

## ENHANCING THE RELEVANCE OF TECHNICAL EDUCATION INSTITUTIONS THROUGH TOTAL QUALITY

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### Introduction :

One of the major problems affecting Technical Educational Institutions is the increasing misalignment between the needs of society, reflected through the needs of Industry, Research Establishments, Government departments and the like, and the output provided by these institutions. The commonly heard complaint is that Technical Educational Institutions, especially Engineering Colleges, and Polytechnics are churning out students with diplomas or degrees, but who are unable to make a meaningful contribution to society in any role, without further in-depth inputs. This is a legitimate concern, and reflects the importance of why educational institutions of all kinds, in fact, will have to continuously ensure their relevance to the ever-changing needs of society.

Total Quality, as a comprehensive philosophy, provides an excellent framework, whereby educational institutions can remain focussed, and useful in serving the needs of society. In doing so, educational institutions will also be able to increase the motivational levels of incoming students, who would then see a direct link between the inputs they receive, and their ability to be useful and productive to society.

This paper provides an overview of the principles of Total Quality, and how they can be applied to educational institutions so that they become effective, and retain

their relevance to society in the long term.

### Educational Institution as a System :

To gauge the effectiveness of technical educational institutions, it helps to consider how such institutions benefitted society in the past. Typically, when society was in need of technical expertise that would facilitate the winning of wars, skills and knowledge that were relevant were consolidated and made available to those who would be useful in the endeavour. This gave rise to those experts, who by virtue of their focussed application of technical knowledge came to be known as Military Engineers. The expertise gained in the arenas of war however, was found to have utility in the construction of public works for civilian use as well. This gave rise to those experts who later came to be known as Civil Engineers (as opposed to Military Engineers).

In both these developments it was needs of society that prompted the integration of all those who could engineer public or military works for specific purposes.

Educational institutions in the early years therefore, served to provide potential learners inputs from all those disciplines that were appropriate for the primary task - namely of enabling learners to craft public works for or civilian purposes. Following the Industrial Revolution, however, the growth in new technology was so rapid and significant that it became

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impossible for an engineer to be adept at the new knowledge that was unfurling. This resulted in specialist engineers being created, who were useful in areas that used technologies with which the engineers were apprised and familiar.

Technical educational institutions therefore, have relied on an understanding of societal needs to develop their internal processes and systems. This resulted in socially relevant output, in the form of trained engineering professionals, technical consultancy and inventions. As a system therefore, an effective technical educational institution is one that transforms young members of society into useful professionals. This is shown in Exhibit 1.

### **Total Quality Applies to all Systems :**

Total Quality is about attaining performance superiority, in satisfying ones chosen customers. This is achieved by using the capabilities of people deployed to use organizational resources, to provide value to those customers. This is further done ensuring that the right things are done right the first time, everytime. Considering educational institution as a system, it is obvious that the principles of total quality can be gainfully employed for their benefit. At the same time, using total quality to enhance the value of the output, would necessitate focusing on the following two points :

1. Who are the intended/chosen customers for the output ?
2. From the point of view of the customers, what features in the output constitute value ?

### **Identifying the Intended Customers and the Features they Value :**

Any improvement in the quality of the

output of an educational institution can be effected only when the intended customers provide feedback on the utility ("fitness for use") of the output. Usually educational institutions have considered all prospective users of engineers as their customers. The feedback that has therefore been forthcoming has often been diffused and contrary. This is not surprising, since all potential users of engineers or engineering expertise, have very diverse requirement. This is all the more when technological advances have altered the complexion of many users of engineering expertise.

What is the way out of this ? According to total quality advisers the first step towards providing value to customers is to try not to be all things to everyone. This implies that technical educational institutions also will have to try to focus on serving the technological needs of a very clearly demarcated (or demarcatable) section of the society. This will be akin to the approach that manufacturers adopt when they offer a product; they make sure that the product serves the unique expectations of a section of the market. In doing so, the product or the service that is thus offered, is viewed to be of value to the users of the section thus identified, and therefore feedback on performance or effectiveness will not only be focused, but can quickly be used to stimulate improvements.

The need therefore is to have educational institutions becoming more focused, and deliberately oriented towards serving the needs of a local community, a region, or a unique group of technology users. This is obviously a departure from the current trends in the area of education, but is an essential change that alone will make technical education more relevant to societal needs.

Once a section is identified, a comprehensive assessment of what constitutes "output value" needs to be made. This is an important step and needs to be done meticulously, dovetailing past data and facts, with the present expectations of chosen customers in the section. Data and information thus gleaned, will also serve as an important input to assess the skills, the knowledge and the abilities that are of value to the customers.

### **Planning for Excellence :**

Once the features which constitute "high value" are known, it becomes so much easier to plan to deliver such output consistently. As is shown in Exhibit 2, the starting point is the articulation of a Vision Statement which spells out how best the institution would endeavour to deliver value to the chosen customers. This is where the institution would need to creatively match, what it perceives as its unique strengths and abilities, with the needs of its chosen customers. Envisioning its role is crucial in providing outstanding value to its customers, because an articulated vision helps to enlist and align all within the institution to its superordinate goals.

As is shown in Exhibit 3, the means available to an educational institution in providing outstanding output, are following:

- a) The input (students) to the institution;
- b) The process of Curriculum Design;
- c) The teaching practices, delivery systems and overall regulating procedures; and
- d) Audits and Process Reviews.

It is also imperative that the educational institution consciously cultivates a total quality culture, where everyone is actively involved in providing

a useful service - if not to the end-users, then to one or more of the many agencies within the institution, that form the internal customer group. A total quality Organization has everyone serving a customer; so much so that even the "next process", or the "next desk" that receives a paper or a file from the preceding one, is also to be treated as a customer.

### **a) Inputs (students) :**

To a large extent the quality of the output of an educational institution depends upon the quality of inputs to it. Care needs to be taken to ensure that students who have a genuine aptitude and a desire to learn are selected. Even the kind of people who would be selected must reflect the expectations of the section being served. Expectations of sections, in turn, would also help to regulate the intake of students in a manner so as not to create either a shortage or a glut of professionals. Care also needs to be taken to assure that the selection process is fair, and provides equal opportunities to all, irrespective of gender. Once candidates are selected to go through the educational process, they become an important "internal customer group", from the point of view of other processes within the institution. Therefore while they ultimately constitute the output of the academic process, they are also customers to the internal processes, as long as they are within the system.

### **b) Curriculum Design :**

The curriculum is a bridge between the needs of the chosen section of society, and the "transformational learning opportunity" that the technical educational institution provides to incoming students. This implies that the process of curriculum design is a critical one from the point of view of adding value to the output. Great care is needed therefore, in ensuring that the curricula are well designed, and provide

clear learning objectives to the students. Clear learning objectives enable students to monitor their performance on their own, and build a culture of self-regulation and internal discipline. In the spirit of total quality the focus has to be all the more on self-certification rather than on inspection and external monitoring alone.

Effective curriculum design calls for extensive interaction with the prospective users of technically qualified professionals within the section, and documenting their expectations systematically. The Quality Function Deployment (QFD) Matrices have been used extensively by some academic institutions, to create a set of features in the curriculum that effectively maps the users needs. These features ultimately give rise to the learning objectives, the most appropriate teaching practices as well as the delivery systems that would be most effective for the intended output.

#### **c) Teaching Practices and Delivery Systems :**

Well-designed curricula automatically point towards the most effective teaching practices, as well as the delivery systems to be used. The effectiveness of the teaching process, and of the delivery systems are dependent on the availability of well-qualified faculty. Academic institutions would therefore have to make all possible efforts to attract the most appropriate and suitable talent, to contribute to the overall process of providing excellence.

The process of teaching, and of ensuring that the teacher is able to stimulate learning in students, is a critical component in the overall process. Faculty members, apart from being capable, must be creative and inspirational. Besides, they can also form small groups, in the nature of Quality Improvement Teams, to work on the delivery systems, their own teaching

styles as well as the interface with the students, to ensure maximum efficacy.

#### **d) Audits and Process Reviews :**

To ensure that all critical processes within the educational institution are being conducted in the way that is expected, regular audits and process reviews are essential. The ISO 9000 series of standards are a useful set of guidelines that help to establish and then monitor the system. Regular reviews of the system, and audits conducted by internal as well as by statutory external assessors are useful in preventing "slips" in the system that can have a negative impact on the ultimate output. These also ensure that valuable information is obtained for improvement from the non-conformities that are identified. In a total quality system, any feedback for improvement is grist to the improvement mill, and serves to stimulate betterment in the processes.

#### **The Dynamic Nature of Societal Needs - Rotating the PDCA Cycle :**

The steps enunciated above correspond to the well-known PDCA Cycle that characterises the Total Quality Improvement Cycle: the Plan, Do, Check, and Act quartet. The relevance of the PDCA cycle is that it provides an effective means to contend with a "marketplace" that is dynamic, and ever-changing. Societal needs are also of the same nature, and keep changing over time; besides being impacted by advances in technology, regional imperatives as well as the demographics of a place. In such an environment it is essential that the four steps of the PDCA cycle are continuously "rotated" and steps are taken to ensure that the output of the educational institution delights its customers consistently, all the time.

The first step, Planning (P) would encompass all those activities connected

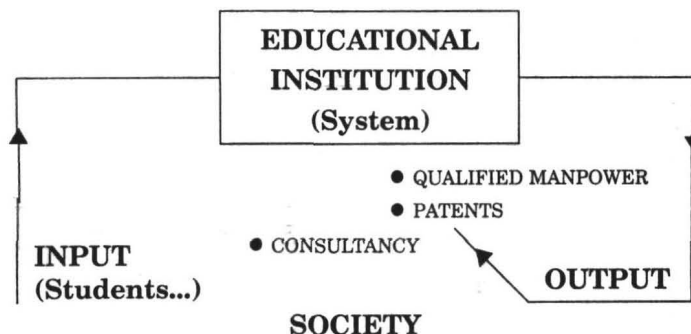
with keeping a tab of the needs of the section identified. To "Do" (D) would be to develop a curriculum, or to refine an existing one, while keeping in mind the changes in customer expectations. Checking (C) would involve making an assessment, and appraising the process used to deliver the intended output. The check function would also throw up improvement opportunities, that could stimulate beneficial change where needed. And finally, the step of Acting (A) would involve implementing the ameliorative changes, and incorporating them into the overall system, so that benefits from them accrue for all time to come.

In a dynamic environment it is imperative to "rotate" the PDCA cycle continuously, if long-term effectiveness is being sought. Educational institutions are

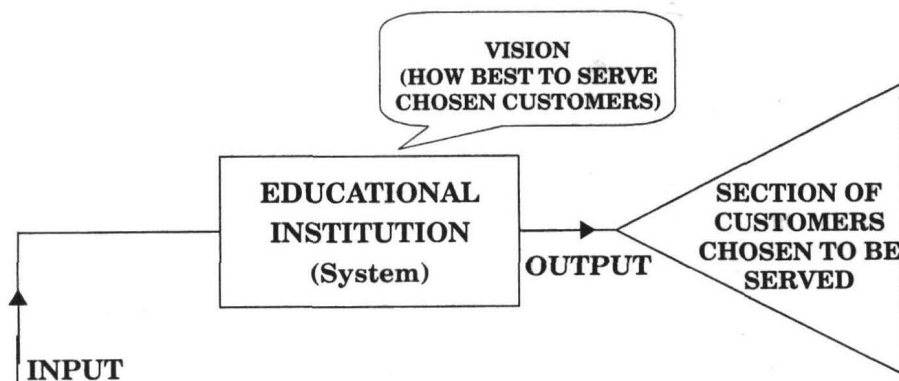
amenable to the use of this total quality tool, and needs to be used as a matter of course.

### Conclusions :

If an educational institution is considered to be a system that operates in a "static" environment, its relevance over time will be lost. Instead if one understands that educational institutions cater to the needs of a well-defined customer niche, whose expectations are gradually changing over time, it sets the stage for continuous improvement and refinement in the processes that create the output. Recognizing the dynamic nature of Society is therefore the starting point to enhance the relevance of Technical Educational Institutions. The application of the basic principles of Total Quality is an effective way to ensure long-term effectiveness thereafter. ★

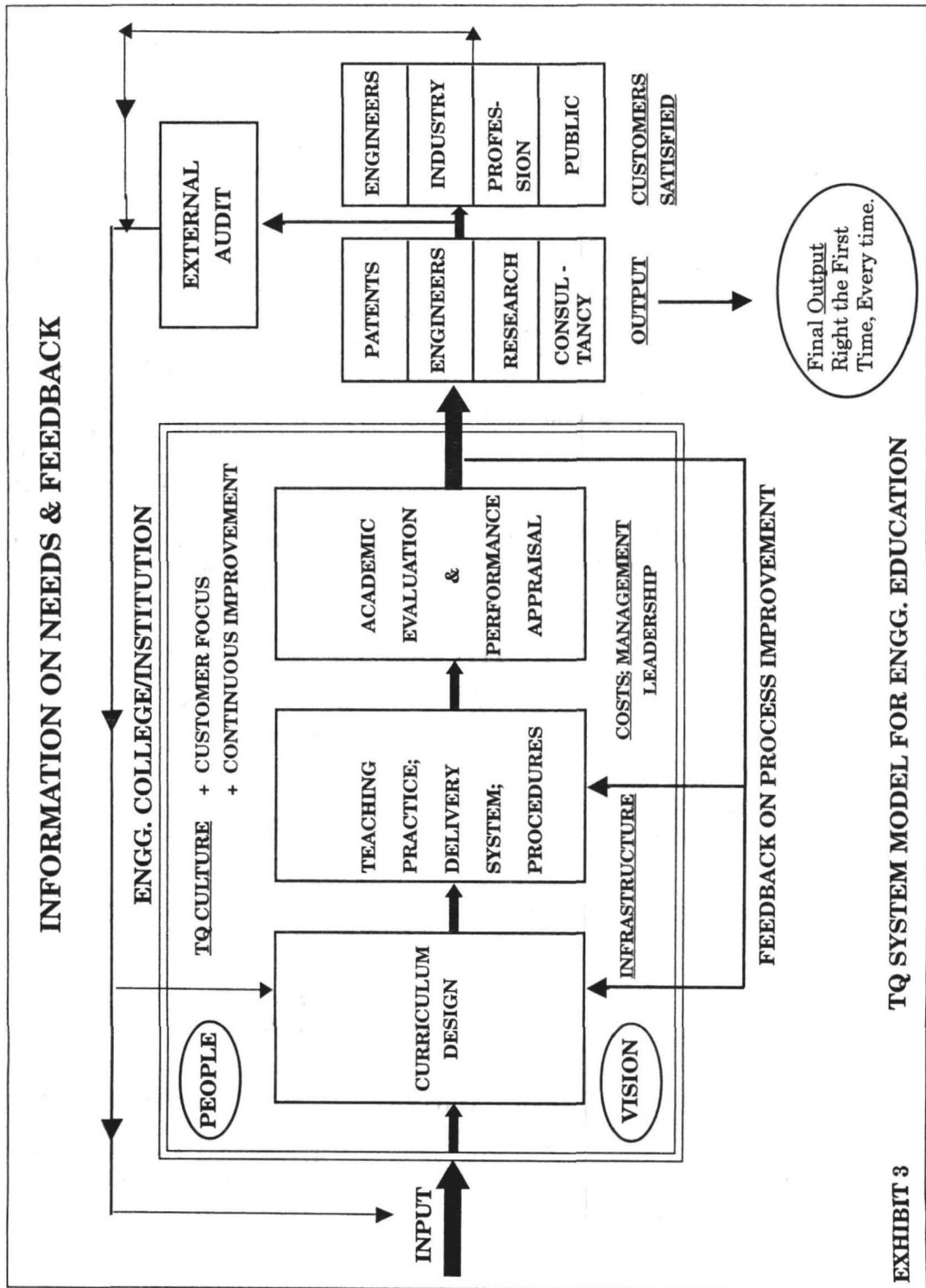


**EXHIBIT 1 : TECHNICAL EDUCATIONAL INSTITUTION AS A SYSTEM**



**EXHIBIT 2 : THE NEED FOR ENVISIONING**





TQ SYSTEM MODEL FOR ENGG. EDUCATION

EXHIBIT 3