APPLICATION OF SIX SIGMA IN TECHNICAL EDUCATION

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Abstract

One of the major problems affecting technical education institution is the increasing misalignment between the needs of society, reflected through the needs of the industry and the output provides by technical institutions. Technical institutions are unable to make a meaningful contribution to the society in any role without further in-depth inputs. The variation in the quality of the product supplied be the educational institutes (Engineers) and the expectations of the customers (Industries) can be minimized by applying Six Sigma philosophy.

Introduction:

There has been phenomenal expansion in the technical education system in India in recent years, in terms of number of institutions, students intake and introduction of new programmes. Unfortunately, quantitative growth is at the cost of quality. (due to lack of infrastructural facilities and human resources). Students seeking technical education and professional do not confine themselves to the national boundaries. Hence, the quality in an education system should be viewed as a global concept.

The marching trends of the new economic order has generated a new capsule of Six Sigma as a unfilled approach to process excellence. The tests reveal that it has been highly successful in multinational companies such as Motorola and GE. The concept of Six Sigma is to identify the problem in a process, charter a project to specifically address the process, evaluate the process and work through the project in order to improve the process in totality.

Six Sigma fundamentals:

Six Sigma is, basically, a process quality goal, where sigma is a statistical of variability in a process. Under the assumption of normally, three Sigma quality level standards of 99.73% translates to a process yield of 2700 PPM failures, if we assume zero driff and 67000 PPM if there is shift of 1.5 o. While, Six Sigma quality level standard produces 0.002 PPM non conformances if there is no shift in the process and 3.4 PPM if there is shift of 1.5 o in the long term. In short, Six Sigma raises customer satisfaction by reducing the number of defectives and it is almost 20,000 times better than three Sigma.

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Culture of Six Sigma:

The culture of Six Sigma suggest a work environment and quality of work life where everyone in the company desires to achieve the Six Sigma target, to increase customer satisfaction by increasing the efficiency and lowering the costs. This culture provides an important and continuing focus to management. The term 'defective' in Six Sigma means an out-of-specification coming off a production line, the amount of 're-work' in a batch of a product, a document with a misprint, or a late delivery time. The implementation in the educational arena requires the teachers to be considered 'employees' or the workforce in general. The customers tend to be the parents who pay the fees and want quality in return of the good result of their wards.

Steps of Six Sigma:

The implementation or application of Six Sigma starts with the recognition of a problem, and defining of a project to cure or alleviate the problem. The project is undertaken by a team using DMAIC, i.e. Define, Measure, Analyze, Improve and Control. These are defined further as :

Define: This phase involves the definition of the project/assignment, using process map, application area, desired improvement, likely benefits, etc. The importance lies in having the chance of a high successful delivery of better quality and saving costs in totality. In the context of academic strata, project may include real life problems such as poor result of the class, poor performance in a particular subject and / or practical, poor communication skill of the students etc.

Measure: This phase involves the analysis of the process to determine its present status. Data collection is the main emphasis of this phase. In academics, it is a quantitative parameter defined by the Define phase.

Analyse: This phase involves the data analysis for identification of parts or process which affect the quality of the problem. In academics, it may be the cause such as poor technical knowledge of teacher, less practical experience of the teacher, absenteeism of the students, poor infrastructural facilities such as learning resource materials, less management support etc.

Improve: This phase adds to the process to find a permanent solution to the problem. This may involve the use of tools like Statistical Process Control or Design of Experiments. Process capability indices such as Cp and Cpk can find the solution to maximize the output with the existing resources and thereby increase the productivity of the educational institutes. Cp and Cpk values computed can serve as a yardstick for quality of education in the institution. These values can be effectively used as a benchmarking tool for continuous improvement.

Control: This phase involves the process of closing the problem loop by putting in the right procedures and management statistics. The use of control charts for variables and attributes play an important role in the control phase.

Six Sigma Professionals:

Green Belts: These represent the Six Sigma practitioners, with a thorough grounding of the approach. The teachers and instructors of the students may act as green belts in educational institutes.

Black Belts: These represent the Six Sigma experts with a thorough grounding in the approach, in additional to the ability to lead the projects. A subgroup of the teachers and instructors act in this role.

Master Black Belts: These represent people who spend their time focused on Six Sigma, assist leadership for projection and consultation. The Administration Officer or the Vice-Principal act in this role.

Champions: They are the senior managers who ensure that resources are available for training and projects and also conduct reviews. The principal acts in this role, in collaboration with chief executive officer of the management.

Implementation of Six Sigma:

With the outcome of the implementation of this methodology, researchers have found that successful deployment of Six Sigma involves focusing on a small number of high-leverage items. The following are the stepts needed for the successful implementation of this concept.

1. The successful improvement must start from the senior level of leadership. This is done by providing training of the principles of and the tools needed for the purpose. Simultaneously, the steps are taken to "soft-wire" the organization and to cultivate an environment for innovation and creativity. The generation of Quality Improvement Team occurs at the level of Principal and other members of the management.

2. The modules is developed for establishing close communication with customers, employees and suppliers. This involves developing rigorous methods of obtaining and evaluating customer, employee and supplier input. The teachers act as the database for reporting and conduct of study.

3. Training is assessed throughout the organization and is considered indispensable. Six Sigma education is provided to ensure that adequate levels of literacy and numeracy are processed by all employees/teachers.

4. A standardized Six Sigma framework for continuous improvement is developed with a system of indicators for monitoring progress and success.

5. The Six Sigma projects are conducted by individual employees and teams led Green Belts and assisted by Black Belts.

Conclusion:

Successfully implemented Six Sigma perform better in virtually every business category, including return on sales, return on investment, employment growth and stock value growth. The strategy that has to be applied in today's educational arena is a thoughtful concern on the part of the management to understand customer needs and strive to reduce defects throughout all educational process.

References:

1. Sarda S. S, Dr. S. P. Kallurkar, "How to achieve Six Sigma Quality", Engineering today, April 2001.

2. Sarda S. S, Dr. S. P. Kallurkar, "An introduction to Six Sigma", Engineering today, June 2001.

3. Sarda S. S, Dr. S. P. Kallurkar, "Students – The true customers of higher education", the Journal of Engineering Education, Oct.-Dec. 2001.

4. Dheeraj Mehrotra, "Six Sigma in Education", Internet.

5. Prof. Dr. O. N. Wakhlu, Bharat Wakhlu, "Enhancing the relevance of technical education through total quality", The Journal of Engineering Education, July-Oct. 1999.

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