

# Panchtatva of Higher Technical Education: The Five Vital Connects for Quality and Excellence

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India's higher technical education system is on the threshold of a major institutional reforms. It is the right time to envision a bright future and create the desired eco-system to meet the challenges of the New Knowledge Age.

When we look at the current status of higher technical education in India we find a glaring disparity between the leading technological institutions such as the IITs and other engineering colleges in the country. The prime differential is in respect of the very nature of activity pursued in these institutions. The IITs are institutions of higher learning established by the Act of Parliament as institutions of national eminence to engage in teaching, research and extension activities to empower the nation with world class human resources and science & technology capabilities. To a great extent this objective has been met by the IITs as their human resource output has been well recognised throughout the world for quality and employability. Further, the quantum of research output and support being provided by the IITs in respect of consultancies and other intellectual output is also well acknowledged, both at home and abroad.

Likewise, a few other premier institutions which include BITS Pilani, Delhi College of Engineering which is now Delhi Technological University, Jadhavpur University, Thapar Institute of Engineering and Technology, Anna University (Main Campus), the Regional Engineering Colleges which are now NITs, and the IIITs also over the years have emerged as globally recognised institutions for providing quality output. These institutions are also emerging as major centres of research and extension services and are being shaped as institutions of high national and global importance. The important point to realise is that India's higher technical education today is predominantly dominated by the self-financing institutions some of them have received recognition as deemed to be universities. In fact, almost 85% of India's higher technical education (degree level onwards) is under

private ownership. The underline assumption was that under the private ownership the absence of bureaucratic hurdles shall promote quality and relevance much better than under the public ownership system which is predominantly dominated by the Government and public policy. This objective has however not been realised to a large extent and as such is a major area of concern. The low employability of engineering graduates, as voiced by industry associations such as NASSCOM, CM, FICCI etc. is primarily a concern for quality of engineering graduates and the relevance of the capabilities nurtured in them for the purpose of employment in today's knowledge intensive, quality and productivity conscious, technology savvy industry environment.

Let us examine, therefore, the context in which quality, relevance and excellence is nurtured in the institutions of higher learning and flag some of the major issues for possible solutions.

The first and foremost issue is that of quality of output. We all know that the quality of the end-output depends upon both the quality of input and the quality of the processes and environment in which the education and training is delivered in the institutions. Here the foremost issue relates to the quality of the input. Admissions on merit in the State or national level test provide a meaningful guarantee to the protection of quality at intake levels. But, here again one has to realise that if 10 lakh candidates appear in AIEEE national level examination all shall not form the quality band for intake. A conscious decision to decide the cut-offs keeping the quality of intake as a prime consideration can only ensure the quality and relevance of the ranks for admission to engineering. Likewise for the State level test. Contrary to this we find that the tendency is to admit almost upto the last rank in admission test and that is where the quality of intake becomes a major question.

Decisions like allowing mere pass percentage holders in the Senior Secondary Examinations as being eligible for engineering admission do a much greater damage to the quality of intake in engineering degree institutions. Question is what can be done now that we have much larger number of seats compared to what

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would qualify for admission if entry is restricted to those having 50%-60% PCM and a fair rank in the admission test. In our craze for more and more seats for admission to engineering we have created a system where even after going to the last rank in admission test the seats remain vacant in very many states in the country. This is the major issue which need to be debated and *discussed seriously if India's technical education is to* protect quality and relevance of its output for today's and tomorrow's industries in India and abroad. After all in no institution or university of repute in any advanced country in the world, the entry qualifications are so lowered to fill-up the vacant seats. In any case in a country like America there are no more than 70,000 seats for engineering undergraduate admissions despite the fact that America commands a lead position in respect of engineering and technology education, being the hub for world renowned universities such as Harvard, MIT, Stanford, Yale, Caltech, Carnegie Mellon, Georgia Tech, Cornell and many others. The challenge in India is to create world quality at a much larger scale than it exists in the advanced countries of US and Europe.

There is no merit in the argument that everybody who aspires for the engineering degree should be given admission irrespective of his capabilities to pursue engineering studies which demand a high competence and calibre of scientific enquiry, mathematical analysis and creative genius to comprehend today's and tomorrow's engineering. It would have been better to build India's higher education as a robust system conforming to high quality output rather than creating a system so badly balanced in favour of quality and employability as it is present.

The second major issue relates to the quality of faculty. Here again it is a matter of great regret that despite major revision of the pay package, the teaching profession in India even in higher technical education remains as the least attractive proposition for the meritorious graduate of our country. Compared to this we find that there is a great rush for research and teaching positions in universities abroad. Building a reservoir of quality faculty for India's vast technical education is a major challenge for the policy makers of our country. Faculty not just as teachers but performing a triple role of a facilitator of learning (teacher in the new role), seriously engaging into industry relevant R&D and constantly engaged in advancing the frontiers of knowledge, and seriously engaged in transforming knowledge into new product

development and innovations is what is expected from the learned faculty in engineering institutions. Such an expectation becomes far more demanding when we have acute shortage of quality teachers in our institutions of engineering and technology.

A national mission on Faculty Development is very much required to address this issue specially that integration of technology can do a much greater collective good to effectively enhance the teaching-learning process. We need technology-savvy, self-learning oriented faculty which is driven by research and innovations in our institutions of engineering and technology. The national mission could address this issue in a comprehensive manner as without quality faculty we shall fail in our responsibility to create the desired quality of out-turn from our institutions, nor we shall be able to accelerate our march on creation of new knowledge and new technologies.

The third important dimension of quality relates to the quality of infrastructure which includes both the knowledge infrastructure and the governance of the institution. In this respect the self-financed institutions having no bureaucratic hurdles can perform much better than even the institutions supported by the government and public funding. But then it requires a considerable investment on knowledge infrastructure such as connectivity, network, knowledge resources, portals and ICT enabled classrooms and creative research oriented laboratories. Institutions simply rely on the fee from the students often find it difficult to invest heavily in these areas while such an investment has become an essential part of our preparation to respond to the challenges of the new knowledge age.

The fourth dimension of quality relates to institution's interface with the industry. Here again we find that enabling mechanism for effective partnership between academia and industry is still lacking in very many institutions and universities in the country. The industry on one hand must realise that its requirement of qualified and trained manpower can only be met by the institutions if industry becomes a partner in progress with the institution. On the positive side we find that the IT industry has recognised this need and has responded favourably. The core and service industry must also recognise this need and come forward with Academia - Industry interface programs learning from the IT industry experience.

The fifth dimension relating to quality and excellence is the dimension of creation of New



Knowledge and Innovations. Here we need to create an academic environment in which not only we comprehend and learn the state-of-art but are inspired to go beyond the frontiers of visible knowledge and state-of-art technologies. The vibrant research and innovation environment within the four walls of the institution is what is required to be created to serve this vital dimension of quality and excellence.

I would like to propose five vital connects for quality, relevance and excellence in higher technical education to revitalise India's higher technical education system. The five vital connects are:

**Connect to Knowledge Network** - The first and most important connect is the institutions connect to the vast body of knowledge. This will ensure that the power of connectivity and power of networking is well utilised by the students and faculty in comprehending the state-of-art as also to develop capabilities to work in today's knowledge intensive tech-savvy environment.

**Connect to the Industries** - This is absolutely necessary to focus on relevance. Industry partnership in delivering expert lectures, conducting technology workshops, participation in joint guidance of major projects and for internship to the students forms the basics of the connect to the industries. This connect to the industries should further result into institutions and industries working together on new challenges of product innovation and technology development. In today's tech-savvy environment it is possible to take on board the local industry as well as industries in India and even abroad to strengthen this vital industry connect.

**Connect to the Society** - It is important that the institutions begin to focus on the society in which they are established so as to be partner in progress to addressing the major problems such as energy efficiency, energy conservation, environmental degradation, water quality management, creating trained manpower in areas of emerging and new technologies and as also partnering with local schools to create the desired interest in science and engineering.

**Connect to National and Global Professional Societies** - This connect ensures the vital flow of information and knowledge on latest happenings. Further, the professional societies provide the

necessary expertise and support to comprehend new and emerging areas of technology and enhance institutions our reach to the vast body of research and knowledge resources being cultivated by researchers and practicing technologists the world over. Institution on its part can set up portals for curriculum watch, knowledge watch, technology watch, new product and innovations watch which can be developed in partnership with the professional societies. The advantage here is that the professional societies are well connected with the industries and as such can strengthen the industry connect of their institution as well.

**Connect to Peer Groups** - This vital connect promotes collaboration, cooperation and alliances with R&D organisations and universities at national as well as global levels. The institution on its part can take advantage of the peer group in these institutions / universities for strengthening its internal peer review so as to constantly assess and focus on quality and excellence. In today's knowledge age it is important to learn to collaborate and cooperate to maximise the impact of efforts invested in an activity. Engineering and technology education and research cannot flourish without effective linkages and mechanisms for collaboration and cooperation between universities and institutions in India and at the global levels. After all the IITs in India for the last many years have benefitted themselves from the collaborations with universities and R&D organisations abroad. In fact, they were set up in collaboration with a major foreign country and have since then maximised their quality and excellence with the collaborative structures which they have established with universities and institutions abroad.

It is the right time for India's higher technical education to strengthen the above five vital connects to leap frog its quality, relevance and excellence. The opportunity to do so is already knocking at our door steps. It is, therefore, important that at this juncture we innovate and adopt the best practices to revitalize India's technical education.

I am sure the national statutory bodies such as AICTE and UGC shall bring out national policies and initiatives that shall facilitate the above five vital connects for quality and excellence in higher technical education in India. □