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THE QUALITY CONSCIOUSNESS IN ENGINEERING EDUCATION 'AN ALARMING ATTENTION'

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Key Word: Quality consciousness, Motivation, **System**, **Education.**

ABSTRACT

The quality education is mainly about the economy of the country because it is the economic development, which depends on quality of education. Quality education does not mean only literacy, formal education, and acquisition of knowledge. The quality education facilitates the physical, mental, social, emotional, and spiritual development of a person. Many private institutes have entered in the field of Technical Education. Postgraduate training that are in the process of being recognized as approved research centers for Postgraduate and Doctoral Research work. Large-scale expansion of technical education in these days caused steep deterioration in the academic standards and the poor quality of technical education thus rendering the entire administration of engineering education a farce. Similarly, management of these institutes and Government Department and Agencies like MHRD, UGC, AICTE, etc., those are responsible for quality assurance in technical education should focus attention on proper maintenance of existing system and increasing the staff moral by improving service conditions/ working environment.The paper aims to highlights quality consciousness in engineering education for the betterment of technical education to develop the society and as a whole the country for the challenging technological development in the world market through imparting knowledge successfully while responding to the abilities, emotions, attitudes and behaviour of the students by way of intense interaction through system approach, Motivation, Cooperation, Coordination and Teamwork.

1. INTRODUCTION

India is a vast country where the number of technical institutions is running. Some of them are now well established and accepted by people in general for their role. Engineering education in India is very intensive involving high capital cost and a huge recurring expenditure. Its expansion and modernization call for additional funds, which are difficult to be provided from government resources under the current situation.

Technical education is an interdisciplinary science, which ensures all-round development of one's body, mind and soul to promote creative, innovative, research & development activity in the technical student for fulfilling the challenging requirement of society and nation as a whole. Technical education is a process through which we get manifestation of perfection and divine that always exists in every man.

Students come from varied backgrounds and all of them bring with them strengths and weaknesses, their likes and dislikes, etc.

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economic development, which depends on quality of education. Education is a process through which we get manifestation of perfection and divine that always exists in every man. Therefore, education is an interdisciplinary science, which ensures all-round development of one's body, mind and soul. In the framing of education policies the acquisition of technical knowledge has received a priority. Syllabi and quality improvement program for teachers had been given more importance. Thus in the school, colleges and universities the students during the pursuit of their studies were confronted with several problems resulting into strikes, cutting short the classes, showing disobedience to the teachers and the teachers too did not lag behind in giving dharnas, putting demands, etc. This has been the result of the lack of moral education realization of human values both at the students' and teachers' level. In India we are in the habit of shifting blame to the others.

The main focus of attention of this technical institution was regular teaching for curriculum of the undergraduate students or higher technical education. Performance of the teachers was also very often analyzed on the basis of results in their subjects. Therefore, majority of the faculty members have limited their horizon for better results, apart from improving their personal qualifications with the point of view of better promotional aspects. This attitude needs to be altered.

Many private institutes have also entered in the field of Technical education that is in the process of being recognized as approved research centers for Postgraduate and Doctoral Research work. The main focus of attention of this technical institution was regular teaching for curriculum of the undergraduate students. Performance of the teachers was also very often analyzed on the basis of results in their subjects. Therefore, majority of the faculty members have limited their horizon for better results, apart from improving their personal qualifications with the point of view of better promotional aspects. This attitude needs to be altered. Similarly, management of these institutes should focus attention on proper maintenance of existing system and increasing the staff moral by improving service conditions/ working environment.

It is commonly believed that the industrial sector has considerable resources which can somehow be diverted to the needs of technical education at least partially. The national economic growth prosperity is highly dependent on the technological advancement that can be brought by the engineers and technocrats in the industry. Recent advances in the technology have totally changed our life style and living standards, which represent a quantum leap from what our previous generation experienced.

Challenges for engineering education and the engineering profession have also arisen from technological and organizational change and the internationalization of business. Our higher education in general the technical education in particular is truly facing an unprecedented crisis. While quality assurance has always been a matter of concern and significance in education, in general and in professional education such as technical education in particular, the recent quantitative expansion of an unprecedented nature, in our country, has caused educators to devote careful attention to the quality consciousness aspect.

There is an ever-growing concern for the quality institutions in higher education and accreditation is being seen as a major strategy for achieving it. While accreditation gives an index for the institution based on its past performance, what is needed today is a systematic and continuous improvement in the quality of technical education coping up with the changing environment.

Government Department and Agencies those are responsible for quality consciousness like MHRD, UGC, AICTE should facilitate this at an early date to bring about an orderly development of the Quality System for technical education in India.

The paper highlights the need for the quality consciousness in engineering institution, quality governing factors and framework by

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technocrats for promoting quality assurance system in the technical education.

2. FULLFILMENT OF QUALITY CONSCIOUSNESS

Quality consciousness may be achieved through three major sources as:

1. Participative management.
2. Development technique in human resource utilization.
3. Utilize the technique to solve the problems.

The concept assumes that people closest to the problem better understand the nature of the problem and what is or is not a feasible solution. It assumes that a group of individuals working together will invariably come up with better solution than one individual working alone. Academicians are a specifically experienced structured form who can work as a Participative management. The first step towards an institutional business philosophy conductive to academician is to discover the valuable resource by the measurement. The philosophy of technocrat is to make better use of human resources. Every institution has a vast store of untapped talent, brains, learning abilities and ideas.

The facts of key philosophical foundation of Technocrat are as:

1. People will take pride and interest in their work if they experience autonomy and control over the decisions that affect them.
2. It helps to develop in employee's sense of belongingness towards a technical institution. The concept of technocrat relies entirely upon intrinsic motivation i.e. from increased satisfaction, involvement in decision-making and the opportunity to satisfy higher order needs.
3. A belief that each employee desires to participate in making the technical institution a better place in which he works.
4. Recognition of the importance of development of human resources. It implies the development of their skills, capabilities, confidence and creativity through the process of education, training, work experience and participation.
5. A willingness to allow people to volunteer their time and effort for any performance of the organisations.
6. The importance of each and every member's role and function in meeting technical institutional goals with enabling everyone involved in the institution to share his responsibility, knowledge, experience in a team effort for quality, student productivity and perfection.
7. An involved and respected employee is a productive employee whose work is of the highest quality.

3. METHOD OF QUALITY CONSCIOUSNESS ASSURANCE

1. To improve the student quality.
2. To reduce the cost of the best student quality.
3. To identify and solve work related problems that interface with quality development.
4. To tap the creative intelligence of the persons working in the institution and to make full use of its human resources.
5. To permit employees to develop and use greater amount of knowledge and skill and motivate them to apply to a wide range of challenging tasks.
6. To improve communication within the institution.
7. To increase employees loyalty and commitment to the institution and its goals.

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8. To respect humanity and build a happy bright work place environment which is meaningful to work in.
9. To enrich human capability, confidence, moral, attitude and relationship.
10. To satisfy the human needs of recognition, achievement and self-development.

4. ASPACTS OF QUALITY EDUCATION

Institution is able to send out students:

- Who can adopt themselves to the fast change technological word
- Who have cross functional abilities
- Who excel-in interpersonal relationship
- Who have enough exposure to Information Technology tools
- With thorough knowledge of quality principles
- With high ethical standards
- With motivation to do the work with coordination and cooperation
- With high Research & Development activity
- With excel of high teamwork relation

5. NEED FOR QUALITY CONSCIOUSNESS IN ENGINEERING EDUCATION [3]

Educational institutions provide the most important input to the industries, namely the workforce of engineers and technicians. The globalization of national economy in recent years is demanding far superior engineering personnel in the country to take both traditional and new areas than in the past. As a result, it has become necessary to restructure engineering education in India to meet the growing challenges. The policies and practices, systems and procedures being followed by our universities are age old. The traditional affiliating systems of universities and colleges have become a problem rather than a solution.

Due to considerable expansion of engineering education more than demand, quality is suffered and there is a lack of relevance. To meet the technological challenges of coming decade's quality engineering is essential. There is need for a coordinated working of all national bodies and institutions engaged in quality assurance and quality management and related subjects, Government department and agencies like MHRD, UGC, AICTE should facilitate this at an early date to bring about an orderly development of the quality system for technical education in India.

The following factors influencing the quality of technical education:

1. Students
2. Teacher
3. Parents
4. Employers
5. Staff
6. Management
7. University
8. Apex bodies (UGC, NBA, AICTE)
9. Society.

6. FACTORS INFLUENCING QUALITY CONSCIOUSNESS ASSURANCE: [3]

- **Insufficient staff:** It is observed that in private teaching institutes senior faculty members i.e. Professor and Assistant Professors are inadequate, staff to student ratio is not satisfactory and adequate, assistance of supporting staff is also not available for conducting experimental work in labs. The teachers, therefore, have to spend most of their time in routine activities like classroom teaching, conducting practical classes and evaluating students and they are left with meager time to undertake any research or

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development activity. Even if a few staff members are interested in undertaking R&D work, no proper guidance or assistance in experimentation is available to them.

- **Demotivated staff:** No proper incentive scheme has been framed and implemented successfully for motivating the faculty members for achieving technical excellence.
- **Little utilization of library facilities**: various journals, periodicals, reference books are procured only from the point of view of satisfying the norms of AICTE/ DTE committees from time to time. Actually apart from subject books, other reference material is rarely used.
- **Under-utilization of laboratory and manufacturing facilities:** Various laboratories and manufacturing facilities are utilized for a maximum span of 4 to 5 hour per week in one semester only.

7. REMEDIAL MEASURES [2]

The situation as referred above really offers a very grim picture. In order to correct this, re-engineering of overall system is essential. It requires basically two-pronged attack.

a. Management commitment: Top management should be sincerely interested in creation of R&D culture in the institution. For this purpose following considerations need due focus of attention.

i. Senior faculty positions: Number of senior faculty members should be increased. If sufficient number is not available, adhoc higher positions may be offered to existing faculty members.

ii. Staff to student ratio: Faculty requirement as per AICTE norms should be evaluated and sincere effort should be made by the management to fill all positions. This will reduce teaching load of faculty members and they will be able to spare time for R&D work.

iii. Supporting staff: Adequate number of technical Assistants/ Lab Assistants should be recruited to help routine lab work and provide support to R&D activities executed by faculty.

iv. Maintenance of infrastructure/ Lab equipment: Proper attention should be paid for maintenance of infrastructure and laboratory equipment. Management should sanction recurring grant equivalent to at least 5% of cost value for this purpose.

The knowledge imparted as part of technical education and training should be directly adaptable in practice i.e. the gap existing between technical education and practice should be bridged. The following two major needs are identified to attain this requirement.

a) There should be a close integration between end use and the knowledge & skill imparted.

b) Appropriate provision should be made to impart agility in the technical education and training

These two needs are considered to be the customer's needs and the features of attaining quality assurance in technical education by adopting standard quality management.

Technical education and training should be considered as a long-range process, which is the mission of an institution that will enable the whole activities to focus towards attaining the mission. Hence, the first task is to formulate quality mission statement by interviewing the managerial personnel concerned with imparting technical quality education and training.

The quality of technical education and training must be declared after developing quality profile and considering external environment. The institution will have to consider its competitors

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and their performance should be evaluated from different perspectives.

Based on the quality policy, the goals of the long term and annual quality objectives of technical education must be set. In a technical education, achieving higher percentage of placement of students, conducting more number of industry-institute interaction programs and so on many constitute annual quality objectives. Likewise, developing advanced technology facilities establishing manufacturing enterprise are few examples of possible long-term objectives.

In technical education, curricula should be design or redesigned to suit the needs of the modern customers. For a technical institution, manufacturing enterprises are the customers and the curricula, which are not meeting their needs, would yield very little beneficial outcome.

The lack of human values in technical fields brings to mind our shortcomings because we are afraid of simple words goodness, mercy and kindness. In the words of philmona Aqudo

"Values are the norms, goals or purposes that one chooses in order to give a sense of direction and meaning to one's life. They are integrative forces that bring about wholeness in one's personality".

In fact all the learned writers have emphasized on the human values, quality of education, moral boosting, and foundation studies along with technical education is a must. It is because where technical expertise is essential alongside the balance of personality with concern towards humanity and nationalism is also of paramount importance.

8. THE ETHICS BASED SURVIVAL OF QUALITY ASSURANCE: [6]

a) EMPLOYEE ETHICS
   a. Honesty
   b. Sincerity of purpose, integrity
   c. Duty consciousness
   d. Punctuality
   e. Responsible behaviour

b) WORK ETHICS (CLASS ROOM)
   a. Love for teaching, learning, research
   b. Respect for students
   c. Sound knowledge of subject
   d. Deep understanding
   e. Clarity of expression
   f. Fluency of language
   g. Legible good handwriting
   h. Able disciplinarian
   i. Self esteem

c) PERSONALITY ETHICS
   a. Just and impartial
   b. Polite
   c. Approachable and friendly
   d. Trustworthy
   e. Sensitive
   f. Open minded
   g. Live, healthy and charming
   h. Vice free, neat and clean
   i. Elegantly dressed
   j. Good manners
   k. Self-reliance and self-restraints

d) ACADEMIC ETHICS:
   a. Be hard working
   b. Have wide reading and study
   c. Strive for continuous improvement/ advancement

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d. Be creative

e) SOCIAL ETHIC

a. Sense of cooperation

b. Social involvement

c. Patriotism

d. Commitment to the organization

e. Fostering institutional image

9. SUGGESTIONS:

In the light of the above factors, the following suggestions are made:

1. Quality education in technical institution should be treated as a public service and its quality of service should be assessed as a useful measure of performance of the institutions.

2. There is an urgent need to bring in major reforms in a) Curriculum and syllabus b) Teaching methodology c) Examination and Evaluation system d) Industrial training and project work.

3. Techniques of total quality Management and ISO certification should be considered as alternative approaches to Quality assurance in the technical education system.

4. A built in mechanism for obtaining feedback from all the stakeholders of the technical education system (like employers, students, staffs, etc) should be developed. This should form the basis for improvement of the assessment and accreditation system.

5. The MHRD, AICTE and UGC may consider giving academic and administrative autonomy to selected good institutions in both Government and private sectors, so that they can grow to become model institutions for quality assurance in technical education in higher degree level.

6. The university system must re-asses its role in a changing world and embrace any innovation that would make its services more effective and efficient manner.

10. ROLE OF TECHNOCRATS: [5]

1. Improving of personal qualifications: Technocrats should always focus attention on acquiring higher degrees such as Master degree, Ph. D., Etc.

2. Regular technical interaction among staff/ formation of study group – Usually a teacher aspiring for higher qualifications restricts his problem area for discussion with his guide. As such the progress of work, solely depends upon the time adjustment between the two. Routine interaction amongst faculty members may prove beneficial in accelerating the pace of research work.

3. Better utilization of existing infrastructure – The use of various laboratory facilities is generally limited to teaching only. Their potential use from the point of view of offering consultancy services should be explored.

4. Use of library Facilities – Utilization of library facilities has to be drastically increased. Teacher should review the reference books, technical journals regularly. Faculty member should deliver at least one lecture in each session based on this review.

5. Departmental Seminars – Recent trends in various topics are very often not included in regular curriculum. Individual teacher must collect this information; present it in the form of a departmental seminar.

6. Interaction with Industry – The faculty members should be encouraged to visit industries, take industry-oriented projects and discuss problems faced by practicing engineers. This may ultimately result in better Industry- Institute-Interaction.

7. Time management – Faculty members should be trained in the art of time management so that they can possibly utilize time available to them for self-development as well as development of institute.

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11. QUALITY ASSURANCE THROUGH MUTUAL COORDINATION [1]

a. THE TECHNICAL INSTITUTIONS COORDINATE TO PRODUCTION INDUSTRY TO:

- Setup Liaison Cell that has adequate data bases on facilities, equipment and expertise available in the institutions, as also on the type and important features of industries in the region.
- Provide material characterization, testing and certification facilities.
- Keep industries informed about new discoveries/ developments and innovative scientific work being undertaken.
- Provide consultancy service of variable nature like development of computer software, conduct of surveys and solving problems.
- Undertake research related to technology transfer in collaboration with R&D unit in industry.
- Help small and medium scale industries to induct and maintain modern technology.
- Provide training programs for technicians, scientists and engineers.
- Develop specialized continuing education programs for updating skills and knowledge.
- Design or develop the product needed by the industry.

b. THE PRODUCTION INDUSTRY COORDINATE TO TECHNICAL INSTITUTIONS TO:

- Assist teaching programs by giving endowments.
- Support research programs; specially those on applied research.
- Make available sophisticated and costly equipment to the institution for research.
- Provide financial assistance for the development of the institutions
- Assist in the development of curricula and syllabi.
- Participate in teaching programs.
- Provide facilities for on-hand training.
- Support sandwich courses for the institute.

c. INDUSTRY IS EXPECTED TO BECOME ONE:

- That keeps pace with the changing world and innovate technologies.
- That grooms the participative culture in the organization
- With quality conscious people
- With very high productivity levels
- That delights the customer
- That follows ethical practices
- Which can complete in global market

The institute- industry participation will be the solution, without which it will be difficult for both to survive.

The industries are the external customers for the educational institutions. Hence, the institutions have to satisfy the needs of the industries. In quality philosophy, the industries have a responsibility in making the vendors rise up to excellence level. If Total Quality Management (TQM) principles are followed in true sense then there will be partnerships developing as a strategy.

12. SWOT–ANALYSIS OF INSTITUTE-INDUSTRY INTERACTION:[6][9]

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Table 1 shows SWOT analysis will be helpful for technocrats in appreciating the institute-industry interaction.

Table 1: SWOT Analysis

	Institute	Industry
Strength	• Available of research personnel. • Available of literature. • Available of testing facilities.	• Target oriented culture. • Better financial resources. • Motivated by buyer's market.
Weaknesses	• Resource crunch in terms of finance. • Red lapism leading to slow progress. • Lack of motivation to do research. • Non-accountability of work done.	• Non-availability of Research & Development manpower with research degree. • Non-availability of full-fledged Research & Development facilities.
Opportunities	• In the current situation only few institutions and industries have realized the available opportunities and make use of them. • In future both the institutions and industries should look for greater opportunities for effective interactions. The threats of one become the opportunities for the other, if it is taken in the right sense.	
Threats	• Mushrooming of educational institutions. • Quality to be proved. • Higher education being expected to be self-supporting. • Stringent norms by the Government.	• Fast changing technology failing to cope with will push the industry out of race. • Absence of training on skills and attitude costing the industry heavily. • Globalization affecting the industries. • Fast changing information technology needs.

13. QUALITY CONSCIOUSNESS ASSURANCE IN ENGINEERING EDUCATION [7]

IF Teachers:

1. Keep focus on problem related work.
2. Not press for personal problem.
3. Demonstrate mutual respect.
4. Offer views freely in problem solving.

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5. Attempt all meetings.
6. Contribute to finding solutions of problems.
7. Contribute to implementing solutions.
8. Attend training seriously with respective attitude.
9. Acquire skills to contribute to the problem solving activities.

IF Head of Department:

1. Conduct meetings and ensure participation by all faculties.
2. Help in collecting data.
3. Transmit quality circle suggestions to facilitator.
4. Interact among themselves and facilitator.
5. Present solutions and suggestions to management.
6. Maintain relevant records of meetings.
7. Ensure implementation of solutions by the group.
8. Keeping the circles informed about status of previously submitted suggestions.
9. Keeping meeting positive and on track.
10. Training circle members in group process and in the use of tools and techniques for generating ideas and problem solutions.

IF Principal:

1. Coordinate the work of several quality circles through leader.
2. Serve as a resource to the Group/ Circle.
3. Arrange for expertise from other groups/ institutions/ organizations.
4. Keep the circle on track.
5. Acquire skill through training programs.
6. Transfer skills to members of quality circles.
7. Transmit proposals /solutions to management.
8. Arrange for training for quality circles members.
9. Provide feedback to members/ management.
10. Maintain budgets and keep cost records.
11. Help circles to provide presentation to management.

The success of quality circle depends mainly upon the proper selection of suitable personnel as facilitator, which serves as a coach for the circle leaders and a process consultant to the circles. Facilitator is a vital man to the management.

IF Director/ Chairman:

1. Officially announces the initiation of the quality circle movement and stress the necessity to establish quality circles and highlight its features and utility.
2. Assist/contribute to the development of the quality circle models and structure.
3. Provide opportunities to quality circles to present their solutions and to implement accepted solution after evaluation.
4. Provide resources like space, time, training facilities, finance, etc.
5. Ensure adequate training opportunities to facilitator quality circle leaders and members.
6. Consider suggestions of quality circles fairly and justly.
7. Recognize the contributions of the facilitator.
8. Encourage the movement.

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9. Communicate the decisions to quality circles.
10. Arrange for external specialist help.
11. Develop guidelines for measurement of circles activities.
12. Periodically review the progress.

CONCLUSION

The scope of quality consciousness assurance is not limited by boundaries. It is concerned with the concept of total student's satisfaction with quality development and development in research and development activity for new things, new technology & creativity with some standards.

Technocrats must have special skill as some have natural flair but others have to acquire it through extensive experience and learning. The technocrats have to impart knowledge very successfully while responding to the abilities, emotions, attitude and behaviour of students by way of intense interaction. The teachers have an extra responsibility to display high degree of patience, honesty, sincerity of purpose and sympathy towards their students.

The survival of any institution is only dependent on the specific efforts for maintaining the highest quality parameters in every facet teaching-learning process. The various aspects stated above require a major effort with full and active involvement at all levels i.e. at the Central, State, Institution and Industry. This also requires commitment from the political leadership and bureaucracy including technocrats who often prefer quantitative expansion sacrificing quality concerns. Every Technical Institutions must take serious steps to define their Quality Policy, articulate their commitment to achieving Quality Assurance in all their activities and implement the politics energetically.

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