

Importance of Quality Concepts in Education Industry in the Current Trend – Review

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ABSTRACT

Quality is the main important key aspects in the global scenario in the recent past. Without quality nothing cannot be improved in the processes done by the individuals in every day today activities. In this work quality concept in education applications is focused in extensive way. Higher learning engineering institutes taken as important focus to study the various metrics in terms of evaluating the quality function in education performance system and other allied areas like research, funding etc. To implement Quality culture in any organization all members must coordinate themselves in professional conduct without violating the quality principles in education system. The most important factor in bringing the quality system in education industry is to empower all minds of people by properly guiding them as team. Next important factor is respect for others as per TQM principles every persons working in organization must respect other ideas and feelings without showing any discrimination with respect to caste, religion and other Alma matters. Employee empowerment, team work and respect for others are the main key element which helps to improve the quality system of organization. In this paper pros and cons of present education system in engineering institutes are discussed with valid background through survey mechanism.

Keywords-- Quality Improvement, Higher Learning Institution, Quality Principles, Education Performance System, Quality Work Culture

I. INTRODUCTION

Every process development and management function inside a business depends on quality as their primary determining factor. Recently, there has been a greater emphasis placed on the value of quality in higher education institutions. Every employee must be given a deeper understanding of TQM principles without having an impact on people's work cultures. The first step in reaching the quality philosophy in all processes is to direct suitable procedures and guidelines towards every person.

In this paper, an effort has been made to concentrate on the recent quality of technical education in India by surveying mechanisms.

Since the pandemic situation in India, quality culture in the educational environment has declined too much due to the system's use of digital technology. In terms of teaching and learning, the environment for conducting research, and other facilities, etc., the technical education system is stated to be just marginally better than average in the post-pandemic instance. However, because classes were virtual after the pandemic and examinations were being taken online, we lost physical connectivity. Even with the prevalence of online exams, fraud of all kinds still occurs occasionally.

As the digital education system has developed, many universities have given software branches like machine learning and data science as well as many related new branches in engineering disciplines more priority. But once-evergreen fields like civil engineering, mechanical engineering, and automobile engineering are now in a declining phase. In these courses, nobody is prepared to enroll. However, some higher level technical institutes' quality of instruction falls short of what is required by university standards.

Numerous institutions of the central government, such as IIT, have made an effort to educate the general population about the value of engineering's main branches and its many career prospects, such as mechanical, civil, and automobile engineering. However, a large number of people are also turning to IT-focused programmes. There are still a large number of open seats in core departments at colleges nowadays. According to recent research reported in Indian Express, Hindu, etc., this is the situation of engineering education in India right now.

One of today's large mass marketplaces that must be driven solely by service and customer pleasure rather than money is the education sector. The institution will only be successful if the workplace culture is appropriate and staff and student morale are higher. However, many

technical educational institutions in India's national level region lack this nowadays. The work culture in the majority of the education sector is completely behind management principles like the TQM (Total Quality Management) philosophy.

Engineering students today face many challenges when learning and completing real-world projects in any technical institution. The quality of engineering education in technical institutes has declined, according to an HINDU poll conducted on August 19, 2015.

The quality of engineering has declined too much during the past ten years, particularly in Tamil Nadu. According to Dr. E. BalaGurusamy, the former VC of Anna University, most institutions lack competent faculty to handle engineering subjects. The information obtained at the end of the day is zero because there is no interactive teaching style used in the engineering education system;

rather, the teaching is done by merely writing questions and answers for the problems. The education sector has been growing this tendency recently. The quality policy is also not being properly implemented by organization staff. Inadequate infrastructure, a weak ethical climate, and other factors are some of the main reasons why the quality of engineering education has decreased.

A thorough understanding of the fundamental principles guiding quality management policies is crucial for achieving success in the educational functional system, from top to bottom level management functions. Along with effective teamwork, leadership and the capacity to comprehend the thoughts and feelings of people are the only things that may propel an organization to new heights.

1.1 Educational Business model in Engineering : Framework

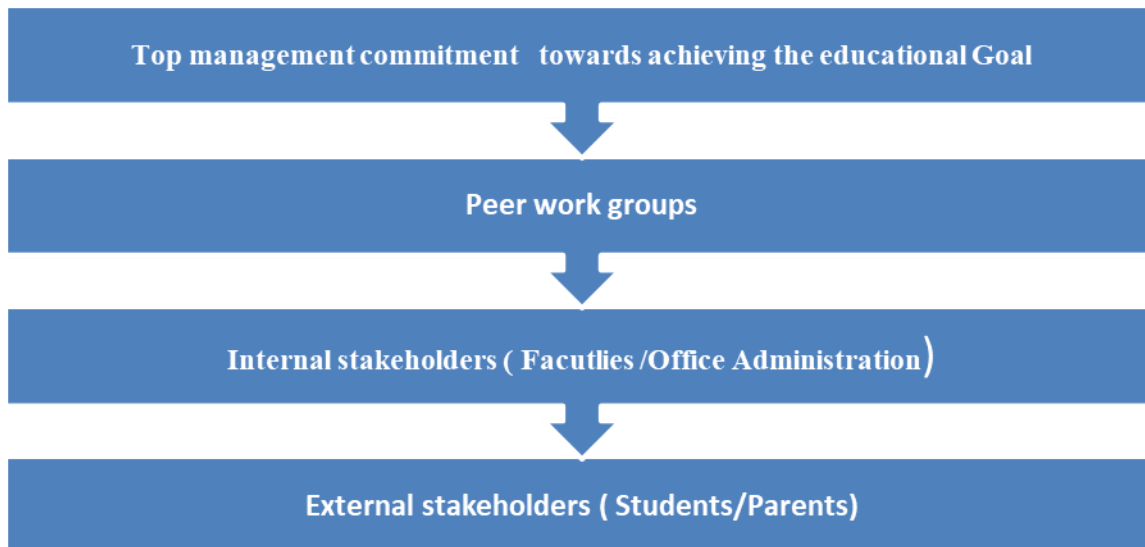


Figure 1: Educational process Model Framework as per TQM Methodology

This section presents a thorough flowchart approach that can be used to improve organizational culture, as shown in figure 1. The aforementioned process model serves as a standard for establishing best practices in fostering a culture of excellence inside the organization. The senior management's dedication to achieving quality in education is shown in layer 1 of the illustrated chart. In the organization's second layer, which comes after, peer groups are discussed. Internal stakeholders including faculties, office staff, and others are discussed in layer 3 of the model. Students and parents are mentioned as being the most significant external stakeholders in Layer 4's description of the business model for education. The key component of the education process model is found in layer 4, which is the last of four layers, and which aids in measuring the organization's achievement of its desired

outcomes or process performance. By offering high-quality education, including effective teaching and research, as well as a supportive ethical environment, external stakeholders' levels of satisfaction are determined.

If any one of the layer out of 4 layers tends to weak the entire process model will get affected as a whole. So enough care must be taken to strengthen the relationships between various management peoples within the organization for maximizing the quality in education.

II. LITERATURE REVIEW

In this section extensive literature survey is conducted on quality concepts in engineering education as listed below:

Ravishankar V Korgal [2016] Total productive maintenance (TPM) is currently the most widely used application philosophy in the current industrial environment, with the automobile industry accounting for the majority of its use. However, there are only a few examples of TPM application in the area of quality and effectiveness in the engineering education sector. This essay looks at the fundamental ideas behind TPM and assesses the important literature around the use of TPM programmes in engineering education. Reviewing the research on Total Productive Maintenance (TPM) and providing an overview of TPM implementation strategies that have been proposed or accepted in the engineering education sector are the two main goals of this essay.

Abdul Talib Bon [2013] The goal of this paper is to evaluate the literature on the connection between total quality management (TQM) and innovation in services organizations and to create a conceptual framework for future research. The most current research that looked into the relationship between TQM and innovation and included service industries in their scope have been reviewed. The TQM practices in service organizations are discussed, and a conceptual framework and model are suggested.

Kelly C. Margot [2019] Understanding teachers' thoughts and attitudes about the development of STEM talent is crucial for schools to provide high-quality STEM education. Teachers have a crucial role in the talent development of students, and they have prior knowledge and experiences that might affect how they teach STEM subjects. This study looks at the available literature to understand what is known about teachers' perceptions of STEM education.

Jaziar Radianti [2020] Virtual reality (VR) uses and advantages have been studied in a variety of contexts. VR has a lot of promise, and recent study has been increasingly interested in its use in education. However, there is currently little systematic research on how scholars have used immersive VR for academic purposes that takes into account the use of both expensive and inexpensive head-mounted displays (HMDs). As a result, we suggest employing systematic mapping to pinpoint design components of previous studies devoted to the use of VR in higher education. Key information from papers indexed in four scientific digital libraries that had been thoroughly screened using exclusion, inclusion, semi-automatic, and manual approaches was extracted to create the reviewed articles.

Guillermo Fuertes [2020] The goal of this work is to review the literature on the key ideas that influence strategic approach determination, strategy development, organizational structure, strategy formulation, and strategic evaluation as a framework for organizational management, taking into account the impacts of various types of

strategies on the performance of organizations. The results of numerous investigations and scientific publications were synthesized in this paper using the systemic literature review method.

Marian Daun[2022] Requirements engineering (RE) is now recognized as a fundamental aspect of software engineering. It is well accepted that strong RE results in higher-quality software and significantly lowers the chance of project failure or budget overspending for software development. Future software engineers must receive RE training, and future requirements engineers must receive education in order to effectively manage requirements across diverse projects. There is still no agreed-upon definition of what RE education should cover. In order to establish the groundwork, we report on a thorough literature assessment of the field and offer a systematic map outlining the condition of RE education as it stands today. We can characterize the changes in the educational environment during the past ten years by doing this.

K.G. Durga Prasad [2012] The DMAIC (Define - Measure - Analyze - Improve - Control) technique, part of the six sigma five phase methodology, is used in this work to build a novel approach with the goal of enhancing quality in an engineering educational institution. In the Define phase of the technique, Critical to Quality (CTQ) flow down is formed, and SIPOC (Supplier - Input-Process- Output - Customer) chart is built. In the Measure phase, process capability indices are calculated. Fishbone diagrams are created to identify multiple reasons during the analyze phase, while Pareto diagrams are created to rank problems according to importance. In the Improvement phase, failure mode effect analysis is done to foresee potential failure types.

Malini Natarajarathinam [2021] Recently, engineering education has shifted its emphasis to include community engagement. Systematic studies that list best practices and pinpoint research trends and gaps are still rare, though. This systematic review, which examined papers on community participation initiatives in engineering education from 1980 to 2019, aims to produce conclusions and insights. With a variety of tested concepts and fresh discoveries, this study offers guidance for community involvement practice and future research.

Efthimia Staiou [2006] Institutions of higher learning have been dealing with difficulties for a while, and additional difficulties are anticipated in the future. Quality is becoming more crucial in the new context that higher education has entered. One of the most distinguishing traits of higher education worldwide during the past ten years has been a focus on quality improvement. Many universities and institutions in the higher education sector have recently embraced Total Quality Management. Engineering education schools and

universities have no choice but to adopt TQM and benefit from its predicted advantages.

I.J. Oluwafemi [2019] Total quality management has received a lot of attention in this area as a result of the screaming for improvement in educational quality from many institutional stakeholders. A lot of emphasis has been placed recently on the need for quality improvement, and attempts are being made to find strategies to raise the worldwide educational standard. Any tertiary institution's productivity particularly that of engineering colleges is centered on the quality culture of those institutions. In addition, customer satisfaction is another factor to take into account in order to attain the desired productivity.

Vijayan Gurumurthy Iyer [2018] The term "sustainable national development" (SND) refers to a type of national development that satisfies current demands without jeopardizing the capability and effectiveness of future generations to satiate their own requirements [25, 26, 27]. Vijayan Gurumurthy Iyer, 2004 World Engineers' Convention (WEC), Shanghai, China. Total Quality Management (TQM) or Continuous Improvements System (CIS) is a collection of systematic actions taken by an institution to effectively accomplish institutional goals that satisfy beneficiaries at the proper time and cost. TQM or CIS can be a thorough and organized method of managing an educational institution that aims to enhance educational services by making adjustments in response to ongoing input.

Abu Saleh Md. Sohel-Uz-Zaman [2016] Many societies around the world place a high priority on high-quality education. The success of academic institutions in a highly competitive educational market depends on the caliber of instruction they provide. Since total quality management (TQM) is acknowledged as an effective management concept for continual improvement, customer satisfaction, and organizational excellence, educationalists, policy makers, scholars, and researchers are demonstrating a real interest in TQM. Since this idea was first created in the manufacturing industry, there is a lot of doubt over whether this philosophy can be used in education.

Sumit P. Raut [2014] Through a student feedback survey, this research seeks to better understand the concepts of total quality management and gauge the degree to which TQM has been implemented in the Mechanical Engineering Department. According to the more recent demands made on the self-financed educational system by the many stakeholders, the technical educational system in particular has come under pressure to change its emphasis from one on quantity expansion to one on quality.

Suneel Ramachandra Joshi [2019] In engineering institutions, the approach to teaching and learning has changed from earlier times. It offers fresh

insight and depth. Technology improvements have significantly altered the way that engineering colleges teach their students. More than merely lessons on a blackboard are now included. To assess the caliber of the teaching and learning methods, the student feedback and other performance metrics have been introduced. To promote excellence in various industries, Total Quality Management was introduced. The paper discusses the value of incorporating that tried-and-true improvement method into engineering education. Spreading the TQM philosophy into engineering institutions' new teaching and learning methods is the research's main accomplishment.

This section outlines about the research aspects in quality concepts of education in engineering Institutes across the national and international level. But in this work attempt has been made to collect the survey based on the perception of quality aspects in engineering education at the national level.

In the literature survey importance of TQM is clearly stated by every researcher in their own perspective.

III. TQM PRINCIPLES IN ENGINEERING EDUCATION SYSTEM – CASE STUDY

The importance of TQM philosophies plays a vital role in today's organizational system. In the recent past many engineering institutions are facing several issues to sustain quality in education process and research. Most of the newly constructed engineering colleges are not having proper infrastructure as well as better qualified faculties to teach the subjects. This is the most recent problem faced by many of the engineering colleges in India. In today's recent times most of the small and medium level engineering institutions are shut down due to low intake and poor quality of resources such as class rooms, Labs and Human resources etc.

In this case study the brief survey is conducted to analyze the possible causes and effects of poor quality principles followed in engineering education through surveying method.

The well designed Google form with following metrics such as Quality policy of education, Faculty and student's quality, subject content delivery by faculties etc are some of the main key components included in the Google sheet.

Organization Background

Let us consider engineering institution (Beta engineering college) situated in southern region of Tamil Nadu started before 20 years ago. The institution has four branches (MECH/CSE/IT/EEE) nearly 1500 students are studying currently and total of 90 faculties working in various departments. At present institution faces certain issues in the last 3 years due to decline in engineering

standard. At the same time decline in the quality of faculties in every departments is measured to be one of the key issues. Since faculties are the main backbone for institution for upliftment. But here there are no good

qualified and experienced staffs. Students also declining in quality due to poor updation of basics fundamentals. The cause and effect diagram is illustrated for detailed analysis of education quality as shown below:

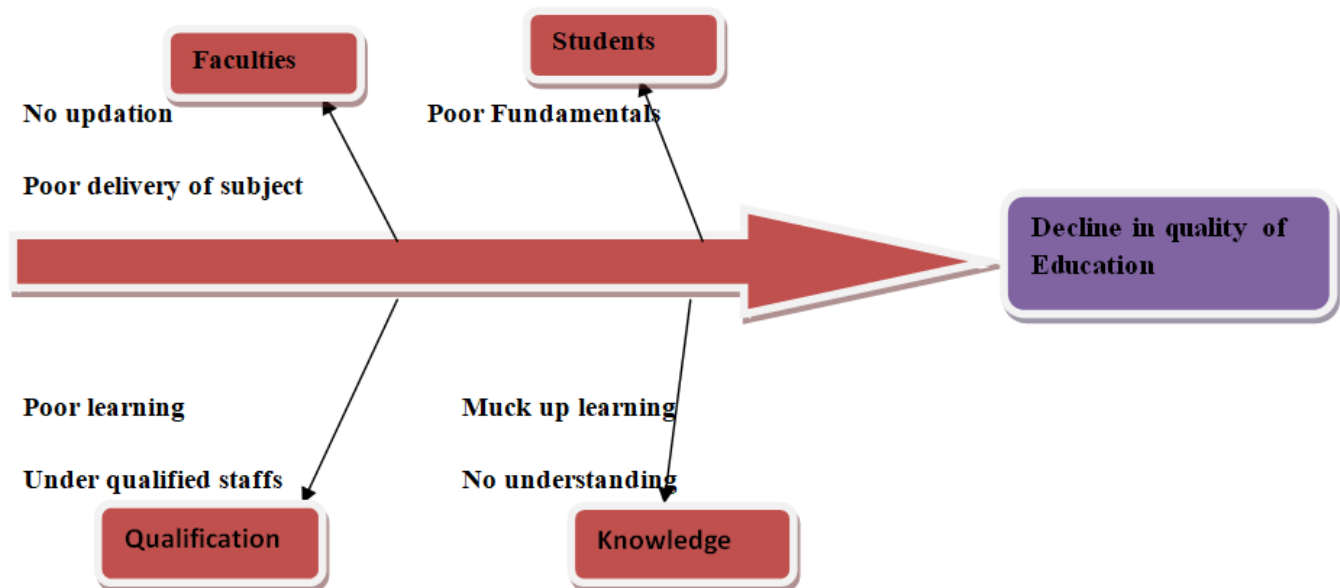


Figure 2: Cause and Effect Diagram for Declining in Education Quality

From fig 2. It is illustrated that there is too many mismatches between various elemental factors say faculties and qualifications as well as students and knowledge attributes of students these are the various elements fixed as shown in fig 2. Based on that causes and effects are listed out through detailed analysis with the help of graphical illustration say cause and effect diagram. Now the management of the institutions framed survey committee to collect the feedback from internal and external stakeholders of organization through surveying mechanism.

The following are the questionnaires framed in the survey form as listed below:

1. Whether the educational objectives are met as per industry needs?
2. How you rate the quality of faculty and students in the organization with respect to today's recent trend?
3. Is the faculty well prepared in subjects handled by him?
4. Whether all students and faculties strictly following TQM applications in Education system as per NAAC/NBA?
5. Is the Faculty utilizing research facilities within the organization?
6. Whether the goals of Quality policy by the organization met are not?

The above questions are framed and forwarded to various stakeholders like faculties and students.

IV. RESULTS AND DISCUSSION

Based on the responses given by the various stakeholders within and outside the organization as discussed here below:

1. 50 % of the respondents says that goal of organization in terms of quality policy is not properly met.
2. Another 50 % of the respondents say that the faculties are not utilizing the resources like research.
3. 75 % of the respondents says that both faculties and students are not following TQM principles in education
4. 66.7% of the respondents say that faculties are medium quality with respect to subject standards and knowledge.

From fig 3. It is clear that human resources in educational institutions are not properly utilized due to lack of awareness about TQM principles. Next research facilities not properly used by the faculties for continuing the research activities within the lab set up. Finally the goals of quality

policy by the institution are not followed well by the institution.

These are the above inference from the statistical results and discussions.

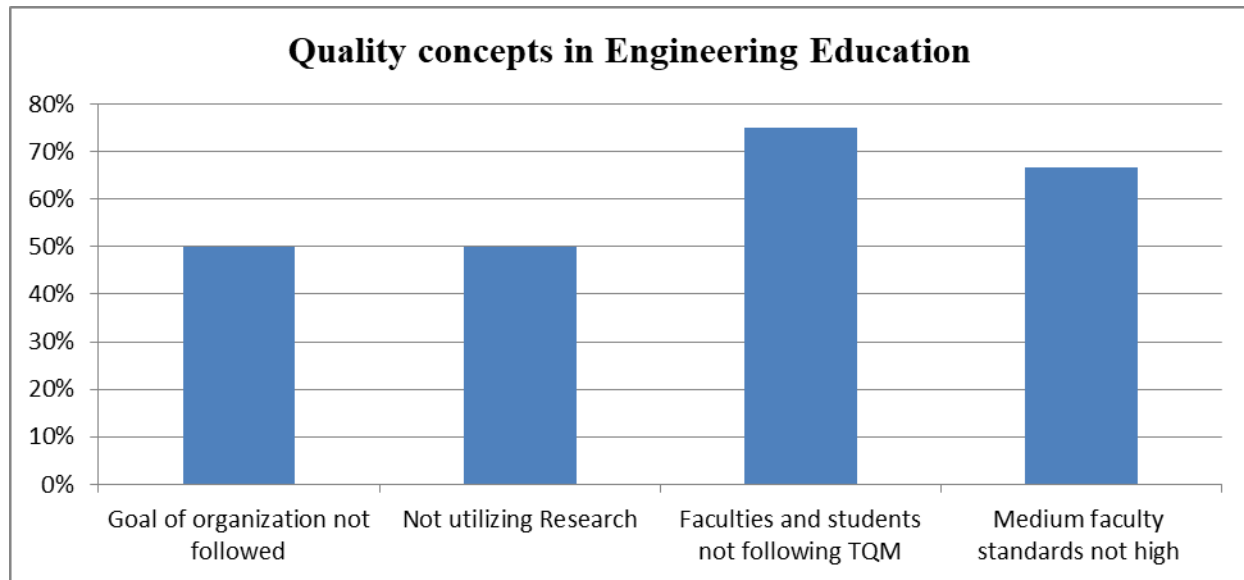


Figure 3: Graphical illustration of Responses given by various respondents

V. CONCLUSION

The key element for any organization's successful upliftment is quality. To meet the objectives, every employee in the firm must adhere to proper quality management principles. Successful execution of organizational procedures and functions depends on a thorough understanding of organizational policy. In these papers, the main focus is on quality ideas in technical education, followed by a case study analysis of educational institution performance. The quality of education and its significance in promoting the standards in various areas, such as teaching, research, and funding, are also determined by conducting a thorough survey of various stakeholders. Every educational institution must adhere to TQM concepts, with sufficient awareness and oversight from staff members in various Department positions.

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