Necessity of Joint Entrance Examination for IITs

Position Review

<u>Abstract</u>

This discussion document prepared by the alumni of IIT critically examines the reasons put forth by the HRD ministry to abolish JEE in its present form and merge it with AIEEE. The paper argues an opposing viewpoint and builds the case for the necessity of Joint Entrance Examination for IITs

By
Alumni, Indian Institute of Technology

Executive summary

The Ministry of Human Resource and Development has proposed the merger of the IIT-JEE (Joint Entrance Examination) and AIEEE (All India Engineering Entrance Examination). This proposal intends to alter a system that has been the backbone and a shining example of opportunity and fairness in the Indian education system. In light of such far reaching and irreversible consequences of this proposal the alumni of all IITs believe it was necessary to critically examine the reasons set forth by the HRD ministry. This document intends to achieve the same.

The reasons cited by the HRD ministry include the following: JEE results in lack of focus on board examinations; JEE encourages Coaching institutes thus skewing the opportunities towards rich students; JEE can be cracked through pattern recognition etc. Although the ministry points out what JEE has failed to do, it gives no reason whatsoever to demonstrate how the new proposed merger of JEE and AIEEE will address any of the above issues.

The Alumni on the other hand have demonstrated the merits of JEE examination particularly the following: JEE is amongst the fairest examination in the world; it gives maximum opportunity to all citizens of the country as can be seen in the demographic spread of the selected candidates; JEE aims to test students on analytical skills that are key for success in professional lives and does not discriminate with candidates on the basis of their ability to speak English or any other criteria that is more characteristic of a candidates social circumstance rather than the inherent capability and potential; JEE questions are set by Professors who have themselves demonstrated a high level of rigor and professional discipline by dedicating themselves to a lifelong pursuit of a career in research and development; and last but not the least JEE and consequently IITs have contributed so much to the success of India and its global recognition by ensuring that only the very best get in.

These and many more such reasons are presented in this document that should be considered by the decision makers. Instead of a unilateral decision to merge AIEEE with JEE there should be an informed discussion and the alumni and the aspirants of IIT should be given an equal voice. The IIT Alumni are fully behind preserving the JEE examination in its current form while being open to improvement opportunity but they are opposed to a unilaterally imposed change that will do more harm than good.

Background

HRD Ministry has unveiled a new proposal to offer a single entrance examination to all engineering admissions thus bringing IITs and institutions admitting students through AIEEE onto the same platform. There have been multiple reasons cited to explain the rationale behind such a proposal. This position review is an discussion document developed by IIT Alumni from across the globe to test the substance in these reasons which if not analyzed correctly, will lead to fragmentation of Higher Education in India rather than building intellectual capital for India.

Purpose and Goal of the Position Review

The purpose of this document is to enhance the composite outlook towards aforementioned proposal and to provide a response to various criticisms of the current status quo from the experience of those who have succeeded in it. This document will allow for the dissemination of background material which will be furthered by presentations at topic-related meetings. The authors envisage that this document may help the IIT Council in their decision to modify the present selection system by understanding the viewpoint of those who have succeeded in the present system.

Approach

With such a proposal being thought of, that will have a lasting impact on Higher education in India, there is a need for a comprehensive approach to analyze the cited reasons objectively and to back them up with evidences This position review document presents few reasons cited by the ministry along with related perspective from some of the findings and conclusions gathered through the experiences of various Alumni.

Scope of the Position Review

The scope of this document is limited to providing a response to the arguments put forth by the HRD ministry in criticizing the existing IIT-JEE selection process. There are several other merits of the existing IIT-JEE system than those outlined in this document which cannot be highlighted here in order to preserve brevity and relevance.

Development and Authorship

This document represents the culmination of 2 weeks of cooperation amongst several IIT alumni through voluntary partnership in the development and co-sponsorship of 4 discussion forums on **Necessity of Joint Entrance Examinations for IITs**. These forums have addressed not only the issue of Necessity of JEE for IITs, but other issues such as negative impact of a single assessment method for prospective engineering students, industry willingness in regard to recruitment of graduates admitted through the proposed process and the possible approaches to curtail the IITJEE 'Coaching' industry. Twenty-three participants and 3 reviewers from 7 cities contributed to this position review and helped in structuring this document. For further details on this document, following can be contacted:

Kunal Chandra, +2348067390043 , kunaliit2002@gmail.com

Abhijith Jayanthi, +919866898311 , abhijith.jayanthi@post.harvard.edu

Akshat Shankar, +919560966885 , akshat.shankar@gmail.com

Position Point - 1

It is not abolition of JEE but merger with AIEEE. The new examination will still be conducted by the IITs.

Until now the authority of conducting the entrance examination was solely with the IITs. According to newspaper reports, in the new proposal, 40% weight age would be given to marks obtained in the board examination (which includes CBSE, ICSE and state boards) and the other 60% would be an examination jointly conducted by IITs and CBSE. With considerable differences across various boards' difficulty standards, using candidate's performance in such boards will result in skewed evaluation. ,. It is important that every candidate is evaluated against a common benchmark rather than bringing in a handicap component for people who come from boards with tougher evaluation schematics.

The pattern of the separate examination would also be significantly different from the one which has been successfully used for last 60 years. Importantly IITs would lose the sole control by which they have ensured that there is no scam (except an aberration in 1997 which was quickly corrected) while there have been repeated cases of ill controlled management of examinations for almost every other engineering/medical entrance examination in India. In the case of CAT, many non IIMs use their score but the responsibility of the examination is lies fully with the IIMs. A similar scheme can be devised to let IITs design the examination and other colleges to use that score. The faith of the people in the integrity and competence of IIT professors is infinitely more than any other existing structure.

Position Point - 2

If a student can do well in JEE then he can also do well in the board examination.

It is not true that if a student can do well in JEE, he would be able to do well in 'Boards' as well. Empirical evidences suggest that the correlation between the board examination results and JEE results is not significantly high. In fact a number of state board toppers fail to make into IITs. On the other hand, most of the IITians score well in 'boards' but definitely not in the top 1 percentile which is what IIT takes. When the entrance criteria of BITS Pilani was changed in 2005 from 'board results' to an entrance examination, it resulted in a significant shift in the kind of intake. Importantly, the purpose of board examinations can never be equaled with purpose of an entrance examination, more so JEE. When purpose / objective of evaluation is not the same, it is not appropriate to address both the issues with a single stroke.

Position Point - 3

IITians don't score well in board examinations because their focus is on JEE. If weightage is given to the board examination, they would be as good in board examinations as in JEE.

IITs are known as institutes of excellence and the degree of inquiry involved in JEE is different from other entrance examinations. There is a purpose for the same, if it only be bringing in all engineering colleges under one ambit along with the boards. But then the level of inquiry should be standardized which defeats the whole idea of excellence.

Even if we were to admit this reason and understand the impact of the same: To an extent, it is true that the performance of IIT aspirants would improve in board examination but it is incorrect that they would rank as well in 'boards' as they rank in JEE. After all, each examination has a distinct purpose and the board examinations are designed to cater to the need of the masses. Anyone who has appeared in board examinations would remember that rarely an original question was asked in the examination and even teachers advised students to focus on working 'solved examples' from the book. Board examinations have historically stressed on asking definitions and some standard questions which are normally 'crammed' by students.

The reason for the same is that our school education system (which includes CBSE, ICSE and sub-standard state boards as well) is so weak that most of the teachers find it difficult to assess an alternative solution. The joke goes that if Newton is asked to define the three laws of motion, most of the school teachers would mark the answer incorrect as it would not be tallying with the book definitions. On the other hand, JEE question papers are checked by IIT

professors who are definitely more competent than the school teachers.

Also an easy examination becomes unfair to the meritorious student as who does better in such examination depends on sheer luck rather than merit. It should not be forgotten that mediocre examination systems which stressed on memorization rather than intelligence had disallowed Ramanujan from higher studies and failed Einstein in the entrance examination of ETH Zurich.

Position Point - 4

IIT JEE has encouraged 'Coaching' and abolishing the examination would shut them.

Definitely, the coaching industry for IITs is a dangerous trend but it is also the case for the board examination. The only difference may be that IIT coaching is a specialized big industry while school 'Coaching' and tuitions can be found in every nook and corner of our neighborhood. In fact big 'Coaching' exist for the CAT examination as well for which the syllabus comprises of high school level Math and English. Similarly 'Coaching' exist and are universally used by students preparing for any examination right from primary school to chartered accountancy around the World. In fact if the students can live in places like Kota and yet be a part of formal school, says more about the administrative authority monitoring those schools. These loop holes should be fixed by the Government before putting the entire blame on the Coaching industry.

Under the proposed new policy students would be forced to start going to the 'Coaching' for both the board examination and for the proposed examination. Can we expect any of the 'Coaching' being afraid of the present move? In fact they would now start an integrated program as it would be difficult for a student to master two distinct examinations. Unfortunately, attempts are made to kill the patient rather than tackle the disease. Creation of varied levels of academic institutions will play a vital role in supporting students with varied intellect – leading to democratization of education. To standardize, will be a blatant abuse of such democracy.

In almost every examination except JEE, 'Coaching' have successfully tried to leak the paper. However big be the 'Coaching Industry' for IITs, no one can allege that they have been able to leak the paper in the case of IIT-JEE (except in 1997 when a re-examination was immediately ordered and that coaching from Lucknow is still embroiled in a court case) Under the new proposal, 'Coaching' would become more powerful as it would become easier for

them to tame the system. Further, rather than tackling the issue of excess pressure on the student, this proposal will lead to various coaching institutions attempting to fold into a single window offering, thus leading to monopoly and additional unwarranted stress on the students. There are other effective ways to counter this menace which should be looked upon. IITs can start counseling service for the students where the professors and the alumni can guide students. In fact prescribing good books to read and uploading free video lectures on Physics, Chemistry and Mathematics would be a great service to the nation and would significantly decrease the need of 'Coaching' in IITs while at the same time heralding the Indian education system into a new era where technology can be put to great use. The alumni of IITs are more than happy to take initiative in this regard.

Position Point - 5

In JEE, everyone focuses on 'pattern recognition' of the questions rather than the essence of the subject. Hence regular course work is excluded, which would have given the subject grounding that is required. Hence board examinations should be preferred.

The presumption that everyone focuses on 'pattern recognition' in JEE implicitly implies that it does not happen in school examinations. After all, results in board examination also depend on a single examination (with a small weightage to 'laboratory practicals' which is 'managed' by the school itself!) and there is no reason why people can't crack them in a similar way.

Board examination have historically focused on some definitions (which are to be crammed) and some easy standard questions. On the other hand, there were always some 'out of the box' questions which used to come (when JEE was subjective) in the JEE examination for which no amount of 'solved examples' would help. It can be easily confirmed by checking the questions of the JEE papers of the nineties and early 2000s. For example, the Math paper of 1999 and 2000 was an intellectual treat and no 'Coaching' could have 'trained' someone to solve them unless the student was bright. Even if we agree that there is some strong pattern in the JEE examination, it is much more difficult to decode than in the board examinations. Unlike IITs which rely on world class original texts such as 'Resnick Halliday, Morrison & Boyd and SL Loney' (and their derivatives which are given in the IIT 'Coaching') to decode that pattern, some cheap guides exist for

board examinations which can be found in any of the study shops. Even a cursory look at these books would appall someone forget learning something from them.

Position Point - 6

JEE is an examination which only checks the mathematical skills of a person and does not focus on the holistic skills of a person.

Each field demands specific skills and the entrance examination should focus on the same. An institution for music should not select students based on their ability to play football. Engineering education heavily requires Mathematics and hence a good engineering examination should test for the ability to solve original mathematical problems. Also for admission into an IIT there is a minimum score requirement in Boards Examination which implies that they more than sufficiently pass the minimum requirement in other subjects. Why should the rank of a JEE aspirant be decided on his/her mastery of Shakespearean plays if an English Literature graduate is not checked for his/her knowledge of 'Theory of Relativity'?

Position Point - 7

JEE has failed to select the right kind of students which can be seen from the fact that not even a single Nobel Prize has been won by an IITian

IITs are primarily an engineering institution while Nobel Prizes are given for Peace, Literature, Medicine, Physics, Chemistry and Economics. Out of these 6, departments only Physics and Chemistry exist in IITs which primarily cater to teaching the basic subject to the engineering students. It is ludicrous to expect Mechanical Engineers or Chemical Engineers to do that good in subjects which they have not graduated in. For example, Sachin Tendulkar cannot be blamed for not winning a gold medal in Olympics for his country. Most Nobel Prize around the World are won by people with PhD degrees and if Nobel Prize is the goal then the Government should address the quality of PhD scholars in IITs and other institutions such as IISc. This has no relevance whatsoever to JEE examination. Merging AIEEE with JEE will under no circumstance address this issue since AIEEE has also not produced any Nobel Prize Winner. There in an existing university system in India which caters to Sciences – How many Nobel prizes have been won

by graduates from the colleges which have a so called better selection criteria?

Position Point - 8

US University system is more successful than India so selection system of US should be emulated in India as well.

There is no doubt that US university system is more successful than IITs but reasons for the same should be found rather than cherry picking things out of that system. It has been argued by many that IITs have been primarily successful because they select the brightest students. Critics say that IITs take good students and turn them into good engineers. If it is the 'selection of the brightest' which gives an edge to the IITs then it is inarguable that the selection has been ensured by JEE only. Why meddle with a system that is working well?

There may be some truth in the previous statement about IITs and it also cannot be denied that IITs don't stand in front of the US counterparts in terms of funds, infrastructure and other facilities. If IITs have to be improved, good qualities of the US system should be adapted while retaining the good attributes of IITs. Will the government ensure absolute autonomy to IITs which all the successful US universities enjoy?

The strength of the US universities is in their post graduate and research programs while IITs are primarily known for their undergraduate programs. In fact the undergraduate program of IITs is comparable to the best in the world. Our focus should be to improve the research output of IITs and not in unnecessarily modifying the part which is already successful.

If a comparison is done based on the substance of the examination, then also the subjective JEE fares better than all the other entrance examinations. JEE in its subjective form was very similar to the Olympiads which are the most respected examinations all over the world. In fact until 2002, apart from the JEE, there was a SAT based entrance to IITs. Students who came through the JEE route used to considerably outperform the students who came through the SAT route. This led to the scheme being discontinued by the Central IIT Council from 2003. It is therefore surprising to see that in the process of improving the existing IIT system, we want to remove things which form the backbone of the system.

Position Point - 9

The new system would be fair to the people who don't have the access to the good educational facilities available in the metros.

It is an illusion that successful candidates in IITs come from Metros and students from small towns fail to make into IITs. A simple demographic survey would show that small towns are represented in big numbers in IITs. Compare this with colleges like St. Stephens and LSR which have most of the students drawn from metro cities and belong to the higher income group. There have been cases in the past when IITJEE was topped by students from village background and coming from uneducated families. This is the beauty of JEE! The reason is that good school education is a costly affair which can't be afforded by economically weaker students and at times there are barriers of social status attached to some very famous schools. On the contrary, JEE offers a considerably level playing field where a student can pass the examination without even spending a single penny. 'Coaching' may help but they are not mandatory to pass as reflected by many students in the past. In fact efforts should be done that selection process of IITs do not disadvantage a student based on his lack of finances and this can be done by designing an examination which checks for 'raw intelligence' rather than asking information which can be 'trained' by the expensive 'Coaching'. This was the case with the JEEs of nineties which coincided with the glorious days of IITs.

The 'Coaching' for JEE may be very expensive and it is a dangerous trend but a student who does really well in the entrance examination of these 'Coaching', gets a complete waiver in the fees. Would the 'elite' schools of India admit an exceptionally bright student from a village without taking the fees? In fact such a student would be disallowed for the inability of speaking proper English and lack of proper etiquettes. There is no such class differentiator in JEE as intelligence is not a property of some class, caste or religion.

More than anything, state boards don't have the proper infrastructure and it is very common that the marks obtained in the examination are not a true reflection of the knowledge of the student. At times copies are checked by incompetent and unwilling teachers and the anomalies exist to the extent that people are marked absent in an examination which they attended. The books prescribed in the state boards are sub-standard and it was only because of the JEE examination that students from small towns used to get exposed to international standard books. It is also impossible to compare marks obtained in one board with that of the other. Various attempts have been done in the past but none of them has been successful. BITS Pilani which was the early proponent of using Board examination results did this system away in 2005. Why does the Government want IITs to adapt something which has failed elsewhere in India? In fact it would be more important for the Government to improve the dismal state of schools in the interiors of the country rather than meddling with a system which has done significantly better than others.

Position Point - 10

Statisticians have found formulae to normalize scores from each board and it would ensure that the proposed selection system would be fair to all.

Theory rarely accounts for possible anomalies, and such an attempt will only create an uneven playing ground. Statistics is based on historical trends and it fails miserably if that trend is susceptible to modification. For example, based on the history of the complexity of examination, a weight is given to a state board. Knowing that the weight is based on the history, the board may relax the examination (relative to the history) to give an advantage to its students. In statistical terms, the weights would be a lag indicator rather than a lead indicator of the reality. To avoid this, if only the recent exam results are used to give the weight, it would be incorrect from the basic principles of statistics. A single observation can have random effects embedded (for example the examination was tough still the students did well that year) which would be ignored by such method. Statistics is required when there is a difficulty in estimating from the true 'Population'. If an apple to apple comparison can be done based on a single examination, why do we want to complicate things by using these complex measures? Especially the failure of models in the recent economic crisis has categorically stated that it is extremely difficult to even correctly predict the 'confidence intervals' forget the 'point estimates'. Why do we want to expose the students on random chances when even a single mark causes displacement of several hundred ranks? In the want of good alternatives to IITs in the country, wouldn't it be a grave injustice if a student fails because of some anomaly of the statistical method. Who gives us the right to play roulette with the merit of this country?