Chief Guest’s Address

By

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‘Generating Talent for Learning, for Progress’
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The IITs of our country are the most visible brands from India globally. But back home, the perception of the average citizen is that it is the home of very high tech, intellectual activity, also a bit inscrutable and mysterious. So when the results of IIT’s efforts are seen on the streets of a city, touching the life of an average citizen, it’s truly innovation at its best.

So the proposed road traffic congestion systems in Mumbai or the hydrogen powered autos in Delhi are, for me, a very satisfying and pleasing sight, indicating IIT’s commitment to a common good.

This is the best time ever for innovators, best time for entrepreneurs ……..and India is the best place for them to be in.

The Director of IIT-Bombay Prof Khakhar, respected members of the Governing Board, Guests of Honour, distinguished faculty members, parents and my young friends. It is my pleasure to be here in this institution, to be talking to the best minds in this country.

I am told that a recent study has estimated that on an average each alumnus of the IIT system creates roughly 100 new jobs. The count is indeed a little higher at 129 Indian jobs, as opposed to 91 jobs created overseas. So somewhere close to 20 million jobs have been created by distinguished graduates of the IITs in the past sixty years! Certainly, no mean accomplishment.

Contrary to popular perception and anecdotal observation, other studies have shown that a good 60+% of IIT graduates have chosen to stay back in India and contribute to national and social development in the country. Many have taken, quite naturally, to a path of entrepreneurship. About two-thirds of the companies founded by IIT alumni are in India, and over half of the top 500 Indian companies have an IIT graduate on their boards.

Interestingly, close to 10% of alumni of IIT are working in social entrepreneurship roles, with a few in active politics as well. Nearly 2% of the IIT alumni have founded their own social development organizations, be they small or large.

Clearly the IIT faculty has inspired its students to strive for lifelong learning, a journey of excellence, and one might even add with a certain pride, a passion for the well-being of society at large. Moreover, the four or five years spent in the campus, in hostels, in a fun-filled, yet competitive environment, has forged life-long friendships and relationships that form the basis of a powerful worldwide network of goodwill and talent.

While indeed the achievements of the IITs are admirable and worthy of celebration, the challenges facing our society are daunting in equal measure. We need the best minds of our country to address these unique India-specific opportunities. For example, our nation is embarked on a historically unprecedented effort to skill 500 Million people, mostly youth, within the next nine years.

We need the most innovative and creative minds of this campus and other IITs to help us create economic opportunities for millions of youth, not in 60 years but in six years, not just in cities but where the youth are. Not only in industry, but in agriculture, as well as in various cultural and art forms that enrich India.

Creating these economic opportunities involves transitioning upwards on the value chain. Take agriculture – a small nation like the Netherlands is the world’s third largest agricultural exporter, India can create more value from our farms and more jobs through the application of innovative new technologies and cutting edge science. For instance, waste water from silk processing is a rich source of valuable proteins like sericin and a couple of the IITs have the nation’s experts on sericin extraction and applications. This could become a new sustainable resource for silk producers.

Innovation by itself is not enough unless we build India-scale solutions around them. India today has 800 Million plus mobile phone subscriptions opening up rich possibilities for new business models that leverage these communication networks. Recent newspaper reports mention an under-100$ mobile to be manufactured with Government support. This could be the last-mile connectivity for the national rural broadband initiative underway that will soon connect 250,000 gram panchayats. That will make us a nation of over 1 billion people connected digitally. I cannot even begin to imagine its game changing impact. It opens new possibilities for learning, for healthcare, new business models, new services and products.

If people are India’s passport for future growth then educating and skilling them have to be on top of the agenda. The gross enrolment ratio of 17% will not do, we need to move to a 21st century model...
for learning, completely disrupting the conventional model of education as an assortment of brick and mortar schools.

We need to leapfrog using educational technology that makes reach, scale, affordability and richness of learning experience possible. For this we need bandwidth, we need an IT backbone, we need educational content and we need stakeholder models that bring all these entities together.

When it comes to content, the trend is clear. Educational content will eventually become free, just like all the mobile apps that you now grab for free. “Massive Open Online Courses” or MOOCS are already a sign of this trend. Prof. Clayton Christensen one of the world’s most respected voices on Innovation predicts that most universities below the upper tier will have to integrate a “second, virtual university” into the standard one.

About three weeks ago, seven IITs, NASSCOM, TCS and other private technology companies announced their decision to join forces to launch a bunch of free, Massive Open Online Courses. Potentially, these courses could help 100,000-150,000 people a year get high-quality education and, more excitingly, make them job-ready. This is clearly the biggest industry-academia partnership in India to help students from both urban and rural areas – get access to top-quality course content and, very importantly, meet specific industry demands.

While I read this article with some delight, I also came across another news article – believe it or not – in the same week. This time from the United States, and the headline read as follows ‘San Jose State suspends online courses’.

The article went on to explain how five online classes that were announced with great fanfare by the governor at San Jose State University had been suspended, after more than half of the enrolled students failed the final exams.

These were courses offered in conjunction with Udacity Inc, one of the major MOOCs players today, and were on Elementary statistics, College algebra, Entry level math, Introduction to programming and Introduction to psychology. However, the school intended to keep offering online courses developed with edX, another major consortium player, whose courses are a mixture of classroom and online learning. Both contradictory experiences only go to show the need to tailor solutions and customize them for specific needs, one size does not fit all.

Having said that, there is no doubt that the immense IT expertise we have in this country provides us the opportunity to make this leap of faith. The world over online resources, from wikis to podcasts to training videos, are allowing both children and adults to pursue education on their own. The MOOCs, that I referred to earlier, could well be repurposed for a largely semi-literate population.

‘DIGITAL GREEN’ is an inspiring example of rich audio-video content created by farmers for farmers in the country. In a similar fashion, we need the educational empowerment of our children especially in rural areas which lack good teachers. The Government is working towards creating a national IT backbone in the form of national rural broadband. What use would it be unless we have entrepreneurs to bet big on these opportunities in education and skilling, we get telecom service providers, education experts, investors, content developers to come together creating collaborative business models.

Business models which do good even as they are profitable.

For 93% of our working population “skilling” is the critical means of upward mobility. Skilling in the right areas must result in jobs. The recently approved National Policy on Electronics aims to cater to the increased domestic demand and provide employment opportunities to 28 million by 2020. Also the government’s new manufacturing policy places an emphasis on distributed job creation, and aims to create 100 million jobs in the sectors. Traditional mindsets will lead us to think that manufacturing jobs would be only on the shop floor. However the smart way would be to explore how can a talented carpenter from Behrampur be trained to design new furniture using CAD and even progress to designing entirely new machines using 3-D printing technologies? How can we bring about a DIY movement in education that places a strong emphasis on acquiring practical skills and applying them creatively!

That every individual has a unique way of learning is widely understood, some of us are more visual while others learn by doing. Catering to such individual needs is made possible through technology. Called adaptive learning, it is possible for intelligent systems to deliver to you educational packages in the way that you can absorb it best.

In fact the evolution of technology and that of new learning experiences have always been closely related. Platforms like Coursera and EdX are building new connections between Learners and Teachers. This year, the Open University is building its own MOOC platform, Futurelearn, which will feature universities from the U.K. Other MOOC initiatives appearing on the horizon include Open2Study in Australia and iUniversity in Germany.

IIT Bombay has played leadership role in using technology in education. It started its distance education program in 2000, initially using VSAT and then switching to internet. Workshops for training teachers were conducted using remote centers, in a scaled effort that was unprecedented in the world. More recently the launch of
massive online courses by IITs will have an impact on the way students learn, the way they are assessed and evaluated. For instance video rich animation and simulation techniques and other interactive techniques will see more profusion. The role of teachers will be redefined, they will need to provoke discussion and debate rather than lecture. The University system will need to include credits earned through such MOOCs into their own evaluation. What is more critical is the adoption of these techniques by other universities in tier 2/3 towns where getting quality faculty is a challenge. This will, in fact, in one sweep enable quality education to all their students. Therefore, India must bet big on this trend, not just for university level but even for our schools. We must do this in order to address the real challenge of expanding reach and scale. The fact that edX is now open source, is important for India. This can be adapted to serve as a MOOC like platform for our other pressing needs, teacher training, vocational skill training and school education. IIT is already taking up such an initiative.

There is recognition that despite these developments, language and educational background can often stop many around the world accessing MOOCs. There needs to be a way where people who need different language versions can create them and they too would become part of the global community. This has already begun. Online communities now offer translated versions of US courses, driven by the demand from non-English speaking students. For example, Veduca in Brazil, offers its one million plus Portuguese-speaking users more than 200 translated courses from institutions including New York University, Stanford and Harvard. There is also unX, a project which claims to be the first entrepreneurial Latin American community, which offers an entirely open learning system through translated courses from MIT. It would be good to see some examples from India as well.

We need to explore how a deserving child in rural India can access an IIT quality course curriculum in his preferred language. It may need the coming together of language experts, MOOC’s, The National Knowledge Network and the Rural Broadband network in some kind of unique collaboration.

I also believe that Open Online Courses have great potential to move beyond Higher Education, into the area of vocational skilling and education as well.

Some companies are using online courses for their own staffing issues. For example, Aquent – a US-based staffing firm that links companies with contractors – has launched its own MOOC, called the Aquent Gymnasium, last month. Aquent mainly serves marketing, creative and digital firms, which see frequent changes in staffing needs as new technologies such as mobile platforms emerge. Last year, they found that their clients were requesting workers with HTML 5 skills, and these were in short supply. So they built a four-session, open online HTML 5 course as an experiment, and offered it online for free. More than 10,000 people registered for the class. Of that number, 367 took a final exam. Aquent interviewed the best performers, and wound up placing 200 of them in jobs.

They now plan to add a new course to ‘Gymnasium’ each month during the year, on a variety of related subjects. The value to all concerned is evident! This initiative expands the company’s pool of job candidates, helps employers find the right employees, and equips candidates with industry-ready skills.

Similarly, employers could create and use private Online Courses as part of the learning and development, as well as ‘Upskilling’ of employees. Organisations and industries could consider using a series of MOOCs, selecting the most appropriate courses from a number of MOOC aggregators, as a pre-qualification for people applying to work in a particular industry, in addition to or instead of a university degree.

The disruption caused by MOOCs is the unshackling of content. This opens the possibility of an interesting competitive scenario in the future. You could one day have IITs competing amongst one another for students, who may opt to choose one part of a course from one IIT and the other part from another institution thereby benefiting from the best of what is available. This could potentially change the concept of a university itself, we may have Universities on a cloud or Meta-universities. The future could well see an ‘IIT on a cloud’.

If anything, this would certainly democratize education. It could potentially open up new job opportunities in new areas that did not exist before. As, for example, planning for Wi-Fi access and Wi-Fi security radios is gaining momentum, it becomes critical to enterprise applications cutting across all industry verticals. While physical site surveys have been the norm, site surveys are time consuming, expensive, erroneous and require specialised knowledge of radios.

AirTight Networks, a company founded by four IITians, has built path breaking technology to secure enterprise networks from Wi-Fi based attacks and massively scalable enterprise grade controller-less Wi-Fi which are being used by thousands of customers spanning all verticals and geographies. AirTight conceptualized and built a desktop based RF Planner for Wi-Fi and WIPS which determines the number of devices for Wi-Fi access and WIPS and their placement given a site map like building floor plans. The tool also generates RF
maps depicting coverage and many other Wi-Fi parameters that are useful in planning installation and commissioning. The company carried out over 1 billion square feet of RF planning for its customers using this tool, it is also being used at Rutgers University to teach Wi-Fi radio propagation and planning.

But why am I telling you this? The beauty of the concept lies in the fact that a person with base skills of a draughtsman can be trained to carryout RF planning for Wi-Fi. As Wi-Fi and WIPS gains momentum, people can be trained in planning Wi-Fi using the tool and get a job. It needs a 2-day course to teach people how to do planning using the tool. This can easily be introduced as a certificate course or as part of curriculum in IITs thus making it accessible to millions of youth as a new career stream.

MOOCs and other forms of online learning are, by design meant to be affordable. In India alone, the size of the online education market is set to double to $40 billion by 2017. The question is, can these platforms be sustainable? Currently the revenues of models like Coursera rely on income from assessment and certification. If, in the future, certification becomes a competitive differentiator, this will have a very positive impact on the quality of the course and program. In the end the student benefits, and the "Best becomes available to the Most".

There is one other significant fall out. I believe these kinds of open learning systems will unleash a very potent force, the empowerment of individuals to be creative, the opportunity to explore a variety of collaborative ways with people from anywhere in the world. The ingenuity of the Indian mind will have found a new channel. Innovation could potentially become the mainstream.

Already India is innovating in its use of technology for large-scale initiatives. The Indian government has launched several initiatives such as the UID project, direct cash transfers, the National e-Governance Plan, National Rural Health Mission, Mission Mode Projects for e-filing of income tax returns, providing agricultural information to farmers, etc. The scale and complexities of such transformational projects are unprecedented in the world.

But there are many other issues that are yet to be tackled. Our overcrowded cities need more intelligent ways to manage its resources, be they water or electricity. They need better traffic management systems that ensure a hassle-free ride home after a hard day’s work. Back in agrarian rural India, where agriculture contributes 17% of our GDP, and accounts for about 52% of our nation’s employment, there are opportunities to greatly enhance productivity and generate talent, where technology and R&D will have a critical role to play. There are unfulfilled services which entrepreneurs can leverage provided they have the requisite skills.

All of these are opportunities waiting to be exploited, hence my statement in the beginning about “This is the best time ever for innovators, best time for entrepreneurs …….and India is the best place for them to be in”.

Friends, in my talk today, I have tried to showcase the opportunities presented by new technologies to aspiring entrepreneurs in this country. We need a new outlook and attitude from you – India’s brightest – to address some of the pressing issues of our times. I have also examined the role of online education and learning, and its many dimensions, in this endeavor.

I believe that education and skilling lie at the heart our progress. They are the passport to securing our future. This transformation of education will not come from traditional approaches, but will need to be developed leveraging technology.

For this we need to stretch our imagination into unchartered territory, perhaps into disruptive approaches. Can India aim to develop the world’s first Electronic Education Exchange, where access is available only for those registered, and student progress is toll-gated and managed by the system? Can we leapfrog to make our laboratories and research labs virtual? What will be the sanctity of a university exam if a global exam which language independent be given on-line?

Several of these questions are existential in nature! They question popular precepts, concepts and established models that have served us well – literally, for centuries. But we need to ask these questions, attempt to experiment, be prepared to fail, and keep learning until we succeed.

What would BRAND IIT be 20 years from now? How many of our cities and towns will showcase ideas, products and services that emerged from IIT. How do we bring multiple capabilities, disciplines, and intellectual and social diversity into the campus so that future leaders emerging from IITs are solving the developmental challenges of a nation at crossroads.

As you step out into this exciting world, I wish to remind you to keep the larger picture in mind. I also wish to share with you what I have learnt over time.

Often the most satisfying pursuits in life are those where your actions lead to the benefit of the most. We all know you are the best, so let MOST of India benefit from the BEST of India.

Thank you.