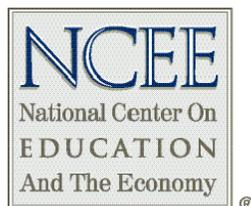


India Education Profile

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India Education Profile

India, with more than a billion residents, has the second largest education system in the world (after China). Experts estimate that 32 percent of its current population is under the age of 15.¹ But counter to the image of India as a youthful engine of economic growth where many urban-based citizens work in some of the best technology-centered jobs in the world, males in India complete just 2.9 years of schooling on average, females just 1.8 years.² And for the small proportion who do persist through primary and secondary schooling, the quality of instruction varies widely, depending on the region of the country and whether one is enrolled in a State-supported public school or a fee-based private school.

Despite the highly inefficient delivery of public services, high levels of teacher absenteeism and non-teaching activity, many Indian students remain motivated to succeed on the college entrance exams. The high level of competition for entry into the Indian Institutes of Technology, the Indian Institutes of Management and other top institutions is enough to spur millions of students to achieve at remarkably high levels, particularly in the areas of science and mathematics. The increased demand for higher education is not currently being met: only ten percent of the age cohort is actually enrolled in higher education. But in a country with such a large population, ten percent enrollment amounts to 9 million students, resulting in 2.5 million new college graduates a year. These numbers driven by the private sector opportunities abroad, and increasingly, back in India, will continue to ensure India's prowess in delivering high-quality technical manpower.

Historically, Indian education has been elitist. Traditional Hindu education was tailored to the needs of Brahmin³ boys who were taught to read and write by a Brahmin teacher. Under British rule from the 1700s until 1947, India's education policies reinforced the pre-existing elitist tendencies, tying entrance and advancement in government service to academic education. Colonial rule contributed to the legacy of an education system geared to preserving the position of the more privileged classes. Education served as a "gatekeeper," permitting an avenue of upward mobility only to those with resources.

Post-primary education has traditionally catered to the interests of the higher and upwardly mobile castes. In the nineteenth century, post-primary students were disproportionately Brahmins; their traditional concern with learning gave them an advantage under British education policies. By the early twentieth century, several other castes realized the advantages of education as a passport to political power and managed to acquire formal learning. But even today, the vast majority of students making it through middle school to high school continue to be from high-level castes and middle- to upper class families living in urban areas.

¹ The World Fact Book, CIA. 2004 estimate.

² Public Report of Basic Education, 1999

³ Brahmin is the highest caste group in India, traditionally made up of priests, philosophers, scholars, and religious leaders.

This historical barrier coupled with the post-independence focus of the education system on tertiary education more than primary education (relative to the number of students in each category), makes it unsurprising that India has the largest number of illiterate people in the world. According to the 2001 Census, more than one out of every three Indian citizens (and 42 percent of adults) is illiterate. The gap between male and female illiteracy, while still a challenge, is decreasing: 25 percent illiteracy for males and 46 percent for females. There is also a wide discrepancy in the literacy rates of different States.⁴ At one end, the state of Kerala has achieved 90 percent literacy, while on the other end, the state of Bihar has only 39 percent.⁵ While the government has increased its focus on primary education, the highly inefficient state of public service delivery in education, with high teacher absence⁶ and low teaching activity even when teachers are present, is likely to keep learning levels low for the foreseeable future.

India has more languages than any other country - fifteen main languages and hundreds of other languages and dialects. Hindi is the national language and the primary tongue of 30 percent of the people. The other main languages are Bengali, Urdu, Punjabi, Gujarati, Tamil and Telegu. And English is ubiquitous in India, a former British colony. While not classified as one of the fifteen national languages, English is certainly important in higher education, upward social mobility, and has played a key role in establishing India as an economic power globally.

In 1997 an India Today survey suggested that about a third of the population had the ability to carry on a conversation in English.⁷ This was an amazing increase over the estimates of the 1980s, when only about four to five percent of the population were thought to use the language. And given the steady increase in English learning since 1997 in secondary schools and among the upwardly mobile, it is estimated that there are 350 million English-speaking Indians today. This is more than the combined English-speaking populations of Britain and the US.⁸

India has been able to capitalize on its large numbers of well-educated people, many of whom are skilled in the English language, to become a major exporter of software services and software workers. The growth of the middle class is fueling the country's overall development. In India, there are now estimated to be some 300 million middle-income earners making \$2,000-\$4,000 a year in purchasing power parity (PPP) terms.⁹ Both the number of middle earners and their income levels are likely to rise rapidly, but their incomes will continue to be substantially below averages in the US and other rich countries even by 2020. There is also sharp regional disparity in economic

⁴ India is made up of 29 States and 6 Union Territories.

⁵ Statistical Database for Literacy, Vol.2, National Institute of Adult Education, New Delhi, 1993. Note: Kerala's 1990 Total Literacy Campaign is credited for dramatically raising literacy levels in remote, tribal areas, but some now question whether the State did truly achieve full literacy.

⁶ See Kremer, Muralidharan, Chaudhury, Hammer, and Rogers (2005)

⁷ However, the level of fluency is likely to be extremely variable, with the vast majority of people who respond to such surveys as "knowing" English having only extremely rudimentary comfort in the language.

⁸ David Crystal (honorary professor of linguistics at the University of Wales, Bangor) "SubContinent Raises Its Voice." YaleGlobal Online. November 30, 2004.

⁹ Basu, Indrajit. "India's Growing Urge to Splurge." Asia Times Online. August 22, 2003.

growth, with the states in the west and south growing much faster than the poorer states such as Bihar, Uttar Pradesh, and Orissa, which are likely to remain underdeveloped in the near to medium-term future.¹⁰

The pervasive low-quality education available to the masses has led the government -- in its five year plans which outline the country's development strategy -- to move funding away from the higher education system overall (although not to the detriment of the crown jewels of the system: the Indian Institutes of Technology and the Indian Institutes of Management) toward basic primary and middle stage education in an effort to boost the abysmally low literacy rates.

Primary and Middle Education

The Indian Constitution made a commitment to make primary and middle grade education (for students ages 6-14) free and universal by 1960, with the two national policy statements on education in 1968 and 1986 (and revised in 1992) placing much emphasis on this goal. But India's inability to allocate resources effectively and efficiently has made that goal unattainable even 45 years later.

There has, however, been a considerable increase in the spread of educational institutions since India gained its independence in 1947. For instance, during the period 1950-51 and 2001-2002, the number of primary schools grew three-fold, while the number of middle (upper primary) schools increased 16 times. Today India has more than six hundred thousand¹¹ primary schools serving 115 million students (the average teacher to student ratio is 1:43) and more than two million upper primary schools serving 45 million students (the average teacher to student ratio is 1:38). Another recent trend is the growth of private schools that receive no government aid and rely on student fees.¹²

The Indian school system follows the British structure. Primary school consists of grades 1-5 (ages 6-11) and middle school consists of grades 6-8 (ages 11-14). Both are compulsory. However, researchers estimate that an average of 70 percent of children between the ages of 6 and 14 actually attend school.¹³

Emphasis on reform has been on compulsory school attendance, rather than on any measure of expected learning. Quality of state-run schools ranges from top-notch to abysmal. Private schools are, on the whole, better but many of them charge high fees making them accessible only to the middle and higher class families and admissions can be highly competitive. A recent phenomenon has been the proliferation of low-cost

¹⁰ Report of the National Intelligence Council's 2020 Project.

¹¹ Sourced from the official education statistics put out by the Indian Ministry of Human Resource Development. Statistics available at:
<http://www.education.nic.in/htmlweb/edusta.htm>

¹² See Kingdon (2005). Paper can be downloaded at:
<http://www.ksg.harvard.edu/pepg/PDF/events/MPSPE/PEPG-05-15geeta.pdf>

¹³ Karthik Muralidharan's work shows average attendance in public schools across India is 64%, and for private schools it is 75%, suggesting an average attendance rate of 70%.

private schools in both rural and urban India. These schools often have poorer facilities and infrastructure than the government schools, but are able to hire many more teachers and have smaller classes and greater teaching activity because private teachers are paid much lower salaries than public school unionized teachers.

Yet, the paucity of educational data in India makes it difficult to estimate true numbers of private schools. Recent evidence suggests that the percentage is much higher than the official figures indicated in the table below (closer to 30 percent rather than 15.4 percent).¹⁴

Total Student Enrollment by Educational Stage and Percent Enrolled in Private Schools (2001)¹⁵

	Total Gross Enrollment	Percent Enrolled in Private Schools
Primary	99.3%	15.4%
Secondary	50.3%	--
Tertiary	11.4%	--

For those who do attend, there are large gaps in access to education; quality of education; and learning according to gender, social grade, and location. Two out of five first-grade students will not complete the primary cycles of 4 to 5 years (depending on the State),¹⁶ and the learning achievement of those graduating is low. Children from poorer families are at a greater disadvantage. The drop-out rate for the poorest households is about four times that of the richest ones.¹⁷

While States determine the curriculum used in schools, the following is the national curriculum outline. The quality of teaching varies tremendously school to school and State to State.

Primary Stage (5 years)

The curriculum includes:

A. Grades 1 and 2

1. One Language — the mother tongue/the regional language
2. Mathematics
3. Art of Healthy and Productive Living

B. Grades 3 to 5

1. One language — the mother tongue/the regional language
2. Mathematics
3. Environmental Studies

¹⁴ Kingdon, 2005.

¹⁵ The World Bank EdStats, 2001.

¹⁶ The World Bank (year?)

¹⁷ The World Bank (year?)

4. Art of Healthy and Productive Living

Upper Primary/Middle Stage (3 years)

The Grade 6-8 curriculum includes:

1. Three Languages — the mother tongue/the regional language, Hindi and English
2. Mathematics
3. Science* and Technology
4. Social Sciences
5. Work Education
6. Art Education (fine arts: Visual and Performing)
7. Health and Physical Education

Mother tongue or regional language is the medium of instruction for most Indian primary students, although students from elite families are typically sent to English medium schools as English is considered a distinction of social class. Many states now start teaching English as a second language by grade 3 – though in practice the execution of this varies widely across states.

Most independent tests of achievement levels continue to show dismally low levels of achievement in basic literacy skills. The Public Report of Basic Education (PROBE) of 1999 is based on a household survey of randomly selected villages in 5 States, accounting for 40 percent of the population and more than half of all out-of-school children in India. The survey found that one of the five States (Himachal Pradesh) had made remarkable progress towards universal elementary education, but the other four had a great distance to go. For example, when PROBE investigators arrived at the school sites, they found that one-quarter of headteachers were teaching, one-third were absent, and the rest were present but not actively delivering instruction. Similarly, only half of the teachers were seen actually teaching, the rest were described as minding the class, not in the classroom, engaging with colleagues, or participating in other non-instructional activities.

Out-of-School Population

One out of every three out-of-school children in the world reside in India. Fifty-three percent of students dropout before completing primary school.¹⁸ The issue today is not a lack of demand, but rather quality of supply. Students often drop out because their public school experiences are often so poor that they learn very little even after being enrolled for 4 to 5 years.

Educating girls is a particular challenge. India's high fertility rates promote a social bias against educating young girls. Parents lack the resources to provide a quality education for all of their children, and therefore invest scarce resources in boys, for whom the market returns to the investment in education are perceived to be higher. It is estimated that for every 100 girls that enroll in school in rural India, 40 will reach grade four, 18

¹⁸ UNESCO, 2000-01.

will reach grade eight, nine will reach grade 9, and only one will make it to grade 12.¹⁹ The PROBE study did find, however, that 98 percent of parents surveyed felt that education was necessary for boys, and 89 percent of parents felt it necessary for girls. Some studies suggest that parents are more likely to incur private expenditure for sons than daughters.²⁰

Secondary Education

The Secondary Stage consists of grades 9-12 (ages 14-17). India has more than one hundred thousand secondary and senior secondary schools serving 30 million students (the average teacher to student ratio is 1:34).²¹ Even though education in government schools continues to be free for grades 9 and above, the majority of enrollment is in private schools whose fees varies considerably.²²

Although UNESCO data indicates that nearly half of all children enrolled in secondary school in 1999-2000 (up from 30 percent in 1980)²³, studies seem to indicate that only 20 percent of students actually attend secondary school.

Public exams at the end of grades 10 and 12 drive instruction at the school level. Therefore, there is significant difference in the curriculum offered correlating to the various examination boards.

Secondary Stage grades 9 and 10 (2 years)

The curriculum includes²⁴:

1. Three Languages — mother tongue/regional language Hindi, English (Some schools offer as electives other languages such as Sanskrit, Chinese, Japanese, Russian, French, German, Arabic, Persian, Spanish)
2. Mathematics*
3. Science and Technology**
4. Social Sciences
5. Work Education or Pre-Vocational Education
6. Art Education (fine arts: Visual and Performing)
7. Physical and Health Education

19 www.infochangeindia.org is a news channel that gathers content from a wide, credible and experienced network of journalists, researchers, development specialists and grassroots activists, and from dozens of different journals, websites and news agencies in India and across the world.

²⁰ Kapur, Devesh and Pratap Bhanu Mehta. "Indian Higher Education Reform: From Half-Baked Socialism to Half-Baked Capitalism." Working Paper, Center for International Development at Harvard University. September 2004.

²¹ UNESCO Institute for Statistics cited in ADB Key Indicators for Global Participation, 2003.

²² Karthik Muralidharan.

²³ UNESCO Institute for Statistics cited in ADB Key Indicators for Global Participation, 2003.

²⁴ According to Shalini, a SAIS student from India, the math and science curriculum up to grade 10 provides a very solid foundation for Indian students and she was amazed at the content and slow pace of her graduate work here in the U.S.

*Mathematics secondary curriculum includes the study of Arithmetical concepts, number systems, algebra, geometry, trigonometry, statistics, measurement, graphs and coordinate geometry. (Additional detail provided in attachment)

**Science and Technology curriculum is designed around six major themes: matter, energy, living world, natural resources, environment and the universe. Each student is expected to do 15 exercises involving lab work per school year. (Additional detail provided in attachment)

The typical school schedule is a 9 period day (40 minutes per period). According to the Central Board of Secondary Education, instructional time in grade 10 is spent as follows:

<u>Subject Area</u>	<u>Amount Studied Weekly</u>
Language I	280 minutes
Language II	240 minutes
Mathematics	280 minutes
Science and Technology	360 minutes
Social Science	360 minutes
Work Education or Pre-Vocational Education	120 minutes (plus time outside school)
Art Education	80 minutes
Physical and Health Education	80 minutes

Secondary schools are affiliated with Central or State boards which administer examinations at the end of grade 10 resulting in the award of the Secondary School Certificate (SSC), the All-India Secondary School Certificate or the Indian Certificate of Secondary Education.. There are three national examining boards: the Central Board of Secondary Education (CBSE), the Council for the Indian School Certificate Examinations (CISCE) and the National Open School (NOS) for distance education.

The academic content and marks awarded by the CBSE and CISCE are broadly equivalent, with the exception of English. The CBSE program examines functional English and has no study of literature, while the CISCE program incorporates the study of Shakespeare and other classics as well as contemporary literature, drama and poetry.²⁵

In some of the States, the first public examination is also conducted at the completion of the middle stage.

The British Council notes that the Indian Secondary School Certificate (awarded by all school boards after grade 10) may generally be considered slightly below the British General Certificate of Secondary Education (GCSE) or the International GCSE High School Examinations standard.²⁶ The content is considered equivalent, but students are

²⁵ Most of the private schools, as well as many government schools, are affiliated with the Central Board of Secondary Education (CBSE).

²⁶ The British GCSE or the IGCSE is the largest and most widely recognized examination system in the world.

not expected to problem solve or apply their knowledge in the same way. Senior secondary certificates from either of the two national boards may be considered equivalent to an 'AS' standard.

Upper Secondary Education

The majority of students exit school after grade 10 (approximately age 15). For those who stay, schooling becomes differentiated. Based on performance on the 10th grade subject exams, students enter an upper-secondary stream for their last two years of schooling before university (grades 11-12). The most prestigious stream (which also has the highest cut-off in terms of marks required in the grade 10 exams) is the science stream, the second is commerce, and the third is humanities (arts). Students in the sciences stream almost always study mathematics, physics, and chemistry. Additional subjects may include biology/botany/zoology for those intending to take medical school entrance exams and computer science for those pursuing engineering degrees. Those in the Commerce stream study economics, accounting, mathematics, and commerce. Students in the Humanities/Arts stream study options that include history, geography, political science, philosophy, psychology, languages, arts, music. Most schools only offer a few of these subjects, which obviously restricts student latitude in selecting areas of focus.

Upper secondary education is conducted in schools, or two-year junior colleges (some of which are also affiliated with degree offering colleges). Some of these institutions are privately operated while others are government-operated institutions. Another common institutional form is to have colleges with private management but receiving substantial financial assistance from the government in return for charging low fees. Student enrollment in private, unaided schools grew by almost 10 percent between 1978 and 1993.²⁷ The curricula for upper secondary institutions are determined by State or Central Boards of Secondary Education and students sit for exams at the conclusion of grade 12.

After completing their upper secondary schoolwork (grade 12), students sit for another set of exams (the Higher Secondary Certificate Examinations) which determines their higher education options. Well known colleges specify cut-off marks for admission in various courses of study, which may sometimes be extremely high (over 90% marks not being uncommon). The cut-off marks or overall entry score can vary between courses in the same university/college, between similar courses in different universities/ colleges and from year to year in the same course. Some courses and some universities/institutions/colleges are in greater demand than others and therefore acceptance is more competitive. Students may also be required to complete pre-requisite coursework.

The top students wanting to pursue professional school (medical, engineering, law) sit for additional school-based entrance exams to determine their admissions into these specific programs. Most science stream students try to get into the engineering or medical colleges as these have the most prestige within India. For the commerce line, students

²⁷ NCERT All India Educational Surveys cited in Financing Education in India, edited by Tilak.

typically try to get admissions into a commerce, accounting, business, or technology program of study. Most students in the humanities stream aim to enter the arts colleges.

Vocational and technical education is also an option in higher secondary schools. The aim of vocational education is to gain a broad knowledge about occupations, not training in specialized subjects. The courses consist of a language course (15%), general foundation courses (15%) and vocational electives (70%), of which about half consists of practical work. Electives are chosen from a wide variety of areas including agriculture, engineering and technology, business and commerce, home science, health and para-medical services, and humanities. Courses are employment-oriented, but also can provide access to courses in related areas of higher education. Examinations at this level are conducted by the All India and State Boards of Vocational Education.

Only 10 percent of students are opting for the vocational stream, against a year 2000 target of 25 percent.²⁸ This is attributed to the lack of industry-school linkages and the system hasn't convinced students that this stream can prepare them for real jobs and careers.

A Three-Tiered System

In 1964, the Kothari Commission Report on Education presented an in-depth study of primary and secondary education. The Commission roundly condemned this separate, unequal school system which it accused of “increasing social segregation and perpetuating and widening grade distinctions.”

Yet little has changed. There are clearly three tiers of schools in India. Ninety percent of the estimated 112 million children who enroll in primary school annually have no choice but to attend ill-maintained government schools, many functioning out of a canvas tent. However, given that the quality of education in these schools is usually quite poor, the fast-increasing middle class prefers to send its children to the government-aided, privately-run schools. The third category, the private schools, caters to the elite upper-grade population, boasting air conditioning and riding lessons.

Summiya Yasmeen, a reporter for India Together (an online news source) offers her opinion on the three tiers of Indian schooling.²⁹

The rich and famous are typically enrolled in five-star English-medium schools affiliated to the upscale CBSE (all India), CISCE (pan India), and IB examination boards which offer globally accepted syllabuses and curriculums.

Next in the pecking order are English medium government aided schools affiliated to State-level examination boards to which the children of the middle grade are sent. The 28 State boards offer inferior infrastructure, sub-standard education and less rigorous syllabuses and examination assessments.

²⁸ Tenth Five-Year Plan. Ministry of Human Resources Development.

²⁹ Yasmeen, Summiya. “Swelling Support for Common Schools.” Indiatogether.org (July 2004).

And at the base of the education pyramid are shabby, poorly managed government/municipal schools which shove dubious quality language education down the children of the poor majority.

Teacher Quality/Teaching Environment

For most students in India, the learning environment is pretty abysmal. School consists of a one-room schoolhouse, one teacher covering multiple grades, and 40 students per teacher. It should be noted that many rural public schools barely have the most basic of facilities (a closed-in building, drinking water, toilets, a blackboard). In addition to these challenges, many rural schools are seriously understaffed, especially in the larger states of Uttar Pradesh and Bihar. While one teacher may have 40 students per class on average, the unwillingness of many teachers to accept remote rural postings (and the attempts to get these postings changed via lobbying and court cases) means that the actual student-teacher ratio is much higher in many parts of rural India. High student-teacher ratios are exacerbated by high levels of teacher absence and low levels of teaching activity.

Without efforts to recruit large numbers of new teachers and an investment of resources to upgrade school facilities, India will be hard-pressed to scale up elementary education and improve instructional outcomes for its young children.

Teaching is a well-paid profession in India and teachers are typically appointed based on political affiliations, not on content or pedagogical knowledge. There is no system in place to motivate teachers to improve academic achievement³⁰, and very little training available to strengthen teaching practices. For example, while the 1986 National Policy on Education upgraded the standard curriculum with increased requirements in English and in the sciences, the curricular changes were not linked with new ways of teaching and assessing student progress.

The British Council provides the following summary of the typical school day. While this description is likely valid for urban private schools, it is far from the case in the typical government school, where the focus (if at all) is still on rote learning for passing exams:

A typical school day begins early in the morning anytime between 7-8 am. Students attend school for about 6 hours during the day with each classroom session spanning 30-40 minutes and a 30-minute lunch break. Some schools operate for a longer duration of time (about 8 hours) and these schools provide two break periods. The school typically begins with a morning assembly for all students and teachers and may include prayers, meditation, important announcements, special assemblies, Mass PT or any other planned activity.

Primary classes generally span for a shorter duration of time than the secondary classes. The grade is managed by one teacher, who is generally assisted by another teacher. This,

³⁰ One innovative example: In Madhya Pradesh, panchayats (village councils) are given responsibility for ensuring teacher performance at the local level, including the right to withhold teachers' salaries in the event of poor teacher performance.

however, is not the rule and in some rural parts of the country one teacher may be responsible for managing a range of classes³¹! A secondary grade typically has one class teacher who has the overall responsibility of managing the grade and also teaches one or more subjects. Subject teachers teach students during their respective periods. For some subjects like Arts, Music, Physical Education, Work Experience, Science Practicals, Library etc. students are required to shift to the relevant work places in the school.

In terms of the physical attributes, there are a number of variations in India. In a city a classroom typically has rows of benches and a teacher's desk right at the front. Other basic resources in the classroom include the blackboard, one or more bulletin boards/display areas and one or more cupboards for storage purposes. Urban private schools may have greater resources to set up modern classrooms and many of them are progressing towards developing Hi-tech classrooms, complete with computer systems and modern teaching aids. In complete contrast, some schools in rural and semi-urban areas lack even the basic facilities like concrete buildings, benches, chairs etc. However, many initiatives are taking place in the area of education and especially to reach out to the underprivileged masses of the society.

A typical classroom session involves guided teaching by the subject teacher following the prescribed syllabus. Teachers are increasingly using the Project method of teaching to encourage students to think, research information and collate data. Majority of the work as well as assessment happens on an individual basis and for certain specific topics and assignments, students work in groups.

Governance

With India's independence in 1947, a Department of Education was established within the Ministry of Human Resource Development. The department has three main divisions:

1. Secondary and Higher Education
2. Elementary Education and Literacy
3. Women and Child Development

The department coordinates planning with the States, provides funding for experimental programs, and acts through the University Grants Commission (defined in the higher education section) and the National Council of Educational Research and Training (NCERT) to develop standards, instructional materials, and design textbooks. The NCERT's textbooks serve as models since States are not legally obligated to follow the national syllabus.

The central government drafts five-year plans that include education policy and some funding for education. State-level ministries of education coordinate education programs at the local levels. Administration of urban government schools are overseen by both the

³¹ Recent research by Kremer and Muralidharan (2005) shows that nearly 70% of rural government schools in India practice "multi-grade" teaching, whereby a teacher simultaneously teaches multiple grades – typically because there are fewer teachers than grades in the school.

state education ministry and the municipal government. In rural areas, either the district board or the panchayat (village council) has oversight on school functioning, which often brings heightened politicization to the teacher appointment process.

The individual State governments provide the majority of educational funding and either directly run schools or support privately-run schools through grants. However, a phenomenon of growing importance over recent years has been the mushrooming of schools in each state that are completely independent of government funding; these are called private, unaided schools. These schools typically pay much lower salaries than government schools, and are therefore able to hire more teachers, reduce multi-grade teaching, and have smaller classes. They are also able to exercise more oversight on teachers and have higher rates of teaching activity.³²

Financing

On the recommendation of the Education Commission (1966), the Indian government (1968) fixed a target of investing six percent of GNP in education by 1986, but this has never been achieved. In the early 1950s, it was as low as 1.2 percent, it has moved up steadily to around 4 percent of GNP (4.2 in 2000-01).³³ According to the Human Development Report (2001), among the 143 countries listed, India ranked 104th with respect to the share of GNP spent on education. And, a recent UNESCO study indicates that countries spending much less than India are getting better results.³⁴

	Primary school dropout rates	Expenditure as % of GDP
India	53%	4.1%
Myanmar	45%	1.4%
Bangladesh	35%	3.7%
Cambodia	35-38%	1.9%
Nepal	35-38%	2.5%

Belatedly recognizing the importance of primary education, the government has in recent years shifted the focus of its funding to primary and middle grades in an attempt to boost overall literacy levels. Higher education funding overall has seen a decline over the past twenty years, although the world-renowned “institutions of national importance” in technology and management have not suffered budget cuts.

Share by Level of Total Public Expenditure on Education (percent)³⁵

³² Kremer and Muralidharan (2005) report survey evidence where only 1 out of nearly 3000 government school head teachers reported ever having fired a teacher for repeated absence, compared to 35 out of around 600 private unaided schools that reported having done so.

³³ Financing Education in India, edited by Talik.

³⁴ UNESCO Global Education Digest 2003 (data from 2000-01 school year)

³⁵ Analysis of Budget Expenditure in India, cited in Financing Education in India, edited by Tilak, p. 29.

Year	Primary	Secondary	Tertiary
1950-51	48	25	20
1960-61	42	27	22
1970-71	43	28	28
1980-81	41	29	29
1990-91	46	32	13
2000-01	49	30	15

The central government contribution to education is relatively small compared to the state budgets (the central government contributes approximately 10 percent of total spending on education). Regardless of the source, there are no reliable reports on the distribution of government resources making it very difficult to track how much of the allocations actually reach the school system for which they have been budgeted. Certainly the Department of Education receives the majority of expenditure, but funds are also released to a number of centrally-sponsored projects and programs, making it unclear how much reaches the district and school level.

Of the total recurring expenditures, teacher salaries amount to more than 80 percent and non-teaching staff salaries make up 8 percent, leaving very little for key investments in infrastructure, teacher training, instructional materials, and the like. Despite a commitment to free education, schools simply do not have the funds to provide the basics. As of 1995-96, only 35 percent of children in public primary schools receive textbooks, five percent receive paper, and 27 percent lunch.³⁶

India's investment in education can be summed up as inadequate in terms of efficiency and equity, yet the country's prized professional higher education institutes continue to be well-funded and to produce high quality graduates.

Foreign Aid

As it does with many poor and developing countries, the World Bank is investing in India's education system to modernize facilities and close the divide between what's available to rural versus urban students. The World Bank's support for education in India focuses on both primary education and vocational and technical education and training. The Bank is also exploring ways in which it can support India's upper-primary education and ways to develop the skills of scientists and technicians.

Bank assistance for basic education in India aims to expand enrollment levels and reduce drop out rates, while raising students' academic performance. Projects focus especially on girls, children from disadvantaged scheduled castes and scheduled tribes, working children, children with disabilities, and other children with limited opportunities to attend primary school.

³⁶ NSS (?) report cited in Financing Education in India, edited by Talik.

The main project activities are working to increase access, improve classroom instruction, strengthen community participation in education, and build institutional and management capacity. This work has been financed with more than \$1.8 billion by the International Development Association (IDA), the World Bank's concessionary lending affiliate that provides interest-free credits to the poorest countries.³⁷

Higher Education: An Expanding System

At the time of its independence, India lacked a national network of universities and affiliated colleges that could provide outreach to a country with vast diversities. Similarly, the feeder secondary institutions were of unequal quality making it difficult to provide a high quality academic curriculum while also ensuring access for a wide swath of the population. Over the last fifty years, India has endeavored to expand access to (i.e. provide a greater number of seats) higher education, but there does not appear to have been a corresponding focus on improving quality.

In fact, in an effort to meet the primary goal of creating social mobility and equality of opportunity, many say the government has overcompensated, instituting strict commonalities in terms of fee structure and curriculum across 250-odd universities. This “excessive egalitarianism” is an unusual goal for tertiary systems and has served to minimize distinction and excellence in institutions. The emphasis on leveling has served to make the majority of higher education degrees meaningless in the marketplace. And rather than respond, the middle class, in large part, has opted for either education abroad or via a private institution. According to Harvard professor of government, Devesh Kapur and his policy researcher colleague Pratap Bhanu Mehta, the system feels no pressure to enhance the median quality of education.³⁸

India's current system of higher education is centralized and highly politicized, offering relatively limited access to higher education. (Only ten percent of the age cohort was enrolled in 2004, however, seven percent of a college-age population of 90 million still equates to more than 9 million students, with 2.5 million graduating from university each year.)³⁹ Over the course of the 1970s and 1980s, politicians acquired a vested interest in universities, seeing them as ways to expand patronage. The result is that in many cases, universities are inextricably intertwined with government officers who oversee and/or fund them. The hiring and promotion of teachers is also politicized, providing teachers with unconditional job security and no accountability in improving student achievement.⁴⁰ It is only because India has such a large population overall, and therefore

³⁷ “World Bank Support for Education in India.” South Asia Sector Brief. The World Bank Group. September 1999.

³⁸ Kapur, Devesh and Pratap Bhanu Mehta. “Indian Higher Education Reform: From Half-Baked Socialism to Half-Baked Capitalism.” Working Paper, Center for International Development at Harvard University. September 2004.

³⁹ India graduates a million more students from college each year than the U.S. does, including 100,000 more in the sciences and 60,000 more in engineering.

⁴⁰ Kapur, Devesh and Pratap Bhanu Mehta. “Indian Higher Education Reform: From Half-Baked Socialism to Half-Baked Capitalism.” Working Paper, Center for International Development at Harvard University. September 2004.

large total numbers of students, that the success of the IIT and IIM graduates provides a strong impression of the higher education system overall.

In some sense, one could argue that the greatest achievement of the IIT's and IIM's is the fact that they have managed to keep their stringent admission standards free of corruption. However, since they manage to select the very best, it is unclear as to how much of their highly-publicized success is due to "value-addition" as opposed to simply to "selection." The greater value to society from the existence of these apex institutions perhaps comes from the fact that so many students attempt the entrance examinations (around 200,000 students take the IIT entrance exam for less than 3,000 seats) and in the process of studying for these stringent exams, they sharply raise their own academic standards relative to that of the normal grade 12 public exams.

This, of course, creates huge demand for university education, and over the past few decades, India has seen phenomenal growth in the number of higher and technical education institutions, and a corresponding growth in enrollment. The higher education system has seen a 13-fold increase in the number of universities and a 26-fold increase in the number of colleges since Independence in 1947. As of 2002-03, there were 196 universities, 76 Deemed Universities, five institutions established through State and central legislation, 11 institutes of national importance established through Central legislation, and nearly 13,150 colleges including around 1,600 women colleges in the country.⁴¹

Recent growth is much greater in professional colleges (especially engineering, management and medicine), as well as in private vocational training courses catering especially to the IT sector.⁴²

In the Indian system, higher (tertiary) education starts after the 10+2 Stage (i.e. ten years of primary and secondary education followed by two years of senior secondary education).

Student enrollment has grown about five percent annually over the past two decades. This growth is about two-and-a-half times the population growth, and results from both a population bulge in lower age cohorts as well as increased demand for higher education overall. Yet only ten percent of the age cohort is enrolled today, a number higher than developing country averages, but lower than the Asian average (11 percent) and much lower than developed countries which average 40 percent. Enrollment ratios vary across Indian States, with the Southern and Western States having higher numbers than their Eastern counterparts.

All India Growth of Student Enrollment: 1983-84 to 2002-2003⁴³

⁴¹ This does not include the "unrecognized" institutions/foreign universities operating in the higher education sector.

⁴² Kapur, Devesh and Pratap Bhanu Mehta. "Indian Higher Education Reform: From Half-Baked Socialism to Half-Baked Capitalism." Working Paper, Center for International Development at Harvard University. September 2004.

⁴³ University Grant Commission, 2002-03

Year	Total Enrolment	Increase over the preceding year	Percentage Increase
1983-84	3,307,649	174,556	5.6
1984-85	3,404,096	96,447	2.9
1985-86	3,605,029	200,933	5.9
1986-87	3,757,158	152,129	4.2
1987-88	4,020,159	263,001	7.0
1988-89	4,285,489	265,330	6.6
1989-90	4,602,680	317,191	7.4
1990-91	4,924,868	322,188	7.0
1991-92	5,265,886	341,018	6.9
1992-93	5,534,966	269,080	5.1
1993-94	5,817,249	282,283	5.1
1994-95	6,113,929	296,680	5.1
1995-96	6,574,005	460,076	7.5
1996-97	6,842,598	268,593	4.1
1997-98	7,260,418	417,820	6.1
1998-99	7,705,520	445,102	6.1
1999-00	8,050,607	345,087	4.5
2000-01	8,399,443	348,836	4.3
2001-02*	8,821,095	421,652	5.0
2002-03*	9,227,833	406,738	4.6

**Provisional*

The vast majority of India's 15,000 colleges in India are Arts, Science, Commerce & Learning Colleges⁴⁴ and these enroll the bulk of the nearly 6 million current tertiary students.⁴⁵ Nearly two-thirds of students are enrolled in arts and science, with another 18 percent in commerce/management.⁴⁶ This is important because most private investment in higher education is concentrated in engineering, medicine and management and therefore, does little for the majority of students. Almost nine in ten students pursue bachelor's degrees, one in ten pursue post-graduate degrees.⁴⁷

There is a trend towards privatization, although of course the degree to which states have allowed private higher education institutions and the quality of such institutions varies widely. In the case of engineering colleges, the private sector, which accounted for just 15 percent of seats in 1960, now accounts for 86.4 percent of seats.⁴⁸ In medical

⁴⁴ University Grants Commission, 2001-02

⁴⁵ <http://www.education.nic.in/htmlweb/iamrstat.htm>
<http://www.education.nic.in/htmlweb/iamr2.htm#TA17>

⁴⁶ University Grants Commission, 2002-03

⁴⁷ University Grants Commission, 2002-03

⁴⁸ AICTE cited in Kapur, Devesh and Pratap Bhanu Mehta. "Indian Higher Education Reform: From Half-Baked Socialism to Half-Baked Capitalism." Working Paper, Center for International Development at Harvard University. September 2004.

colleges, the proportion of private seats has risen from 6.8 percent in 1960 to 40.9 percent in 2003.⁴⁹ Privatization does not imply a release from the state monopoly of regulation which dictates teaching methods, courses taught, and syllabi. Privatization simply means that institutions are self-financing; they draw on student fees rather than government funding. It is presumed that the efficiency of such schools is much greater than in government-supported schools.

And, of course, there are an estimated 110,000 Indian students studying abroad – approximately 80,000 in the U.S.⁵⁰, although they are turning to Canada, the U.K. and Australia with the effects of the terrorist strike in September 2001 making entry into the U.S. much more difficult. Indians are spending between \$700 million and \$1 billion on higher education abroad, a sum total that exceeds expenditures by the State. Public institutions have been limited in the fees they can charge students which sends a somewhat perverse message to those with means: “If you have money, you can spend it on education abroad, you can come to a private arrangement, or even waste it on any form of consumption, but the one thing you will not be allowed to do is to spend it at public institutions or on getting an education in India.”⁵¹

And, those who leave, typically the most capable and financially well-off, have little stake in improving the home system. However, while the majority of Indian students graduating from U.S. institutions used to stay and work in America, more and more are now returning to India as profitable and challenging job opportunities become available back home, and in response to reduction in the number of H-1B visas relative to the internet boom years. So perhaps with greater numbers returning, there might be additional pressure to strengthen educational offerings overall.

There has also been a recent emphasis on women’s education since almost sixty percent of girls/women in India remain illiterate. The number of women’s colleges has recorded a substantial increase (1,600 in 2002-03) and women now constitute a greater proportion of enrollment figures. They represented just 31 percent of the student population in 1991 which had climbed to 40 percent by 2002.⁵²

Additionally, India’s most marginalized social groups (scheduled castes and scheduled tribes) are enrolling in greater numbers, moving from eight percent of students in the late 1950s to 12-13 percent in the late 1980s. There is also strong evidence to suggest that the

⁴⁹ Medical Council of India cited in Kapur, Devesh and Pratap Bhanu Mehta. “Indian Higher Education Reform: From Half-Baked Socialism to Half-Baked Capitalism.” Working Paper, Center for International Development at Harvard University. September 2004.

⁵⁰ More than 70 per cent of Indian students who come to the U.S., do so to study engineering and science.

⁵¹ Kapur, Devesh and Pratap Bhanu Mehta. “Indian Higher Education Reform: From Half-Baked Socialism to Half-Baked Capitalism.” Working Paper, Center for International Development at Harvard University. September 2004.

⁵² University Grants Commission

proportion of first generation graduates has been rising in State and Central Universities.⁵³

Governance Bodies

The *University Grants Commission* (UGC), established in 1952 and awarded statutory authority in 1956, is responsible for the development of higher education, allocating and distributing grants from the Central Government to all eligible central, State and deemed universities based on an assessment of their needs. Universities established under the Acts of Parliament are eligible for both development and maintenance grants; those established by State legislatures are eligible for development grants only. There is a growing consensus that the UGC needs to be restructured, with less emphasis on the grant dispensation, and more emphasis on becoming a monitoring organization that benchmarks Indian colleges and universities with the best in the world in order to strengthen academic standards. Currently only 6,000 of India's colleges qualify for UGC grants and recognition because the other 9,000 lack sufficient resources or qualified faculty.⁵⁴

The UGC established an autonomous body, the *National Accreditation and Assessment Council* (NAAC), for carrying out periodic assessment of volunteering universities and colleges. NAAC's process of assessment and accreditation involves the preparation of a self-study report by the institution, validation of this report by peers, and final decision by the Council. Criteria include: curricular aspects; teaching-learning and evaluation; research, consultancy and extension; infrastructure and learning resources; student support and progression; organization and management; and healthy practices. The NAAC's main initiative is to address the qualitative problems that have arisen because of the recent explosion in higher education. However, the agency's authority is confined to institutions that are already recognized by the University Grants Commission as degree-granting institutions or as affiliated institutions. They have no power to assess or regulate private, unrecognized institutions. And accreditation is voluntary, with very few institutions participating to date.

The *All-India Council of Technical Education* (AICTE), established in 1948 and awarded statutory authority in 1988, is responsible for planning and developing technical education (engineering and technology, architecture, management and pharmacy). It oversees the review and update of the curriculum and facilities of the engineering colleges and other technician-training institutions. The AICTE also regulates the establishment of new private professional colleges in order to limit their proliferation. A significant feature in the development of technical education in the last twenty years is the emergence of "self-financing" institutions in the private sector that charge student fees and do not depend on government grants. The AICTE recently established a National Board of Accreditation (NBA) to initiate the accreditation of technical institutions (like its counterpart, the NAAC).

⁵³ Kapur, Devesh and Pratap Bhanu Mehta. "Indian Higher Education Reform: From Half-Baked Socialism to Half-Baked Capitalism." Working Paper, Center for International Development at Harvard University. September 2004.

⁵⁴ Dilip Thakore. "UGC Begins a New Innings." *Indiatogether.org*. May 2004.

In 2004, AICTE announced that it will constitute a *National Engineers Registration and Licensing Board* (NERLB) to provide registration and licenses for the engineering graduates of IITs with a view to enhance the level of proficiency and ethics. NERLB would among other things represent the engineering profession at national and international levels, facilitating international mobility of Indian engineers.

All universities are members of the *Association of Indian Universities* (AIU). The AIU has no executive powers but plays an important role as an agency of dissemination of information and as an advisor to the government, UGC and the universities themselves.

The *National Council for Teacher Education* (NCTE), established in 1973 and awarded statutory authority in 1993, is responsible for planning and developing teacher education, including setting and maintaining standards. There is a National Eligibility Test to select teachers. Some States also conduct State Level Tests for appointment of teachers in their States. In 1987, *Academic Staff Colleges* (ASC) were set up (45 to date) to provide opportunities for general orientation and subject refresher programs for academic staff. More than 100,000 teachers have received training of 3-4 weeks duration. These colleges also conduct 2-3 day seminars for Principals.

Higher Education Provider Options

On paper, the Indian government is responsible for maintaining educational quality and standards, for studying and matching educational options with workforce needs, and for supporting research and advanced study. Yet, experts say that India's higher education system, like its K-12 counterpart, is fraught with politics and corruption and is considered to be highly inefficient in doing its job. Devesh Kapur of Harvard and Pratap Mehta of the Center for Policy Research in New Delhi posit in a recent paper that higher education in India is being de facto privatized. However, because private initiatives remain hostage to State regulations, private capital has been unable to structure a productive alternative to the public system. Private colleges are not able to respond to demand or fill a market niche because they must operate in the same regulatory environment that public institutions do.

Higher education is provided by: 1) Universities – including agricultural universities and medical universities;⁵⁵ 2) "Deemed to be universities" which are institutions that are conferred the status of a university by virtue of their long tradition of teaching, or specialization in a particular area; and 3) Institutions of National Importance which are established or designated through Acts of Parliament. There are 11 such institutions including the Indian Institutes of Technology. They are empowered to award their own degrees, a privilege normally granted only to universities.

Industrial training institutes and polytechnics (administered through the State departments of technical education) offer non-university level post-secondary education in various technical and commercial fields.

⁵⁵ There are Central Universities, funded directly by the Ministry of Human Resources Development, and State Universities, set up and funded by various States.

Since the early 1980s, India has been developing an Open University system that provides distance education to improve university access. The *Distance Education Council* (DEC) provides development funding (from the Central Government) to open universities and distance education institutions. With 72 percent of the population living in rural areas, where only 38 percent of colleges are located, the Indian government had to implement distance education to fulfill demand. Open learning is credited with expanding and diversifying the courses available to students and reaching a vastly heterogeneous student body (age, gender, region, social background, income, and educational experience). There are now some sixty Institutes/Directorates of distance education attached to conventional universities and ten Open Universities. Students can choose from over 100 courses leading to degrees/diplomas via distance education.

Courses are offered on a modular pattern, leading to the award of certificates, diplomas and degrees. Open University programs have proven to be highly cost-effective, averaging just 35 to 50 percent of the cost of traditional programs. Also, unlike their University counterparts, Open Universities are notable for their close linkages with industry and employer groups, not only in designing and preparing learning packages, but also in the delivery of various services to students at the workplace.

Universities in India: Important Features

University Type	Established By	Important Features
Conventional	Central/ State Governments	<i>Nearly 50% of universities in India belong to this category.</i>
Professional	State Governments	<i>Specialized instruction and research on campus. Professional areas like engineering, medicine, law covered.</i>
Deemed	Central Government Private/Joint Sector (UGC Approved)	<i>University status awarded to institutions(60) of long standing and high academic reputation. Typically encompasses both teaching and research, with close interactions between the two.</i>
Other	Central Government	<i>Highly selective institutions offering professional teaching /research; IITs/NITs/IIMs/ Law Institutes</i>
Other	Private/Joint Sector	<i>Private Institutions</i>
Open	Central/ State Governments	<i>Open and flexible education offered through the distance mode using correspondence courses/modern educational technology like interactive TV; Wide variety of programs.</i>

Instruction for almost 80 percent of students in undergraduate programs is delivered by colleges which are affiliated with universities (universities have the power to grant

affiliation to a college). Universities prescribe the courses and set the standards for the colleges, conducting the examinations and awarding the degrees. This leaves college teachers very little flexibility in what they teach and how. The UGC has, however, conferred autonomous status on 140 colleges allowing teachers to experiment with the curriculum, introduce innovations in teaching, conduct their own examinations, and award joint degrees with affiliating universities. The target is to make 10 percent of existing colleges autonomous by 2007 (which would raise the number to 600).⁵⁶

While there has been a dramatic increase in the number of public colleges established in recent years, most of them only offer general education courses through syllabi set by their affiliating universities. These colleges have neither the flexibility nor the financial resources to offer the same innovative programs that private institutions have developed. A graduate of a traditional three-year bachelor's program in a non-professional school has virtually no marketable skills as compared to one that has completed a program that included applied mathematics and science and industry placement in the same three-year span. Therefore, a degree in Arts and Sciences is meaningless in the marketplace and does not perform a signaling effect for employers because the quality of education received varies so widely. As reported by the president of the Reliance Group, India's largest private sector corporation:

“We are obliged to rigorously test (graduate) job applicants to determine their IQs and street smartness rather than trust their degree qualifications. We train them, creating our own Bachelor of Sciences and re-teaching our employees mechanical and chemical engineering.”⁵⁷

The rapid scale-up in the number of colleges has appeared to impact the quality of education in that academic standards are not up to par by international standards. Today's diversified student body ranges from first generation learners who attended publicly funded schools to those from professional and higher income families who patronized private institutions. Many educational experts feel that the quality of higher education has declined in an effort to serve the wide variety of students entering today.

Curriculum content is criticized as outdated, with much reliance on rote teaching methods. Students complain of too little connection to work-related opportunities or career preparation. Many feel they study for irrelevant degrees and are unprepared for the world of work as a result. Graduate unemployment is rising; in fact, the unemployment level of the educated workforce – defined as secondary and above level of education—is almost six times that of the workforce educated only up to the primary level.⁵⁸ The total number of registered unemployed recently topped 40 million Indian residents, with many more unregistered but still interested in finding employment.

⁵⁶ Dilip Thakore. “UGC Begins a New Innings.” Indiatogether.org. May 2004.

⁵⁷ Quote taken from Dilip Thakore, “UGC Begins a New Innings.” Indiatogether.org. May 2004.

⁵⁸ According to Morgan Stanley economist Chetan Ahta in “India Appending Itself to the Global Labour Supply Chain.” [Global Economic Forum](http://GlobalEconomicForum.com). February 4, 2004.

In the early post-Independence years, a bachelor's degree often provided the elite entrance to prime government positions, but in contemporary India, it at best provides a chance to become a white-collar worker at a relatively modest salary. And with organized employment only representing 10 percent of total employment, finding a professional job is a challenge. Nevertheless, a university degree or diploma continues to be a requirement for most jobs and consequently, the college and university system remains in demand. But students do not demand quality improvements in their education.⁵⁹ Instead, many of them spend more years (and increasingly more resources) in acquiring some sort of post-graduate professional qualification in order to signal their skills and knowledge to potential employers. Another recent phenomenon is the number of college students, in non-professional degree courses, who study in parallel technical professionally-oriented courses with the hope of increasing their job prospects upon graduation (examples of these include various kinds of computer courses provided by institutes such as NIIT and Aptech).

With teacher appointments made based on political affiliation, the teachers themselves are often unmotivated, unchallenged by competition in that students do not select teachers and courses once they enroll in a program, not held accountable for the quality of their teaching, and in fact, are very often paid on a per lecture basis. (Teacher salaries can constitute as much as 95 percent of university expenditures.)

In response to these problems, the UGC is now encouraging students to take electives from other disciplines outside their stream in order to gain additional job-related skills and earn certificates after just one year of study. Practical courses are beginning to be offered at colleges and universities, offering hands-on learning to supplement the theory-heavy traditional curriculum.⁶⁰

Admissions

For admission to undergraduate courses, universities/institutes in India require candidates to have completed 12 years of schooling. This is considered by the British Council to be equivalent to earning pass grades in five subjects at the Ordinary Level (O level) and two subjects at the Advanced Level (A Level) through the GCE Examination of the U.K.

Privately managed and publicly funded colleges are required to admit 50 percent of their students based on their performance on entrance exams (free seats). These students are not required to pay any extra fees or tuition. The other 50 percent of students are admitted based on their willingness to pay extra tuition (payment seats). The unaided private colleges set their own fee levels (below a government-set ceiling) that are generally extremely high in comparison to the aided private colleges and government colleges.

⁵⁹ Kapur, Devesh and Pratap Bhanu Mehta. "Indian Higher Education Reform: From Half-Baked Socialism to Half-Baked Capitalism." Working Paper, Center for International Development at Harvard University. September 2004.

⁶⁰ Dilip Thakore. "New Stimulus for College Education." Indiatogether.org. June 2004.

Only students who are able to obtain an 80% to 99% on their examinations are able to get admission into a good college. Otherwise, many students are admitted into average colleges for regular Bachelor of Arts, Sciences or Communication degrees.

In general, gaining admission to a nonprofessional college is not unduly difficult except in the case of some select colleges that are particularly competitive. Students encounter greater difficulties in gaining admission to professional colleges in such fields as architecture, business, medicine, and dentistry. And, of course, admissions to the Indian Institutes of Technology (and the Indian Institutes of Management for graduate level work) is extremely competitive.

Indian Institutes of Technology

In 1946, the Sarkar Committee was set up to explore creating technical institutes of higher education for post-war industrial development of India under a special act by the President. The recommendations of the Sarkar Committee were modeled along the lines of great U.S. universities, notably the Massachusetts Institute of Technology (MIT).

The first Indian Institute of Technology (IIT) was created in 1950. The seventh and latest was established by upgrading one of India's oldest engineering institutions, Roorkee University, into an IIT. IITs offer undergraduate, integrated postgraduate, postgraduate and doctoral degrees in over 25 different engineering, technology and business/management disciplines. There are about 1,500 undergraduate and 2,000 graduate students in each IIT (except for IIT Guwahati which is about half this size). The government reserves just over 20 percent of the IIT places for scheduled castes and tribes. But this does nothing to help women, who make up less than 5 percent of the IIT students.

IITs are considered world-class and are core to the knowledge-based development strategy of the country. The curriculum may be the most rigorous in the world. Students carry approximately 50 percent more courses than the typical U.S. undergrad. Last year, 178,000 high school seniors took the entrance exam called the JEE (Joint Entrance Examination). The entrance exams are fiercely competitive and no amount of connections or string-pulling help. (Most students wishing to enter IITs rely on extensive private tutoring to prepare them for the highly rigorous exam.)

The Examination consists of one Screening Paper of three hours duration in Mathematics, Physics and Chemistry. Those who qualify in the screening test return for the Main Examination consisting of three papers in Mathematics, Physics & Chemistry, each of two hours duration. The question papers for Joint Entrance Examination are in both English and Hindi. The candidates are permitted to write the Main Examination in any one of the following languages: Assamese, Bengali, English, Gujarati, Hindi, Tamil and Telugu. Just over 3,500 were accepted, or less than two percent of the 200,000 students who sat for the JEE (compared to Harvard College's eight percent acceptance rate).

Each institute is staffed by high-caliber teaching faculty, has well equipped most modern laboratories, state-of-art library and computer networks. The selected candidates live in a pleasant and intellectually simulating environment. The teaching method relies on direct personal contact between teacher and students (the average student: teacher ratio is

10:1)⁶¹. A high staff to student ratio ensures close contact for monitoring and academic progress of each student. Living in such an environment with people having similar goals and aspirations is credited with building student confidence and providing academic stimulation. Students and faculty make no distinction between rich and poor, city-bred and rural. The only things that matter are ability, expertise and leadership quality.

The following are quotes from CBS News Transcripts, Lesley Stahl, “Imported from India: Indian Institute of Technology produces world-grade chemical, electrical and computer engineers who’ve played a leading role in the American technology revolution,” March 2, 2003:

“You wouldn't mistake this for MIT or Caltech. It's the final exam of metal fabrication grade, required for every IIT freshman. Call it shop grade on steroids. Using just a saw and a file, students have to cut quarter-inch steel into an assigned shape, measured to the millimeter. It's an illustration of IIT's emphasis on engineering basics, precision and discipline. Nobody majors in music at IIT. The education is not well-rounded. But in science and technology, IIT undergraduates leave their American counterparts in the dust.”

“Students act like entrepreneurs the whole time they're at IIT. They run everything in the dorms, which might be mistaken for cellblocks if not for all the Pentium 4 PCs. They organize the sports themselves. They even hire the chefs and pick the food in the mess halls. And unlike so many other institutions in India, they all know they're here because they deserve to be here.”

“IIT may also be one of the best educational bargains in the world. It costs a family just about \$700 a year for room, board and tuition. That's less than 20 percent of the true cost. The Indian government subsidizes all the rest. While some IIT grads stay and have helped build India's flourishing high-tech sector, almost two-thirds--up to 2,000 people--leave every year, most for the US.”

A key reason why IITs are so successful is their near-complete autonomy from the government. Yet the IIT continues to attract significant levels of State funding. For instance, while the Victoria Jubilee Technical Institute, a much-respected engineering college in Mumbai, has to manage with \$1.88 million every year, the annual budget of IIT Mumbai exceeds \$26 million.⁶²

IIT graduates occupy key positions in industries in India and abroad. In 1998, the renowned Indian Institute of Technology sent 30 percent of all of its graduates to the United States, including 80 percent of its computer science graduates.⁶³ About 20,000 IIT graduates currently live in the United States, almost 20 percent of the total IIT grad population since the system's inception.

⁶¹ “Joshi for more students in IITs, IIMs.” News Insight (public affairs magazine). January 2, 2004.

⁶² Raju Bist. “Students for the World: India’s Dilemma.” Asia Times. February 19, 2003.

⁶³ Janamitra Devan and Parth S. Tewari, “Brains Abroad,” McKinsey Quarterly, No. 4, 2001.

A topic of much debate in India is should the government continue subsidizing the education of IIT students since so many of them end up working in foreign countries? There are many who are asking that an "exit tax" be imposed on students who pass out from prestigious institutions like the IIT only to take up jobs abroad. There is also a proposal to ask them to serve time in Indian rural areas - just like medical students are required to do.

Another criticism often levied against the IITs is that do not attract students who want to pursue a career in research. But the situation is fast changing as industries begin to link up with the IITs. IT giant IBM, for example, has entered into a much talked-about collaboration with IIT Delhi, setting up a technology center within the campus. The center showcases advanced applications for bio-informatics, networking, knowledge management and application of e-commerce to local initiatives. Similarly, IIT Kharagpur is doing research work in collaboration with multinationals like Motorola, Compaq, Oracle and GE Capital.

Indian Institutes of Management

The IIMs were set up by the government of India in 1961 as specialized institutes to improve the practice of management in the country. Students take a two-year course of study leading to a Post-Graduate in Management degree (the equivalent of an MBA). The IIMs have six colleges in the country: Ahmedabad, Bangalore, Calcutta, Indore, Kozhikode and Lucknow.

Like their IIT counterparts, the facilities and faculty at the IIMs are some of the best in India (the average student:teacher ratio is just 5:1).⁶⁴ The Institutes collaborated with Harvard Business School to design their own system of case-study teaching. The benefits for students are the high quality of teaching, wide choice of subjects, massive library and computer facilities and easy access to industry for project placements.

IIM graduates no longer line up for safe government jobs (particularly since the government is considered overstaffed with almost 19 million employees and represents only one percent of newly generated jobs). They prefer and enjoy the challenges and risks of becoming entrepreneurs and global players. The average IIM student has multiple lower-level managerial job offers – often in well-paid industries like IT and finance -- even before graduation. But because the average starting salary for top MBA graduates in India is only about \$43,000 (compared to a U.S. starting salary of over \$100,000), 25 percent of graduates accept placements abroad where the salary prospects are higher.⁶⁵

Admission to the IIMs is through a Common Admission Test (CAT), followed by a panel interview and a personal interview. IIM Ahmedabad, in the western State of Gujarat, was rated the toughest business school in world to get into by the Economist Intelligence Unit (2002). With more than 70,000 applicants fighting for 200 places, the two-year program was considered an international bargain at \$5,100.⁶⁶

⁶⁴ "Joshi for more students in IITs, IIMs." News Insight (public affairs magazine). January 2, 2004.

⁶⁵ "Consider India." The Economist Global Executive. June 6, 2002.

⁶⁶ "Consider India." The Economist Global Executive. June 6, 2002.

Despite the fact that graduates of these top institutions have high earning levels, the government remains reluctant to increase student fees. In fact, student fees decreased by 80 percent from 2002 to 2004, amounting to just \$750 per student (out of a total annual cost of \$10,000 per student).

Higher Education Financing

Higher education occupies a low priority in terms of public expenditures. Its share of GNP was nearly one percent during the 1970s, just .35 percent in the mid-1990s, and has since had a modest increase to .6 percent. Higher education received 12 percent of the share of the total expenditure on education in 2000-01.⁶⁷ Yet, the central government provides only one-quarter of the funding for higher education, with much of the rest coming from the States.

Until the late 1980s, the central government supplied up to 90 percent of the total funding for higher education. In contrast, student fees contributed around 5 percent. However, in the 1990s the government allegedly saw minimal social rates of returns from its higher education investments and changed its policy, increasing funding at the elementary and secondary levels and decreasing funding at the university level. The Government of India's 1997 discussion paper on Government Subsidies in India provided a revealing insight into government thinking. For the first time, higher education (as well as secondary education) was classified in the discussion paper as a "nonmerit good" (and elementary education as a "merit good"). Therefore, it was argued that government subsidies for higher education would need to be reduced drastically.

Estimated Higher Education Expenses Incurred by Parents and Students⁶⁸ (Bachelor's degree, academic year 2001-02)

	Public				Private College (aided)
	Central University	State University	University College	Government College	
Up-front or one-time fees	\$3	\$17	\$12	\$17	\$17
Tuition	\$20	\$85	\$37	\$37	\$37
Other fees	\$9	\$50	\$68	\$50	\$50
Books	\$73	\$44	\$38	\$19	\$51
Lodging	\$37	\$170	\$166	\$8	\$255
Food	\$552	\$509	\$552	\$637	\$1,019
Transportation	\$116	\$90	\$42	\$36	\$39

⁶⁷ Analysis of Budgeted Expenditure on Education, Ministry of Human Resource Development cited in Kapur, Devesh and Pratap Bhanu Mehta. "Indian Higher Education Reform: From Half-Baked Socialism to Half-Baked Capitalism." Working Paper, Center for International Development at Harvard University. September 2004.

⁶⁸ M.R. Narayana, Professor of Economics, Institute for Social and Economic Change, Bangalore cited in Buffalo University's International Comparative Higher Education Finance and Accessibility Project report on India (www.gse.buffalo.edu/org/inthigheredfinance/region_asia_India.html)

Other personal expenses	\$25	\$18	\$14	\$6	\$19
Total cost to parent and student	\$836	\$986	\$947	\$810	\$1,487

Generally, it is felt that there exists much room for fee increases, the solicitation of private donations, and the use of consultancy to generate revenues. The government has promised incentives: matching grants to the institutions that secure private funds and income tax savings to individual donors. But these initiatives have made little headway, because the government and its bureaucrats have not been able to give up their culture of control over institutes of higher education.

A couple of recent controversies highlight this problem: First was the directive from the Education Minister under the previous BJP-led government to IIMs to reduce their fees drastically. While this was done in the name of making the Institutes more accessible to the poor, in practice this was not an issue since banks lined up to give educational loans to any one who had been admitted to an IIM. Most analysts saw the real issue being one of control, whereby the government would reduce the autonomy of the IIM by making it even more dependent on government-provided funds. The second example was a directive by the same minister to the effect that all alumni donations to the IITs be made to a central fund administered by the government, which would then pass the monies on to the IITs. While this was ostensibly done to increase “coordination” in the use of alumni funds, most observers again saw it as an issue of “control.”

At present, the university system is too large for the government of India to maintain financially. While University funding by Central/State Governments has been the tradition, this practice is declining as government funding is steadily being reduced. Yet, large amounts of public money continue to be spent per student in the IITs and IIMs, which generally cater to the relatively affluent students, in order to generate economic growth.

Competition is also inserting itself in India’s higher education system. Private and joint sector institutions ‘deemed as universities’ are expanding rapidly. Virtual universities are likely to spread in the coming years. And although foreign universities in India are mostly in the big cities and are few in number today, many institutions from the U.S. and other developed countries are eager to insert themselves into this new marketplace in the post-WTO era (beginning January 1, 2005 foreign institutions are now free to set up shop in India).

Appendix

Grade 10

Mathematics Core Topics	Science and Technology Core Topics
Algebra (26% of grade) <ul style="list-style-type: none"> • Linear equations in two variables • Polynomials • Rational expressions • Quadratic equations • Arithmetic progressions 	Chemical Reactions and Important Chemical Compounds (6% of grade) <ul style="list-style-type: none"> • Rate of chemical reaction and chemical equilibrium • Some important chemical compounds
Commercial Mathematics (12% of grade) <ul style="list-style-type: none"> • Installments • Income tax 	Energy (22% of grade) <ul style="list-style-type: none"> • Light • Refraction of light • Optical instruments • Dispersion • Electricity and its effects • Chemical effects of current • Magnetic effect of current • Sources of energy
Geometry (22% of grade) <ul style="list-style-type: none"> • Similar triangles • Circles • Constructions 	Life Processes (19% of grade) <ul style="list-style-type: none"> • Life processes • Respiration • Transportation • Excretion • Reproduction • Heredity and evolution
Trigonometry (10% of grade) <ul style="list-style-type: none"> • Trigonometric identities • Trigonometric ratios of complimentary angles • Heights and distances 	Natural Resources (18% of grade) <ul style="list-style-type: none"> • Metals and non-metals • Carbon compounds
Measurement (10% of grade) <ul style="list-style-type: none"> • Volumes and surface areas 	Our Environment (5% of grade)
Statistics (12% of grade) <ul style="list-style-type: none"> • Mean • Probability • Pictorial representation of data 	Exploring Space (5% of grade)
Coordinate Geometry (8% of grade)	15 Lab Exercises (25% of grade)

Grade 12

Mathematics Core Topics	Science Core Topics
<i>Part A (required)</i>	

Matrices and Determinants	
Boolean Algebra	
Probability	
Functions, Limits and Continuity	
Differentiation	
Applications of Derivatives	
Indefinite Integrals	
Definite Integrals	
Differential Equations	
<i>Part B (choose B or C)</i>	
Vectors	
Three-dimensional Geometry	
Elementary Statics (?)	
Elementary Dynamics	
<i>Part C (choose B or C)</i>	
Partnership (?)	
Bill of Exchange	
Annuities	
Applications of Calculus in Commerce and Economics	
Probability	