

Technical Institutes: Paving Way Towards Quality

Prateek Guleria¹ Vikas Ucharia² Chetan Sharma³ Rupinder Singh Kanwar⁴

^{1,2,3,4}Department of Mechanical Engineering

^{1,2,3,4}Bahra University, Wagnaghat, Solan

Abstract— Globalization and increase in the technological aspects has made technical education more competitive and knowledge driven. Increasing competition among institutes have made them to adopt quality in education as their survival tool. Maintaining quality is not as same as that of the quality in manufacturing units, but quality philosophy like Six Sigma can be applied to the education system. In India it is difficult task to maintain quality good and also deliver them at low cost. Six Sigma professionals and applying engineers has made a tremendous improvement in the quality, customer satisfaction, minimization of the defects with increased profits. Author has tried to maintain a relationship with the fundamentals of the Six Sigma and its connection with educational institutes to provide more quality driven technical education. This paper gives you the problems and inside idea of the quality among the institutes to maintain quality and how Six Sigma players can help in order to achieve a status of quality education institutes/body.

Key words: Six Sigma, Paving Way

I. INTRODUCTION

Technical education has played a major role in developing countries like India to help it achieve the status of a developed nation. In this era of the competition technical education holds the key towards all the sustainable growth. The economic conditions of a country have seen a large jump in manufacturing units who have quality workforce. In the competitive world engineering/technical education has been put on a lot of stress in the last decade. Following the approach the world is adopting the science and technology sector in India has also seen a major leap forward. India has also tried to maintain the speed with the world of manufacturing thinking with the help of from the government policies, public and private funds. India has marking its approach towards the largest networks of the higher education system^[1&2]. In the recent years India has seen a rise in the self-financed educational institutions. Most of the institutes had tried to take advantage of the situation and had started looting students and also creating doubts in the minds of the parents.

As a result of this a variety of the innovative approaches to increase the quality in education sector also. In this paper author has tried to apply the philosophy of the Six Sigma to engineering/technical education. Six Sigma has found its place and made organization earn profits which are measurable at every stage of manufacturing lines. By taking the Six Sigma approach from industries to the academics; results may provide a methodology to increase the quality standards in education sector especially in technical education.

A. Concept of Six Sigma

Six Sigma originated in 1980's with the goal improving quality of the products, goods, services. It was coined by the Bill Smith, CEO, Motorola in 1986^[9]. Further the concept has got widely accepted after the Motorola publicized the

concept of success of Six Sigma in 1995. Six sigma can be viewed as a metric, a mindset, a methodology^[4]. It is a not new now but applied approach to the quality assurance and quality management. The main purpose of this is to reach level of quality and reliability that will satisfy and even exceeds demands of the today's demanding customer^[5]. The said philosophy has been widespread in the field of the manufacturing industry, Healthcare, Education and many more^[6].

B. Six Sigma Methodology

Six Sigma is a process improvement methodology which includes different phases logically linked with one another. Six sigma methodology is generally described by the acronym DMAIC (Define, Measure, Analyze, Improve and Control) is used for continuous improvement of already existing products or processes^[7]. One of the important aspects of six sigma is the involvement, training and reward of employees at all levels of the organization. Champions at the executive levels guide the selection of projects, securing of resources and goal setting for improvement efforts. Employees are given martial arts titles such as Master black belt, Black belt, Green belt etc., reflecting their training and status in project improvement efforts^[8].

According to Harry (2001) CEO Six Sigma Academy Phoenix^[9], USA :

Six Sigma is a powerful breakthrough business improvement strategy that enables companies to use simple and powerful statistical methods for achieving and sustaining operational excellence. It is well structured, disciplined, data driven methodology for eliminating defects, waste or quality control problems of all kinds in manufacturing, service delivery, management and other business activities.

It is business strategy that allows companies to drastically improve their performance by designing and monitoring everyday business activities in the way to minimize waste and resources while increasing customer satisfaction.

II. SIX SIGMA IN TECHNICAL EDUCATION

In the present era of the globalization technical education has seen many changes. In today's world the technical education has become a commercial enterprise and status is sold as a marketable commodity. Many countries have prepared themselves and marketed them in Indian markets which also includes the study abroad programmes. Quality in technical education is going to play major role in the upcoming few years in India also because of the pressure mounted up due to the globalization.

All the problems are in need of the serious attention and we need to organize and re-orientation of the technical/engineering institutes. Serious thinking on every aspects of the quality in technical education system is needed. Quality is needed in every manufacturing and service organization and technical educational institutes are also falling in the line of the Six Sigma tools.

The first step in Six Sigma need identification of the clear problem, latter includes measuring and monitoring with the help of constant data analysis with frequent and improved communications. These above mentioned steps are being used with statical tools to keep in the record of the reduction of the various service variability and service in mass production.

Many of the manufacturing organizations operate about 4 to 5 Sigma resulting the defects of 6210 to 233 defects parts per million. Figure 1 shows a typical normal distribution curve in which defects per part million are shown. This concept is commonly used in industry, however author is proposing this concept to be used in the technical education sector to provide quality education and make our engineers employable.

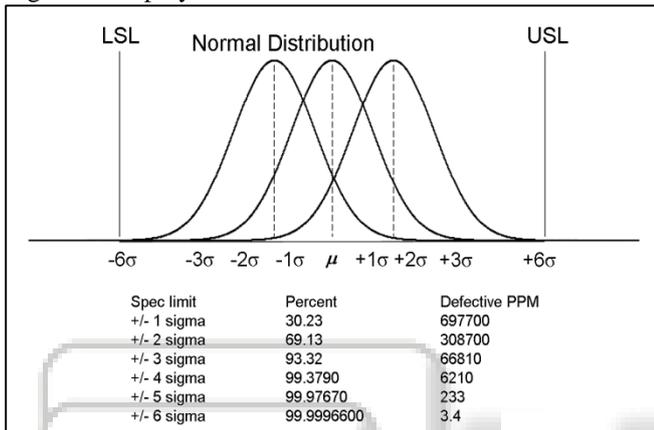


Fig. 1:

Although education is a process which involve the students to take courses, learn effectively and eventually graduate. One can apply the methods and principles to get quality right in the technical education. Six Sigma may not be fully applied to the technical institutes but it certainly will help in the continual improvement of the institutes. Presently technical institutes are operating at a 3,4 or even at 2 Sigma, which can only be improved by applying Six Sigma tools and methodology. With Six Sigma the institutes are increasing quality and services and decreasing the costs. Six Sigma driven institutes are definitely going to meet the global competition and can face the challenges of quality and competitive technical education.

III. COMPARISON OF SIX SIGMA IN INDUSTRIES AND IN TECHNICAL EDUCATION

In industries the role of six sigma is the effect of the team work desiring the goal of the total quality. But in technical education system the team work cannot alone change the scenario of the quality in the technical education system. So the first way to change the declining status of the technical education is the adoption of the proficiency in the tools of the Six Sigma.

Industries	Educational Institutes
LEADERS: Senior Managers Plan Six Sigma and achieve the aim of the six sigma in a planned way.	MANAGEMENT: Vice-Chancellor Members of the management committee proposes the plan
PROJECT SPONSOR: A Six Sigma professional Leader in success of projects	DEAN : Goals for improvement Resources and team effort

SIX SIGMA COACH: Act as mentor and trainer	HOD'S: Communication with Dean Resolve conflicts, gather analysis and deals with the resistance towards implementation
TEAM LEADER : Primary responsible for project	FACULTY MEMBERS: Clarifies project guidelines Members selection, resources and project implementation
WORKFORCE: Measure the collection and analysis of data	STUDENT: Perform functions and assignments Learn ways to perform the tasks and collection and testing
PROCESS : Managers and engineers are responsible to the resolution and maintaining the quality in the industry	PROCESS: All the HOD's and Faculty members are responsible for the continual improvement of the educational institutes

Table 1:

IV. METHODOLOGY ADOPTED

The Six Sigma methodology principles can be used along with the various tools and methodologies are DMAIC (Define, Measure, Analyze, Improve, Control) and DMADV (Define, Measure, Analyze, Design, Validate). The process chart is shown in Figure 2.

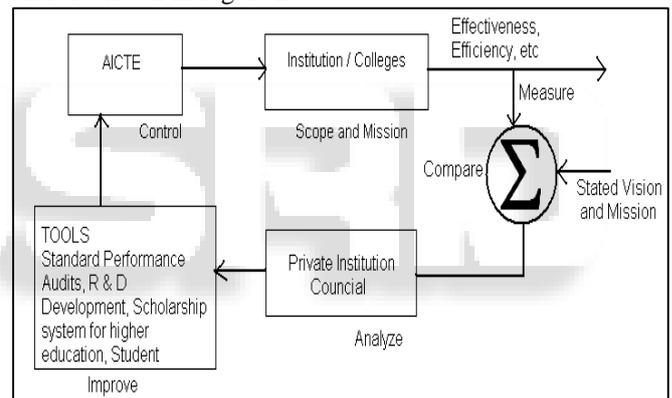


Fig. 2:

The mission and the goals are being set by the institutes and being compare with the actual.

A. Define

The institutional purpose is defined during this phase. Problems are being identified, teams are formed and the existing and futuristic customers are identified. The next is to identify required outputs and to set priority for the student's and their parents requirements who really are paying for the services provided by the institutes and the help their need in the academics and what are needs that are critical to quality (CTQ) to the customer.

B. Measure

It evaluates the running process and creates a current assessment of the existing service which is being delivered and can be made useful to the actual customers. This will help the organization to find the potential causes to identify what is to be measure, what types of variations are there and with what accuracy they are being measured. This measurement will actually help in the calculation of the current sigma level and help to determine process capability.

C. Analyze

It is the baseline performance of the service delivery process. In this phase the collected data in the measure phase have been examined to generate a list of the sources of variation, what cause the problems and to identify the reasons of problems, to conduct brainstorming techniques and recommend improvements. After that we have to determine which things have large impacts on student's requirements and how to develop proposed process plan to improve quality and what are the various risks that are being involved in the implementation of this methodology.

D. Improve

This is the phase where we have to identify solutions and from the solution we have to select the best possible solution that can be held the most useful for the contemplation of our problem. Further recommendation and implementation are being suggested and permission to gain approval for the proposed changes. This impact of assessment is to carried out to finalize the implementation plan, and with the permission implement the approved changes and the solutions are the major things that are being run under this phase.

E. Control

Obtained knowledge from the application of the above mentioned phases can help in the improvement of the quality and project can be published in other areas to help accelerate improvements of service delivery. To establish the quality at various aspects the communication is important and the control phase help in the maintaining of the various processes to achieve quality.

V. CONCLUSION

This paper concludes that Six Sigma is a process that brings additional benefits and helps institutions to adopt best practices for service delivery through a quality process which ensure its success. This paper has discussed approach which is highly useful and can help the other technical institutions achieve good and upon time deliverance. We have discussed in the paper about the various aspects of the quality improvement and how they can be related with the education sector. However, the author believes in the effectiveness of the Six Sigma methodology and can help in facing the global competition and can play a major part in the generation of the quality workforce.

REFERENCES

- [1] Raj Kumar R.V, "Engineering Education in India - Quality concerns and Remedial Measures", The Indian Journal of Technical Education; 30(3):73-90, 2007
- [2] Ramachandran, H, Anil Kumar, "Engineering education in India", Productivity; 44(2): 187-194, 2003
- [3] Prabhakar Kaushik, Dinesh Khanduga, "Six Sigma professionals: From industry to institute". The Indian Journal of Technical Education Vol 31, June 2008
- [4] Goffnett, S.P., "Understanding Six Sigma: Implications for Industry and Education", Journal of Industrial Technology 2004; 20(4):1-10, 2004
- [5] Sokovic. M, Pavletic. D and Krulcic.E, "Six Sigma process improvements in automotive parts production",

- Journal of Achievements in Materials and Manufacturing Engineering 2006; 19(1): 96-102, 2006
- [6] Maha Mohammed Yusr, Abdul Rahim Othman, Sany Sanuri M. Mokhtar, "Six Sigma and Innovation Performance: A Conceptual Framework Based on the Absorptive Capacity Theory Perspective", Int. j. emerg. sci. 1(3):307-323, 2011
- [7] Yousef Amer, Lee Luong, Sang - Heon Lee and M.Azeem Ashraf, "Optimizing order fulfillment using design for six sigma and fuzzy logic", International Journal of Management Science and Engineering Management; 3(2): 83-99, 2008
- [8] Monica C. Holmes, Anil Kumar and Lawrence O. Jenicke, "Improving the Effectiveness of the Academic Delivery Process Utilizing Six Sigma", Issues in Information Systems; 6(1):353-359, 2005
- [9] Harry, M. J. "Six Sigma: A Breakthrough Strategy for Profitability, Quality Progress", pp. 60-64, 1988.