Chapter 2

Literature review:

Education is a process for the creation of open, inspired, prepared and enriched minds. Engineering education contributes in this endeavor of ever greening minds. Central to the process is the development of discerning learning minds and intellect that are able to perceive, observe, think, strategize and act in consonance in a creative mode in trans-national and trans-cultural global competitive environment under varying circumstances. This necessitates inputs related to physical, social and spiritual aspects in engineering curriculum over and above mere technical content in the curriculum to nurture a “smart” student.

There are varying approaches reported in literature on curriculum development such as Tarek (et.al 2007) discussed aspects of Mechatronics curriculum development. Kitchenham have presented investigation on software engineering curricula. Abhyankar (the researcher), have presented a model on integrating intellectual property rights in technical education. Tofta elaborates changing paradigms for professional engineering practice.

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. General Agreement of Trade in Services (GATS) signed by World Trade Organisation (WTO) initiated liberalization 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 globalization. The globalization has spurred demand for quality education on one side as well as pushed the demand for quantity also. The reorganization of Indian graduate at global level has given rise to enhancement of expectation of masses internally. Indian technical education system needs to meaningfully respond to this changing paradigm.
Education is a function of five dimensions of quality that include learners, enabling environment in the institute, content in terms of curriculum, processes of learning and outcomes of the learning. The outcome includes acquiring literacy, numeracy and life skills, creative and emotional skills, values and social benefits. Complementary components associated with these quality dimensions are of educational system / institute such as human resources, educational infrastructure and educational processes [7].

Thus these components need to integrate in the educational institute so as to impart students the quality education that constitutes aspects of learning to know wherein the students and faculty build their own knowledge as a continual learning process, learning to live together to acquire critical skills so as to develop individuals free from discriminations, learning to do that focuses on practical applications of what is learned and learning to be that emphasizes the skills needed for individuals to develop their full potential (Understanding Education Quality: EFA Global monitoring report, 2005)

There are varying approaches reported in literature by the authors Mari Murtonen (Murtonen et al 2008)[8], Diane G. Gal (Gal et al, 2005)[7], Carol R. Rinke (Rinke et al, 2008)[9], Päivi Tynjälä (Tynjälä et al, 2008)[10] have provided perspectives on motivation, teacher’s career and learning aspects. Kaplan K, and Kaplan J (Kaplan, 2003)[11] and Soetendrop R, McLaughlan R, Roach J, and Childs B (Soetendrop et al, 2005)[12] have proposed and designed IP courses for non lawyers as a formal part of their technical education and implemented them through interdepartmental collaborative efforts.

Indian higher education system is not only large but also the most complex one. Prof. K.Sudha Rao (et al, 2008)[13], in their research paper gave the background from Britisher’s era of the growth of higher education, the relevant policies and structure in India. It also gives compilation of data about growth of higher educational institutes and enrollment of students. It talks about emerging private sector in education and mentions the genesis of paucity of qualified teachers. It also gives comparative study of various countries on status of academic research. It summarizes the challenges faced by the Indian education system.
In a World Bank Report on governance of technical and engineering education in India (Aug. 2009)\textsuperscript{[14]}, different types of universities in the country have been described. The governing structure, budgetary issues, faculty and quality related issues have been discussed. It highlights recent scheme for technical education quality improvement program. It offers a lesson for other countries in terms of the challenges in establishing greater autonomy and the “right” levels of accountability as well as good governance for higher education.

In another World Bank Report on summary of higher education (March 2010)\textsuperscript{[15]}, the current status, growth of higher education since 1951, the levels of enrolment in higher education, enrolment of candidates for various “degrees” including UG, PG and Ph.D. level has been given. The report has also compiled the output at UG and PG level in the year 2003. The report presents the study of paucity of teachers, quality assurance mechanisms and expenditures incurred on higher education.

Bhatia and Dash (IRJFE 2010)\textsuperscript{[16]} think that the 21\textsuperscript{st} century will be the “knowledge century”. It describes the initiative by the Prime Minister of India, Dr. Manmohan Singh to reform the Indian economy into a knowledge economy by making reformation in higher education of India. The aim is to make India on the top of the world economy by knowledge by enhancing access to knowledge, re-invigorating institutions where knowledge concepts are imparted creating a world class environment for creation of knowledge, promoting applications of knowledge for sustained and inclusive growth and using knowledge applications in efficient delivery of public places.

In a research document published by Rangan Banerjee (et al, Dec. 2008)\textsuperscript{[17]}, it is stated that India has a potential to be a global technology leader. The document gives a study of typical institutions for understanding the research potential at UG and PG institutions. It gives the data on the total degree holders (UG, PG and Ph.D.) produced by the country till 2006.

The review of various papers shows that there is a need to understand the perception of quality by the stakeholders, especially the students and teaching faculty. There is also a need to investigate better methods for enhancing the learning of the students in a technical education system in India.