

Enhancing Quality of Technical Education – Looking Beyond

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Abstract — *It is imperative for the technical educational institutes in India to effectively adapt and respond in terms of human resource grooming to the fast changing contours of economic development. It is established fact that Indian region has become preferred and most sought after destination for the foreign technical, financial and educational sectors, thanks to the welcoming Governmental policies and highest population of youngsters across globe in India. Further, India is looked upon as pipeline of students seeking post graduate and doctoral studies across globe. In view of this India is witnessing unprecedented demand for technically trained quality human resource. It is time for technical education sector in India, major part of which is self financed technical institutes, popularly known as private institutes to meaningfully respond to this demand in terms of adapting technical education and being compatible according to the changing needs of society. To this effect, to maintain quality of education, the local accreditation entities have established conventional benchmarks. The present paper provides a novel and workable perspectives / approaches for being effectively and meaningfully be compatible to the foreign technical, financial and educational sectors pitching in India without losing academic spirit, enhancing quality of education and respecting established Governmental regulatory framework. Vishwakarma Institute of Technology has experimented with these approaches over the period of time. Conceptual and operational framework of implantation and the experience in this regard is elaborated in the present paper.*

Index Terms — *Technical education, self-financed institute*

BACKDROP

Unprecedented changing contours of social and economic development in India demand meaningful response from technical educational institutions. It is well established fact that the technological progress and economic development of any nation is a strong function of higher education. Education is a means to for bringing social and economic reforms. The 21st century has seen interesting relationship emerging among education, knowledge, conversion of knowledge into suitable entities from a trade point of view, wealth and economy [1]. General Agreement of Trade in Services (GATS) signed by World Trade Organisation (WTO) initiated liberalisation of trade in services. It has classified education as one of the services. Thus role of education has transcended narrowness of geographical boundaries and demands cross-cultural and trans-national character in this flat world of globalisation. The globalisation has spurred demand for quality education on one side as well as pushed the demand for quantity also. The reorganisation of Indian graduate at global level has given rise to enhancement of expectation of masses internally [2]. Indian technical education system needs to meaningfully respond to this changing paradigm.

The present paper provides a novel and workable perspectives / approaches for being effectively and meaningfully be compatible to the foreign technical, financial and educational sectors pitching in India without losing academic spirit, enhancing quality of education and respecting established Governmental regulatory framework. Vishwakarma Institute of Technology (VI, Pune) has experimented with these approaches over the period of time. Conceptual and operational framework of implantation and the experience in this regard is elaborated in the present paper.

GENESIS

To put the aspect of this paper in perspective, it is important to appreciate technical education system in India. To respond to ever-growing demand of engineering students, India has taken steps to open self financed engineering institutions, popularly known as private institutions that are run by charitable trusts on no profit basis. These institutions are not owned by the Government. Today, more than 90% institutions in India are private / self financed non-Government funded institutions. These were established in 1983 onwards. The engineering student intake in India has scaled up from few thousand to around 500,000 over last two decades and is increasing continuously. The engineering

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Academic structure of technical education in India comprises of Indian Institute of Technology popularly known as IITs, Regional Colleges funded by Government and self financed institutions that are affiliated to Universities in the region. The self financed institutions are relatively young in the sense most of them were established in early 80's. VI, Pune was established in 1983. Though the self financed institutions have financial autonomy, they do not have academic autonomy meaning curriculum is developed in the University by a central body that is constituted by representation from various affiliated engineering institutions. Further, examination conduct and evaluation is carried out by the corresponding University [3].

All India Council for Technical Education (AICTE) was established as a statutory body by the Government for overseeing growth and quality of technical education in India. National Board of Accreditation (NBA) was set up by the AICTE for the purpose of assessment of Quality and Accreditation of Technical programmes in India. These are well defined norms, technical institutes need to abide by and get accreditation at defined time interval. VI, Pune academic programmes are accredited by the NBA.

However, in the pursuit of excellence, VI Pune decided not to stop upon accreditation process but conceive and implement novel initiatives taking into consideration student fraternity as focal point. The objective is to respond effectively and meaningfully to internationalisation of education in terms of enhancing quality of education, developing well rounded student personality, enabling meaningful collaborations with foreign universities, enhancing skills of human resource in the institute and increase industry participation by providing enabling environment.

THE APPROACH

The core to the conceptual frame work is to concentrate on dimensions of quality such as learners, enabling environment in the institute, curriculum, processes of learning and outcomes of the learning in the context of internalisation [4]

Curriculum development

A pragmatic and practical curriculum along with academic structure was first developed with the involvement of all the stakeholders. The curriculum is relevant and need based yet burden and stress free. Vishwakarma Institute of Technology being a self financed institutions, to get the flexibility to experiment with the curriculum and academic structure, it was necessary to opt for Academic Autonomy. This model was presented in ICEE 2008 at Pecs [5]. The curriculum and academic structure was developed in a manner that it is compatible with most of the curriculum across renowned universities. It was aimed at developing well rounded personality of a student to make him/her a "complete" student who is ready to take professional challenges across globe. Further, credit system was established unlike marking system in the University pattern. The credit system along with the modified curriculum and academic structure facilitated student exchange programmes.

Foreign Collaborations

Meaningful foreign collaborations are fostered with the aim of enhancing quality of education and enable internationalisation in terms of offering students international exposure, opportunities and enhancing skills of VI, Pune by providing platform for interaction, teaching, and research with universities abroad. The collaborations were established at different tiers such as student wherein student exchange programme were initiated, faculty wherein faculty exchange programme and visiting faculty programme was initiated and research wherein collaborative research programme was established with foreign universities.

In student exchange programme, a batch of students was deputed to foreign countries and in reciprocation VI, Pune accepted students from these countries. The faculty members of respective department were deeply involved in establishing equivalence of the subjects for the semester in which VI, Pune students would participate in the exchange programme. Detailed feed back and open house sessions with regard to the academic environment, curriculum, pedagogical aspects and research aspects was discussed deeply with the faculty members of VI, Pune to increase their visibility of foreign institutes and academic aspects of the same. The students from foreign universities studying in VI Pune as a part of this exchange programme provided their feed back and shared experience of the educational system in the host university. These interactions result in enriching and exposing aspects of foreign education system to faculty of VI, Pune.

Faculty exchange programme were established with the foreign collaborating institutes / universities. VI, Pune has six post graduate programme. A collaborative research programme was established with the collaborating institutes wherein the model includes combined supervision of the thesis by faculty from VI, Pune and faculty from collaborating foreign institute. The field of study of both the faculty members is matched beforehand and the thesis problem to be offered to students is arrived at by both the faculty members. The student spends a first phase working on the thesis in VI, Pune and later phase in the foreign institute. This allowed meaningful interaction of VI, faculty with foreign institute on a research platform and helped laboratory development in VI, Pune. Further, post graduate students could get international exposure.

Faculty exchange programmes with foreign universities were established wherein faculty from the foreign university was invited at VI, Pune to interact with students as well as faculty from VI, Pune. VI, faculty was offered choice of subjects to be taught in the foreign institutes and adjunct professorship. This helped VI, faculty obtain international exposure and develops different pedagogical approach as per the requirement of foreign institutes.

Collaborative Centre of Excellence

A centre of Excellence (CoE) was established in VI, Pune with stake holders as foreign institute, industry from the same country and VI, Pune. The activities in the CoE provides platform for exposure to practical / hands on training. Further, value added courses that help enhance skills of the students are launched wherein the course structure, content and evaluation is being endorsed by the foreign institute and the course was delivered by the industry experts. In this course the students are provided with real life problems to work on by the industry stake holder so as to get the pulse of professional aspect of technical education. It is planned that the VI, Pune faculty will also participate in such courses to hone their skill sets.

Accreditation by Industry representatives

Confederation of Indian Industry (CII) is a non-government, not-for-profit, industry led and industry managed organisation, playing a proactive role in India's development process. Founded over 115 years ago, it is India's premier business association, with a direct membership of over 8100 organisations from the private as well as public sectors, including Small and Medium Scale industries (SMEs) and Multi National Companies (MNCs), and an indirect membership of over 90,000 companies from around 400 national and regional sectoral associations [6]. In this novel model, it is proposed that CII prepare accreditation norms based on the industry perspective to include expectations of the industry from technical institution. The team of CII comprising industry representative would conduct accreditation of VI, Pune. In this model what is important is the process of accreditation wherein industry representatives would get an insight into the academic aspects and would interact closely with faculty bringing in industry perspective that enriches curriculum.

Intellectual Property Rights as a means to enhance quality of education

A model IPRinternalise™ was implemented to integrate innovation process in the technical education by way of using intellectual property rights and in particular patenting aspects. The intellectual property rights process is integrated in students project at an early stage so that the student get exposed to the significance of prior art searches, analysis of prior art in the context of the problem they are solving, developing solutions that are novel, have tailored inventive steps and are useful to industry. This approach enhance learning ability of students [7].

Preparing well groomed human resource

The objective of this model is to prepare open, inspired and enriched minds of the faculty, administrative, supporting staff combination of them that forms epicentre of the engineering institution and would ultimately contribute to the enhancement of the quality of education imparted to students. This was presented in ICEE 2009 at Korea [3].

IMPLEMENTATION

This section provides details of the implementation of the aforementioned conceptual aspects in VI, Pune. The new curriculum was developed along with the credit based system and academic calendar. It was implemented in the year 2008. Details of the implementation of this model are provided in published paper during ICEE 2008 [5].

In terms of foreign collaboration, VI, Pune established cooperation agreements for faculty exchange and student transfer with Marist College, USA. Similar agreement is established with Asian Institute of Technology based in Thailand. In both the collaborations faculty got involved in terms of teaching and research fronts. The student exchange programme was established with Groupe des Ecoles des Mines (GEM) of France. It is a group of 7 engineering schools of higher learning in France. The students from VI, Pune complete a semester in GEM under this student exchange programme. In reciprocation students from GEM also completed a semester in VI, Pune. GEM and VI, Pune signed Indo-French Master's and PhD programmes in Engineering within the framework of the Indo-French Consortium of Universities (IFCU) that provided opportunity for faculty to work on research projects. With regard to engineering schools in Canada, VI, Pune is being participating in Ontario-Maharashtra-Goa student exchange programme wherein batches of students from VI, Pune completed a semester in the consortium of 17 colleges in the state of Ontario in Canada.

Centre of Excellence is established in the Mechanical Engineering Department of VI, Pune wherein value added programmes certified by a State University in New York and an industry Anveshak Technology and Knowledge Solutions, Chandler, Arizona. Similar centre is being established in the Electronics Engineering Department in collaboration with a European University and industry therein. VI, Pune faculty is deeply involved in the activities of this centre and get an opportunity to interact with industry and university representatives.

The IPRinternalise™ is being implemented in VI, Pune for last 4 years that has yielded several patent applications filed based on the student projects. It is important to recognize that IPRinternalisation emphasizes on the process of learning by doing and sparking the creative instincts dormant in individuals. Over and above filing patent applications, it is helping in seeding and creating purposeful querying minds that helps galvanise learning process and thereby quality of education.

The implementation of well planned human resource grooming since 2003 resulted in naturally drawing the faculty, administrative, supporting staff wherein combination of them that forms epicenter of the engineering institution in the process of grooming. This has immensely contributed in the enhancement of the quality of learning process. Details of this model are provided in the paper published in ICEE 2009 [3].

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