

The JEE conundrum

Anurag Mehra*

The Joint Entrance Examination (JEE) conducted by the Indian Institute of Technology (IITs) is under review again. The reasons for this review have to do with the stress that children have to undergo in appearing for multiple entrance examinations and the impact of coaching classes (with the consequent neglect of school attendance and studies). While these issues are real and demand urgent solutions, the ideas put forward by the Ramasami Committee – having a single, all-India examination, and including class XII board examination marks, after due ‘normalization’, for admitting students to undergraduate science/engineering programmes – are based on questionable premises and superficial analysis, and, if implemented, may well cause more misery than solve the above-mentioned problems. In view of the complexity of the problem, and the constraints imposed by the huge scarcity of ‘good’ educational opportunities, finding workable and reasonable solutions is difficult. Re-design of the engineering entrance examination system merits a full discussion by the academic community at large and should not be decided by a committee of few people.

Keywords: Coaching classes, entrance and board examinations, normalization of marks, stress on children, undergraduate programmes.

Two concerns

ADMISSION to the undergraduate programmes of the Indian Institutes of Technology (IITs) is made on the basis of a Joint Entrance Examination (JEE), conducted jointly by the IITs. A committee headed by T. Ramasami (Secretary, Department of Science and Technology, New Delhi), appointed by the Ministry of Human Resource Development (MHRD, Government of India), to formulate a new admission system for engineering undergraduate programmes in the country, submitted its report in September 2011. A necessary consequence of the new admission system proposed by this committee is the abolition of JEE as we know it today and a drastic change in the way undergraduate students are currently admitted to the IITs, and all other government engineering institutions.

The Ramasami Committee recommendations may be summarized as follows: (i) Normalization of school board examination marks; (ii) Single, two-part (aptitude and advanced) ‘screening test scheme’ as the only entrance examination; (iii) Listing of the various options available for combining the normalized board score with the screening test marks to generate a composite total score, and its use in creating the final merit list, for admission to all state engineering institutions. These recommendations imply that all the current state-sponsored entrance examinations (JEE and the All India Engineering Entrance

Examination – AIEEE), including those conducted by the state governments (provided the states voluntarily adopt the proposed scheme or its variants), will be superseded by this new admission model.

One of the major concerns that has gained prominence, in the context of professional college admissions, is the number of tests that a student has to appear for, and the consequent stress that this generates. The other significant concern that infuses the debate on entrance examinations is the very large impact of the coaching classes on the admissions process: in particular, the effect it has on the quality of the students getting admission, and the economic bias in favour of those who have had the resources to pay for expensive coaching. Related to this is the neglect of school studies in favour of the coaching classes; hence the proposal for the inclusion of the board examination marks in the admissions process.

The analysis

Too many examinations: good or bad?

Indeed, it is true that examinations and tests are always a source of stress and it is important to minimize these. However, in the Indian context, it is even more true that the fear of being left out of the system completely generates even more trauma and stress. It is an unfortunate fact that even after so many decades of our nationhood, the demand for ‘quality’ educational seats outstrips supply by such colossal margins that a sense of desperation and insecurity overshadows all other feelings, for prospective

Anurag Mehra is in the Department of Chemical Engineering, Indian Institute of Technology Bombay, Powai, Mumbai 400 076, India.

*e-mail: mehra@iitb.ac.in

college entrants, at all levels and for all disciplines: will they 'get anything at all'? This anxiety is the primary source of stress amongst students and not the multiple examinations per se, which simply happens because students apply to so many colleges – public and private, each with its own set of examinations and admission requirements. And how else can this be? Does anything different happen in other countries? In USA, one takes the reasoning Scholastic Aptitude Test (SAT), and then various subject SATs depending on the stream in which admission is being sought. In addition, many universities interview (not just counsel) the prospective students (if not in person, then over the phone), and also seriously count in extra-curricular profiles of each applicant.

It can actually be argued, contrarily, that multiple examinations *reduce* stress by providing multiple opportunities. All the eggs are not kept in one basket, and a bad performance in one examination can hopefully be compensated by a better performance in another. Many students therefore feel that multiple examinations actually afford them the safety of revisiting their performance and the possibility of 'getting something'. According to a study carried out on school children attending coaching institutes in Agra¹, 'Self-inflicted stress starts because of uncertainty and insecurity about future academic and professional life. After every examination these adolescents resolve to score better marks next time. Perhaps the pressure to improve one's own performance each time is strongest in adolescents of coaching institutes. This type of pressure may be very useful for them, because it motivates them for better achievement ... stressed individuals are benefited by improving their achievement if this stress does not exceed the optimal level'. In any case, preparation for JEE also ends up preparing the student for AIEEE and the state entrance examinations; thus the effort to take multiple examinations is not much more than what is needed for one examination². In a more fundamental sense, college admissions are also about exercising individual choices and the cardinal principle of the freedom to choose should be available to individual students so that they can decide which examinations to take. It is not unheard of that there are students who opt not to appear for the JEE because it is anyway too hard to get in (see note 1). There is a lesson to be learnt from China on this issue. The stress and desperation associated with the one 'Gao Kao' examination that determines the fate of some 11 million Chinese high school students, is sad and horrific (Table 1)³.

Institutional autonomy on academic issues

This begs further questions, now about the freedom of institutions, to define their admission policies and processes: how justifiable is it for the government to impose on publicly funded, autonomous institutions, restrictions

and conditions in the *admission process* (other than those which are constitutionally mandated, such as reservation policies for various disadvantaged groups)? Will the government be able to impose admission-related 'guidelines' on private institutions? It should be a basic principle, that institutions should have the freedom to use their own criteria, duly generated from their internal debates and from suitably empowered *academic* senates or councils, for admission. The government should therefore refrain from enforcing ideas, such as a 'single, national admission test', that affect institutional *academic autonomy and mandates*.

In this context, and as an example, it is pertinent to note that the Institutes of Technology Act of 1961, already embodies this principle: it empowers *only* the IIT senates to deal with matters pertaining to admissions (Section 28; Table 2). While this should not prevent external agencies (ministry, council, expert groups) from making suggestions or creating proposals, consideration and approval by the senate is mandatory. Even more, the Act also says clearly that the power of the IIT council is only *advisory* in nature (at least on academic issues – section 33a, the word 'advisory' is used specifically in this clause, and in contrast, not used in 33b to f, all of which refers to administrative functions) and therefore, by sheer linguistic implication, not binding (Table 2). And this is indeed the way it should be, because legislating

Table 1. Excerpts from Chen³ on the stress associated with the post high-school, college entrance test in China, the 'Gao Kao'

Because the Gao Kao is the primary determinant of one's future college in China, extreme hype and pressure are centered around the test, even to the point where many see the exam as consuming their lives.

'I have a niece who attended high school in China and when she was in school, she did not get home until eight p.m. Even after that, she would stay up until one in the morning to do homework, and then get up again at six to get ready for school', states Justine Su, Professor of Educational Leadership and Policy Studies at California State University Northridge. 'Schools are even known to call students back during the summer so that they can give them a preview of what is coming up in the school year so that they can be better prepared for the exam.'

Some students have been known to hook themselves to oxygen containers in hospitals while studying in hopes of boosting concentration according to the *New York Times*. Certain provinces order Internet cafes to close down until exam dates have passed. Many girls will even resort to taking contraceptives so they do not get their period during the exam.

The Gao Kao has even begun affecting the breadth of education, as more and more high schools have changed curriculums to help students excel on the test. Many high schools' reputations are affected by how many of their students are accepted into the most prominent universities. 'I remember taking mock exams in class all the time', Zheng explained, 'students can feel almost depressed if they do not perform well on a test. There's a saying that "If you don't take the Gao Kao, you are not an adult" '.

Table 2. Excerpts from the Institute of Technology Act, 1961 (Sections 28 and 33) (emphasis ours)

28. Subject to the provisions of this Act and the Statutes, the Ordinance, of each Institute may provide for all or any of the following matters namely:

(a) *the admission of the students to the Institute;*

...

(c) the conditions under which students shall be admitted to the degree or diploma courses and to the examinations of the Institute, and shall be eligible for degrees and diplomas;

33. (1) It shall be the general duty of the council to co-ordinate the activities of all the Institutes.

(2) Without prejudice to the provisions of sub. section (1), the Council shall perform the following functions, namely:

(a) to *advise* on matters relating to the duration of the courses, the degrees and other *academic* distinctions to be conferred by the Institutes, admission standards and other *academic* matters.

on academic standards and requirements should be the sole prerogative of the institution itself. Any position other than this is ethically indefensible, leaving aside legality for a moment. In the current instance, it seems that the position that the council (and through it, the ministry) 'is supreme' stems probably from an unconditional extrapolation of such a power relationship on administrative/financial matters (see note 2).

This also means that if the promise of true autonomy, enshrined so clearly in the Act, is implemented, not just the IIT system, but every individual IIT has the right to choose its own method and process of admission.

Killing coaching using board examination marks

Keeping aside, for the moment, the intrinsic merit of board examination marks, let us examine the idea that the inclusion of board examination marks in the ranking system for admissions, will reduce the impact of the coaching classes. This is an erroneous and naive hypothesis. To begin with, a very significant number of students, across the whole country, take 'remedial' coaching for board examinations as well (including at the class X level). Snehi⁴, in a study on schools in Delhi, found that almost 78% of students enrolled in the science stream were taking private tuitions or coaching, and even more importantly, that high achievers took to coaching 'to improve and maintain their high position'. This study further reports that students enrolled in the arts and commerce streams cited 'better understanding and solving of individual difficulties' as the main reasons for their joining coaching/tuition classes; science students also reported similar motivation, along with 'preparation for competitive examinations'. Thus, the coaching bazaar has flourished for two primary reasons: first, the levels of incompetence and the inefficiency of our schools in providing even basic concepts and syllabus coverage, and, secondly, the desperation of 'getting admission some-

where' leading to students enrolling in multiple coaching classes in a simple-minded bid to stay ahead. Even more importantly, what this indicates is the broken and abysmal state of the education system which is quite well documented⁵⁻⁷. For this very significant reason, more and more students will turn to the coaching classes and tuition bureaus for improving their board examination performance. *They will not 'return' to school.* Ironically, this also shows that many coaching classes teach more than schools do, and many do a good job of explaining the fundamentals as well as providing analytical skills.

The inclusion of a general aptitude test as well as the board examination marks in the selection process will now allow coaching classes to market 3-in-1 packages to prospective customers (aptitude + subject test + board). Instead of coaching just for the subject tests (e.g. JEE and AIEEE), now the coaching market will expand to include 'how to simultaneously score high marks' in the aptitude and board examinations as well (see *Mumbai Mirror*, 26 February 2012, cover page, for a full-page advertisement from a coaching academy). This could well be the great marketing opportunity that coaching classes have been looking forward to. It is a telling sign that even as we debate the proposed reforms, coaching classes are already engaged in bundling new coaching packages, based on the new test scheme, and 'explaining the new scheme'. It is therefore very likely that this new importance of board examinations will drive students into the clutches of coaching classes even more intensely and desperately. Instead of allaying any stress, this will make life *triple* stressful for all candidates. A classic case of the cure being worse than the disease. Some years ago, Tamil Nadu actually scrapped its own state entrance examination, preferring to use the state board examination marks for admissions, resulting in 'a thriving guidebook-based tuition industry exerting unhealthy pressure on the examination process. It produces high scorers, many of whom – ironically – struggle through college or fail' (*The Hindu*, 24 February 2012). Coaching therefore penetrates into any kind of examination as long as there is desperation.

Even more troublesome will be the new nexus that coaching classes have established with many boards, by establishing 'integrated schools', where coaching is carried out in the garb of running the school. It would surely be naive not to expect coaching institutes running such schools to influence their collaborating boards towards insidious and corrupt practices, such as paper leakage, sale of expected questions, grade inflation, buying marks and many more creative 'products'? A government that cares about the high economic burden of taking multiple entrance examinations would do well to look into the high costs that people incur in joining such schools which are growing exponentially and represent a kind of back-door privatization of school education.

Ultimately, coaching can only be 'killed' by removal of scarcity and desperation associated with college

admissions, and developing an excellent schooling system that produces competent and confident students who do not feel any intrinsic need to get coached. There are no short-cuts.

Board examination marks as ranking criterion

The last issue of relevance is to examine whether the use of board examination marks to rank students in an admission merit list is appropriate. The first question that arises is why are entrance examinations a preferred method of admission in comparison to board examination? The obvious answers are: (i) to make a fair comparison between students coming from diverse boards and (ii) to test attributes/aptitude required for a particular academic discipline/institution.

The IIT entrance examination was born because initially, the IITs had it difficult to compare students across widely varying syllabi, using marks obtained by them in their respective board examinations. The JEE, then known as CEE (Common Entrance Examination) was first held in its full glory in 1961, and involved the IITs at Kharagpur, Bombay, Kanpur and Madras. As Manchanda⁸, puts it succinctly, in his much applauded work on the history of IIT Bombay, 'Over only the first couple of years of its existence did IIT-Bombay depend on the results of school or junior college exams to select entrants for its undergraduate programmes. Subsequently, in order to establish parity between students who came from higher secondary boards that varied widely in examination formats and standards, the IITs attempted to create a level playing field through the institution of a nationwide examination'. It should be noted that even at that time the IITs did not opt for using 'normalized' board examination marks, and instead, chose the logistically more complex device of an entrance test. This happened possibly for three reasons.

First, board examination marks were not considered to have the kind of sanctity that entrance test scores would have. Even today, instances of paper leakages, severe lapses in invigilation, delays in the scheduling of examinations and declaration of results, even mass copying are not infrequent (see *Times of India*, 25 February 2012, for reports on cheating in the HSC examinations in Maharashtra, and also the fiasco in which students have been given multiple examination centres). A somewhat telling narration on the potential magnitude of this problem is given by Kindon⁶, 'when the Kalyan Singh government brought in an anti-cheating rule and installed police at all examination centres in 1992 to prevent the mass-cheating that routinely takes place at board examinations in Uttar Pradesh, the pass rate in the high school exam fell from 57% in 1991 to a pitiful 14.7% in 1992. This is when the bar for passing is set very low, i.e. a student only needs on average 33% marks in their various

subjects in order to pass high school. This suggests the true extent of the problem of low achievement levels in secondary education, though it is possible that achievement levels in Uttar Pradesh are lower than in other states. Moreover, students rely on "guess papers" which are sold a few weeks before the exams. These attempt to anticipate exam questions and are often remarkably close to them. There is frequent leaking of papers in advance of examinations.' Nepotism and favouritism are commonplace, including in tests that have external evaluators. This happens in some of the better schools as well. It should therefore be evident that board examinations which are plagued by such *corrupting* influences, however small or large, *cannot* be used in a *ranking system*. It is also easy to sense this by talking to school-going children and also how strongly they feel about these issues. Students at the college entrance stage firmly believe that the board examinations are an inevitable fact of life, but not the best measure of their capabilities. In contrast, the JEE has acquired a reputation for being fair, free of corrupt practices and scrupulously punctual in keeping to its timelines; it has passed the test of integrity with flying colours. (The JEE may have had its own share of glitches and unsavoury incidents, but these have been few and far between.) This has been possible because the examination is tightly controlled and supervised by the IITs themselves, with clockwork precision and many safety catches in place.

Secondly, there are significant question marks on the *feasibility* of creating normalized board scores, for comparing individuals across different boards. Normalization of board examination marks can have many purposes. If the idea is to make very *broad* comparisons, such as, say, 'comparing the top 5% across boards', it may be feasible, though even this would require statistical validation; however, if the idea is to generate normalized scores such that these can be compared across individuals situated in different boards, *to rank students in a single, unified merit list*, then this is not possible. It is like asking if we could find some way of comparing examination marks that students in, say, class X, get all over the world. Different boards are different in a myriad of ways, and sometimes hugely so: what is taught in or up to a given class, in what depth and breadth it is taught, the level of mathematics associated with the treatment, the distribution of marks across theory and practicals, the course topics, the number and type of internal examinations, the assessment scheme, the marks distribution and absolute scores that the examination produces and so on. Consider this simplified example, for the physics paper: Board 1 gives questions that are mostly descriptive, Board 2 sets questions that are only numerical and Board 3 asks primarily for derivation of formulae. Now, how does one compare three students, one from each board, whose normalized score is, say, 90/100? Moreover, do these 'equal' students have 'equal' pre-requisite skills to take up science/

engineering? Such a comparison will be meaningless. These *vast qualitative differences*, between board examinations, suggest that it would *not* be meaningful to devise a quantitative normalization procedure. Indeed, if this kind of comparison, across board examinations, were feasible we would not have to wait for 50 years to come up with a normalization scheme. If such a magic wand were available then why have any entrance examination at all. Just rely on normalized board marks. Creation of a level playing field by such a device is not possible. Indeed, this has been realized by none other than one of the boards – CBSE recently replaced marks in the class X board examination by *letter grades*, signalling that students within a certain range of marks (a fairly large bin of 10 marks) are statistically indistinguishable. This change was made to eliminate the unhealthy obsession that students had for comparing differences as low as 0.1%. Strangely, now we see a reversal in thinking where insignificant differences in marks will be used to rank students.

Thirdly, it is well known and well lamented on, that our school system dwells more on rote learning, memorizing formulae and regurgitating drilled-in information as opposed to analytical approaches and problem-solving. There are, of course, significant variations in the extent to which different boards lay emphasis on these different styles. Perusal of XII class examination papers of many boards will immediately reveal the undue emphasis on reproducing, and sometimes literally and precisely, material from the textbook in the expected answers (and therefore also in the grading scheme). These ‘skills’ are rendered *redundant* in college (at least in some) where the emphasis is more likely to be on *analytical reasoning and computational skills*. Thus, institutions find that they still need to test applicants for skills and aptitude that college education will require and this is *best* done by conducting one’s own entrance test. And in some sense, and unfortunately, a huge part of the school education is rendered irrelevant. This is also where the failings of the school system are capitalized upon efficiently by the coaching classes.

The Ramasami report

The Ramasami Committee Report⁹, in its final form has just become ‘available’, even to faculty members in the IITs, apparently *after* it has already been accepted by the IIT council. This has happened without any discussion in the senates of the various IITs. It would have been much more appropriate to include the resolutions of the various IIT senates, on this report, into the decision-making process by which the council ‘accepted’ the report (see note 3). The report contains many errors of grammar and style, sociological ‘observations’, and recommends an aptitude test, an advanced test and a normalization ‘procedure’ for

board examination marks, across boards, apparently based on inputs from the Indian Statistical Institute (ISI).

The advanced tests already exist – whether it is JEE or AIEEE or the state CETs; the aptitude test, for evaluating ‘raw’ intelligence is proposed also because it is ‘un-coachable’. This is flawed logic because anything can be coached by sheer, brute practice and pattern recognition. Do we not have coaching classes for SAT and GRE in India? Even more interestingly, aptitude tests to measure intelligence are severely controversial and discredited. There is voluminous literature on this issue, ranging from the philosophical¹⁰ to specific analysis related to their use in college admissions: Coleman¹¹ reports that a large number of colleges in the United States do not use SAT1 (SAT1 is ‘reasoning’ SAT) for college admissions. Freedle¹² argues that SAT1 is ‘culturally and statistically biased against African Americans, Hispanic Americans, and Asian Americans’. The extent to which SAT1 limits access, of racial and ethnic minorities in USA, to college education has been explored by Zwick¹³. In her book, Zwick¹⁴, cites a University of California study which concludes that student scores in SAT2 (subject SAT) correlate much better with college grades than SAT1. This study also suggests that the SAT2 score is much less influenced by the socio-economic background of the student, in comparison to the SAT1 score. If we extend these observations to apply broadly to disadvantaged groups, based on *class, caste or gender*, in India, it is obvious that the aptitude test should *not* be instituted at all. Yet again, the stated concern about bridging gender and the urban–rural divides, will be accentuated by the proposed solutions.

The core issue for the report, once it suggested inclusion of board examination marks, should have been to focus on the marks normalization across different boards. However, it provides a simplistic ‘statistical analysis’ to assert that board examination marks *can* be normalized, but does *not* show at all whether this normalization is *meaningful*. It is also curious that the media had carried reports indicating that ISI had actually suggested that it was *not* possible to normalize scores *across* boards. *The Tribune* (13 September 2011) has this to report, ‘before presenting his report to the council tomorrow, T. Ramasamy, Secretary, Science and Technology, and Chairman, JEE Reform Committee, reportedly held discussions with experts from the Indian Statistical Institute, Kolkata, who have concluded through intensive analysis of class XII standard marks of various boards that there existed a poor correlation among marks scored across boards though there existed a correlation among a board’s marks across the years. The experts inferred that marks scored across boards cannot be compared or normalized effectively’. What happened, then, to *change* this conclusion?

Given the ‘accepted’ status of the report, it is surprising that it makes a large number of suggestions, and further analysis, to *validate its proposals and claims*. Excerpts

from the section titled 'Further Work Suggested' are shown in Table 3.

As can be seen, there is *still* a lot of data collection to be carried out, and so also any *analysis* based on these data. It is unlikely that the magnitude and kind of data that are now needed will become accessible so easily and so quickly. The analysis by ISI takes 3 years data from 4 boards, which in itself is very limited in scale, and makes no attempt to show if the proposed formula would have chosen the 'same' set of people that entered through JEE. Even the meetings of the state education ministers and those of board chiefs (both held in February 2012), according to media reports, agreed to the idea *in principle*, and that it be implemented with effect from 2013. If such is the state of preparedness, what is the *hurry* to implement something that is so short on *detail, validation and feedback*? Currently, candidates can take two attempts at JEE; so it should have been more logical and fair to propose at least 2014 as the year of implementation (two-year lead period).

A critique of the JEE

There are indeed a few issues pertaining to IIT-JEE that need to be addressed, and these have been topics of contemporary internal discussions and debates.

The first issue is the inherent defect of *multiple choice type questions* (MCQ), in that there is a finite probability of a student marking the right answer without actually knowing how to solve the problem (despite the negative marking used to discourage such markings). The MCQ pattern was adopted to enable machine grading in view of the large number of candidates; it was simply becoming impossible to evaluate so many answer books by reading through long answers. MCQs are possibly also more prone to be solved by 'pattern recognition', 'guesswork' and other such devices, thus making this pattern

Table 3. Excerpts from section on 'Further Work' from the Ramasami report (2011)

1. There are as many as 42 school boards in the country conducting examinations at school levels. They conduct examinations in slightly varying schedules. Such differing schedules may pose challenges. Some work may be required to align the time schedules of board examinations and National Screening Tests.
2. Although ISI seems to have developed a scientific methodology for normalization of school boards' scores based on a pilot study involving four typical school boards, it may be necessary to access data from all the 42 boards and test run the findings of the experts of ISI.
3. It will be beneficial to apply the recommended methodology on candidates selected for admission into IITs, NITs during the last four years using the data on current students sourcing data from IIT-JEE and AIEEE as well as school boards scores at class X and XII levels. This will help us ground truthing and revalidation of proposed methods.

somewhat more 'coachable'. This does not mean that coaching classes teach only such tricks, nor does it imply that long-answer-type problems cannot be coached for. Indeed the IIT-JEE coaching was an industry even in the pre-MCQ days.

The second problem lies with the exclusionary nature of the examination, where the primary focus is to *exclude* as many candidates as possible, and also to create a difference in marks that can translate into a rank, by use of 'undesirably' tough/difficult questions. This is an intrinsic response to the huge gap that exists between the number of aspirants and the number of seats available. The consequences of this situation are more desperation and stress, and the burnout that is seen in many first-year students in the IITs. An even more significant effect is the psychological devastation and drastic loss of self-worth that is wrought upon young minds when, at the end of so much 'torture', they do not qualify. However, it is erroneous to blame the IITs for this – they are not responsible for the scarcity of seats. It is even more erroneous to conclude from this that it is the difficult nature of the IIT-JEE that drives aspirants to coaching – in a country where coaching and tuitions are necessary throughout school, for board examinations, and for all and sundry entrance examinations, and where clarity in concepts and 'clearing of doubts' hardly happen in schools, coaching will truly remain a flourishing business.

Some suggestions

What we can conclude, from the foregoing, are the following:

1. It is imperative that the MHRD commission a comprehensive survey for schoolchildren, teachers, college faculty and parents, in order to ascertain the ground reality – what are the most important student concerns, what kind of stresses do they face, what is wrong with schools, and what do they have to say about coaching classes – as directly as possible. If an NGO can prepare a national 'state of education' report every year, what prevents the government from sponsoring an even more comprehensive survey?

2. It may be enabling to create a national testing framework. Testing 'raw' intelligence may be a good idea on paper, but we should not end up testing trivial, irrelevant abilities, and in any case its inclusion should be justified properly. The subject tests already exist in the form of AIEEE, JEE and state CETs. The states will need to be persuaded to abandon their own CETs – something they are likely to have tailored to their own board syllabus, and will therefore be unwilling to give up, in favour of a centralized examination. It is unlikely that such a testing framework can be legally enforced upon private colleges, so it would be a matter of sustaining the credibility of the centralized examination to 'attract' private

schools to use it. It may be a good idea to strengthen AIEEE (as the new national test?), as it is taken by the largest number of students and also has an on-line option; the proposal to provide students with multiple opportunities to take this examination in a year is welcome.

3. We should leave to the IITs, the decision of whether they should continue to conduct their own JEE or merge their examination with the national advanced/subject test. There are many possibilities here, best arrived at in some final form by senate proceedings: partially use some score from the national test, or use it as a screener, and then administer a long-answer-type examination (new JEE?) to the X top percentage of students from the national test; the latter has the benefit of resolving one of the issues that has vexed many minds about the current MCQ pattern in the JEE. However, if these 'reforms' are forced through, it will lead to greater degree of alienation of the faculty from their institutions, and emasculate the role of the senates. There is a more general plea here, and not just for the IITs. How the national test will be used by various institutions, including private entities, should be the prerogative of the institutions themselves: some institutes may use this and nothing else for their admissions, while others may use some of these plus more stringent testing, in appropriate combinations, or even not use the national test at all and stick to their own entrance process. This will also create an incentive to keep the national test free from corrupt practices: institutions which think that the scores are untrustworthy will not use them.

4. The influence of the coaching classes cannot be eliminated unless scarcity of good education is not overcome and *drastic* school system reforms are carried out. However, these are intensely long-term solutions and the recent announcement of a National Mission on Teachers and Teaching (*Indian Express*, 19 April 2012) is a welcome step in this direction. It is highly desirable that self-learning material produced by the institutions themselves is made available to students at cheap prices, just like SAT papers, guidebooks and solutions are sold worldwide by the College Board (which conducts SAT) itself.

5. If board examinations continue to be dogged by corrupting influences, these should not be used at all. As for using the board examination marks to admit students, it may be prudent to *first* enforce a level of *standardization* in the *syllabi* and the broad examination *pattern* (more analytical, problem-oriented) across all boards. The last suggestion is difficult to implement over a short term, as it requires changes in the way science is taught currently from class I to XII; however, some changes must be attempted in the short term, such as in the teaching style and question paper pattern, from class IX to XII (a period of 4 years). Only after this, attempts at normalizing board marks should be made, so that meaningful comparisons between individual scores may become feasible. We

should also wait and watch at least for a few years if all state boards can and do declare examination results according to a desirable schedule, rather than create a new untested system in which some boards end up playing *havoc* with the careers of the students.

If it is strongly felt that normalization is feasible right away, a team of statisticians from within the IITs and those from ISI should show unequivocally, using large databases, say, covering 40 boards (including some of the smaller ones) over 5 years, whether the formula incorporating normalized board scores selects the 'same' students as the JEE has been doing.

6. Significant changes to the existing system should be made with much better preparation and *not* in a hurry. The time-frame of 'next year' is too short and implementation of the new system should be done over a window of at least two years, but more desirably over four years, considering some of the points made above.

It seems that there is a sentiment in the media that portrays the JEE in the popular imagination, as being too 'elitist', as something that needs 'opening up' and 'democratizing'. Democracy does not imply a lowering of standards; it means that anyone who wants to, can attempt to get in. The JEE is not elitist, everyone has a chance to take two shots at it. It is scarcity of seats that makes the examination 'tough', and will remain so depending upon the gap between the number of seats and the number of aspirants. This democratization myth also generates a false hope, and potential support for the proposed 'reforms', that 'board exams are for everyone, so now my child can get in'. No such thing will ever happen; there will be no 'opening up', as such access is constrained only by the number of seats available and nothing else. What will, however, happen if these 'reforms' are forced through, is that the merit lists will seem to have no logic and will become *unpredictably unjust*, and most importantly, we will have learnt to meekly accept that *institutional autonomy and academic rigour* are *fragile* concepts in the Indian context.

Notes

1. The difference between the number of students appearing for AIEEE (~12 lakhs, offline alone; *Indian Express*, Mumbai, 29 April 2012) and JEE (~5 lakhs; *Times of India*, 7 April 2012) is clear evidence of student selectiveness in choosing which examination is appropriate for them.
2. An extended version of the supremacy-of-the-council argument also says that the advice of a higher body (council) is 'automatically binding' on a lower body (senate). The assumptions of 'higher' and 'lower' are erroneous in this case (the council is a committee of administrators whereas the senate is body of academic experts).
3. In the face of considerable resistance from some of the IITs, the report has been discussed officially in some of the senates, and 'alternative' proposals have been invited from the IITs. Why this was not done before its 'acceptance' by the council remains unclear. The fate of these invited proposals, and their impact, on the 'final' resolution remain to be seen.

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