

A Conceptual Framework for Measuring the Quality of Pakistan's Higher Education System

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ABSTRACT: This chapter attempts to define the main determinants of university and college quality. The performance index proposed herein could effectively discern between “good” and “bad” higher education once data becomes available along the suggested lines. At the end, a key question is posed: how is the free-fall of academic standards in Pakistan to be arrested? What should Pakistan's national priorities be in the next decade?

INTRODUCTION

Common wisdom everywhere is that increased funding can solve all – or at least most – systemic problems that bedevil higher education. But Pakistan offers an instructive counterexample: a many-fold increase in university funding from 2002-2008 resulted in only marginal improvements in some parts of the higher education sector. One can, in fact, also point to deterioration in other areas from the existence of excess monies. This violation of “commonsense” points to the need for some fresh thinking.

This chapter will analyze the progression of Pakistan's higher education system. It divides naturally into three parts:

First: a brief backgrounder on the history of higher education in Pakistan will serve as an introduction. From a single university in 1947, the number has increased to well over one hundred. This impressive expansion has still not changed the fact that, relative to other countries of South Asia, only a small proportion of Pakistanis are enrolled in higher education. The cost of rapid expansion has been a significant deterioration of quality.

Second: I shall attempt an objective definition of quality that goes beyond personal and subjective opinions. How is one to assess the quality and usefulness of individual institutions? A “quality factor index”, tailored to the Pakistani situation, will be proposed here. Hopefully it shall have relevance to other countries as well. Large international organizations, such as the World Bank and USAID, which have loaned billions to Pakistan may actually want to invest in making meaningful assessments of quality, to be defined here, for a wide range of Pakistani colleges and universities before they commit further resources. This would help develop policies that could address actual needs and put brakes on wasteful spending.

Third: I shall ask what must be done to arrest the manifest decline in academic standards? It will be argued that solutions must be sought at three distinct levels – re-apportioning resources towards immediate and urgent needs, efficient and responsible implementation of approved plans and projects, and, most importantly, inducing proper attitudinal changes towards education and its values.

I. HIGHER EDUCATION ENROLLMENT AND GROWTH

In the early 20th century, Muslims of the Indian subcontinent were, in general, poorly educated relative to Hindus. This was both because of British prejudice against Muslims, as well as resistance by orthodox Muslims to modern scientific ideas and to the English language. Poor education made it difficult for Muslims to get high-level government jobs. This was historically one of the most important reasons that led to the demand for Pakistan.

Compared with much of India, the areas that currently constitute Pakistan were educationally backward. In 1947, Pakistan had only one teaching university, Punjab University in Lahore, with a student enrollment of 644. It lost its best faculty members, who were mostly Hindus, to the migration following the Partition. Although the University of Sindh also formally existed at this time, it was only an examining body and began its role as a teaching university after relocating from Karachi to Hyderabad in 1951. Karachi University was established in 1950. University level education in Pakistan clearly had a very modest beginning.

The first private Pakistani universities were the elite Lahore University of Management Sciences in 1984, followed by the Aga Khan University Hospital in 1985. The tally on the HEC website in 2010 was as follows:

- 60 public universities (several upgraded from college status)
- 13 public Degree Awarding Institutes (DAIs)
- 42 private HEC recognized universities
- 17 private Degree Awarding Institutes

This makes a grand total of 132 universities and DAI's, an apparently impressive achievement given the low starting point. Student enrollment increased correspondingly¹.

Let us briefly reflect upon the province-wise enrollment. The populations in Punjab, Sindh, NWFP, and Balochistan are roughly 55%, 23%, 16% and 5% of the total population respectively. *If Balochistan had the same population as Punjab the enrollment there would be only 63,591 instead of Punjab's 102,781, showing that this province has much lower access.* Sind appears to have far greater access – it would have 190,802 for equal population with Punjab. But this is deceptive because Karachi, with a population of nearly 16 million, has the overwhelming number of higher education institutions in Sindh.

To put these figures in context: the university enrollments of NWFP and Balochistan put together is less than the enrollment at a single large US university. The University of Maryland, for example, has over 50,000 students. Pakistan does not compare favorably even in comparison with its neighbors – Iran and India. Iran with a population of about 65 million in 2004 had over 2.2 million students in its universities². India has

¹ ibid

² Ministry of Knowledge, Research, and Education, Government of Iran, <http://www.irphe.ir/fa/statistics/Statistics%20Forms/w-br.bruoshoor83-84.pdf>

approximately twice as much of its eligible population enrolled in comparison to Pakistan. Such comparisons put pressure upon policy makers to show fast results.

In a nutshell, the Pakistani situation is as follows: 1) Enrollment in higher education has increased many-fold over the last six decades; 2) Access is still limited to only a small fraction of the eligible population; 3) Provincial disparities are substantial; 4) The number of formally qualified teachers is low; and, 5) Funding for universities has increased enormously since 2002.

But the real problem – higher education quality – has so far not entered any discussion in a significant way. To address this will be our central task.

II. MEASURING UNIVERSITY QUALITY

Every country wants universities, and the more the better. There is a clear utilitarian goal behind this: universities have become the engines of progress for knowledge-driven economies in the age of rapid globalization. They are the fountainheads of modern science, and of technologies that have changed the world more in the past fifty years than the previous ten thousand years.

But higher education requires much more than just building structures and calling them universities or colleges. There is little to be gained from a department of English where the department's head cannot speak or write a grammatically correct non-trivial sentence of English; a physics department where the head is confused about the operation of an incandescent light bulb; a mathematics department where graduate students have problems with elementary surds and roots; or a biology department where evolution is thought to be new-fangled and quite unnecessary to teach as part of modern biology. Nor does putting a big signboard advertising a “centre of excellence” make it one.

There are many colleges and universities in Pakistan where the above is literally true. On the other hand, there are also examples of high quality such as a world-class medical university and business school, and some good quality engineering and fine-arts colleges.

It is clearly essential to define “quality” of higher education. Equivalently, how may one differentiate between HE institutions on the basis of quality? Of course, judging quality is always controversial. Comparing universities across countries, or even within a country, is fraught with difficulties. No agency has yet done a proper global comparison of universities. There have been sporadic attempts by newspapers and journals but with only some success. Results of the Times Higher Education Supplement, as well as those of Shanghai Jiao Tong University, are widely quoted in the literature. But their criteria for assessment and weighting factors, breadth of surveys, techniques of analysis etc. are quite different. This leads to a wide spread of results. A sound theoretical basis for doing comparisons is lacking.

II.a The Ideal University

As a tool that could help us frame the issues better, let us create for ourselves a hypothetical *ideal university*. Freed from practical constraints, this allows us to imagine

all that a university should be and hence provides a datum against which actual universities can be assessed.³

First, the ideal university is a bastion of critical inquiry covering every conceivable field of human endeavor. It has first-rate faculty that does first-rate research on super-massive black holes and discovers new extra-solar planets, figures out quantum computation and the folding of proteins, documents the mating habits of macaws and tarantulas, and deciphers the extinct languages of Sumeria and Mesopotamia. The professors are widely cited and known for important discoveries. Their fame attracts talented researchers and students from across the world.

Our (imagined) university also spawns high-tech companies that create more powerful computers and data compression techniques. It generates products and ideas upon which civilizations' progress and survival depend, such as new crop varieties and renewable energy sources. It also does a splendid job at training engineers, doctors, economists, business managers, and other professionals.

Most importantly – this ideal university creates a modern citizenry capable of responsible and reasoned decision making. Its graduates can think independently and scientifically, have an understanding of history and culture, can create discourses on social and political issues, and are capable of coherent expression in speech and writing. They are in demand everywhere – both in academia and industry – nationally and internationally. A tall order indeed! Harvard, MIT, Cambridge, Oxford, Sorbonne are considered among the world's best universities. But even these are poor approximations to an impossibly high ideal.

Coming down to earth: one would like to know what constitutes a reasonable expectation from a public university in Pakistan. If, for example, Khairpur University, deep in the backwaters of Sind, or Quaid-e-Azam University, in the heart of Pakistan's capital, are to be called real universities then by what criteria should they be evaluated?

A perfectly objective assessment is simply impossible. Value judgments are inevitably involved. Even more fundamentally, ideology and purpose play a crucial role. For example, Soviet and Chinese universities concentrated largely on utilitarian goals whereas western universities – or at least the better ones among them – seek a balance between scholarship and utilitarian needs. Nonetheless, the need to judge and assess is one that cannot be avoided.

Why does quality have to be reflected in numbers? The fact is that resources and finances are always finite. The world we live in demands that hard choices be made. If you are a planner in a high position, finances have to be allocated in a manner according to some rational policy. This means one simply must have numbers. The thoughtful educational planner is inevitably presented with a dilemma: hard numbers reflecting a sufficient measure of truth are essential for decision making. But at the same time, he or she is aware that behind these numbers can be hidden subjective judgments.

³ *World-class universities: a new holy grail*, Pervez Hoodbhoy, 6 June 2007, SciDev.Net, <http://www.scidev.net/opinions/index.cfm?fuseaction=printarticle&itemid=617&language=1>

Let us therefore invent a new quantitative measure and call it the “Institutional Teaching Quality Factor” (ITQF). ITQF is based upon five key determinant.

- A) Quality of teaching and teachers
- B) Quality of student body
- C) Adequacy of basics
- D) Governance and ethics
- E) General ambience

A numerical calculation of ITQF goes like this:

$$\begin{aligned} (\text{ITQF})_{\text{total}} = & W_{\text{teachers}} \times (\text{QF})_{\text{teachers}} \\ & + W_{\text{students}} \times (\text{QF})_{\text{students}} \\ & + W_{\text{basics}} \times (\text{QF})_{\text{basics}} \\ & + W_{\text{governance}} \times (\text{QF})_{\text{governance}} \\ & + W_{\text{ambience}} \times (\text{QF})_{\text{ambience}} \end{aligned}$$

The weight W of each Quality Factor (QF) component is a number between zero and one. W assigns importance to each determining factor. The sum of all weights is, of course, one. An ITQF of one means that all enrolled students in that institution have full and proper access to higher education. Conversely a non-functional university would have an ITQF equal to zero – enrolling any number of students does not amount to any real access at all.

The W 's cannot be mechanically generated by a computer – they reflect the individual judgment of those who have been tasked with planning. How much importance should one give to having good teachers as compared to, for example, good administrators? There can never be an answer that is fully satisfactory and one might end up by saying they should given equal importance, or perhaps that teaching is twice as important as administration, etc.

Since individual opinions and judgments are inevitably involved, is it worth the effort to compute numbers requiring so much detailed knowledge? The answer is yes. The very fact that one must work through details makes individual whim less important. And what about research? Should it not be part of the figure-of-merit of a teaching institution? If so, why has it been excluded from the above formula? We shall return to this important matter later.

Here is what a hypothetical calculation of the ITQF for a particular university might look like:

$$\begin{aligned}
 (\text{ITQF})_{\text{total}} = & \frac{1}{5} \times (\text{QF})_{\text{teachers}} + \frac{1}{5} \times (\text{QF})_{\text{students}} \\
 & + \frac{1}{5} \times (\text{QF})_{\text{basics}} + \frac{1}{5} \times (\text{QF})_{\text{governance}} + \frac{1}{5} \times (\text{QF})_{\text{ambience}}
 \end{aligned}$$

The weights are chosen as: $W_{\text{teachers}} = W_{\text{students}} = W_{\text{basics}} = W_{\text{governance}} = W_{\text{ambience}} = 1/5$. This gives equal importance to these five factors. Numbers, hypothetically reported by researchers who thoroughly investigated and evaluated the institution, give:

$$\begin{aligned}
 \text{ITQF} &= \frac{1}{5} \times 0.4 + \frac{1}{5} \times 0.64 + \frac{1}{5} \times 0.3 + \frac{1}{5} \times 0.8 + \frac{1}{5} \times 0.6 \\
 &= 0.55
 \end{aligned}$$

In this imagined evaluation, governance is found to be very good (0.8) but basics are rather poor (0.3) because of limited space, facilities, internet connectivity, etc.

In the following, we shall take up the considerations that are needed for giving a numerical value to each constituent of the overall ITQF.

II.b Quality of teachers and their teaching

The ignorant must not teach the ignorant. It is not our intent here to discuss philosophical questions of what constitutes ignorance or wisdom. Instead, there is a practical question: how can one decide whether an individual is adequately knowledgeable, or perhaps unacceptably ignorant, to function as a university or college teacher?

Requiring formal qualifications is the first step. It is a sensible to assume that an individual with a higher university degree possesses a higher degree of knowledge, and is hence relatively more suitable as a teacher in a higher education institution. In much of the world this works. But the premise is valid only when an educational system has sufficient integrity. But after it is sufficiently corrupted, the correlation between university degrees and the quantum of subject knowledge could be lost. Examples are not hard to find. Nothing can be done about a 50-year old English professor who speaks or writes ungrammatical English, or a physics professor unable to solve a simple quadratic equation. Does such basic incompetence exist at the 20, 50, or 70 percent-level? Higher or lower?

These questions are unanswerable unless one creates yardsticks, and then proceeds to use them for performing measurements.

At least in the sciences, criteria are possible to devise. One measure of a college or university teacher's adequacy would be if he or she can solve at least a certain percentage of the problems and exercises at the end of the book chapter. Textbook writers and experts strongly recommend, and even require, problem solving. This encourages analytical thinking and requires the student to acquire a certain minimum understanding. One can imagine more stringent tests.

A second possibility for assessing the competence of a college or university science teacher is to use some standardized subject test. Such tests are frequently used for entrance into US universities. The Graduate Record Examination (GRE), administered by the Educational Testing Service in Princeton, is the most commonly used one. Subject areas include a number of scientific disciplines: biology, biochemistry, cell and molecular biology, chemistry, physics, mathematics, and computer science. In 2006, the GRE subject test was officially declared mandatory for obtaining admission into a Ph.D program in Pakistani universities. Unfortunately, under the pressure of students and their supervisors, this condition was withdrawn in 2010.

A locally devised so-called GRE substitute also exists in Pakistan. A private company, the National Testing Service, offers specialized subject testing in 10 areas: agriculture sciences, computer engineering, economics, electronics, electrical engineering, education, geography, Islamic studies, management sciences, and veterinary/animal sciences⁴. Unfortunately, the Pakistani clone is marred by sub-standard scholarship. One hopes that professional management of the company, and oversight by suitably capable academics, will eventually change the situation.

In the humanities and social sciences, assessment of a university teacher's adequacy or otherwise is harder and more controversial. One must resort to such criteria as whether the teacher is capable of holding an intelligent discussion in the subject he or she is teaching; has adequate verbal and quantitative skills; is reasonably fluent in oral and written expression; and has adequate capacity to think analytically and abstractly. In principle, one would like such abilities of a general academic nature, which are independent of specialization, to be measured by some kind of standardized test. The general part of the GRE is one such test that is widely used.

Standardized subjects tests could also be used to either screen new applicants for college and university teaching positions at the lecturer or assistant professor level, or determine the quality of existing faculty, or both. In every case, one expects that there will be resistance from a substantial portion of the existing teaching community, as well as aspiring teachers. One must be conscious, however, that some of this resistance has legitimate cause. The difficult and unfamiliar English language terms puts test-takers from an Urdu-medium educational background at a disadvantage. Another critique of the general GRE is that the quantitative part is unfamiliar to all but a minority which has studied in the O-A level system. The importance of quantitative reasoning for disciplines like history, anthropology, international relations, etc. is questionable.

Standardized tests do offer a possible means of discriminating on the basis of ability and scholarship – provided they are designed for the local environment. The low performance in these tests is worrisome. Many government scholarships for foreign study have been offered to in-service university teachers provided they achieve reasonable scores in the GRE but only a few have succeeded.

⁴ National Testing Service website, <http://www.nts.org.pk/>

Other important determinants of teaching quality are:

- *The extent to which teachers teach concepts rather than use rote learning.* Rote learning is the dominant learning mode at the high school and intermediate levels, and remains so in all except the very best departments of universities⁵. A possible way to quantitatively research this would require a scrutiny of past examination papers in order to identify the frequency of questions that are:
 - a) Repeated from past exam papers.
 - b) Lifted directly from the prescribed text.
 - c) Simply demand repetition of materials contained in the text.
- *The extent to which teachers use modern textbooks rather than old notes.* Most university and college teachers in Pakistan teach from notes taken when they were students. In earlier years, only a small minority used some modern textbook published internationally. This was either because suitable textbooks were not available or expensive, or because they were unfamiliar and difficult to follow. To an extent this has changed because of the ready availability of e-books and printed textbooks, mostly by Western authors, published in India as cheap South Asian editions⁶.
- *The time that teachers of a particular institution spend on their jobs rather than moonlight.* Many college and university teachers, usually secretly and illegally, have jobs that are unrelated to their main occupational position. Some teach at private institutes, others give tuitions to students. A few look after family businesses. In 2003/4 out of a total of 37428 university and DAI teachers, 22812 were part-time only. Most of these were probably moon-lighting from their parent institutions. Financial needs, as well as lax institutional rules, have contributed to this phenomenon. This is a major reason why teachers generally spend little time on the campuses.
- *The frequency with which new courses are introduced, old ones updated, term papers and problem sets regularly assigned, and class or individual projects given.* Only in a handful of university departments – and almost never in colleges – is regular student work handed out and then marked. This is in spite of the fact that the current student-to-teacher ratio of 19:1 in Pakistani universities is fairly reasonable, although in colleges this is higher.

⁵ The well-known English chemist, J.B.S.Haldane (*“Is Science a Misnomer”*, *The Hindu Weekly Review*, August 31, 1959.) recounts an instance that particularly impressed upon him the manner in which science is generally taught and learned in Pakistan: “I was walking near my house one Sunday afternoon when I heard a male voice raised in a monotonous chant. I supposed that I was listening to some mantras, and asked if my companion could identify them. The practice of repeating religious formulae is, of course, about as common in Europe as in Pakistan. But my companion stated that the language of the chant was English and the subject organic chemistry. We returned and I found he was right. The subject of the chant was aliphatic amines, with special reference to various precautions.”

⁶ The Indian edition of a typical textbook published in North America listed at \$60-70 (Pakistan Rupees, Rs. 3600-4200) can be bought in Islamabad for as little as Rs. 400-500

- *Adherence to basic principles of teaching, grading, and fairness.* Two outstanding questions need to be researched and quantified:
 - a) To what extent do teachers encourage, tolerate, or discourage class participation and questions asked in class?
 - b) How often do teachers allow their grades to be checked and challenged by students?

The situation is relatively better in the more progressive American-type “semester system”, as compared to the more common British-type “annual system”. Both systems operate in Pakistan. College and university authorities should make it mandatory for all semester tests to be returned to students, and establish the right of students to view their examination answer sheets. This reduces the chances of abuse considerably, and allows students to understand where they might have gone wrong. In the “annual system” it is next to impossible for a student to view the marked exam paper; at most the marks obtained in individual questions can be re-totaled.

To summarize this point: assigning roughly equal numerical weights to each, “teacher quality” can be estimated using the categories suggested below:

1. Whether teachers actually teach concepts rather than use rote learning.
2. The extent to which teachers use modern textbooks rather than old notes.
3. The time that teachers of a particular institution spend on their jobs, rather than moonlight.
4. The frequency with which new courses are introduced, old ones updated, term papers and problem sets assigned, and class or individual projects given.
5. Adherence to basic principles of teaching, grading, and fairness.

A hypothetical numerical evaluation of an individual teacher is shown below. The $(AF)_{\text{teachers}}$ for the entire college or university could be obtained by averaging over a sufficiently large representative group of teachers, spread over different departments.

A Typical Teacher Evaluation

$$\begin{aligned}
 (QF)_{\text{teacher}} = & \frac{3}{10} \times (QF)_{\text{understanding}} \\
 & + \frac{1}{10} \times (QF)_{\text{books used}} \\
 & + \frac{1}{5} \times (QF)_{\text{regularity}} \\
 & + \frac{1}{5} \times (QF)_{\text{innovation}} \\
 & + \frac{1}{5} \times (QF)_{\text{ethical behaviour}}
 \end{aligned}$$

The weights are chosen to give the greatest weight to the teacher's understanding of the subject and pedagogy (3/10), quality of textbooks used (1/10), time on job (2/10), the degree of innovation shown in teaching (2/10), and indifference to extraneous – ethnic, religious, and political – factors (2/10).

$$\begin{aligned}
 (QF)_{\text{teacher}} &= \frac{3}{10} \times 0.9 + \frac{1}{10} \times 0.8 + \frac{2}{10} \times 0.7 + \frac{2}{10} \times 0.75 + \frac{2}{10} \times 0.8 + \frac{2}{10} \times 1.0 \\
 &= 0.86
 \end{aligned}$$

This teacher, hypothetically evaluated, is rated perfectly for ethically grading papers and being fair to students, but is not very highly rated for introducing new courses or introducing innovative approaches to teaching.

II.c Quality of Student Body

Student admission into higher education institutions determines the quality of the student body. Countries with a properly functioning higher education system take this very seriously. US universities admit students on the basis of their grades, recommendations, and SAT/GRE scores; British universities place heavy emphasis on O-A level scores; the well-known Indian Institutes of Technology have fiercely contested national competitive examinations; Iranian universities require a centralized nationwide university entrance examination and select roughly 150,000 out of 1.4 million high school graduates who take a tough 4.5 hours multiple-choice exam.

Student quality is fundamental to the success of a university. But how is this to be defined? Traditional societies educate their young to be replicators and reproducers of existing wisdom. This was as true for traditional Islamic societies as for classical education of Victorian times in England. But creating a modern citizenry capable of responsible and reasoned decision making imposes very different demands.

Critical inquiry is fundamental. This attitudinal trait is essential for generating new knowledge of the physical world, as well as of human societies. The traditional concept of knowledge will simply not do. Knowledge is not something to be acquired because of a divine command nor can it be acquired once and for all; rather it is the result of an incremental process and the outcome of exercising critical intelligence.

From this standpoint, there has probably been significant deterioration in the student quality of Pakistani public higher education institutions, and perhaps in private ones as well. But there is no “smoking gun” proof of this, just partial indicators.

A hint that standards are falling comes from the number of Pakistani students studying in the US. Generally, only students with sufficient academic background succeed in getting admission to a US university because, in contrast to some European universities, many require credible proof of academic achievement. However, the situation is complicated by the fact that visas for studying in the US are relatively hard to get, and expenses are greater as well. Nevertheless, it is interesting to look at some current trends.

From the International Institute for Education, which publishes a year-wise report for every country⁷, one learns that in academic year 2009/10, 5,222 students from Pakistan were studying in the United States (down 1.4% from the previous year; in the same year there were 104,897 Indian students). The majority of Pakistani students study at the undergraduate level. In 2008/09, their breakdown was as follows:

- 48.5% undergraduate
- 41.8% graduate students
- 1.7% other
- 8.0% OPT (Optional Practical Training)

According to the IIE, following a period of decline in the 1990s, Pakistan experienced significant growth in the first two years of the 2000s. Since 2001/02, the number of Pakistani students in the U.S. has dropped significantly, pushing Pakistan out of the top 20 sending places of origin in 2006/07. The number of students from Pakistan continued to decline, by 1% in 2007/08 and again by 0.9% in 2008/09.

Country	# of Students in US in 2006/2007
India	83,883
Turkey	11,506
Indonesia	7,338
Nigeria	5,943
Nepal	7,754
Pakistan	5,401

Foreign students in United States universities from different countries⁸.

⁷ <http://opendoors.iienetwork.org/>

⁸ <http://opendoors.iienetwork.org/?p=89245>

Most students in the US from Pakistan study at the undergraduate level, which indicates that they mostly come from elite Pakistani private high-schools and not public higher education institutions, where the student body is manifestly of poorer academic quality. Countries with stronger universities have a greater fraction of students in US graduate programs: compare India (73.7%) and Turkey (59%) with Pakistan (37.1%).

Let us now return to the question: how should one seek to determine student quality at a particular institution? A combination of all four determinants below with appropriately chosen weights could provide an adequate gauge.

- *Quality of the standardized test that checks reading, writing, and math skills for selecting incoming students.* Ideally, one would like to know how the typical student entering a Pakistani college or university institution compares in reading, writing, reasoning, general knowledge, and mathematical skills relative to a student of equal age in other institutions within Pakistan, as well as in other countries. Standardized nationally administered tests offer the best hope of improving student intake. This task must be undertaken but it is not easy. There are two difficulties: First, as mentioned earlier, the US-centered SAT is expensive and unsuitable for the ordinary Pakistani student while the local equivalent – the NTS test – is of poor academic quality and currently not sufficiently credible. Secondly, strong political will is needed because there is strong opposition to standardized tests. In NWFP, street demonstrations in 2005 demanded scrapping a proposed test for university admissions because students from tribal areas would suffer a disadvantage if they had to compete against students from urban areas. Similar protests have taken place at various times in the interior of Sind. The Punjab Law Department has already opposed a proposal to declare the NTS test as mandatory for admissions to public sector universities in Punjab⁹.

At the graduate level, the Graduate Record Examination (GRE), administered by the Educational Testing Service in Princeton, is considered a relatively reliable tool for testing basic subject competence. Subject areas include a number of scientific disciplines: biology, biochemistry, cell and molecular biology, chemistry, physics, mathematics, and computer science. GRE results for Pakistani students are fragmentary. Nevertheless, there is reason to be disturbed. In 2007, as an experiment, 54 students in the best physics department in Pakistan (at Quaid-e-Azam University), took the GRE physics subject test. The best individual score obtained was 63 percentile – meaning that that student had done better than 63% of all students world- wide. Most scores ranged in the 15-30% range. US graduate schools rarely accept students with scores below 70%. However, results have rapidly improved with time. In 2010, three students from the same department achieved scores exceeding 80 percentile.

The attention to the GRE was a consequence of the HEC having made GRE subject tests mandatory in 2005 for the award of a PhD degree from every public university. Of course, the passing mark set was ludicrously low (40 percentile). But

⁹ The Daily Times, Lahore, 5 June, 2007.

performance was steadily improving. About 15 physics students from the physics department at QAU cleared this hurdle in the first three years. Students were suddenly confronted head-on with a hard fact: science is about problem solving and they will have to shape up if they want to play ball. The fact that students could not simply cheat or cram did a huge amount of good. The withdrawal of the GRE requirement is a serious setback to higher education quality.

- *The quality of the student selection mechanism used in a particular institution.* The more an institution worries about how it will select its students, the better the rating it deserves in this regard. In Pakistan, elite private universities – LUMS, AKU, GIKI, NUST, etc – either conduct their own entrance tests or require the Scholastic Aptitude Test (SAT). But in public higher education institutions, with the exception of a few scattered departments, the selection of students is done using rigid mechanical rules based on “merit”. This term is a misnomer because it is only determined by marks obtained in local board examinations where rote memorization, predictable exam papers, massive cheating, and poor marking practices is rampant. Reform of these boards has been much discussed but little progress has actually been made¹⁰.
- *Employer satisfaction with graduates.* Graduates from higher education institutions are ultimately absorbed into businesses, industry, and government jobs. Do they perform well? This is a hard question to answer: landing any of these jobs often means using patronage, family or political connections, and religious or ethnic affiliations. However, employee competence and merit are given high priority in large organizations. Among these are Pakistan International Airlines, Pakistan Atomic Energy Commission, Kahuta Research Laboratories, Pakistan Telecommunications Corporation, Public Services Commission, etc. These organizations have selection tests and exams, and do not consider college or university grades sufficiently reliable. It would be significant to check the correlation between the results of their selection exams and formal grades. A possibly significant indicator is that the pass rate on the Federal Public Service Commission examinations has declined from 33% to 7.5% over a period of 15 years.
- *Student intellectual activities outside the classroom.* Ideally one would also like to include student participation in the nation’s intellectual life. This includes production of campus newspapers, academic journals, dramas, and films as well as dancing, music, poetry, participation in cultural events, etc.

¹⁰ *Public Examinations in Pakistan: A System in Need of Reform*, Vincent Greaney and Parween Hasan, in *Education and the State – Fifty Years of Pakistan*, edited by Pervez Hoodbhoy, Oxford University Press, 1998.

A Typical Student Quality Evaluation

$$\begin{aligned}(\text{QF})_{\text{student body}} &= \frac{4}{10} \times (\text{AF})_{\text{test quality}} \\ &+ \frac{2}{10} \times (\text{AF})_{\text{selection mechanism}} \\ &+ \frac{3}{10} \times (\text{AF})_{\text{employer satisfaction}} \\ &+ \frac{1}{10} \times (\text{AF})_{\text{extracurricular}}\end{aligned}$$

The selection test quality has been given the highest importance (4/10), followed by employer satisfaction with the university of college graduates (3/10), the adequacy of the admissions process (2/10), and extracurricular activities (1/10).

$$\begin{aligned}(\text{QF})_{\text{teacher}} &= \frac{4}{10} \times 0.9 + \frac{2}{10} \times 0.7 + \frac{3}{10} \times 0.7 + \frac{1}{10} \times 0.5 \\ &= 0.76\end{aligned}$$

In the above, the test quality was good but students were insufficiently engaged in work outside of the classrooms. However, the small weightage given to the latter made the impact of the latter rather small.

II.d Adequacy of Basics

Every college or university has certain basic infrastructural and operational requirements. An assessment should involve the following key factors.

- *Land and buildings:* It is impossible to lay down hard and fast rules as to what is adequate. Functionality must suffice as the bare-bones criterion. Rural land is relatively cheap whereas land is extremely expensive in crowded urban environments. Most public universities were given large amounts of land in earlier decades by the government. Today these assets are under threat from encroachers, profiteers, and even that university's own faculty. Quaid-e-Azam University, Punjab University, and Karachi University are examples.
- *Period of actual university operation:* How many days of the year, and how many hours of a working day, does a given university actually function? Is there a schedule that is adhered to? A survey could uncover unknown, but easily knowable, facts. University working hours are generally short with many breaks during the day (lunch, prayer, unscheduled). There are many unscheduled holidays – typically a semester's teaching begins 1-2 weeks after the announced date, 3-day Eid holidays actually mean 8-12 days, various disturbances and unscheduled holidays add to non-working days. During evenings most campuses have unutilized building capacity. Universities do not publish an operating schedule. Only a few private universities announce in advance student application deadlines, dates for start of the next academic session, courses to be offered etc.

- Adequacy of library facilities: As a crude measure, it may be enough to know the total number of books in a university library and the library budget. A finer measure would consider library organization, adequacy of shelving and lending records, fraction of new books purchased yearly, etc.
- Adequacy of science teaching laboratories: While this is an important element, it is difficult to assess except through field visits by trusted experts. Anecdotal evidence indicates that experimental methodology is poorly taught even where adequate equipment and supplies exist.
- Internet access and average number of computers per students: this may be the easiest parameter to estimate. Usage would certainly be a useful but difficult quantity to know. It could presumably be estimated by looking at downloads of academic materials.

II.e Institutional Governance and Ethics

Universities are microcosms of the society in which they exist. As such they necessarily reflect values and practices in the rest of society. The successful functioning of a higher education institution depends critically upon adherence to basic norms of academic values and behavior. Conversely, any institution that violates its own rules is unlikely to have collective self-respect.

When rating a university, one must seek answers to questions such as those below:

- *Are faculty appointments and promotions done by subject experts, fairly, and transparently on academic grounds alone?* The traditional Pakistani public university recruitment system relies upon a selection board appointed by the university's highest body, the syndicate. Apart from the department's chairperson, this board has minimal representation by subject experts. Starting in the early 1980's, and continuing for over twenty years, prospective faculty were often required to answer questions completely unrelated to their subject such as various Quranic prayers, on the ideology of Pakistan, their political preferences, etc. In some universities this practice was never discontinued. Candidates would often lobby fiercely, seeking political and personal connections by which to influence the selection board members. Comparatively speaking, the Tenure Track System (TTS) offers better protection against political tampering. It requires that applications be sent for review to subject experts outside Pakistan. While TTS has been partially implemented in a few universities, it has been rejected by most because of opposition by their faculty. Many teachers feel threatened and insecure at the thought of being judged by experts over whom they have no control.
- *Is the university head chosen by a credible process or a political appointee?* All public university vice-chancellors are political appointees. Some are well-chosen, but most are poorly equipped in terms of intellectual and administrative capability. Having military officers as university heads was a disaster. Some attempt has been

made to address this issue, but until a more stable national political system comes about, it is likely that university heads will not be well chosen.

- *Is the reward and punishment structure for faculty helpful in creating a better academic body?* The old system was time-bound and had no challenges or incentives. Promotions and regularizations were more or less automatic; with time everyone rose together. There is no known case of a Pakistani academic who has been fired for not knowing his or her subject. The new system (TTS) is better in this regard. But it has been implemented in a way that has generated new problems: even trivial research is rewarded with cash and promotions, creating a plagiarism pandemic on campuses. The arrival of the internet has raised the problem to new levels of complexity.
- *How common is unethical behavior among students, faculty, and administrators?* Institutional ethics are essential to successful performance. In the university context the key issues are:
 - a) Cheating by students in examinations.
 - b) Plagiarism by students and teachers.
 - c) Fake or forged degrees.
 - d) Unfair grading where a student is either favored or victimized for ethnic, religious, or political reasons.

There is little doubt that these issues are of grave importance in Pakistan, but they need quantitative investigation for every individual institution that is to be considered. It has been estimated that 30-40% of students cheat in one way or the other at the matric and intermediate levels; plagiarism is tolerated and results in penalties only in exceptional situations; fake degrees are common to the point where even members of the national assembly are well-known for having these dubious credentials; and grading abuse is common because the teacher wields enormous authority.

- *Does there exist a community of scholars reasonably familiar with the work of other colleagues, respectful of the other's professional accomplishment, and able to self-govern?* A university is not a factory where each worker performs a narrow specialized task about which others have little or no idea. By virtue of his or her education in a university, a university teacher is well rounded and able to understand at least the broad outlines of the work carried out by colleagues. This is crucial for creating an environment where academic work receives the level of recognition it deserves, new programs can be sensibly discussed, courses prescribed, etc. Collegiality is essential for the successful performance of university departments and academic bodies. Conversely, adversarial politics – which is all too common on campuses – can be severely detrimental if it exists to an extreme degree. Therefore, in assessing university quality, a qualitative estimate of this factor is needed.

II.f Campus Ambience

The learning environment matters in an educational institution. The “feel” of a campus is necessarily subjective – different individuals will assess the ambience differently, and different kinds of institutions create different environments. The atmospherics of a well performing technical training school are unlikely to be suitable for a liberal arts college, etc. Hence, weights for the criteria below must be adjusted appropriately.

- *How much academic and personal freedom is permitted?* While students study at a university primarily to get a degree, they need to have the right to question, to raise unpopular issues, or to put forward controversial views without being penalized. In Pakistan, the restrictions on thought, speech, and actions are imposed both by the state as well as the cultural milieu. The authority of the teacher is so dominating that few students dare ask questions in class. Most students often have an impoverished view of their genuine academic rights. The amount of personal freedom varies from place to place. This reflects in how students may dress, whether they may listen to music or see films, meet or talk to members of the opposite sex, etc. In conservative parts of the country, the choice for women is between the burqa and hijab – showing her face is not an option on many campuses.
- *How common are campus colloquia, seminars, workshops, etc? Do international visitors come to the campus? Are there research collaborations with foreign universities?* For a university, mere classroom teaching is insufficient. Intellectual variety and diversity are critical to the growth of ideas, and regular academic activities are important. A university that is capable of absorbing inputs from the world at large has much to gain. The more common situation in Pakistan is where foreign visitors are rare, and even visitors from other Pakistani institutions are few.
- *Is the campus law-and-order adequate? Are professors and students reasonably secure in physical terms?* Contrary to popular perception, most universities have not been closed for extended periods. However, some campuses are run by gangs of hoodlums and harbour known criminals, while others have Rangers with machine guns on continuous patrol. On occasion student wolf packs attack each other with sticks, stones, pistols, and automatic weapons. Student gangs organize mostly on ethnic lines, but also sometimes on the Shia-Sunni divide. The student groups associated with the Jamaat-i-Islami and MQM are known for their strong arm tactics. A survey is needed to reveal correct facts.

Well-functioning universities are the products of a complex organic and evolutionary process that is internal to a society. Facilities matter, but it is much more important for a university to have a forward looking world-view, an open environment, high ethical standards, a sense of collegiality and shared sense of purpose, and good governance practices.

Finally, let us ask: should university research be counted in assessing university quality? In principle, the answer is: yes. There are excellent reasons for this. A university should be the place where new knowledge grows, new questions are asked, and curiosity is

encouraged as a matter of principle. The best teachers are often those who have created new concepts and worked at the cutting edge of their field. They can create a genuine sense of excitement in their students.

II.g Counting Research Papers Is A Bad Criterion

For Pakistani public universities – at least in their present condition – a culture of wholesale corruption has made the value of research doubtful. Research is a seriously misunderstood concept in much of Pakistan’s academia, and the criteria for assessing its worth are often wrong.

A unique and precise definition for genuine research in an academic field – mathematics or physics, molecular biology or engineering, economics or archaeology – does not exist. An exploratory definition might be that research is the discovery of new and interesting phenomena, creation of concepts that have explanatory or predictive power, making of new and useful inventions and processes, etc. The researcher must certainly do something original, not merely repeat what is already known. But merely doing something for the first time is not good enough to qualify as research. So, for example, one does not do meaningful research by gathering all kinds of butterflies and listing the number caught of each kind in a particular place at a particular time, etc. Nor is it “research” if one finds the spectrum of one kind of atom after another, or merely categorizes the compounds found in certain plants, or note wind speeds at different geographical locations. Unless there is a valid and interesting reason for doing so, to gather data is essentially valueless. It is not research – even if it is published in some journal, whether international or national.

The success of research is judged by its importance. For research of an applied nature, the impact can be measured by its effect upon industrial or academic production, jobs created, rise in company stock, etc. The number and type of patents that follow from the research give an important indication of success.

For academic research, only the specialist in that exact field can be entrusted with the evaluation. Of all imperfect measures, the least imperfect one is to count the number of citations in refereed journals. However, this ignores the contribution of university faculty to specific national needs, as judged by importance given by decision makers in government or industry. Clearly, judging research quality involves many different criteria.

Nonetheless, one cannot abandon the task of judging research quality, importance, and impact. Counting journal publications, and rewarding individuals proportionately, has worsened the state of corruption. An environment, where unethical behaviour was regrettably common to begin with, has been made yet healthier.

Although research quality is always difficult to exactly evaluate, numbers related to academic research in Pakistan are, like research elsewhere, relatively easy to obtain in the age of the internet. Below, Pakistan, together with the seven most productive Muslim countries, is compared against some other countries. The results are not flattering.

	Physics Papers	Physics Citations	All Science Papers	All Science Citations
Malaysia	690	1,685	11,287	40,925
Pakistan	846	2,952	7,934	26,958
Saudi Arabia	836	2,220	14,538	49,654
Morocco	1,518	5,332	9,979	35,011
Iran	2,408	9,385	25,400	76,467
Egypt	3,064	11,211	26,276	90,056
Turkey	5,036	21,798	88,438	299,808
Brazil	18,571	104,245	128,687	642,745
India	26,241	136,993	202,727	793,946
China	75,318	298,227	431,859	1,637,287
USA	201,062	2,332,789	2,732,816	35,678,385

The seven most scientifically productive Islamic countries in 2007 compared against a selection of various other countries. This data is from the Philadelphia-based science information specialist, Thomson ISI.

In 2005/2006 research funding totaled Rs 0.342 billion – an enormous sum considering how badly the colleges are funded. The policy of monetary rewards for publishing research papers, given by the PCST and HEC, led to an outbreak of plagiarism without improving the quality of the research. Research projects need to be evaluated much more carefully than at the present time. Unfortunately, this is easier said than done.

In the current state of Pakistan’s universities, throwing money on equipment is easily done but achieves little. There is a fervent plea to acquire the latest equipment, no matter what it costs. One might think that this price to be paid for excellence. Are not the thousands of “research” papers proof of public money well spent?

The answer is, no. One can point to some significant papers here and there. But an overwhelming number of Pakistani publications are largely based upon routine aspects of data collection. These have zero or few citations, as may be verified by accessing the free database www.scholar.google.com or still more comprehensive databases.

My point is not to denigrate academic research in Pakistan, but to make the case that such research is consuming a disproportionate amount of resources at the cost of our desperately impoverished educational system. The real problem is that Pakistani students in government schools, colleges, and universities – as well as their teachers – are far below internationally acceptable levels in terms of basic subject understanding.

Setting aside a small minority of good professionals, the poor state of subject knowledge that public university teachers currently have simply does not warrant the current government strategy of hugely rewarding research. It leads, on the contrary, to distorted priorities and immense wastage. Today, what goes under the name of “research” is largely done to increase publication numbers of individual teachers. It adds little to the stock of existing knowledge. Nor does this reflect in new inventions, patents, etc.

To summarize: a concept for evaluating university quality has been presented here. The primacy of faculty and student quality has been stressed. Although gathering data calls for considerable effort, an attempt at measurement would, at the very least, focus on the key elements needed for creating universities that actually work. Else one will continue to shoot in the dark.

III – The Path To Real Reform

A key challenge for every government in Pakistan will be to sort out (in all the areas of public policy) the facts on the ground from the intricate fictions offered over the eight years of General Pervez Musharraf's regime that paraded for success. This means going beyond the standard blame game. Governments have come and gone without setting Pakistan on a clear way forward. So what sets it apart from the developed world, or even India? At the deepest level, it is the value system that shapes modern education and a modern mindset built upon critical thinking. Pakistan's educational system, shaped by deeply conservative social and cultural values, discourages questioning and stresses obedience. Progress demands that ultimately the dead hand of tradition be cast aside.

More specifically, in seeking change of values, it will be important to break the absolute tyranny of the teacher, a relic of pre-modern social values. Closed minds cannot innovate, create art and literature, or do science. Modern education is all about individual liberty, willingness to accept change, intellectual honesty, and constructive rebellion. Critical thought allows individuals to make a revolutionary difference and to invent the future. Else they will merely repeat the dysfunction of the past. But Pakistani students memorize an arbitrary set of rules and an endless number of facts and say that X is true and Y is false because that's what the textbook says (I grind my teeth whenever a master's or Ph.D student in my university class gives me this argument!). The key point is that minds must be opened.

To develop thinking minds, change must begin at the school level. Good pedagogy requires encouraging the spirit of healthy questioning in the classroom. It should therefore be normal practice for teachers to raise such questions as: How do we know? What is important to measure? How to check the correctness of measurements? What is the evidence? How to make sense out of your results? Is there a counter explanation, or perhaps a simpler one? The aim should be to get students into the habit of posing such critical questions and framing reasoned answers.

On a more practical level, there is urgent need for better academic planning and management at the national level. This will be amplified upon below.

Revise spending priorities: Currently these are the haphazard expression of individual whims, not actual needs. For example, most Pakistani students in higher education (about 0.8 million) study in about 800 colleges. These colleges receive pitifully small funding compared to universities. The spending per college student is only one sixth that for a university student. This is absurd. It is no surprise then that public colleges are in desperate shape with dilapidated buildings, broken furniture, and laboratory and library facilities that exist only in name.

The beggarly treatment of colleges compared to universities is often justified on grounds that universities perform research while colleges do not. But, notwithstanding a few honorable exceptions, this “research” has added little to the stock of existing knowledge as judged by the international community of scholars. Nevertheless, in 2005/2006 university research funding totaled a whopping Rs 0.342 billion. Past experience shows that much of the money will be used to buy expensive research equipment that will find little if any real use.

Public universities in the Musharraf-Atta era were awash in funds. They went on a shopping binge for all kinds of gadgetry – fax machines, fancy multimedia projectors, and electricity-guzzling air-conditioners. But this did not improve teaching quality, even marginally. Worse, the availability of “free money” led to the pursuit of expensive but unworkable projects. False claims to bring in hundreds of fearful European university professors to teach in a country – where suicide bombers kill at will – ultimately foundered.

Concentrate upon faculty development. Because bad teaching quality largely comes from having teachers with insufficient knowledge of their subject, it is important both to have better teacher selection mechanisms and to create large-scale teacher-training academies in every province. Established with international help, these academies should bring in the best teachers as trainers from across the country and from our neighbours.

A proposal in 2003, authored by Pakistanis at the Massachusetts Institute of Technology, floated the idea of a National Faculty Academy. The abstract read as follows: “*In the short-term, the academy will seek to enhance basic competencies in teaching of the core sciences – physics, chemistry, biology, mathematics, computer sciences, and functional English – at the B.Sc and M.Sc levels in Pakistani universities and colleges. It will offer training programs for junior faculty at the level of lecturers and assistant professors. Master trainers with excellent professional and pedagogical skill will train junior faculty to assure a satisfactory level of basic subject competency, encourage a problem-solving approach, and make available new methods for teaching and demonstrations. The scale of operation for the academy will achieve significant impact on the national higher education system within 5-10 years.*”

Unfortunately this proposal was rejected by the HEC. This effort will cost money and take time – perhaps on the order of a billion dollars over 5 years. However, such efforts must not be abandoned. High-quality teacher training institutions should have a clear philosophy aimed at equipping teachers to teach through concepts rather than rote learning, use modern textbooks, use distance-learning materials effectively, and emphasize basic principles of pedagogy, grading, and fairness. They should award degrees to create an incentive for teachers to enroll and to do well. Until a sufficiently large number of adequate university teachers can be generated by the above (and various other) means, the practice of making new universities must be discontinued.

Institute national level university entrance examinations. These would separate students who can benefit from higher education from those who cannot.

Qualifying tests for university faculty must be made mandatory. The system has remained broken for so long that written entrance tests for junior faculty, standardized at a central facility, are essential¹. Teachers will surely resist this but without such tests, universities will continue to hire teachers who freely convey their confusion and ignorance to students. No teacher has ever been fired for demonstrating incompetence.

Be harsh and uncompromising in matters of academic fraud and corruption: Academic crime flourishes in Pakistan's universities because it is almost never punished. Even when media publicity makes action unavoidable, the punishment amounts to little more than a slap on the wrist. The discovery that dozens of Pakistani parliamentarians have fake degrees has, at the time of this writing, not resulted in their resignation or dismissal.

Implement better, more transparent, and accountable ways to recruit vice-chancellors and senior administrators. Pakistan has a patronage system that appoints unqualified and unsuitable bureaucrats or military men as vice-chancellors, and that staffs universities with corrupt and incompetent administrators. Fortunately, there seems to be some indications of positive change and, at least for the appointment of a number of vice-chancellors, search committees were set up.

Permit students to self-organize. It is crucial to bring back on to the campuses meaningful discussions on social, cultural and political issues. To create the culture of civilized debate, student unions must be restored, with elections for student representatives. They will be the next generation of political leaders. Such a step will not be free from problems – religious extremists rule many Pakistani campuses although all unions are banned. They would surely try to take advantage of the new opportunities offered once the ban is lifted. Political parties have also been less than responsible. But the reinstatement of unions – subject to their elected leaders making a pledge to abjure violence and the disruption of academic activity – is the only way forward towards creating a university culture on campus. Ultimately, reasonable voices, too, will become heard. As an interim step, the government should allow and encourage limited activities such as community work, science popularization by students, etc. To condemn Pakistani students as fundamentally incapable of responsible behaviour amounts to a condemnation of the Pakistani nation itself. If students in neighbouring countries can successfully study, as well as unionize and engage in larger issues, then surely Pakistan's can do so as well.

Remove nationality restrictions on foreign faculty hiring. It is a good thing that the Higher Education Commission has initiated a program for hiring foreign faculty with attractive salaries. There are simply not enough qualified persons within the country to adequately staff the departments. But the success of this program is uncertain, and programme management is poor. Jealousy at salary differentials, and a fear that local incompetence will be exposed, has led local teachers and university administrations to block the hiring of faculty from abroad.

Pakistan's image as a violent country deters most foreigners from wanting to come and live in Pakistan for any considerable period of time. Therefore, westerners are almost totally absent from the list of those who have applied under the foreign faculty hiring program. Apart from Pakistani expatriates in the Middle East, the bulk of applicants are Russian speakers from the former Soviet Union countries. One wishes it could be otherwise. It would be a major breakthrough if Indian and Iranian teachers could be brought to Pakistan. Indians, in particular, would find it much easier to adapt to local ways and customs than others and also have smaller salary expectations. The huge pool of strong Indian candidates could be used to Pakistan's advantage – it could pick the best teachers and researchers, and those most likely to make a positive impact on the system. In the present mood of rapprochement, it is hard to think of a more meaningful confidence building measure.

Pakistani higher education will turn around only if Pakistan can be turned around. This cannot happen while its cities, towns, army, and police are constantly attacked by maniacal terrorists. Winning peace is therefore critically needed for uplifting higher education.

ⁱ In Italy, passing the centrally administered “concorso” examinations is necessary for the appointment of junior faculty. A sample lecture must also be delivered on a topic given to the candidate a day earlier.