

8. MELDING TQM WITH PRINCIPLES OF LERANING ORGANIZATION FOR ENGINEERING EDUCATION

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Abstract

The purpose of this research is to offer a set of select strategies based on the melding of TQM principles and philosophy of learning organization proposed by Peter Senge in the book "Fifth Discipline". The logic behind each melding is explained in the light of some real life experiences. Paper reviews the constructs related to service organizations like education, TQM application in education and learning organization. An essence of each is extracted to deliver a set of strategies for implementing a visionary growth oriented approach in engineering education. The premise of the paper is to propose a new thinking for educational institutions where continuous learning could be ensured through an enhanced motivation for learning at individual level.

Keywords: Total Quality Management (TQM), Learning organizations, Education

1. Introduction

TQM principles are in appreciation and practice right from the inception. The various meanings are attached to the word "TQM" by researchers (Boaden, 1997). According to Lawler (1994) there is no single theoretical formulation of the TQM approach. Witcher (1990) defines the term by breaking the phase into three terms, whereby "total" implies every person is involved (including customers and suppliers), "quality" implies customer requirements are met exactly and "management" implies senior executives are committed. A fundamental premise of TQM is that the costs of poor quality (such as inspection, rework, lost customers, and so on) are far greater than the costs of developing processes that produce high-quality products and services. Lee (1998) identified nine

areas as the most important elements of TQM by some empirical studies. These are: (1) customer focuses; (2) top management's commitment; (3) quality data and reporting; (4) training; (5) roles of quality departments; (6) employee involvement; (7) process management; (8) product/service design; and (9) supplier quality management.

The word "quality" has been derived from the Latin word *quails*, meaning "what kind of" with a wide variety of meanings and connotations attached to it, quality is a difficult and elusive term to define, having thus been referred to as a "slippery concept" (Pfeffer and Coote, 1991). The term has been defined from different perspectives and orientations, according to the person making the definition, the measures applied and the

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context within which it is considered (Tapiero, 1996). Green (1993) believes that quality is a concept "the capacity, which whole organizations can be made to have, to continually learn and implement customer wants". Quality as "fitness for purpose" is one definition that is adopted in higher education. Quality is judged in terms of the extent to which a product/ service meets the stated purpose, with the definition providing a model for determining what the specification should be. Here, we aim to build the theme of this paper on a definition that "Quality as effectiveness in achieving institutional goals" implies efficiency in the use of resources or effective management".

Engineering Education System are exposed to some of the challenges like a) World of accelerating multi-dimensional change; b) shift to knowledge economy; c) revolution in Information and Communication Technology (ICT); d) increasing competition among indigenous engineering institutions; e) government's approval for FDI (Foreign Direct Investments) in education. An engineering education system is forced to counter these through a Quality response. An ability of the organization to create an individual learner with system wide thinking has become a big challenge. In response, Peter Senge (1994) has offered the concept and principles of learning organization in the book "Fifth Discipline". Present paper aims to devise some strategies based on the melding of TQM principles with the philosophy of learning organization. Our screening of contemporary literature and difficulties reported in harnessing the benefits of TQM has helped to pin-point the following research gaps (RG). However, these should also be considered as the motivators for current research (RG's).

RG1. *There appears to be no apparent reason for rejecting the applicability of TQM as a "general philosophy" in education. If there are problems with its introduction in this environment. Their roots should be sought in the system itself*

rather than in the philosophy (Owlia and Aspinwall, 1997).

RG2. *A shared vision and organization-wide learning are the necessities for the success of TQM in education (Motwani and Kumar, 1997; Lee, 1998; Thakkar et al., 2006b).*

RG3. *Misapplication of the total quality management techniques and lack of visible leadership and foresight and staff empowerment often account for failure (Elmuti et al., 1995; Thakkar et al., 2006a).*

RG4. *Productivity measurement in the context of education institutions is the measurement of learning. Learning comes from newness and innovation. TQE has to carry education institutions towards their vision of being "preferred suppliers for learning" (Zairi, 1995; Green, 1993).*

RG5. *Externally driven quality assessments are directly and indirectly expensive. When quality is something that is 'done to you' groups lose their sensitivity to the indications of change in the outside world and have little incentive to innovate (Newby, 1999).*

Education differs from the manufacturing sector in four ways: objectives, processes, inputs and outputs. For manufacturing firms, profit is the commonly used indicator for measuring effectiveness. However, the objectives for education are not so simple. According to Tribus (1993) the objective of every school should be to provide for each student opportunities to develop in four categories; these are "Knowledge"—which enables us to understand; know-how—which enables us to do; wisdom—which enables us to set priorities; and character—which enables us to cooperate, to persevere, and to become respected and trusted members of society". Therefore, the mission of education is relatively long term and there is no single indicator, such as profit, which can reflect the effectiveness of achieving these objectives. The identified gaps with a further focus to implementing TQM in education gives rise to few critical questions (CQ) such as:

CQ1. *How can an administration of education institution be made more effective and responsive while avoiding or reversing staff expansion?*

CQ2. *How can an efficiency and overall quality of learning be improved?*

CQ3. *How can system act in a more appealing*

way to the new generation of students?

CQ4. *How can we be more responsive to the changing needs of industries who are the ultimate customers?*

Literature reports various views on application and interpretation of TQM philosophy in education. A summary of some contemporary

Table I : Contemporary studies conducted on TQM in education

Author (s)/ researcher (s)	Year	Empirical/Theoretical	Focus/ emphasis
Elmuti et al.	1995	Empirical	TQM application for higher education
Harvey and Knight	1996	Both	Transforming education; quality in higher education
Lozier and Teeter	1996	Theoretical	Quality and higher education
Swift	1996	Empirical	Improving quality of engineering institutions
Cheng and Tam	1997	Theoretical	Models of quality in education
Frazier	1997	Theoretical	Quality transformation in education
Owlia and Aspinwall	1997	Both	Quality in higher education - a survey, identifying TQM success factors
Motwani and Kumar	1997		Model for the use of University including five phases such as deciding, preparing, starting, integrating, and evaluating,
Owlia and Aspinwall	1998	Empirical	Framework of measuring quality in education
Kanji and Tambi	1999	Both	Models of TQM in education
McAdam and Welsh	2000	Empirical	Business excellence quality model applied in education
Sahney et al.	2003	Empirical	Paper reports a study on educational institutions-industry interaction in Indian perspective using QFD model
Sahney et al.	2004b	Empirical	An integrated approach of SERVQUAL and QFD model for identifying the gaps in quality education and customer requirements
Sahney et al.	2004a	Theoretical	Explores merits and demerits of TQM in education
Thakkar et al.	2006a	Theoretical	QFD model of self-financed technical institutions
Thakkar et al.	2006b	Theoretical	Six Sigma model for service sector like education

work is provided in Table I.

TQM has an important role to play in non-manufacturing organizations – competing more effectively has become an overwhelming concern for virtually all organizations today in the interdependent global economy. A service system is like any other general system, which takes a range of inputs and transforms them through a value-adding process to desired outputs, which have utility to the users. Although TQM was originally intended for industrial sector, Deming (1986) pointed out in the preface to his

book out of the crisis that his management principles could be applied equally well in service sectors. However, Jessome (1988) identifies the problems associated with the application of total quality to service system as:

- Service, by its very nature, has less control over the factors which affect the quality.
- Because service outputs cannot be stored for later use and because of participation by the customer in the process, there is a much higher level of external uncertainty than in manufacturing processes.

- The intangibility of services makes it difficult to set standards, to conform to them and to measure them.
- Good service is an expectation of individual customers, and this expectation is generally unstated and unknown.
- The customer participates in the process, to a greater or lesser extent, and therefore has an impact on the quality of service.
- Service quality is difficult to measure because of its subjective nature.

The remainder of the paper is organized as follows. Section 2 summarizes the issues related to quality and application of TQM in education and offers a force-field analysis. A set of 15 TQM principles were melded with five key elements – systems thinking, personal mastery, mental models, building shared vision, and team learning of “learning organization” in the light of some real life experiences in academic system. Finally, closure is made with six “C’s” of Crosby which can facilitate the adaptation of proposed thought with greater rigor.

2. Melding TQM with Principles of Learning Organization

Literature classifies customer of educational system into two categories: external (students, employees, the community at large, tax payers, other educators from different institutions) and internal (other instructors, service department staff). Kanji et al. (1999) have classified customers of higher education into primary and secondary groups on the basis of their locations i.e. whether internal or external, and the frequency of interactions the institution has with them. While the educator (as an employee) is the primary internal customer, the student (as an educational partner) is the secondary internal customer. Quality in education is a multiple concept with varying conceptualizations and this poses problems in formulating a single, comprehensive definition (Sahney et al., 2004). “Quality of education” has also been defined in a contextual manner taking into account the

external environment in which the teaching-learning process takes place (Govinda and Varghese, 1992). West-Burnham (1992) refers to the issue of “quality in education”, as a perennial one, that, he feels, is incapable of a solution being that of the customer and not that of the supplier through meeting stated needs, requirements and standards.

Harris (1994) asserts that there are three generic approaches to TQM in education; first, a **customer focus approach**, where the idea of service to students is fostered through staff training and development. Second, a **staff focused approach**, that is concerned to value and enhance the contribution of all the members of staff to the effectiveness of the school; and the third, that takes a **service agreement focus** and seeks to ensure conformity to specification at certain key measurable points of the education process. A systems approach is adopted by Cheng (1996) who defines education system as “the characteristic of the set of elements in the input, process and output of the education system that provides services that completely satisfy both internal and external strategic constituencies by meeting their explicit and implicit expectations. Teaching and learning processes are not the same as assembly lines. They are interactive processes between teachers and students, and therefore the procedures in the processes cannot be preset in a step-by-step format as those for an assembly line. Moreover, both of the parties are human beings whose behaviors are subject to different motives and objectives, emotional fluctuations, as well as individual styles of interpersonal skills. Therefore, there cannot be any specification as regards the standardized codes of practice in learning and teaching. More complicating, the behavior of one party is often responding to the act of the counterpart. Students are human beings whose performance is expected to vary under different situations, and thus, the measurement of human behavior cannot be subjected to a precise scale. This factor complicates the difficulty of measuring the

quality of incoming students. Likewise, it is difficult to define a certain quality standard for the output. The role of three important entities in describing an educational system could be outlined as below:

- **Role of Students:** Administrators need to involve students in their own education by training them to question the learning process, and once the students have questioned it, administrators need to seriously consider student proposals for change.

- **Role of Teachers:** TQM calls for changes in teachers' relationships with both students and administrators; teachers need to view engineering education through students' eyes, and they need to work with administrators as a team. For this purpose administration should delegate power and responsibility to the teachers.

- **Performance evaluation:** Instead of using standardized tests and grades to measure students' progress, schools that embrace TQM often try to assess student progress regularly throughout the year.

The Indian educational system is under the exponentially progressive change over recent years. Specifically, in the competing self-financed educational system, engineering education system must translate these challenges through a quality response. Initially, we assess the barriers and facilitators for implementing TQM for a case of self financed engineering college XYZ Institute of Technology as tabulated in Table II. (see on page no. 58).

In order to understand the critical issues affecting the quality of engineering education, some engineering students at XYZ Institute of Technology (name is concealed for technical reasons) were consulted about their opinions and ideas. It is well researched that the primary customer is the students who attend the university. Therefore, the students should be involved in the brainstorming process to improve education. In order to obtain the students' view

on the issue of engineering education, a session was conducted that used the nominal group technique. One of the lectures of 55 minutes was devoted on such exercise. A broad topic titled "*What can be done to improve the quality of education at the college?*" was give to the students for brainstorming. Responses from all students were then tabulated and added to find the final rankings that appear below:

1. Have instructors teach on the student's level.
2. Give more time for intermediate test exams (more than one week).
3. Enhance engineering counselling for all students.
4. Make dead week more of a study week (too much work due).
5. Hire instructors who can be understood (language).
6. Decrease the size of large classes.
7. Have senior advisors for freshmen.
8. Use textbooks that contain more examples.
9. Be able to reprimand/replace bad professors with tenure.
10. Make the engineering schedule more flexible.
11. Improve procedures for paying tuition, financial aid, etc.
12. Increase co-operation between all departments.
13. Require fewer cluster courses.
14. Change the way that students are evaluated.
15. Base grades more on projects rather than tests.

Table II: Force-filed analysis of XYZ Institute of Technology

FORCES FACILITATING CHANGE (+VE)	FORCES RESISTING CHANGE (-VE)
<i>F1⁺</i> Functional autonomy available with self-financed institution	<i>F1⁻</i> Inadequate leadership and commitment from top management
<i>F2⁺</i> Prompt management decisions for the investment, improvement etc.	<i>F2⁻</i> Poor intake quality of students
<i>F3⁺</i> Good motivation and support for qualification improvement and training	<i>F3⁻</i> Lack of rigor in research
<i>F4⁺</i> Competing self-financed technical institutions and availability of benchmarks	<i>F4⁻</i> Poor functional integration and absence of cross functional teams
<i>F5⁺</i> Young and energetic staff	<i>F5⁻</i> Frequently changing priorities of teachers and management
<i>F6⁺</i> Reward and recognition on achievements	<i>F6⁻</i> Poor class attendance
<i>F7⁺</i> Growth oriented approach and quick promotions	<i>F7⁻</i> Frequent lapses of teachers in duties assigned
<i>F8⁺</i> Existing small and medium scale industry cluster in vicinity	<i>F8⁻</i> Lack of motivation and pride in work and higher employee turnover
<i>F9⁺</i> Recently signed MOU (Memorandum Of Understanding) for joint research and development with industry	<i>F9⁻</i> Lack of transparency in performance evaluation at student and faculty level
<i>F10⁺</i> Dominating and well-established educational trust	<i>F10⁻</i> Poor interpersonal trust and respect

An extended list of TQM principles proposed by British Quality Foundation (BQF) is utilized for the present purpose. Simultaneously, a set of principles extracted from the book *"The Fifth Discipline"* for learning organization are tabulated. Peter Senge defines learning organizations as "organizations where people continually expand their capacity to create the results they truly desire, where new and expensive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together. Melding of these two (Table III) has helped to offer select strategies which will assist the thought provocation in the mind of leaders of this field. The authors possess long-experience of teaching and managing administrative tasks in academics. Two authors are with state-of-the-art institution like IIT (Indian Institute of Technology Delhi) while third one is an observant of various problems/issues of a progressively developing self-financed technical institution. **Table III:** Melding TQM with the philosophy of learning organizations

Above analysis has helped to come out with some select strategies as outlined below. The attempt has been made to establish links between TQM principles and some select attributes of learning organizations outlined by Peter Senge. The efforts are directed to explain the path way for making the TQM principles more effective and workable for an academic set-up. The overall synthesis has helped to explore five melding opportunities. The justification of each is given in light of some real life examples/ incidences.

Melding 1: Strengthening TQM principles P1, P2, P4, P7, P10, P13, P15 with "systems thinking"

Systems thinking is a conceptual framework, a body of knowledge and tools that helps to make the full patterns clearer, and to help us see how to change them effectively. The events which are distant in time, for example - behavior of students, declining interest in a subject, lack of motivation on the part of employee etc. but are interdependent. Changing leadership style and

Table III: Melding TQM with the philosophy of learning organizations

BQF TQM Principles	Significance for technical education	Limitation	Melding	Philosophy of learning organization
P1. Highest priority	Total quality must overtly be the highest priority of the organization/company/individual	Difficulty in synchronizing priorities of institution, goals of the programme (engineering), expectation of students and requirements of ultimate customer - industry		Systems thinking
P2. Quality definition	Any definition of quality must include meeting/satisfying/conforming to agreed/negotiated customer needs/requirements/wants/expectations	Requirements of an honest educational system are in direct conflict with students' demands		Systems thinking
P3. Customer definition	The concept of customers includes investors/employees/stake-holders/suppliers/the community and every interpersonal relationship	Differs from teacher to teacher because of their own different mental models		Systems thinking
P4. Aim	A total quality organization will have a clearly stated, widely understood and generally accepted direction/aim	Inability of leader to share the vision, Tight departmental walls		Systems thinking
P5. Communication	A total quality organization will openly and clearly communicate its principles/beliefs/values/mission statement /policy for quality	Difference in beliefs at top management, director, head of the department (HOD) and faculty level		Personal mastery
P6. Ethos	Total quality management embodies the values/beliefs/ethos of the organization, and thus total quality is intrinsic to every activity, decision and action	Existence of different definitions and interpretations		Personal mastery
P7. Values	The highest levels of integrity, honesty, trust and openness are essential ingredients of total quality management	Fear of being highlighted as less knowledgeable in the business of knowledge creation		Mental models
P8. Mutual respect and benefit	There is an implicit mutual respect of all stake-holders involved with a total quality organization that assumes that long-term business is intended to be mutually beneficial to all concerned	Focus on only too operational level tasks, long-term vision is absent		Mental models
P9. Health and safety	Health, safety and environmental issues have a high priority within a total quality organization since the welfare of all investors/employees/suppliers/the community, as stake-holders in the enterprise, is intrinsic to the future wellbeing of the organization	Steel-reinforced concrete silos!		Mental models
P10. Commitment	Leadership of total quality management stems from the top of the organization and enlists individual and team commitment throughout	Very little interaction between institute and industry, More academic research		Mental models
P11. Participation and ownership	Total quality offers each individual the opportunity to participate in, ownership and to feel ownership of, his/her activities, and to jointly share a sense of ownership for the success of the entire organization	Commitment varies with time and changing priorities		Building shared vision
P12. Continuous improvement	Total quality management involves continuous and measurable improvement at all levels of the organization, ranging from company performance to individual employee performance, such that continuous process improvement, forever, becomes an essential ingredient of success	Lack of recognition and monotony in work		Building shared vision
P13. Performance	Total quality management requires consistent/predictable/accurate/precise performance to high standards in all areas of the organization; thus measurement, assessment and auditing are common TQM activities	Improvement stops in absence of demand for continuous learning		Building shared vision
P14. Resources	An aim of every total quality organization is to better use resources, to achieve greater success, financial and/or otherwise	Measurements are more focused on select tangible issues which fail to highlight degree of learning and improvement		Building shared vision
P15. Investment	Total quality management will always require sufficient/appropriate investment to ensure that planned activity can occur	Infrastructural and human resources are only utilized for academic work in absence of team working, lack of direction, and future plan Dis-proportionate allocation of funds		Team learning

belief of top management specifically in case of self-financed education carries a lot of effect. Here, top management behaves in a way which leaves some of the stake holders of academic system happy and motivated but the counter effect is realized due to lack of motivation of few others. Author quotes its own example to illustrate the situation better. An engineering institution has implemented the system of giving yearly reward – recognition through certificate and money. In the absence of clear and transparent evaluation, this new initiative has hampered the overall spirit for improvement. People have become suspicious and entered into the fault finding process with the selected winners. In the light of this, it is proposed that TQM principles P1, P2, P4, P7, P10, P13, and P15 are interrelated and a systems approach can only help realize their cumulative benefits. One more issue like lack of framework for evaluation and measuring students' abilities reduces degree of transparency between student and teacher. Further, lack of vision exercised at top level, the effect carried away by faculty members leaves the students embarrassed when they receive "A" grade in one subject and "D" grade in other by applying equal amount of efforts and intelligence. Top management intervene in giving some special concessions to few who fall short students in class attendance. When the same is not applied equally to others, teachers lose their face and students their faith in the system.

Melding 2: Strengthening TQM principles P9, P11 with "personal mastery"

It is a process of continually clarifying and deepening our personal vision, of focusing our energies, of developing patience and of seeing reality objectively. To illustrate the dilemma for an engineering education author quotes a small example. "Institute has formulated the consultancy cell and signed MOU (Memorandum Of Understanding) with small and medium scale industry cluster nearby. A senior faculty appointed as the group in-charge of such cell has expressed his dilemma as "Our thinking

is more academic which is restraining us from working on real life problems. We have lost our skills and abilities to present a workable and convincing solution to the industry. We have lost confidence in ourselves and this is a major stumbling block. We admit that we have not improved ourselves with time and hence at this juncture to think about offering the consultancy to the people who are already well-equipped in knowledge and infrastructure is a difficult proposition. *I think first we need to hire a consultant who can first teach us about "doing consultancy....."* In general, when asked to any faculty member about his/her utility in the system, a general response which comes as "it is a system whether you work or don't work results are the same. We do not have any challenges! The instilled fear over a period of time restrains us from taking bigger challenges in professional as well as individual life. We do not know about the relevance of our presence for the system". This is a clear indication of lack of personal mastery at individual level which does not leave the human resource only with a lack of confidence but in competing educational scenario with a fear of becoming redundant which further deteriorates their performance. It results in a vicious circle wherein a person goes away from the work, enters into false criticisms leading to a distorted and lost picture of the system. In nutshell, initially, system offers the luxury or tolerance to greater degree of work relaxations and flexible working, later, when system dependency increases, system obliges the person for not having contributed sufficiently which ultimately results in poor self-esteem and pride in work. Such discussion forms sufficient basis to meld TQM principles P9 and P11 with the philosophy of personal mastery.

Melding 3: Strengthening TQM principles P2, P3, P5, P6, P7, P8, P12, P14 with "Mental models"

Mental models are deeply ingrained assumptions, generalizations, or even pictures or images that influence. Very often, we are not consciously aware of mental models or the

effects they have on our behaviors. Many insights into new markets or outmoded organizational practices fail to put into practice because they conflict with powerful, tacit mental models. For example, dressing of the teacher, his attitude towards the profession and associated activities like research, teaching, consultancy etc. People in academics have enjoyed a status quo derived from their ancestors. Based on the derived images/ accepted models, their behaviors are shaped. Sometimes, it leads to the some of the observations such as lethargy, casual approach, end inspection and correction/ rework, loss of physical and mental health, irritations and boredom in the job. Faculty doesn't understand that this is the compensatory feedback because of a wrong adoption of mental model or sometimes "no adoption". Author cites some of the issues observed in day-to-day life of an academic institution which is older in maturity by seven years. This includes,

- a) always entering into the criticism of director, colleagues, university or profession;
- b) lack of motivation and pride in work;
- c) hatred for new learning;
- d) greater degree of suspicion for students and mentality to keep them always in fear, etc. The discipline of working with mental models starts with turning the mirror inward; learning to unearth our internal pictures of the world, to bring them to the surface and hold them rigorously to scrutiny.

Melding 4: Strengthening TQM principles P2, P4, P12 with "Building shared vision"

It is the capacity to hold a shared picture of the future we seek to create. Today, leaders of academic system are hard pressed to think of any organization that has sustained some measures of greatness in the absence of goals, values and missions that become deeply shared

throughout the organization. Principal/ Director of academic institution works with their own mental model, sometimes more illusionary and hypothetical derived from their mentor or earlier experiences. However, good or bad the vision is many times it fails in measuring the exact effect of it. This partial result makes a few more comfortable whose mental models are matching with the leader's while others begin their day with lack of vision and lot of criticism. This could be supported in the light of a real life example such as: "Principal of an institution had inherited the beliefs based on his long-term association with government organizations where giving memo and firing the people for every small reason is perceived as regular practice. The environment of self-financed technical institution is quite different and opposite to it where involvement of top management is direct and forthright, the selection of people is based on their maturity which is perceived as a function of "excellence" and not only a mere experience in "no. of years". These differences have exposed the organization to many conflict areas. Leader has continued to believe that people are always wrong and hide their mistakes, do not take interest in their work and hence should be fired. This has led to the deterioration to the leading edge faculty members which has increased employee turnover heavily. Good, qualified human asset with the distorted vision and mission policy of leader have left the organization or reduced their level of commitments. New initiatives like giving rewards, giving early promotions, some monetary benefits, recognition in the college bulletin etc. have failed to motivate towards their long-lasting commitment to organization. The effect is further exacerbated when it has drawn the attention of customers of the system – "student" in a direct or indirect way. In nutshell, TQM principles P2, P4 and P12 which are directly pointing towards the system could be better experienced when applied in an environment where a vision is shared by the leader with the people and among the people.

Melding 5: Strengthening TQM principles P5, P8, P10, P11, P14 with "Team Learning"

When teams are truly learning, not only are they producing extraordinary results but the individual members are growing more rapidly than could have occurred otherwise. The discipline of team learning starts with "dialogue". The capacity of members of a team to suspend assumptions and enter into a genuine "thinking together" aspect is specifically missing in academic system wherein people would like to live with greater status quo and functional silos. The failure to offer complete solution demands efforts from all the areas. A cross functional collaboration among various branches like Mechanical, Electrical, Computers, etc. leaves each entity with a sense of incompleteness. This leads to complacency than competence. Faculty develops a personal mastery in hiding the weaknesses than overcoming through collective team efforts. Attempts to shadow the image either destructs the right development of mental model or leaves the process completely untouched. To strengthen the argument author offers a real life example, "Faculty members are teaching only half of the subject for the last 20 years. The unawareness on the part of consequences of other half offers incompleteness not only in work but an approach towards the life. When there is an overlap of two disciplines, students exhibit the better understanding than faculty". Such examples form an adequate basis, if not sufficient, for making TQM principles P5, P8, P10, P11, and P14 more workable through Team learning. To articulate the complete understanding on transforming educational system into a TQM based learning organization we offer a pyramid called "EP²" as shown in Figure 1. (See Fig. on page No. 63).

3. Cascading Education

The aim and philosophy of TQM is not the measurement of quality performance as an end in itself, but the continuing and continual improvement of quality through a process of cultural and organizational change. It is people

driven and results are evidenced in terms of improved teamwork, company morale and organizational climate – resulting in improved productivity and profitability. Transforming Educational Institutions into Learning Organizations requires some of the actions such as:

- a) development of a culture of shared vision (amongst students, teachers and staff);
- b) do not overemphasize competition, promote cooperation, wherein faculty-staff join together;
- c) have a culture of pro-activeness and not of reactiveness;
- d) faculty, students and administration think of all educational processes, activities, functions, and interactions with the environment as part of a system of inter-relationships. This could be achieved through the suggested melding of TQM principles with the philosophy of learning organization. Such melding could be realized more effectively in the light of Crosby's Six "C" (Crosby, 1984) for quality as described below:

- **Comprehension:** is the understanding of what is necessary, and the abandonment of the "conventional-wisdom" way of thinking
- **Commitment:** is the expression of dedication on the part of management first and everyone else soon after
- **Competence:** is the implementation of the improvement process in a methodical way
- **Correction:** is the elimination of the opportunities of error by identifying current problems and tracking them back to their basic cause
- **Communication:** is the complete understanding and support of all people in the corporate society including suppliers and customers
- **Consistence:** is the unyielding remembrance

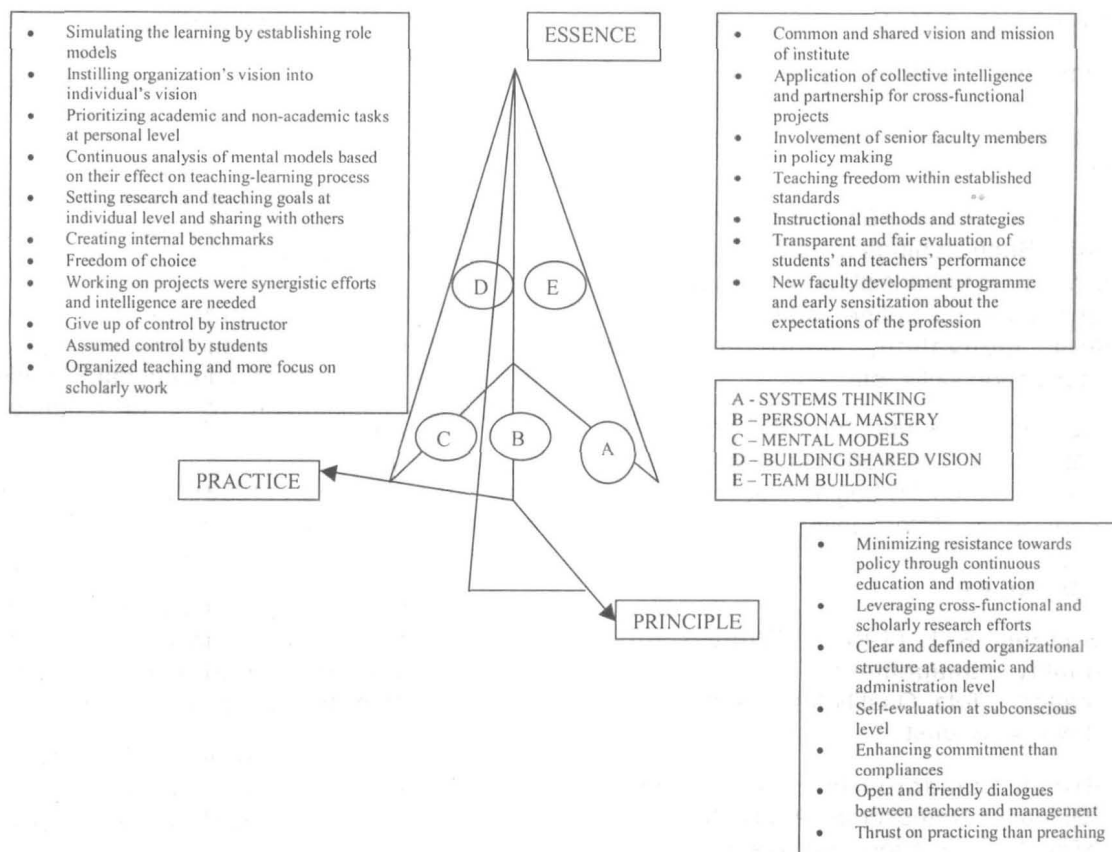


Figure 1: EP² pyramid for transforming educational system

of how things used to be and how they are going to be

In nutshell, following measures could be adopted towards converting an educational system – engineering or otherwise into a learning organization.

M1. Improve overall working culture and relationships among different echelons of the academic system through clear vision and policies. It helps build a brand image in competing self-financed academic institutions.

M2. Generate sense of pride and work satisfaction by making the individuals responsible and motivated and accountable towards their duties.

M3. Optimize resource constraints towards

maximum satisfaction of employee (training, permissions for higher studies, conference participation, etc.) and students (grants for projects, functions, concessions in fees for accelerating students, etc.).

M4. Emphasise on continuous improvement to update the standards of technical institution with rapidly changing technological environment and improve overall competitiveness

M5. Develop cross-functional collaboration towards development of competitive benchmarks and synergies for learning).

M6. Develop clarity on roles and responsibilities of teachers as well as students through implementing clear organizational structure.

M7. Enhance teacher-student interaction to

establish greater faith, trust and understanding.

M8. Improve suitability and relevance of curriculum to the maximum benefit to students, and ultimate customer – industry, in satisfying their changing requirements.

M9. Evaluate students as an employee by the industry. Such evaluation will assist timely modifications to the tangible and intangible areas of curriculum, discipline, attitude building, student motivation, improvement in communication skills, etc.

Education thus becomes the vehicle for cultural change. The world is never the same again when total quality begins to develop within the organization. Total quality, this is!

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