ABSTRACT

Six sigma has been proved to be a successful quality improvement concept in reducing the process variation and defect rate in all critical business processes. It is used to realize breakthrough improvement in process performance that yields significant savings to both service and manufacturing organizations. Six sigma is being implemented in plenty of service industries like financial services, banking sectors and hospitals and so on. Though it is applied in many service sectors, educational service sector has shown a slow progress in adopting this concept.

Engineering education is the backbone of any society because it is the quality of engineering education that decides the quality of human resources in a country. In developing countries like India, any degree in engineering is a boon to an individual and his/her family members as it gives them good job opportunities and good salary.

At present, there are 3495 engineering institutions and about one million students are graduated in engineering degree in a year from these institutions in India. In spite of the huge output, the employability of engineering graduates in India is about only 10% of its total output. The
academic performance of the students is not good enough as required by industries. Parents of students have been paying huge amount of money from their savings, by selling their properties or by getting loan from banks to make their wards engineers. In this regard, this doctoral work illustrates successful deployment of six sigma to enhance the academic performance and employability of the engineering students of the self-financing private non-autonomous engineering colleges affiliated to a particular regional technical University in India and approved by AICTE, New Delhi.

In order to provide solutions to the problems defined, the following methodology has been adopted. First of all, the self-financing engineering colleges have been prepared for effective and efficient implementation of six sigma concept. In six sigma organizations, the employees are systematically trained and their roles are termed as in Karate martial arts, Green Belt, Black Belt, Master Black Belt and so on, based on their knowledge and experience in applying statistical tools and techniques to solve the problems. In private engineering colleges the stakeholders like the Chairman, Principal, Heads of the Departments and other faculty members have been designated as six sigma leader, Champion, Black Belts, and Green Belts respectively. Their roles and responsibilities have been formulated with respect to self-financing private non-autonomous engineering colleges in India. Secondly, the six sigma training and development have been carried out for all sections of stakeholders. Over a period of time, Cultural changes have been expected to be
achieved. Hence, it is essential to prepare the organization for six sigma implementation.

Failure modes and effect analysis is one of the primary quality tools being widely used in service sectors for finding potential failure modes, causes of failures and effect of such failures and the severity is calculated for preventing them in the system in the design stage itself. Total failure modes and effect analysis have been developed in this research as a modified tool of FMEA for finding potential failure modes, effect of such failures, and preventing methods and used as a tool of six sigma for project identification.

In engineering education students’ data collection and development of Importance-Satisfaction model have been developed and survey conducted in two engineering colleges in Tamilnadu for all branch students of undergraduate courses. I-S model have been developed for six sigma prioritization.

The six sigma DMAIC (Define, Measure, Analyze, Improve and Control) methodology has been applied in the employability improvement and academic performance improvement projects. Quality tools like brainstorming, cause and effect analysis, affinity diagram and Pareto analysis have been used for finding the root causes.
The findings of this research can be summarized as the top management commitment, involvement, dedication and support required for ever. Faculty training, development not only in subject handling but also in class room management, motivational technique and digital media preparation are continually needed. Awareness among students, parents are to be improved for not influenced by false advertisement, fake promises, and so on. The academic performance and employability of students have been improved. Finally the thesis is concluded with the findings that, the six sigma concept can be implemented effectively and efficiently in self-financing private engineering colleges in India to attain world class standards.