A CONCEPTUAL THINKING OF TOTAL QUALITY MANAGEMENT IN ENGINEERING EDUCATION

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ABSTRACT

The Total Quality Management have been valued by many companies around the world. Many organizations have achieved excellence and competitive lead by putting into practice TQM policy. Most of the principles of TQM can advantageously be employed in the area of education and training. Quality is at the top of most agenda. At the same time it is difficult to define or measure. The basic principles for the Total Quality Management (TQM) are to satisfy the customer, satisfy the supplier, and continuously improve the business processes. Here the students are the stakeholders along with their parents and the industries. This paper highlights the essence of TQM and explains how engineering educational institutions can improve the quality of their services by following the principles of TQM.

I. INTRODUCTION

In the information society in which we live, progress depends critically on the degree of one’s education. Although the expenses associated with educational processes implementation increase, many countries are still unable to increase their budget in education.
Technical Education has attained a key position in the knowledge society under globalised economy. However, the challenges faced are enormous. Globalization and rapid technological evolutions gives rise to new challenges in technical education. Furthermore, the international education, the individual mobility allows the comparison between educational processes.

The concept of Total Quality Management (TQM) was developed by an American, W. Edwards Deming, after World War II. It was proposed for improving the production quality of goods and services. It was not accepted by US industry but was heartily endorsed by Japan in their recovery from World War II. Japanese used it to dominate world markets by 1980. By then most U.S. manufacturers had finally accepted TQM approach.

The basic principles for the Total Quality Management (TQM) are to satisfy the customer, satisfy the supplier, and continuously improve the business processes [1]. The 14 points of Dr. W. Edwards Deming form a framework for the implementation of TQM [2].

Total Quality management refers to a management process and set of disciplines. TQM engages all divisions, departments and levels of the organization. Traditional organizations tend to think and plan with respect to short term outcomes, while TQM organizations tend to think in much larger time spans. TQM implies an open management style, stress on two-way communication, decentralization of responsibility and establishment of problem solving team. TQM is usually implemented in answer to apparent competition and aims to win and sustain competitive advantage.

This paper outlines a systematic methodology for effecting Total Quality Management in higher education. It gives brief introduction of Total Quality Management. Section II highlights on engineering education system model. Quality issues are discussed in section III. TQM in engineering education is explained in section IV. The paper ends with concluding remarks.

II. ENGINEERING EDUCATION SYSTEM MODEL

We have modeled education system as the basic observable components of a engineering educational institute as shown in Figure 1 [11]. It demonstrates different modules of a typical education organization. These are the key elements of any engineering education organization.
The process components which are important for engineering education institute are –

I. Teaching and Learning
II. Leadership qualities
III. Innovation and research culture
IV. Team work
V. Activities beyond curriculum
VI. Appraisal and feedback

III. QUALITY ISSUES OF TECHNICAL EDUCATION

Taking into consideration above components the important quality issues expressed by almost all concerned are summarized as follows-

- The way the students learn
- Activities of students beyond the regular time table
- The overall academic climate
- The opportunities and encouragement for innovations and development and of research
- The curriculum relevant to the needs of society & industry
- Curriculum monitoring & implementation strategies to develop in students the employable skills
- The reward and recognition system
- The faculty development program
- Innovative teaching –learning practices
The above list is not exhaustive. However, assuming that these imitate the total quality improvement needs of the system, it is necessary to develop methods and strategies to respond to these for total quality management of the system.

IV. TQM IN ENGINEERING EDUCATION

The globalization of education, student’s migration from one country to another are causes for concerns to the educationists. The use of new teaching and learning methodologies, changing patterns of education delivery, course content, the concept of quality has become an essential component of the educational process for its success. Total Quality Management (TQM) in Education is an appropriate tool. It must be clearly understood, adopted and implemented as soon as possible. Beckhard and Pritchard (1992) have outlined the basic steps in managing a transition to a new system such as TQM: identifying tasks to be done, creating necessary management structures, developing strategies for building commitment, designing mechanisms to communicate the change, and assigning resources.

NBA of AICTE is accrediting institutes with a view to create external pressure to bring the institutes to a bare minimum level of acceptance. Opportunities and threats have to be understood.

Considering the quality factors discussed in section IV. Following are some of the actions to be taken

**A Clear Mission**

In properly operated TQM programs, administrators and supervisors work diligently at:

a. Insisting on clear visions and missions
b. coordinating among task or improvement teams
c. Supporting the efforts and authority of improvement teams to the highest possible degree.

**Management Commitment**

Emphasize leadership instead of management. TQM organizations show more confidence in staff and more trust. Appreciation for good work, transparency in the system, creating favorable environment for everyone to contribute and grow are some of the vital issues that would lead to attitudinal development.

**Employee Empowerment**

In TQM organizations, employees are much more actively involved in both the decision-making and communication processes. Information flows both top to bottom and bottom to top. The faculty will certainly be well educated in their disciplines but maybe not be in the art of teaching. Faculty development programs may help teachers. Planning of comprehensive leadership training for educators at all levels can be provided. Use research and practice-based information to guide both policy and practice is required. Encourage cooperation, not competition. Encourage the forming of cross-function teams to address
Continuous Improvement and Self Evaluation

Total Quality is, essentially, a win-win approach. This works to everyone’s ultimate advantage. TQM emphasizes self-evaluation as part of a continuous improvement process. In addition, this principle also laminates to the focusing on students’ strengths, individual learning styles, and different types of intelligences.

Teaching Methodology

We propose that there should be the best and unique teaching methodology of every department and in turn of institute that becomes institutes brand. Majority of institutes have similar kind of infrastructure following same guidelines from university, UGC and AICTE. One can make difference by doing the things differently. We recommend developing the best unique teaching methodology. We very strongly put forth that there should be process maturity and pathways to process maturity.

Industry- Institute Interaction

The Head of the institute, training and placement officer, the heads of departments and the students and alumni should together take the responsibility of industry institute interaction. This will also be beneficial from the view of student’s placement.

Methodology should help in

- Going to the level of students
- Understanding students psychology
- Creating learning environment
- Learning through experiences
- Learning through simulated experiences
- Invoking understanding
- Making students learn
- Inculcating self learning
- Cultivating them to lifelong learners
- Getting proper feedback from students
- Embedding remedial teaching

For developing methodology, we suggest few useful tips that teaching should be learner centric instead of teacher centric. It is important that knowledge gets transferred. The methodology should evolve

- Taking student from known to unknown
- Taking student from concrete to abstract
- Taking student from specialization to generalization
- Make Student learn through experiencing

The process should involve following phases:

- Define
- Evolve
- Progress and
- Feedback

Small activities should be given to student instead of just delivering monotonous lectures. Let student learn through experiences. Good evaluation process is to be
developed as far as examination is concerned. Knowledge of the student should be tested and not memory. Let them learn through simulated experiences.

CONCLUSION

Quality improvement initiatives are necessary in engineering education system. Therefore, the aim must be to achieve international standards in all respect. Application of principles of TQM, in engineering education must be made to covert the threat of getting marginalized to an opportunity to achieve excellence. To communicate the change, mechanisms beyond existing processes will need to be developed. TQM in engineering education is excellent strategy that will result in meeting the expectation of stakeholders, efficient and effective teaching learning process, improved team performance. Ultimately applying TQM will lead to quality technical education and will bridge the gap between expectations and outcome

REFERENCES

1. Basic Principles of Total Quality Management (TQM), by Ron Kurtus (28 May 2001)