

STEP: Informed, perhaps, by your experiences as a student at MIT during the Vietnam War, you have spoken in favor of re-establishing student unions in Pakistani Universities. Could you briefly make the case for re-instituting student unions in Pakistan?

PH: Meaningful discussions on social, cultural and political issues must be brought back to campuses. Young people are idealists; in fact, there is no other way for them unless they are brain dead. They naturally dream of what a good society is; a society that is way better than what they have inherited from their elders. So, it is perfectly healthy for students to have a self-image of being agents for positive change. Once aware, they soon realize that individuals count for little --- only organized actions do. But organized actions require a culture of civilized debate. In my 36 years of teaching at Quaid-e-Azam University, I have never felt that rational, civilized debate with or between students is impossible. Of course, there have been exceptional situations, such as after the 1998 nuclear tests, but students will generally listen to the other side in a civilized way.

We must have faith in the young, educated people of our society. This is why I strongly feel that student unions must be restored, and student representatives be elected by popular vote. How else can Pakistan generate its next generation of political leaders? Are we forever doomed to being ruled by military usurpers and dynastic rulers? No, we must believe in ourselves.

I'm not asking for something far out, something that has never existed. Even under the British Raj, there were student unions. So, why not now? In the early 1970's, which is when I had just begun teaching, all Pakistani universities had student unions. On the one hand there was the Islami Jamiat-e-Talaba and other far right-wing organizations. They were pitted against an assorted range of left and liberal organizations: the National Students Federation, Democratic Students Federation, Peoples Students Federation, etc. Sure, there were occasional physical clashes, but it was still healthy in the sense that battles were fought primarily in the realm of ideas. This kind of fighting was infinitely better than fighting the senseless ethnic and religious wars of today.

I know that some people feel that our students are fundamentally incapable of responsible behavior. In my opinion, this amounts to a condemnation of Pakistan itself. If students in India can successfully study and become world-renowned professionals, as well as unionize and fully engage in national and international political issues, then surely Pakistani students can do this just as well. Else, let's be prepared to declare Pakistan a grand failure, a bad idea to begin with, and our people stupid and irrational. I do not accept this terrible conclusion.

STEP: What realistic measures could be taken to prevent student unions from devolving once again into quasi-militant organizations responsible for violence and intimidation instead of political debate and activism?

PH: I would begin cautiously lest the whole idea of restoration flops. Although all unions remain banned, religious extremists still rule many Pakistani campuses. They will surely

try to take advantage of the new opportunities offered if the ban is lifted, and will want to impose their extreme views upon the rest of the student body. Also, let's not forget that political parties like the PPP were less than responsible in the 1970's. They also violated laws and ethical responsibilities to gain power just as much as the Islamists. So, there must be a clear code of ethics that specifically abjures physical violence, and specifies immediate penalties, including immediate expulsion of students if these are violated by whoever is responsible, irrespective of political orientation.

I know it is difficult, but the reinstatement of unions, subject to their elected leaders making a solemn pledge to uphold specified rules is the only way forward towards creating a culture of debate and tolerance on campus. Ultimately, the voices of reason will become loud enough to be heard.

Before a full restoration, the government should allow and encourage limited activities such as disaster relief activities, community work, science popularization by students, etc. But this first step must not be the last one, and we must move as rapidly as circumstances allow.

STEP: Partly as a result, perhaps, of stifling university campuses, creativity and innovation are not valued personal traits in Pakistani society, even in urban centers. Do you believe there is a case for creating an 'HEC for the Arts', that cultivates and funds literature and the arts in Pakistan? What measures can be taken to change attitudes towards creative individuals and their ideas?

PH: Literature, art, music, and sculpture are expressions of creative expression. If you want them then you must first fight the battle for political, cultural, and personal freedom. Without this freedom all the money in the world, and the finest building for a "HEC for the Arts", will achieve exactly nothing. The starting point is to acknowledge that we actually want the Arts.

Presently, it is not clear that anything beyond narrowly technical education is desirable or socially sanctioned. Unlike during the earlier years of Pakistan, today we see that film, drama, dance, and music are frowned upon within the campuses of most public universities. Joyous or artistic expressions are sometimes attacked by student vigilantes who say these violate religious norms. At Punjab University, the Islami Jamiat-e-Talaba staged violent protests against the establishment of a department of musicology. Even when something low-key was finally established, it had to be located away from the main campus.

Burqa and hijab are ubiquitous, cafeterias are segregated, males and females are not allowed to walk together, and Islamic morality squads enforce these restrictions with due fervor. I cannot see the faces of most of my female students today.

There is no strong Jamiat in my university, but the Saudiized culture is not too different from Punjab University. Indeed, I would contend that we are witnessing a broad social phenomenon that is no longer linked to specific political initiatives as they were in the

past. An example: in the physics department of Quaid-e-Azam University we started a film club some time ago. The first movie was *A Beautiful Mind*, a PG-13 rated story of Princeton mathematician John Nash. It's a marvelous story of this psychologically disturbed genius. But half-way through, some fanatical students disrupted it and turned off the electricity. The following day there were posters up across the university accusing me, as the physics department chairman, of screening pornographic movies and importing western culture! It was ordinary middle-class students doing it without the Jamiat behind them.

In a landscape that is generally pretty dank and dark, there are a few bright spots. The times that I have been to the National College of Arts in Lahore, and the Indus Valley School of Arts and Architecture in Karachi, I was impressed by the vitality of students and the open atmosphere. Their work looked rather good to my untutored eye. The ambiance there reminded me of my visit to Indian universities a few years ago. Perhaps openness is the key to their success. More generally, ambiance really does matter in determining the quality of a college or university, even if it does not specifically relate to the liberal arts because learning has to be taken in a broader sense than mere book-learning. Personal freedom is crucial to creating a well-rounded individual. It is particularly important to learn to deal with colleagues of the opposite sex in a mature way. This is a necessary part of the maturation process for homo-sapiens.

STEP: In the past, you have written about the tension between Islam and Science, particularly the lack of scientific maturity among university students. As a university professor, you are guaranteed a captive audience of young impressionable people, mature enough to understand the implications of the scientific method. Rather than blame ideologues for succeeding to capture an intellectual vacuum, would you concede instead that the scientific intelligentsia, including university academics, are simply failing to articulate the "idea-system" of science to university students?

PH: Yes, university academics in Pakistan have failed to create a scientific culture and mindset. They, like most school and college teachers, are indeed guilty. Except for the honorable few, most consider scientific thinking an alien, imported, western concept. Sadly, those who are paid to teach science know next to nothing about the scientific method, the premises which underlie science, or its history. This also holds for the majority of teachers who hold PhDs from our universities. In fact many --- whether actively or implicitly --- work against the idea system of science.

In my opinion, the scientific mind is nothing but the questioning mind. It starts to develop naturally when students encounter questions that engage the brain's reasoning and logical capabilities rather than memory capacity. To nurture it, teachers need to raise such questions as: How do we know? What is important to measure? How do we check the correctness of measurements? What is the evidence? How do you 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 questions and framing answers.

The barrenness of academia is painfully apparent. Anyone who has studied or taught in the Pakistani system (O-A levels and elite private universities excluded) knows that our teachers are guaranteed a captive audience of students who hang on to every scribble made upon the blackboard, or every sentence read out from the teacher's notes. Students who ask questions are frowned upon and risk being branded as trouble makers. To get good grades, examinees need only reproduce this undigested, or partially digested, information. No surprise: this is exactly the way the teachers were educated themselves and what formed their worldview.

The impact of rigid obedience on science education is fatal. I have often seen science being taught in schools as though it was Islamiyat - as something that exists in its final, complete, and ultimate form. Rote memorization dominates even in my university, which is supposed to be Pakistan's best public university. Science teaching is reduced to an absurdity and is nothing but a waste of time because the essence is lost.

A sorry anecdote: as departmental chairman, I decided to monitor the teaching practices of an assistant professor in my department about whom students had frequently complained to me in private. So I sat in one of his classes and found that he jumped from formula to formula with no connection between them. Later, I summoned him to my office and demanded an explanation for the intermediate steps. His answer: this formula and that formula are in the prescribed M.Sc-level plasma physics textbook on page so-and-so. He could not even understand why I was horrified. I tried to tell him that physics depends on a chain of logical connections, not the authority of the textbook. Step 1 leads to step 2, and so forth. Sadly, I did not see my horror reflected in my colleagues. So my efforts to remove this teacher have failed thus far. He has been receiving a full salary for the last two and a half years although I do not allow him to teach a course in my department.

Why is the system increasingly totally rote-oriented and anti-questioning? There may be deeper reasons, but one obvious reason is lack of subject competence: teachers can only dare to invite questions from students if they know all the answers, or at least most of them. This requires having a solid understanding of the material you are teaching. If you have insufficient mastery over a subject, then obviously you don't want your ignorance exposed. So, even if teachers agree in principle that students should ask questions, the mixture of intellectual laziness and incompetence is usually too heavy to cast off. Nevertheless, while the competence deficit is a difficult problem to fix, it is solvable. Better books, examinations, and evaluation criteria can produce more competent teachers who would then emphasize internalization of knowledge over rote learning. For this there has to be a strong will.

STEP: Rote memorization is a ubiquitous feature in the education systems of most developing countries, like China, North Korea, India, and Singapore; none of these are Muslim-majority countries. Why do you feel the problem of rote learning is more closely correlated with religion than economic development in Pakistan?

PH: Traditional, culturally-driven, societies rely upon inherited knowledge and think of it as a fixed corpus of facts. Teachers are supposed to transmit the "truth" as determined by some unapproachable authority. To that extent, science and traditional learning do not get along well. Joseph Needham's marvelous treatise on Chinese science exposes this point in great detail. But the countries you named – with North Korea probably excluded – have been undergoing a massive cultural and social transformation over the decades. They are rapidly modernizing their values and ways of behavior. Not all the changes are good, of course, but the fact is that they are moving towards a way of thinking that is eminently suited for good, science-based education. Hence their excellent technical universities and high educational standards.

It's a different matter in strongly religiously-driven societies such as ours. Fixity and rigidity are much more ingrained, the resistance to modernity much fiercer. This directly impacts pedagogy. The teaching of religion is necessarily authoritarian because religious knowledge is final, total, and unalterable --- it all comes from God up above. If this attitude remained confined to Islamiat, it wouldn't be a problem. But one inevitable by-product is that the reverential concept of knowledge filters all the way down into science subjects and their teaching. The notion of "up above" becomes fluid and extends into textbooks and teachers, which lie almost beyond challenge.

I think that obedience to "the hand above" is paralyzing because science simply does not accept anything that lies outside of logic, mathematics, and observation. In fact, intellectual timidity critically underlies the failure of science in Islam for the last 700-800 years. This young man in my department who I referred to above is just one of the millions from General Zia-ul-Haq's Islamized generation. They are steeped in the notion of textual authority --- the Book is always right even if it is a textbook!

The scientific mindset and orthodox belief (as we have it today in Pakistan) are mutually exclusive. Take your pick, you just can't have both. Please note that I am not extending this to science and faith in general; compromises have been worked out in different places at different times. Muslims and science got along famously for a good 400-500 years. But I am fairly certain that with present attitudes to life and knowledge, all the world's laboratory equipment, computers, fast internet connections, and books won't move us an inch towards genuine science. Like the Saudis, we are doomed to be mere consumers of knowledge and its myriad products. I don't see this changing any time soon.

Q12: With the extreme scarcity of “scientifically-literate” teachers, the hiring of sub-standard faculty, like the one you mention, seems necessary and inevitable. In the present climate, how can the hiring processes at universities be reformed to prevent incompetent faculty from joining?

Before hiring faculty in any university, a test to check subject basics is absolutely essential even if the applicant has a PhD. It should be a national policy that applicants at the lecturer and assistant professor level should obtain more than a prescribed number of marks in a centrally set and administered subject test of high reliability. This test should be used only in a pass/fail mode --- the final selection should take into account the usual

criteria (publications, performance in a trial public lecture, etc). But subject literacy should absolutely be the first criterion, not publication quantity. At the associate or full professorship, a public lecture must be made compulsory.

I am aware that implementing this is not easy. First, very few science departments have faculty who can make good tests and grade them. This means that one should rely on GRE exams, which lie beyond petty corruption but have some known disadvantages as well. Second, there will be stiff resistance from applicants to pass any kind of test. They will argue that a PhD is more than enough to qualify. They frequently invoke the "ghairat" argument, and accuse proponents of testing as "foreign agents". However their ignorance rapidly emerges once they are challenged to answer any question outside some very narrow domain.

Q13: In the final mix, is it better to have poor faculty or no faculty at all?

That's a really tough question! A miniscule proportion of the eligible population has access to higher education, about 4%. One wants greater enrollment but clearly somewhere one has to put a lower bound on quality. So, for example, there's no point in having a department of English if the head of department can't speak or write a straight sentence of English. In some colleges that's actually the case. Ditto for literacy in the sciences.

Maybe it would be helpful to have different grades of universities and colleges. So grade-I would do both teaching and research, grade-II would do only teaching. Finer differentiation could also be done. But at some point one has to simply say: no, this is worthless! Let's not pretend that we're offering "higher education".

Q14: Finally, are there any trends you see in Pakistan today that offer the promise of a better tomorrow for science and education?

If one looks hard, it is possible to point to some good things that are happening. First, there is increasing realization that local testing and examination standards have collapsed to the point that they have lost meaning. This is forcing us to confront reality - which is absolutely vital for reform.

An example: the HEC has made GRE subject tests mandatory for the award of a PhD degree from every public university. Of course, the passing mark is ludicrously low (40 percentile) and most students can't make even the low grade. But their performance is steadily improving. About 15 students from my department have cleared this hurdle, and the best has scored 80 percentile. Much more importantly, our students are being 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 they can't cheat or cram is doing a huge amount of good.

Another positive development: there are universities that are seriously developing science faculties of high quality. The LUMS School of Science and Engineering has already

taken off. Given how much effort it has put into faculty recruitment, this must be considered a flagship effort. If it succeeds --- and the odds are that it will --- we shall actually have a model for other efforts.

But let's not fool ourselves. Pakistani higher education will turn around when Pakistan turns around. This can't happen while our cities, towns, army, and police are attacked by maniacal terrorists day after day. Expatriate Pakistanis, as well as others of high academic accomplishment, are vital to the uplift of our universities and colleges. In these circumstances they do not feel safe enough to work in Pakistan. Without winning peace, the country will just continue to stagger along.