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Quality Improvement of Higher and Technical Education Using Modern Total Quality Management Tools

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Abstract: -Technical education can play a crucial role in the economic and cultural reconstruction and development of the nations. For hundreds of years, the universities and effective educational systems are development factors and agents of change in their communities.

In the last decades , a lot of innovative experiments are being done to improve the performance and introduced several laws and constitutions for both academic and educational standards aimed to further develop and improve its ability to compete consistently by successive Indian governments, realizing the importance of this sector for socio-economic and cultural development and this requires an ideal governance and service delivery, but the system of higher and technical education in India must be reshaped, the strength must be maintained, but the weaknesses must be addressed and developed, to serve a new social order, to meet the pressing national as well as world markets needs, and to respond to a context of new realities and opportunities. Through this piece of work, this research paper is a theoretical attempt to explain the implementation of modern total quality management tools in higher and technical education institutions in India, and deals with issues related to quality in higher and technical education, and identify variables influencing quality in this sector.

Key Words:-Total Quality Management (TQM,),Education, Tools,

I. INTRODUCTION

In the last decades, several factors have contributed to raising public concerns over higher and technical education institutions quality, learning to the emergence of quality management and improvement devices such as performance indicators, accreditations, programme, and institutional assessment and quality audits, and there have been attempts to import models from the private sector in to higher and technical education institutions.

The overall scenario of higher and technical education in India not matches with global Quality standards. Hence, there is enough justification for increased assessment of the quality of the country's educational institutions. Generally, these institutions anticipated that Quality could be obtained by their internal resources, viz., faculty with remarkable set of degrees and experience detailed at the end of the institute's attractive admission brochure, number of books,perodicals, and journals in the library, an ultramodern and high tech campus, and size of the end of the endowment, etc., or by its definable and quantifiable outputs, viz., efficient use of various high tech resources, creating uniquely educated, highly satisfied and employable graduates.

Growing students' numbers, mass enrolment rates, and different type of program delivery, changing society structures and job descriptions produce complex question of quality in the institutions of higher and technical education. Inside the new roles and functions, higher education institutions must review their technical, managerial and social functions. The TQM evaluation model is a key tool for assessing the three-dimension function of higher education institutions.

Quality is the heart of education. It influences what students learn, how well they learn and what benefits they draw from their education. The quest to ensure that students achieve learning outcomes and acquire values and skills that help them play a positive role in their societies is an issue on the policy agenda of nearly every country.

II. CONCEPT OF QUALITY

Total quality management (TQM) is deliberated as a philosophy of modern management, which depends on several modern concepts and philosophies based on a combination of basic administrative means, innovative and creative efforts and focused technical skills to improve the level of performance and keep continuous improvement. The global transformations movement

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creates new conditions of economic, technical, political, social and cultural variables that make business organizations think twice about the quality of any objects that they will provide as products or services.

A. Quality has five different approaches, which are

1) In terms of excellent and high standards.
2) In terms of consistency
3) As a fitness for purpose
4) As a value for money through efficiency and effectiveness
5) As transformative in terms of qualitative change.

In TQM the quality movement initiated with quality improvement project in manufacturing industries; afterwards it started to spread to other services organizations including banking, insurance, nonprofit institutions ,hospitals, healthcare, government and educational institutions. So that the main concept of TQM is shifting from correcting problems after an incident to prevent it from happening from the beginning.

Quality requires a model for continuous improvement in designing, products and services, also for planning and changes implementation. This model called Quality Cycle or Deming Cycle, which also refers to Plan-Do-Check-Act (PDCA) Cycle.

III. TOTAL QUALITY MANAGEMENT IN EDUCATION

The thought of total quality, familiarized by Professor W. Edwards Deming in the 1950s, can be applied to nearly every organization up to a certain level. The term total quality views for the process of shifting the focus of the organization towards a superior quality of products and services.

TQM is a management philosophy that shapes a customer-driven learning organization, dedicated to total customer satisfaction through continuous improvement in the effectiveness and efficiency of the organization and its processes. Total Quality Management offers what is required, as judged by the client. It is done through everyone in the organization being committed to get desire results, a passion for quality and decisions created on performance data(Iftikhaar Ahmad Wani et al 2014)

TQM philosophy in education includes achieving higher quality, it also influencing all sections or part of the educational process: organization, management, interpersonal relations, material and human resources, etc. Applying the approach described above quality becomes total quality

The starting of total quality management requires a number of changes in educational institutions. And process.The first changes have to occur in the attitudes and activities of the management, in the organization and monitoring of the entire educational process, in the evaluation of its results, in the culture of communication, in the school atmosphere, and mainly in the area of interpersonal relations.

The success of total quality management depends on its eight components: ethics, integrity, trust, education, teamwork, leadership, recognizability and communication. The total quality management model includes the following: process planning, process management, continual improvement, total involvement and focus on the user TQM is all about quality management of the users, leadership and management loyalty, continuous improvement, prompt response, actions based on facts, the participation of employees in the TQM culture If an educational organization is constantly willing to direct its energies towards continues improvement, the philosophies presented above can lead to excellence in quality. (13)

IV. TOTAL QUALITY MANAGEMENT NEW TOOLS

In Today era educational institutions for higher and technical education are wide-open with global competition for the sustainability for a long run such as low graduation rates, less employability and rising questions of relevance of college education for public good etc.,

Few educational institutions in India have successfully implemented ISO 9001:2008. The quality of education is more important to the customers of the educational institutions such as students, parents and the organizations where they are getting employment after competing education.. Educational Institutions need an innovative supporting tool which supports in improving &refining the quality of processes pertaining to the important functions particularly teaching, research and service.

There are a wide range of TQM tools;. The following is a list of widely used tools. There is no tool that is best for every application; the knowledgeable expert is aware of a rich variety of tools and uses the appropriate one according to suitability.

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A. Process maps

For improving the process mapping of the process is required. While there are several different approaches to process mapping, the key is to determine who does what at each step of the process. Repeatedly, the simple drawing of a process map is sufficient to solve many quality problems because the map makes it so obvious where defects can be introduced the Training Module can be developed in higher education involved in designing processes, preparing manuals or reviewing processes. Process map can also prepare for examination system.

B. Poke-A-Yoke"

This concept of the Japanese management philosophy is to make a process foolproof. A poka-yoke is mechanism in a lean manufacturing process that supports an equipment operator avoid (yokeru) mistakes (poka). Its main purpose is to eliminate or remove product defects by preventing, correcting, or drawing attention to human errors as they occur in process . The idea is to design the process in such a way that it is self-checking or incorporates process steps that cause instant detection and possible correction of any defect. (07)

Simple examples include color-coding and special keying of parts to ensure that they are assembled the right way.

1) Automatic closure of classroom doors as soon as the teacher enters the classroom and when the lecture starts on schedule so that no late coming is possible. Only the faculty s fingerprint can unlock the door in case of any demand or emergency.
2) Smart attendance of students recording on a tablet.
3) A scanner that can detect any dress code that is not aligned with the formal dress code of student or faculty.
4) Closed circuit television cameras to identify deviant behaviors within the premises of education institute.

C. Statistical Tools

One of Deming's major helps to the quality movement as the introduction of statistically stranded approaches to the analysis of defects. Without the use of these tools, one can often make incorrect decisions regarding the cause of a problem. This can repeatedly lead to exactly the opposite effect of that being sought. Various tools in this series are statistical process control (SPC) charts, Pareto Charts, and histograms. Statically tools are very useful for educational institute for showing various data; It is also useful in Higher education for research of students and faculty.

D. Root Cause Analysis (Five Whys

Root cause analysis is a structured team process that supports in identifying underlying factors or causes of an event**.** The Five Whys is a simple problem-solving technique that helps to get to the root of a problem quickly. (12)

The Japanese popularized this tool. Five Whys is an questioning technique used to discover the cause-and-effect relationships underlying a particular problem It consists of asking a series of questions (whys) until one discovers the root cause of a defective product. The main of this study is to determine why a defective product was produced. This is to be distinguished with the usual approach of just fixing the defective product or replacing it. For Pre-service teachers RCA teaching strategy training, including the theory and practice of root cause analysis(RCA). RCA teaching strategy is a method of finding out the root causes, and it develops students' habits of thinking all likely causes.

E. Fishbone Diagram (Ishakawa Diagram

The fishbone diagram classifies many possible causes for an effect or problem. It can be used to plan a brainstorming session (08). It immediately sorts ideas into useful categories. This tool is also called a cause-and effect diagram. It is used in a brainstorming session to scrutinize factors that may effect a given situation or outcome. The causes are frequently grouped into categories or classes such as people, material, method or process, and equipment. The resulting diagram takes the shape of a fishbone, hence the name. Educational Institute improvement planning can be done by Fishbone Diagram.

F. The Plan-Do-Check-Act (PDCA) Cycle

The plan–do–check–act cycle is a four–step model for carrying out change. Just as a circle has no end (15), the PDCA cycle should be repeated again and again for continuous improvement of quality . This tool is also recognized as the shewhart Cycle. Deming promoted it in Japan; as a result the Japanese refer to it as the deeming Cycle. The tool highlights a new plan for change. It carries out tests to make the change on a small scale, observes the effects, and lastly, studies the results to determine what has been learned.

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The cycle is repeated as needed. Teaching skills, knowledge and abilities appropriate for occupation-ready graduates and assessing learning are complex issues. Developing an effective and reliable method is often by trial and error. Instead, of this one can used Deming's PDCA Cycle of continuous improvement as a systematic procedure to incrementally move closer to their goal in any educational institute.

G. Brainstorming

This process has become a foremost of the TQM movement. The concept is to call participants to suggest "solutions" to a problem without any evaluation of the usefulness or correctness of their ideas. Numerous different approaches are possible, including open suggestions, rotating suggestions, or blind suggestions. There are many computer tools that have been developed to assist in this process. After a fixed period of time, or after all suggestions have been made, there is discussion of the "value" of the suggestions given by various experts. For achieving aims and objectives of teaching social studies teachers are supposed to use different techniques like group work, class discussion, role play and brainstorming etc.

Technique of brainstorming is depending on the capability of human brain to make relationship. let see when any science student see or hear the term "plant" automatically brain associated it with other words like leaves, roots and flowers etc as learner.

H. Affinity Diagram

The affinity diagram tool is used to establish large amounts of non-quantitative ideas, opinions, issues, etc. information into groupings based on natural relationships between the items. It is largely a creative process instead of a logical process. The affinity diagram sort out for ideas what statistics sort out for numbers, viz. extract meaning from raw data. The affinity diagram process is regularly used with the outcomes of a brainstorming session to organize the resulting ideas.

Affinity diagrams can be used by the class or individual students to brainstorm information and ideas which are then organized into categories.

1) *Examples in educational institute:* Grouping of curricular concepts, ideas, or vocabulary into categories to facilitate learning; grouping of actions or beliefs into categories to facilitate problem-solving, writing mission statements, etc.

I. Interrelation Digraph

This tool encourages team members to think in multiple directions rather than linearly discovers the cause and effect relationships among all the issues, including the most controversial It is also called interrelationship diagram or digraph.(10)Relations Diagrams are drawn to show all the different relationships between factors, areas, or processes This tool takes complex, multi-variable problems, or desired outcomes, and discovers and displays all of the interrelated factors involved. It graphically displays the logical and often causal relationship between various factors. It is often used in conjunction with the results of an affinity diagram exercise to seek causes and effects in order to determine why corrective action needs to be applied.

Multidirectional thoughtful process is used in this tool. It is used when the problem is too complex and it is thought to be the root cause for many other problems.

1) *Tree Diagram:* This tool is used to methodically map out, in increasing detail, the full range of paths and tasks that need to be able to achieve a primary goal and every related sub goal. Graphically, it look like an organization chart or family tree. It is used to break down broad categories into finer and finer levels of detail. Developing the tree diagram helps you move your thinking step by step from generalizations to particulars. Tree diagram can be used as an assessment tool to measure students' knowledge structures in statistics education.

J. Quality function deployment (QFD)

Quality function deployment or QFD is a Japanese technique used extensively by Japanese companies and gradually introduced by many leading Western corporations when designing a product. QFD involves finding out what customers want before designing new products or services and guaranteeing that at every stage of the design process the customers' needs are considered and integrated. It is generally accepted in TQM circles that while a new product may be technically acceptable. In today's educational marketplace, we have to decide that what are the factors that make one institution different from another? The basic curriculum is usually the same for all institute or universities. It is the value-added which gives an institution the superiority. Searching that value-added is usually not an easy task. It needs careful listening, complete market research and careful analysis of need of customer. Generally educational institutions provide only what they think their customer groups need. The QFD technique involves deciding

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what the critical characteristics of any new product.QFD recording these at each stage of design and production and establishing the customer requirements for them.

K. Prioritization Matrices

Prioritization Matrice can support you decide what to do after key actions, criteria or Critical-To-Quality (CTQ) characteristics have been recognized, but their relative importance (priority) is not known with certainty. Prioritization matrices are mainly useful if problem-solving resources, such as people, time or money, are limited, or if the identified problem-solving actions or CTQs are strongly interrelated (14). Prioritization matrices are important group of decision making tools that help to prioritize tasks, issues, or possible actions on the basis of agreed upon criteria. These tools cannot make decisions, but they can support to ensure that all factors are evaluated and that logical decisions are stretched. This tool can be used for comparison of results may vary from one organization to another. Prioritization Matrix helps you in narrowing down the activities or projects by finding a beneficial order of getting the most vital things done first. It works on assignments and projects whose relative importance is not yet known.

L. Activity Network Diagram

This tool includes a wide range of project management tools used to plan the most appropriate schedule for a complex project. Classic examples of these diagrams are Gantt Charts PERT, and CPM charts. These tools project likely completion time of project and associated effects and provide a method for judging compliance with a plan. Some excellent computer programs exist for automating the work associated with this class of tools.

M. Kaizen

Kaizen is the practice of continuous improvement. Kaizen was originally introduced to the West by Masaaki Imai in his book Kaizen: The Key to Japan's Competitive Success in 1986(11)The Japanese word Kaizen states to continuous improvement. It is taken from two Japanese words "Kai" meaning "change" and "Zen" meaning "good". Today competitive market requires individuals to think of methods to continuously improve the products and services, at all levels in the organization. In educational institute Students can adopt Kaizen by putting effort to develop Kaizen thinking. It involves acquiring the ability to identify waste and learning the different methods of reducing waste through a step by step approach until it is removed.

N. ISO 9000;

In fact, ISO 9000:2000 is defined as a quality management system to direct and control an educational institute with respect to quality. A quality system is a tool for controlling and improving the quality of the company's products and processes. The system must be documented, because documentation of the system is a key foundation for quality audit. in different contract situations. "ISO 9000" is the commonly used name to label a series of international standards.

for quality assurance within organizations: ISO 9001, ISO 9002, ISO 9003, ISO 9004 (and their subsets). The most important norms to be considered in the context of this contribution are ISO 9001 and ISO 9002. The official title for ISO 9001 is "Quality systems.

Following are main benefits of ISO-9000 in Educational Institutes.

1) For the promotion and campaign of a high quality brand image, with high vision and credibility for educational Institute.
2) It is a way of replying to external factors, in particular pressures from customers (directly or indirectly), governments or funding agencies.
3) It is systematic a method for developing a full quality assurance system which covers the whole educational institute.
*4)*The need to improve a number of definite activities of the institute , which are currently critically managed.

V. RECOMMENDATIONS

With reference to the literatures and conclusions of the study, the following recommendations are offered:

Higher and technical education has been challenged to continue improving the quality of academies; increasing participation by all sectors of society; and by a new set of cooperative relations and partnerships between higher education and all stakeholders. Universities and academies are more concerned than others, so they must become more innovative leading to quality institutions of knowledge creation, and being to increasingly higher standards by the many groups to which they provide better programs and services.

Higher and technical education institutions should more and more take in to account customers perception, especially students on

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what ever offered to them, and not the long – lasting old paradigm, which frequently are just the result of a benchmarking that does not consider individually and the characteristics of each institution. In this way, it becomes clear that it's necessary to spread professional management practices in the higher education institutions, which no doubt suggests a boarder understanding concerning a service provider organizations.

India needs education that envisages a new system of higher and technical education characterized by increased effective participation by all sectors of society by greater institutional responsiveness to policy imperatives and by a new set of co–operative relations and partnerships between higher education and the boarder society.

Results of TQM often did not happen simultaneously and quickly, depended on leadership in each department. It always needed patience in reaching results of TQM application. The commitment from top management to the lower level is very important matter for better implementation and result,

The government should enhance just practices, and eliminate nepotism, favoritism, and unethical practices which negatively affect all society members. Decision makers in both public and private sectors should internalize patriotic orientations and abandon nepotism

VI. CONCLUSION

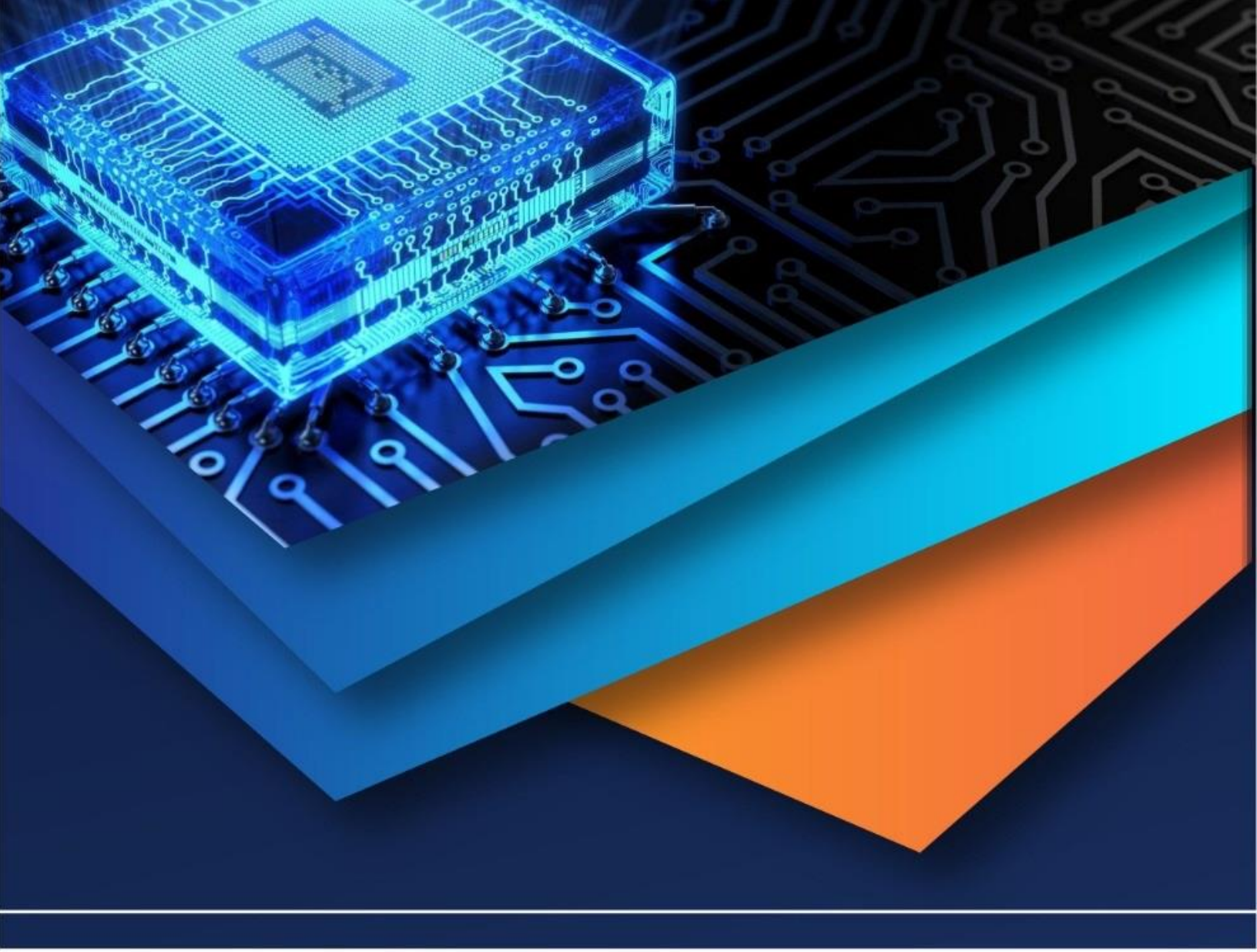
Quality should be about constant improvement and excellence, and because of the higher and technical education effect on the society and individuals, TQM should be adopted in a manner to raise quality in the educational process. Therefore, universities start to have their own quality and development department to keep track of the quality in the educational process by implementing the TQM. TQM has many effects on the educational process and on the institution overall, those effects ensured continues improvement and progress towards excellent institution and hence competitive.

TQM is about quality and competitive will kept increasing in the future, besides a well-organized TQM model methodology such as six sigma should be applied to ensure continues risen of the quality with more efficiency and more insurance.

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