial revolution created the first and deeply entrenched income gap between nations. The knowledge revolution may increase this gap.

Besides creating a greater need for trained individuals, the knowledge explosion has other consequences for higher education. The most obvious is that in most fields, students must learn much more than ever before; many will be pushed to narrow their studies so they can study particular areas in greater depth. New information and communication technologies have the potential to facilitate this process by improving communication among students, teachers, and researchers, and by easing their access to quality educational materials. Videoconferencing, for example, is becoming more accessible, and it is often an inexpensive and adequate substitute for conference travel.

The Internet will increasingly serve as an information repository and teaching aid. It is accessible in more than 180 countries and links more than 30 million host computer systems. However, the Internet access and participation gap between developing and industrial countries is wide and growing (Khalil, 2003).

In combination with radio and television, new technologies can replace or complement traditional methods for delivering higher education and may prove especially valuable in meeting the demand for expanded access to high-quality higher education. The use of such technologies could lower the cost of teaching students, especially when considering distance education. However, the net benefits should not be overstated. Information technologies require not just the appropriate hardware and software, but the associated infrastructure along with specially designed curricula and qualified instructors.

Rural populations, which account for some 55% of the developing world, stand to gain much from the capacity of new information technologies to overcome their isolation. While infrastructure costs do present a barrier, rural residents could benefit from higher education once electrification and telecommunications infrastructure reach these areas and make distance learning an option. This may prove to be more cost-effective than building traditional schools in isolated regions.

New information technologies could also improve the quality of higher education. Not only can good instructional materials be updated frequently, but the best teachers can easily reach more students than in the past. The technologies might also permit more active student participation.

While little systematic evidence is available to support the view that new technologies promote better educational outcomes, as these continue to be developed and disseminated, researchers will likely provide empirical evidence that demonstrates their utility. Nevertheless, some words of caution are necessary. The use of new technologies will require planning and resources to ensure satisfaction of bandwidth requirements, electricity supply needs, and the burgeoning demand for Internet access points. The difficulty of financing infrastructure investments in many developing countries raises a familiar question: will new technologies simply widen the existing gap in access to higher education between developing and industrial countries?

Technological change encompasses more than the well-known advances in telecommunications and information technology. Production methods are changing rapidly; new techniques, materials, and management methods are constantly reshaping industry; and new practices are changing the face of agriculture. Many of these changes require broadly educated, well-trained people to manage new processes and to work effectively in revamped industrial contexts. Countries whose citizens are unable to adapt relatively quickly to the ever-changing demands of both the local and the global economy will find themselves falling further behind.

The rapid growth of the knowledge economy means that new technologies are continually making old ones obsolete. Thus workers' skills can quickly become less useful, and they need to be able to acquire new proficiencies. However, higher education in developing countries does not currently equip students with this flexibility, since it tends—too often—to focus on rote learning instead of rewarding creativity and curiosity. Incorporating technology in instruction holds the promise of making learning more focused on exactly what each student needs. Such incorporation can include everything from the adaptation of online lesson plans for local use to highly interactive, computer-based instructional methods.

One of the advantages of incorporating technology into education is that students become accustomed to the types of tools that businesses use. The best example of this is in the use of the basic set of word processing and spreadsheet computer programs and the Internet. Students' daily use of this technology will inevitably enhance their abilities to function in a world that is increasingly dependent on such skills. However, two difficulties arise in incorporating technology in this way. First, academic staff may be more reluctant than students to shift their style to be more technologically oriented. Second, many countries' universities simply do not have enough computers to ensure that most students have sufficient access to carry out all their assignments using a computer.

Financing Higher Education

Many developing countries have faced significant struggles over the extent to which the government should finance higher education. Some segments of the population see such funding as a right akin to the state's more widely accepted responsibility for primary and secondary education. Others point out that as the well-off constitute most of the student population, state funding is regressive and unjustified. The policies that a country ends up following will ultimately be dictated, in part, by social and political pressures.

The question of whether a country should have a general subsidy for higher education has been debated at length. For decades, economists analyzing issues of public funding relied on rate-of-return analyses that sought to clarify who—individuals or society as a whole—gained from investments in higher education. These analyses typically took into account only the higher earnings that accrued to individuals who received higher education and did not consider the broader societal benefits—some of which are economic—that a society receives when its people are more educated. Taking into account these broader benefits can tilt the case toward the justification of public funding.[13]

Even with such a tilt, however, the case for a *general* subsidy for higher education would still rely on several conditions that may or may not be met. First, the social net benefit from the investment must be positive; that is, the gains for society as a whole must outweigh the costs of such an investment in higher education. Second, individuals, on their own, must lack sufficient incentive or ability to undertake the socially desirable level of investment themselves. And finally, the subsidies under consideration must have a higher social net benefit than other competing investments (Bloom & Sevilla, 2004).

Whatever policies a country adopts, state financing will inevitably be limited given developing countries' overall financial constraints and the high and rapidly growing demand for higher education. Countries are unlikely to be able to count on state financing to provide all the funds needed for higher education.

Substantial funds for higher education already come from students and their families. In many countries and for some groups of students this is perfectly reasonable, because the beneficiaries have access to sufficient resources to pay a sizable share of their own higher education. State subsidization would amount to a transfer from poor and middle-income households to the rich. Even though the middle class often attempts to resist paying for any part of a university education, governments will most often insist that those who have the resources pay a significant share of the costs. However, state financing can accompany private provision; for instance, the state can provide scholarships to promising students who attend a private university.

Democratization, Decentralization, and Globalization

For the first time in history, more than half the world's population is living in countries with democratic political systems, and the numbers are rising. This trend affects both the possibilities for social and economic development and their inherent challenges.

The allocation of public resources to higher education is more transparent in a democracy, and the public is more heavily involved. The latter could lead to pressure for

more scholarships and greater accountability, and ultimately to beneficial innovations in higher education. Also of significance is the role of higher education in opening up space for public discourse regarding societal values. Finally, academic freedom undoubtedly is greater in democratic societies.

Accompanying the expansion of democracy is the trend to decentralize public services from the national level to provincial or municipal levels. If extended to higher education, such decentralization could promote quality by enhancing autonomy for universities over spending allocations, academic standards, and personnel matters; greater inter-provincial competition could also promote quality. However, decentralization could also prove detrimental if higher education institutions do not have sufficient numbers of well-trained administrators to take over this function from government administrators.

While decentralization moves forward within countries, national economies have become increasingly integrated in the last decade through international trade and international movements of labor, capital, and ideas. Higher education has considerable potential to make an impact on both the positive and negative aspects of globalization. Higher education can help developing countries thrive as a result of globalization—for example, by putting countries in a better position to reach and implement informed decisions about how to manage their integration into regional and global economies. Countries with a larger proportion of highly educated people tend to be more competitive in world markets, because a higher skill level complements capital-intensive production and acts as a magnet for the attraction of direct foreign investment. On the other hand, globalization also increases access to gaining higher education abroad, and offers many college graduates from developing countries easier opportunities to earn higher incomes by leaving their home country. Globalization thereby magnifies the vexing problem of "brain drain," although this problem is partially offset by migrants' economic and social remittances.

Higher education also affords opportunities to deal with many of the large and growing economic and social deficits and disparities that seem to be accompanying globalization. Many of these disparities are reflected in the United Nations' Millennium Development Goals. These include eradicating extreme poverty and hunger, ensuring universal primary and secondary education, empowering women, and reducing child mortality. All of these goals are potentially addressed through the widening and deepening of higher education systems, either directly—by increasing knowledge and skill (and therefore individual productivity and income)—or indirectly, by strengthening national and global institutions.

Challenges for Public Universities

Public universities have an important role to play in national development insofar as they are frequently the only universities with research potential. As part of the public sector, however, these universities suffer from many of the same challenges as other state-owned enterprises. Resources are not well used because there is resistance to change, and employees in state-run institutions lack the motivation to serve the public good efficiently. In universities, rules about decision making, tenure, workloads, and research

may hobble potential advancements. The typically low levels of funding available to public universities help to push many academic professionals into taking second jobs at other academic institutions, thereby making them less available to students. Heavy tuition subsidies at public universities also make them a coveted first option for prospective students who lack economic means. Unfortunately, many such students lack access to secondary schools that are of sufficient quality to secure their admission to public higher education institutions.

For-profit private universities face a different constraint that can make them ineffective as a means of providing adequate education: the need to make a profit. Since many students are seeking a degree but not necessarily a true education, private institutions can all too easily be tempted to ignore quality. Students get their degree, but may not acquire a *bona fide* body of knowledge and skills.

Curriculum Reform

Curricula need to be relevant to current issues and technologies. The flexibility required by a rapidly changing world economy highlights the need for a corps of well-rounded individuals whose education has explored a wide range of areas—meaning that liberal (or general) education will have an increasingly central role to play in a revamped curriculum. In the end, curriculum reform is both a technical and a political problem; a failure to recognize its political aspects can doom even the most technically worthy efforts.

For-profit universities may have less control over curricula and educational quality than public universities due to the need to conform to market demand. This is obviously not the case with not-for-profit private institutions, but in many countries (including some industrial countries) standards for all institutions (private and public) are not well spelled out and are not enforced. Accreditation is a huge problem, because government authorities may lack the competence or motivation to ensure that universities are actually offering a useful education to students. And as noted earlier, many students, in turn, care about little more than receiving a credential.

The adoption of a top-down committee approach is responsible for the collapse of many reform efforts. Stakeholder participation appears to be essential to curriculum design and reforms, and preventing those interested in and affected by reform from participating can doom it from the outset. Teachers, students, administrators, employers, donors, and other interested parties must be encouraged to voice their views, and academic professionals in particular must be handled carefully, because they are often the ones who feel the most threatened by curriculum change.

Liberal education. Western civilization is home to a long tradition of liberal education, defined as an emphasis on the broad development of an individual and not just training for an occupation. By offering students a range of courses that goes well beyond those required by any one specialty, liberal education emphasizes individuals' ability to think, communicate, and learn; to adopt a comparative and international perspective; and to provide a basis for further, more specialized study. The beginnings of this philosophy can be traced back to ancient Greece and to the *trivium* (grammar, rhetoric, and logic)

and *quadrivium* (arithmetic, geometry, astronomy, and music) of medieval times. That tradition has continued, and today liberal education is an important component of higher education in a number of industrial countries.[14]

The contrast with developing countries is stark. Since achieving independence, many developing countries have viewed liberal education as a luxury. This is reflected in the curricula of both secondary and higher education institutions, which tend to favor vocational training. Governments shun liberal education on the grounds that it is elitist, emblematic of the values of Western colonialism—indeed, that it would be an inheritance of colonial systems, and too expensive. While these attitudes may be changing, most developing countries still do not recognize the benefits of a liberal or general education. There are exceptions, however, reflected by programs in Bangladesh, China, and Pakistan.

Developing countries could benefit from the introduction—or in a few cases, the expansion—of high-quality general education. Liberal education can promote responsible citizenship and civic virtue, and foster an understanding of the differences among groups in a society. While such an education is not appropriate for all students, countries can benefit if there is a significant group of citizens who can operate at a high intellectual level in rapidly changing times—whether to perform such unusual functions as negotiating with international aid donors, deciding whether to import generic AIDS drugs, or developing a fair electoral system, or more prosaically to run and participate in organizations and businesses with international links.

The content of general education curricula will vary from country to country, and the process of designing such curricula allows nations to assess what matters to their particular society given its history, culture, and values. Rather than blindly adopting models from elsewhere, countries can review lessons learned in other places and adapt them to suit their own requirements.

Nevertheless, many developing countries perceive liberal education as an expensive frill that does not fulfill any of their genuine needs and may find that justifying students' "dabbling in" literature, philosophy, history, and the arts is not possible when their needs are so stark. Moreover, the diversified instructional staff required to impart a liberal education complicates running a university. Adding to the perception of liberal education as impractical is the fact that interactive liberal arts courses are best taught in smaller groups, placing extra financial demands on a university. Worse yet, liberal education courses might extend the period during which students attend university. Finally, those with a stake in the status quo may perceive liberal education as a threat, because students with this kind of background are more likely to question orthodoxy of all types.

Science education. Science and technology present some unique challenges for universities. First, basic scientific inquiry often requires large investments to deliver long-term, but highly uncertain, benefits. The free market is not good at funding basic research, especially if the poor are more likely to reap benefits than the rich. Consider, for instance, the low priority given to finding a cure for malaria: most of the victims are poor; since they would not be able to pay the likely high cost of new drugs, companies have little incentive to develop such remedies. Second, the way that scientific

knowledge is produced is changing rapidly. Individual scientists working alone in their laboratories have largely become a thing of the past. Today, scientific research tends to transcend organizational and disciplinary boundaries, involve public and private sector participation, and employ teamwork.

Providing education in science and technology at the university level requires a significant investment in physical resources, including laboratories and libraries. With funds scarce in all developing countries, such investment will be difficult. A more careful sharing of resources within and among institutions might alleviate this problem somewhat, but more resources will undoubtedly be needed if science education is to advance rapidly.

Improving and expanding science education will also require new, well-trained, dedicated academic professionals who can communicate effectively with large numbers of students. The problem here is twofold: first, past deficiencies in producing scientists and teachers who are well-trained in science mean that the pool of available people to draw from is small; and second, highly qualified scientists often enjoy well-paid or otherwise appealing employment opportunities abroad or outside the education sector.

Management and Delivery

The manner in which tertiary education is organized and administered has a significant effect on the results achieved by a country's system of higher education. A system-wide perspective—one in which the structure and operation of institutions of higher education are considered in concert—addresses the place of various institutions in relation to each other and their links to the rest of the education system and to society as a whole. It naturally leads to the development of a rational, stratified system of higher education—i.e., one with a range of different types of institutions with different objectives. Links to higher education institutions in other countries are also becoming increasingly important.

Governance. Governance—the formal and informal arrangements that allow higher education to function—is a key determinant of the effectiveness of institutions. Academic freedom, autonomy, monitoring and accountability, and meritocratic selection of teachers and students are among the essential and proven principles of good governance. Tools for converting these principles into action range from specific mechanisms for hiring and promoting academic professionals and administrators, to boards of trustees, academic councils, institutional handbooks, and visiting committees.

An institution's governance structure sets the stage for everything that occurs within its walls. Institutional performance is generally improved when practices and procedures established by the governing authorities are stable and transparent.

Too many universities in developing countries—and elsewhere—are governed as participatory democracies, that is, department or faculty chairs elect deans and rectors, who must periodically run for re-election. This situation makes senior administrators vulnerable to pressures coming from academic professionals in any area where they have to make hard choices. As a result, in order to keep their posts, administrators must listen and respond to the wishes of academic professionals, whether or not those wishes

serve the greater interests of the university. By contrast, top-down governance, with effective faculty consultation, is less fractious and more efficient than participatory democracy and might serve developing countries well.

Role of the state. The state can provide clarity and guidance concerning the role and functioning of institutions of higher education. In the case of public institutions, the state is also the primary source of funds. In most developing countries, public universities are a source of great national pride. Citizens have an interest in ensuring that these universities produce graduates who have the knowledge and skills that are relevant to the country's development, and they also have an interest in ensuring that public funds are wisely spent in achieving this goal. The state is responsible for promoting these legitimate interests. To do this, it must typically promulgate broad rules and a framework within which public institutions of higher education must operate. By contrast, many believe that the state's role in a university's *internal* governance should be quite circumscribed.

As mentioned earlier, the state also has an important role to play in regulating private universities, especially in relation to accreditation.

Academic staff. With the salaries of academic professionals almost invariably low in developing countries, teaching staff face strong temptations to work outside the university. Such work may take the form of adjunct teaching at another institution or employment in a non-academic institution. On the one hand, this is entirely understandable and difficult to prevent. On the other hand, the university community must realize that cohesion—which can help inspire both academic professionals and students to maintain higher academic standards, and can be an essential ingredient in bringing about a stimulating academic atmosphere—will suffer when academic professionals view the university as just one of several sources of employment.

Brain drain. The brain drain issue can pose obstacles to the reform of the higher education sector. As noted earlier, even if a developing country does manage to produce more highly trained academic professionals, they are more mobile (in the context of an increasingly globalizing world) and may be more readily tempted by higher salaries in other countries. Similarly, students who are skilled in the development and acquisition of knowledge, and might therefore become good academic staff, are tempting targets for firms, governments, and international development organizations.

The existence of brain drain makes arguing the case for investment in higher education more difficult. If a sizable number of a country's best students—whose education has been funded out of the public purse—emigrate as soon as they have graduated (and do not send home significant remittances), what benefit has the country reaped from its investment? Unless a country takes brain drain into account during policy development, it may complicate decisions about investment in higher education, and could provoke strong political opposition. Developing good institutions—both in education and the workplace—can help stem brain drain. International organizations that place conditions on overseas scholarships requiring recipients to return can also make a difference. Of great importance, obviously, are wages for those who are well educated,

since higher earnings will deter some people from emigrating, or entice them to return to their original country. In addition, political stability greatly increases the likelihood that well-educated individuals will want to live in their home country.

Conclusion

The United Nations' Millennium Development Goals (MDGs) represent the central imperatives of contemporary international development efforts. These eight goals, which were endorsed by over 180 heads of state in 2000, are intended to point the way toward improving living standards among the world's most vulnerable people, with a focus on the estimated 1.2 billion people living on less than one dollar per day. In addition to the goal of poverty reduction, the MDGs focus on such items as child and maternal health, combating infectious diseases, environmental sustainability, the status of women, and access to primary education.

Conspicuous for its absence among the MDGs is any mention of higher education. This omission is surprising given the intrinsic benefit of higher education in enabling many people to live a fuller life. It is even more surprising given the potentially large instrumental benefits of higher education in moving developing countries onto higher and more sharply rising development trajectories and mitigating cross-country disparities in living standards.

Notwithstanding higher education's absence from the MDGs, expanding access to higher education and improving its quality represent both basic goals and instruments of development progress. Moving forward to reform higher education institutions and systems in developing countries will require considerable financial and human resources. It will also take vision and committed, long-term leadership, as the payback period for investments in higher education reform is more naturally measured in decades than years. Despite these obstacles, developing countries would do well to keep in mind the words of Lao-Tsu, Chinese philosopher and founder of Taoism: "A journey of a thousand miles begins with a single step."

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Notes

1. The figure refers to GDP per capita measured in constant US$ for the year 2002. If measured in international dollars (adjusted for purchasing power parity differences across countries), the disparity was 13 in 2002.
2. By industrial countries we mean those identified as high-income countries by the World Bank: the United States, Canada, the countries of Western Europe, Slovenia, Israel, Kuwait, Qatar, United Arab Emirates, Brunei, Hong Kong-China, Japan, Singapore, South Korea, Taiwan-China, Australia, New Zealand, and several small island countries. All other countries are considered "developing countries." This includes Africa, much of Asia, most of the Middle East, nearly

all of Latin America, and all parts of the former Soviet Union. By this definition, developing countries encompass nearly 85% of the world's population.

3. In relation to patents, see http://www.southcentre.org/publications/ecommerce/ecommerce-09.htm
4. 1998 data are used when that is the latest year available.
5. The gross enrollment ratio is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to a particular level of education. For tertiary education, the gross enrollment ratio is expressed as a percentage of the population in the 5-year age group following the official secondary school leaving age, which varies somewhat by country.
6. Throughout, we use regional definitions supplied by the World Bank, with industrial countries treated as an entirely separate category, as noted above. Sub-Saharan Africa encompasses all of what has traditionally been considered East, Southern, and West Africa. The Middle East and North Africa encompasses the remainder of Africa and the Middle East as far east as Iran. Latin America and the Caribbean includes, of course, Mexico and Central America. Eastern Europe and Central Asia includes all of what was traditionally considered Eastern Europe, as well as all of the countries of the former Soviet Union, including Russia. South Asia stretches from Afghanistan to Bangladesh. East Asia and the Pacific includes all other Asian countries and the islands of the Pacific. China, of course, is the dominant factor in the data for this region.
7. The figure for "East Asia and the Pacific" includes China, which, with a 2% attainment rate, mostly determines the regional average. Of note, the corresponding figures are 19% for South Korea and 22% for Japan.
8. Universidad de los Andes (in Colombia) is one example of a longstanding, high-quality, private institution. More recently, other top-level private universities, such as the Lahore Institute of Management Sciences, have been founded.
9. The surprisingly low figure for East Asia is due to the fact that China, which spends little compared to GDP, dominates the figures for that region.
10. There are, of course, important exceptions to this general picture, such as the Aga Khan University in Karachi, Pakistan, the Indian Institutes of Technology, the University of Cape Town in South Africa, and a number of institutions in the former Soviet Union.
11. These figures are based on an analysis of data from the UNESCO Institute for Statistics website. The largest country for which data are missing from this source is Pakistan. Country categorization into regions is based on World Bank (2003).
12. UNESCO Institute for Statistics website.
13. A longer discussion of these issues appears in Task Force on Higher Education (2000) and Bloom and Rosovsky (2004). Also, please see the chapter by Bloom, Rosovsky and Hartley in Volume 1 of this *Handbook*.
14. The European tradition of elite-based higher education placed liberal education into the academic preparatory secondary schools. That is changing as Europe's higher education systems reorient themselves toward mass education.

References

Altbach, P. G. (1998). *Comparative higher education.* Norwood, NJ: Ablex.

Bloom, D. E., & Rosovsky, H. (2004). 'Higher education in developing countries: Peril and promise'—Has it made a difference? *Comparative Education Review*, *48*(1), 78–81, 85–88.

Bloom, D. E., & Rosovsky, H. (2003). Why developing countries should not neglect liberal education. *Liberal Education*, 89(1), 16–23.

Bloom, D. E., & Sevilla, J. (2004). Should there be a general subsidy for higher education in developing countries? *Journal of Higher Education in Africa*, *1*(2), 137–150.

Castro, C. M., & Levy, D. C. (2000). *Myth, reality, and reform: Higher education policy in Latin America*. Washington, DC: InterAmerican Development Bank.

Khalil, M. (2003). The wireless Internet opportunity for developing countries. Paper presented at the World Summit on Information Society, Geneva, Switzerland (December). Washington, DC: The World Bank.

Task Force on Higher Education and Society. (2000). *Higher education in developing countries: Peril and promise.* Washington, DC: The World Bank.

UNESCO Institute for Statistics. Website: www.uis.unesco.org/TEMPLATE/html/Exceltables/education/enrol_tertiary.xls

World Bank. (1994). *Higher education: The lessons of experience.* Washington, DC: The World Bank.

World Bank. (2002). *Constructing knowledge societies: New challenges for tertiary education.* Washington, DC: The World Bank.

World Bank. (2003). *World development indicators 2003.* Washington, DC: The World Bank.

World Bank. (2004). *World development indicators 2004.* Washington, DC: The World Bank.