Improving Quality of Education using Six Sigma

DMAIC Methodology: A Case Study of a Self-Financed Technical Institution in India

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ABSTRACT

There have been many successful applications of Six sigma in manufacturing over the last two decades. In the last decade, there has been quantum increase in applications of Six sigma in service organizations. However, academic organizations have lagged other organizations in applying Six sigma. Education is emerging as major commercial activity in the service sector, and institutions are realizing the significance of quality improvement in education. Quality in education is no more a desirable strategy; it has become essential for the survival of an institution. The paper illustrates how Six sigma may be used to improve performance parameters of a technical institution. The authors have identified critical to quality characteristics and proposed a team structure for successful implementation of a Six sigma project. The authors have further recommended findings along with an implementation control plan based on a Six sigma case study of technical institution located in National Capital Region (NCR) in India.

Keywords: DMAIC methodology, Gage R and R, Quality, Six Sigma, Technical Institution

1. INTRODUCTION

From Ancient to Modern India, higher education has always occupied a place of prominence in Indian history. In ancient times, universities like Nalanda, Taxila were attracting students not only from all over India, but from far off countries. Today India manages one of the largest higher education systems in the world. The Indian education system has been subjected to revolutionary change over the recent years and indeed this change is still in progress. This change is impacted by the changes in global economics, social and cultural changes in Indian society. Education
now a days have become much more of a education industry with student as internal as well as external customers. Madu et.al (1994) has classified customers in a education system in three categories i.e. input customers, transformation customers and output customers. Students and parents may be categorized as input customers, faculty & staff of institution as transformation customer and organizations recruiting students as well as society as output customer. It has been recognized that quality of services in education like any other services are associated with customer satisfaction. Hence, it is necessary to identify customer requirement and redesign critical to quality characteristics (CTQs) that make up education system.

The paper has been organized as in four sections. In next session, review of Six sigma quality initiatives in education is presented. In section III, a case study of Six sigma define, measure, analyze, improve and control (DMAIC) methodology in technical institution is presented. The paper ends with recommendations and conclusion drawn based on the case study.

2. LITERATURE REVIEW OF SIX SIGMA QUALITY INITIATIVES IN TECHNICAL EDUCATION

Sigma is a Greek letter representing variation in the process. Six sigma is a scientific methodology to reduce number of defects as low as 3.4 defects per million opportunities (DPMO) in any process. According to Harry and Schroeder (1999), Six sigma is scientific method of collecting rigorous data and robust statistical analysis to pin point source of error and ways of eliminating them. Six sigma is a formal methodology for defining, measuring, analyzing, improving, and then controlling or “locking-in” processes. The numerical goal of Six sigma project is to reduce the occurrence of defects to Six sigma level of defects i.e. 3.4 DPMO. Table 1 shows some recent work on quality initiatives in higher education.

3. APPLICATION OF SIX SIGMA DMAIC METHODOLOGY IN TECHNICAL INSTITUTIONS

Engineering education became a main attraction after 1990 when India became a major contributor to the global IT industry revolution. In the last two decades, many State Governments and Self financed technical institutions have been established. Nearly 80% of technical institutions in india are being managed by private managements. In these institutions, profitability is emerging as primary motto Hence there is utmost need for quality improvements initiatives. Major performance parameters of these institutions are placement and passing rate of the students.

In the present case study, a self financed technical institution located in National Capital Region (NCR) India was selected for case study. The institution has five branches of engineering and having strength of around 1200 students and 69 faculty members. Average student passing ratio of students for last five year was collected which was very low (49.67%) and hence taken as project goal. The goal statement for Six sigma project is to enhance student passing ratio by 15%. For successful implementation, the Management, Principal, and Heads of Department (HODs) must be convinced that Six sigma methodology provides quantum jumps in improvement. A presentation regarding Six sigma methodology and its benefits was made before management, senior faculty members, HODs and Principal to ensure necessary support during the project. The Six sigma implementation Team was formulated which encompass 12 members including a member of board of governors, Principal, three HODs, five faculty members and two students. The organization structure of team is shown in Figure 1.
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