International Journal of Advanced Research and Development
ISSN: 2455-4030, Impact Factor: RJIF 5.24
www.advancedjournal.com
Volume 2; Issue 3; May 2017; Page No. 12-16

Total quality management in higher technical education

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Abstract
Quality Management is seen as an effective method that can help organizations achieve remarkable improvement in quality levels and overall productivity. The purpose of Quality Management practice is to bring about continuous improvement initiatives throughout the organization. Quality initiative integrates the fundamental techniques and principles of quality deployment. Thus primary objective is to incorporate quality and integrity into all functions at all levels of the organization. The objective of this paper is to give an overview of the concept of Total Quality Management (TQM) and its implications in organizations in general and higher technical institutions in particular.

Keywords: tqm, productivity, effectiveness, higher technical education, customer driven quality, quality control

1. Introduction

Education plays a vital part in a person's achievement, apart from inborn talent. Education will mold and guide a person to be what they want to be. Of course, if discussing education, teachers will play a very important role. Teacher has many responsibilities not only to the students but also to the society. Now in the 21st century, a time when technology is at its peak, education faced a deep challenge to adopt on fast paced world. Changes in global educational settings have compelled the institutions of higher learning to revolutionize its activity. Teachers must follow through in learning new techniques or methods in their teaching for the benefit of the students and society as a whole. The aggressive business environment leads the collaborator of the educational sector to require for more dependable, ingenious, and multi-skilled and knowledgeable work force. These have imposed the higher technical education institutions to be more interested on quality educational system [1].

Quality Management is seen as an effective method that can help organizations achieve remarkable improvement in quality levels and overall productivity. The purpose of Quality Management practice is to bring about continuous improvement initiatives throughout the organization. Quality initiative integrates the fundamental techniques and principles of quality deployment. Thus primary objective is to incorporate quality and integrity into all functions at all levels of the organization. Thus quality is a much-debated term. New technologies have empowered customers to seek out and compare an endless array of products and services from around the globe. According to ISO 8402-1986 standard Quality is "the totality of features and characteristics of a product or service that bears its ability to satisfy stated or implied needs." The term quality can be understood from differently from different directions as mentioned below. One of the quality gurus Philip B. Crosbyz [2] defines quality as it is conformance to requirements. Another Management thinker, father of modern Management, Peter F Drucker [3] opined that, quality is what the customer wants and is willing to pay for. According to Joseph M Juran [4] quality is fitness for use and fitness is defined by the customer. The following table gives the evolution of new concept of quality.

Table 1: Evolution of New Quality concept

Time	***Early 1990s***	***1940s***	***1960s***	***1980sBeyond***
Focus	Inspection (Detection)	Quality Control (Detection using statistics: Statistical sampling)	Quality Assurance (Prevention) (Organizational quality focus) Zero defect: Ex: ISO9001:2000	Total Quality Management (Customer driven quality) (Building quality into process. Identify, correct causes of quality problem)
Old concept of quality				New concept of quality

Source: Reid, D. R. & Sanders, N. R. (2010), Operations Management (4th ed). New York:Wiley.

The concept of TQM

TQM is a management philosophy, which seeks to integrate all organizational functions (production, design, engineering, finance, human resources, logistics, marketing, sales, customer service, etc.) to focus on meeting customer needs and organizational objectives. It views organizations as a collection of processes. It maintains that organizations must strive continuously to improve the processes by incorporating the knowledge and experiences of employees. It is an approach to improving the effectiveness and flexibility of business as a whole. It is essentially a way of organizing and involving the whole organization, every department, each

activity, and all the employees at every level. For an organization to be truly effective, recognizing an individual and each activity affects and in turn is affected by others is necessary.

Some of the most exciting applications of Quality Management have materialized from departments, which could see little relevance when first introduced to the concepts. Following training, many examples from different departments or organizations show the use of the techniques. Sales staff can monitor and increase successful sales calls; office staff has used quality methods to prevent errors in word-processing and improve input to computers; customer service people have monitored and reduced complaints; and distribution staff has controlled lateness and disruption in deliveries.

Quality Management is a method for freeing people's lives of wasted effort by involving everyone in the process of improvement, i.e. improving the effectiveness of work so that results are achieved in less time. The methods and techniques used in quality can be applied in each and every department of the organization. They can be used to improve quality in finance, sales, marketing, distribution, development, manufacturing, and the public relations departments. Thus quality can be made as a way of life in many organizations. Quality approach keeps the organization goals at the supreme but there is a fundamental shift in philosophy from work centered to employee –centered.

While quality management pioneered in the manufacturing sector, its benefits have been brought to service and public sector organizations. Some of the manufacturing companies who have implemented TQM include Ford Motor Company, Phillips Semiconductor, SGL Carbon, Motorola and Toyota Motor Company. Federal Express (FedEx) and Florida Power and Light (FPL) are the companies in the service sector that have benefited tremendously from applying TQM techniques. FedEx processes close to a million parcels a day with an error rate of 1%. FPL is one of the most efficiently-run public utilities in the world. Many educational institutions in the US and Canada are applying quality management techniques to improve their organizational effectiveness and the quality of their programs. Whether product based or service oriented, quality is the only means for organizations to meet the customer satisfaction, to gain an edge over competitors and to attract customers. Particularly in case of service sector, the benefits cannot be viewed but can be perceived.

The Elements of Quality Management

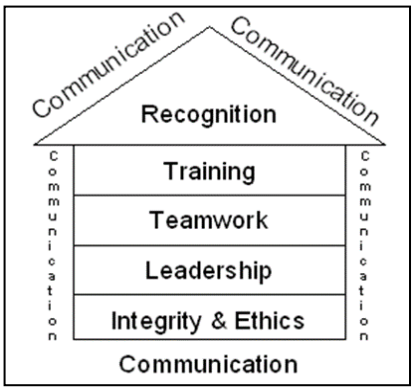

Fig 2: Eight Elements of Quality Management

To be successful implementing quality management practices, an organization must concentrate on the eight key elements:

1. Ethics
2. Integrity
3. Trust
4. Training
5. Teamwork
6. Leadership
7. Recognition
8. Communication

Key Elements

Quality Management is a philosophy that makes quality the driving force behind leadership, design, planning, and improvement initiatives. For this, it requires the help of the eight key elements. These elements can be divided into four groups according to their function:

The four groups are:

i) Foundation - It includes: Ethics, Integrity and Trust.
ii) Building Bricks - It includes: Training, Teamwork and Leadership.
III. Binding Mortar - It includes: Communication.
iii) Roof - It includes: Recognition.

i) Foundation

Quality is built on a foundation of ethics, integrity and trust. It fosters openness, fairness and sincerity and allows involvement by everyone. This is the key to unlocking the ultimate potential of an organisation. These three elements move together, however, each element offers something different to the quality concept.

1. **Ethics -** Ethics is the discipline concerned with good and bad in any situation. It is a two-faceted subject represented by organizational and individual ethics. Organizational ethics establish a business code of ethics that outlines guidelines that all employees need to adhere to in the performance of their work. Individual ethics is concerned with decision related to whether an action to be taken is right or wrong.
2. **Integrity -** Integrity implies honesty, morals, values, fairness, and adherence to the facts and sincerity. It is the extent to which organizations act according to the values, beliefs and principles they claim to hold. In other words, it is the extent to which an organization offers to customers (internal or external) what expect and deserve to receive. People see the opposite of integrity as hypocrisy.
3. **Trust -** Trust is a by-product of integrity and ethical conduct. Without trust, the framework of quality cannot be built. Trust ensures whole hearted participation of all members. It allows empowerment that encourages pride ownership and it encourages commitment. It allows decision making at appropriate levels in the organization, fosters individual risk-taking for continuous improvement and helps to ensure that measurements focus on improvement of process and are not used to contend people. Trust is essential to ensure customer satisfaction.

ii) Bricks

Basing on the strong foundation of trust, ethics and integrity, bricks are placed to reach the roof of recognition. It includes:

4. **Training -** Training is very important for employees to be highly productive. Supervisors are solely responsible for bringing quality within their departments. Training that employees require are interpersonal skills, ability to work within teams, problem solving, decision making, job management performance analysis and improvement, business economics and technical skills. During the process, employees are trained so that they can contribute their services more effectively to the company.
5. **Teamwork -** To become successful in business, teamwork is also a key element of quality organisation. With the use of teams, the business will receive faster and better solutions to problems. Teams also provide more permanent improvements in processes and operations. In teams, people feel more comfortable bringing up problems that may occur, and can get help from other workers to find a solution and put into place. There are mainly three types of teams that quality organizations adopt:
   a) Quality Improvement Teams or Excellence Teams (QITS) - These are temporary teams with the purpose of dealing with specific problems that often re-occur. These teams are set up for period of three to twelve months.
   b) Problem Solving Teams (PSTs) - These are temporary teams to solve certain problems and also to identify and overcome causes of problems. They generally last from one week to three months.
   c) Natural Work Teams (NWTs) - These teams consist of small groups of skilled workers who share tasks and responsibilities. These teams use concepts such as employee involvement teams, self-managing teams and quality circles. These teams generally work for one to two hours a week. They develop new ideas to improve productivity and cut costs in the organization.
6. **Leadership** - It is possibly the most important element for managing quality. It is required at every level in the organization. Leadership requires the manager to provide an inspiring vision, make strategic directions that are understood by all and to instil values that guide subordinates. To be successful in the business, the supervisor must be committed in leading his employees. A supervisor must understand and believe in quality and then demonstrate their belief and commitment through their daily practices. The supervisor makes sure that strategies, philosophies, values and goals are transmitted down throughout the organization to provide focus, clarity and direction. Commitment and personal involvement is required from top management in creating and deploying clear quality values and goals consistent with the objectives of the company and in creating and deploying well defined systems, methods and performance measures for achieving those goals.

iii) Binding Mortar

7. Communication - It binds everything together. Starting from foundation to roof of the quality house, everything is bound by strong mortar of communication. It acts as a vital link between all elements quality. Communication means a common understanding of ideas between the sender and the receiver. The success of qualitative organisation depends on communication with and among all the organization members, suppliers and customers. Supervisors must develop open communication system where employees can send and receive information about the quality process. Communication coupled with the sharing of correct information is vital. For communication to be credible the message must be short, simple and straight forward for receiver.

   There are different ways of communication such as:
   a) Downward communication - This is the dominant form of communication in an organization. Presentations and discussions basically do it. By this the supervisors are able to make the employees clear about quality.
   b) Upward communication - By this the lower level of employees are able to provide suggestions to upper management. As employees provide insight and constructive criticism, supervisors must listen effectively to correct the situation that comes about through the use of quality principles. This forms a level of trust between supervisors and employees. This is also similar to empowering communication, where supervisors keep open ears and listen to others.
   c) Sideways communication - This type of communication is important because it breaks down barriers between departments. It also allows dealing with customers and suppliers in a more professional manner.

iv) Roof

8. **Recognition -** Recognition is the last and final element in the entire system. It should be provided for both suggestions and achievements for teams as well as individuals. Employees strive to receive recognition for themselves and their teams. Detecting and recognizing contributors is the most important job of a supervisor. As people are recognized, there can be huge changes in self-esteem, productivity, quality and the amount of effort exhorted to the task at hand. Recognition comes in its best form when it is immediately following an action that an employee has performed. Recognition comes in different ways, places and time such as,
   - Ways - It can be by way of personal letter from top management. Also by award banquets, plaques, trophies etc.
   - Places - Good performers can be recognized in presence of their department colleagues, on performance boards and also in presence of top management.
   - Time - Recognition can be given at any time like in staff meeting, annual award banquets, etc.

These eight elements are key in ensuring the success of quality in an organization and that the supervisor is a huge part in developing these elements in the work place. Without these elements, the business entities cannot be successful quality implementers. It is very clear from the above discussion that quality without involving integrity, ethics and trust would be incomplete. Training is the key by which the organization creates a quality environment. Leadership and teamwork go hand in hand. Lack of communication between departments, supervisors and employees create a burden on the whole quality process. Last but not the least, recognition should be given to people who contributed to the overall task.

Hence, led by example, train employees to provide a quality product, create an environment where there is no fear to share knowledge, and give credit to deserving people is the motto of a successful quality organization.

Why higher technical institutions need to apply TQM principles?

Quality Management is a philosophy and system for continuously improving the services and/or products offered to customers. Now that the technologies of transportation and communication have substituted national economic systems with a global economy, nations and businesses that do not implement Quality Management can become globally non-competitive quickly. This non-competitiveness can be prevented if societies are trained to become Quality Management advocates. Many engineering graduates are remaining unemployed. The recruiting companies are pointing to the fact that the students are lacking in the basic knowledge and employable skills. The industry is suggesting educational institutions to upgrade academic standards. The increasing competition between various private and government academic institutions and reduction in the pool of funds for research and teaching, institutions are under pressure to renovate their systems to access the scarce funds. According to Crosby (1984) unless strategy is focused on the quality of the teaching system and improvement, dreams of the engineering graduates cannot be fulfilled. The possible advantages of Quality Management in Higher technical institutions are very clear like:

- Quality Management will support educational institutions to create an upgraded service to its customers namely the students and employers.
- The consistent improvement focus of Quality Management is an essential component for satisfying the accountability essential to educational reform.
- Executing a no-fear Quality Management system offers more exciting challenge to students and teacher to empower teamwork and cooperation with one another. In that way, each observation can be utilized to help each other for better advancement.

Therefore, if Quality Management techniques are well facilitated and thoroughly implemented, while the basic principles and practices are accepted and executed, Quality Management methods will be a great help to have a successful development in upgrading the quality of education institutions provide to make their students be more competent and competitive globally to face our fast progressing world.

Barriers for bringing quality in Education

i) **Conflict:** There is often a conflict between administration and academic functions. The two groups often form parallel worlds without a shared vision or mission for the institution. A total quality approach requires that the two conflicting groups work together to meet customer expectations;

ii) **Divisionalization:** Within the academic group, there is often too much divisionalization. Those who belong to the science subgroup and those who belong to the arts and languages subgroup may consider themselves as rival groups. They often lock horns competing for the same resources. Identity with the entire institution must take precedence over subgroup identity.

iii) **Resistance:** Most schools have entrenched culture that may create resistance to change. The teaching profession is individualistic as well as team-based. Educational institutions have often a myth that they do not have to adopt change compared to manufacturing and service organizations. There is a tendency to place the responsibility for poor performance on individuals as opposed to the system. Management may claim that the teacher was less knowledgeable, the student was ill-prepared or the curriculum prescribed by government was inadequate.

iv) **Customer:** The concept of a customer may be difficult to adopt in an academic environment. Faculty believes that student is a learner and whatever the faculty says should be obliged by student without any arguments. However, in today's world, students do not have to depend on faculty alone for learning. They have wide variety of sources for learning including guides available in market for exams preparation and internet for additional knowledge. The student cannot be satisfied until faculty offers something unique that the books and internet cannot provide them. So, time has come for faculty to recognise that student is their customer and they have to strive hard to offer quality services that are expected by customer.

v) **Standardization:** The need for control, measurement, and feedback systems for the purposes of standardization is unknown till now to academic environments. Institutions may have fear that standardization can harm creativity of faculty. Quality thinking promotes creativity as well as the standardization of processes that will yield desired outcomes.

Quality in Higher Technical Education

Quality in higher technical education is related to some specific goals like acquisition of knowledge, application of knowledge and transfer of knowledge. Harvey explains that national governments expect higher technical education to be more relevant to social and economic needs; widen access; be more cost effective; ensure comparability of provision and procedures, within and between institutions, including international comparisons; and be responsive to a range of stakeholders". Potter [5] identifies the key elements necessary for success as: commitment and example from top management; awareness of the cost of quality; knowledge of the tools and techniques; understanding of customers' specifications and satisfaction; pursuit of continuous improvement; and, belief that everyone has a responsibility for quality.

Quality in higher technical education is a multidimensional concept, which includes all the related functions and activities that from part of the academic life in a university system. Therefore, any framework for an assessment of quality should take into account the quality of students, teachers, infrastructure, student support service, curricula, assessment and learning resources. A number of factors, such as internationalization, marketing, proliferation, competition, expansion of higher technical education and greater accountability have brought the concern of quality of higher technical education to the forefront of national debate. Given below are some of the main indicators of quality education:

1. Faculty Quality

Faculty quality mostly depends on the environment the organization creates. The environment should be in such a way that it focuses on the knowledge, skills, sensitivities and techniques of faculty members, rather than on the courses they teach. Organisation should seek to change the structure, policies and organizational environment in which instructions takes place. Faculty quality depends on instructional development. It includes the systematic design, development, implementation and evaluation of instructional materials, lessons, courses and curricula. Training programmes such as Pre-service training programs, In-service training, seminars, conferences and workshops are to be arranged periodically.

2. Students Quality

Students' quality is considered as raw material in higher technical education institutions. The raw material needs to be processed by skilled faculty using quality equipment in conducive atmosphere provided by the institution. How the students are moulded depends on the quality of process used and their abilities and motivation.

3. Curricula Quality

Curriculum quality calls for special care in the defining objectives of training. The objectives should be based on requirements of the organizations and the needs of society. Teaching methods should be so designed as to make students more active, develop analytical skills and an enterprising spirit.

4. Infrastructure Quality

Infrastructure of the internal and external environment is important for success of educational institutions. It is one of the quality parameter. The infrastructure includes spacious classrooms, facilities for power point presentations by students and faculty, fully equipped Seminar halls, Libraries, facilities for e-learning, laboratories with advanced instruments, Computer labs, internet facility, and sufficient open space for students to gather and share their ideas and display their talents. Updated curricula, quality infrastructure, and flexible training programs, effective use of technology and interaction with industry are key to quality in educational institutions.

5. Management and Governance Quality

The management should recognize that educational institution is not a set of isolated departments but a coherent whole that interacts with its environment. It is impossible for higher technical education institutions to exist as isolated.

6. Accountability Quality

The quality of higher technical education is highly dependent on systemic evaluation and regulation. This involves inculcating a culture of evaluation within the institution.

Conclusion

Higher technical education institutions play a vital role in the development of society. Universities always had a crucial role in educating the potential professionals, businessmen, and political leaders, religious and social scholars, who serve the society. To enrich its values and develop its resources". They are highlighted in the national objectives of higher technical education. The Dearing Report underlined the importance of higher technical education in these words. For the state, higher technical education has become a crucial asset. Government must recognize what it will gain from ensuring the well-being of higher technical education. In return, higher technical education institutions must recognize their obligation to society as a whole.

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