What ails IIT Education?

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Recently I gave a lecture to undergraduate students at my alma mater IIT Kanpur. A day before my lecture the students had arranged for a bull session at night with the residents of one hall (where I stayed for 3 years during my undergraduate days in late 1960s). This exchange with about 100 students (mostly 1st and 2nd year) was very interesting and informative. Most of them complained that after passing the toughest exam in the world called Joint Entrance Exam or JEE, they felt let down since they were not challenged or inspired by the IIT teachers. While the teachers said that students do not read, attend classes and are just not interested in studies any more. I think the truth lies somewhere in between these two views.

Recently a spate of news items have come about how IIT is slipping and that the IIT students are not up to the mark as they used to be. A little deeper analysis will reveal that it is not the students' fault since they are not being guided, challenged and inspired properly.

In the last couple of years I have given lectures and interacted with students not only at some of the major Institutes of India like IITs, NITs, management Institutes etc., but also in schools and colleges in rural towns.

And everywhere I have found bright kids and students who want to do something worthwhile with their life. Being better informed via electronic media like cell phones, internet and social networks they know what exists in the world and want to be a part of it. A proper guidance, inspiration and challenge at this stage will go a long way in producing better citizens of India.

I also feel that the teachers, parents and the senior generation have failed to provide proper role models to these students. If students knew what they

wanted to do then they would not be students. They need to be molded, guided, cajoled and inspired. That is what the teachers and parents should do which unfortunately is not happening.

An entry into IIT is a passport to success. This is based on past history of IITians getting plum jobs in IT, banking and other fields. Thus getting into IIT is a goal of almost all students and has therefore spawned a huge IIT coaching industry all over the country. Presently this industry is nearly Rs. 10,000 crores/year strong and growing.

Nevertheless JEE is a great filtering mechanism and only those students who are bright and have mastered the art of passing the exam go through. This is no mean achievement because even the faculty of IITs cannot pass the JEE in the time allotted. Thus saying that most of the students who get nowadays into IITs are zombies is not correct. They are as bright as ever. Yes the JEE can be improved by having an extra question paper on languages and an aptitude test. These extra tests can evaluate the students on other subjects besides science ones and also create filter for serious engineering students to get into IIT.

The reason why IITs were set up was to create excellent engineers and technologists for India. That basis has failed since majority of IIT graduates go for non engineering jobs such as management, banking, civil services etc. The reason for that is not difficult to see.

The teaching in IITs has been deteriorating since last 20-30 years and is presently quite mediocre with most of the faculty not up to date in engineering research. Research and teaching go hand in hand because the excitement of new research is then passed on to the students. Since the research quality in IITs is much below world standards the teachers are not able to inspire students in it. The students therefore look for other challenges and are opting for non-engineering jobs.

Four years of IIT education is a sufficiently long time to inspire the students. The fact that only a handful of students who pass out every year opt for engineering or research career shows that very little of good engineering is taught. Smart

students (as most IITians are) need to be guided, inspired and challenged. When teachers do not do it the bright brain looks for alternatives and with the focus of society on money and greed they opt for careers which will give them maximum remunerations.

The teenage brain (as most of the IITians are in this age group) needs a huge amount of inputs to be challenged. Thus the onus is on the teachers to provide this challenge. And part of that comes by expecting excellence and feedback from students. This can be in the form of regular homework and exciting hands-on projects which most of the IIT teachers do not give and even if it is given is never graded and supervised properly. Thus the students never know whether he/she has learnt anything in the course.

Thus one of the biggest problems facing IITs is the lack of good teachers. Almost in every IIT around 50% of faculty positions are vacant. The government (HRD ministry) in its wisdom thinks that by giving higher pay will help attract good faculty to these Institutes. This is a myth because great teachers are not attracted only by pay but by the scholarship environment of doing good research and teaching. Thus this is an egg and chicken story. Great Institutes produce a good number of great researchers, some of whom also become great teachers. Numbers beget quality.

Thus one of the ways forward is to create great research and scholarship environment in IITs. This can happen when faculty and students work on problems of India and especially for rural areas. Providing basic necessities to 60% of our rural population is a huge technological challenge and R&D on this should come from IITs. At the same time emphasis should be laid on faculty spending time in industry. A linkage between faculty promotion and time spent in industry should be encouraged. This trend is prevalent in European and American Universities and needs to be emulated in India.

Also some of the problems with IIT education have been created by Information Technology (IT) companies themselves. In the past these companies have heavily recruited from IIT campuses. In fact not long ago there used to be a saying "anything that moves in IIT gets a job in Infosys"! This resulted in

making most of the students complacent and bunking classes since they knew that they will be taken by IT companies irrespective of their grades. With this attitude it becomes very difficult for students to learn anything.

It is not that all the existing teachers are bad. In fact quite a few have inspired students to do great things. A recent example is of micro satellite called "Jugnu", designed and fabricated by undergraduate students at IIT Kanpur that recently was launched successfully by ISRO. About 35 students were inspired and challenged by their professors and worked day and night for 3 years to produce this satellite. Besides most of the students working on this project after graduation have opted for careers in engineering and start-ups.

However these efforts are few and far between. Imagine what many more Jugnu-type efforts in different fields can do for the country. It will not only produce excellent technologies but will also create scientists and engineers that India really needs and for which IITs were set up.

I also feel that IIT alumni should lecture regularly to the students. After all the alumni have done exceedingly well all over the world and their experiences will be very useful in educating and inspiring the present students. Thus there should be a mechanism whereby IITs actively seek and invite the successful alumni to lecture at the institutes on a regular basis.

In survey after survey IITs are nowhere in the top 200 universities of the world. It is a shame because some of its alumni are top achievers in varied fields all over the world. What is needed are great teachers, researchers and inspirers to further egg these students on to do good engineering so that large number of its alumni contribute to the society and nation.

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