

## MODEL TECHNICAL EDUCATION SUB - SYSTEM (TESS)

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### *Abstract*

*With globalisation of Indian industry there is need to achieve world class quality in engineering education. This paper provides a model for the Technical Education Sub-System (TESS) proposing a greater role for industry in the system. Equilateral co-operation between AICTE, Industry, Technical Institutions, and professional societies is provided for achieving excellence in engineering education for the satisfaction of all those who globally use the services of engineers coming out from TESS.*

### **INTRODUCTION:**

Four important things have happened in the last fifty years. Engineering education has expanded rapidly, technology has advanced hyperbolically, demand for engineering manpower is spiralling and the information technology (IT) revolution has made the world smaller though not yet a wholesomely integrated one. The world is fast becoming a single market which is dominated by competition, continuous change and consumer control. It is in this context that the model of the Technical Education Sub-System (TESS) has been briefly outlined in his paper. The application of the model is expected to achieve the following results.

- Provide a mechanism for a pivotal role by the All India Council for Technical Education (AICTE).

- Establish Total Quality Management (TQM) practices in the institution on a firm base.
- Instal Human Resources Development (HRD) for proper staffing career development of academic and other employees.
- Establish strong linkages between Industry-Institutions and professional societies to enhance research, innovation and entrepreneurship.
- Make education and training of students creative and joyful.
- Make admission policies consistent with academic, social and legal conditionalities.
- Integrate the different tiers of technical education viz. vocational, degree, diploma, and post-graduate into complimentary whole for

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achieving common objectives.

#### PRESENT FRAMEWORK OF TESS :

The present framework of TESS is a five tier system of which the various parts are not properly interdependent or even closely networking. These are the private trade and skill guides, industrial training institutes, polytechnics, engineering colleges and Institutes of Technology (IIT's). These are managed by private NGO's, government departments or quasi-government autonomous Boards. Universities monitor the academic programmes of the colleges, while those of the polytechnics and industrial training institutes are monitored by Director of Technical Education of each state government. Vocational institutes are also looked after by industries departments of the respective governments. AICTE has only recently acquired the statutory role of overseeing quality and standards in technical education and granting recognition to engineering institutions throughout the country. This system has done its job in the past rather well but many deficiencies are still critical.

#### DEFICIENCIES

TESS suffers from some deficiencies which need to be remedied in order to meet the high standards. Due to non-uniformity of standards accreditation of degrees/diplomas is difficult at global level. The emphasis on industrial training and liberal arts/management studies in the curriculum varies widely. Interaction with industry is not part of TESS. Educators have no industrial experience nor any professional training as

trainers. Leadership skills are deficient. Very few colleges encourage research, consultancy and professional activity. Financial support for technical education is very meagre and faculty are hired at very low wages with the result that quality suffers badly. Staff recruitment, training, career planning, promotion and development are based on archaic bureaucratic systems resulting in mediocrity being the norm rather than an exception. Difference in the academic quality of students admitted to colleges varies widely and differences are often glaring in many ways. This affects the training programme as well as the morale of both teachers and students. Often a lot of effort is wasted in trying to make "leather shoes out of cardboard."

#### OUTLINE OF THE TESS MODEL

The New Technology Policy (1993) of the Government of India emphasizes some action points regarding role of women, research and development, creativity and innovation, encouraging industries to contribute openly to training needs and enlarging the base of technical institutions to train people in significantly large numbers. Thrust areas of technology have been identified and the need for institutional networking and creating linkages has been stressed. Similarly, Khanna (1994) has spelt out the Action Plan of the AICTE which speaks about having "integrated models for future society. Sub-systems should buttress each other instead of pulling in different directions. All possible be done to streamline the entire system."

The model for TESS is proposed in the light of the above two documents,

and is best understood if we attempt to put down the objective of engineering institutions. The mission of these institutions is : integrated, continuous and wholesome development of engineers providing them with technical knowledge and social skills, values and ethics and appropriate attitude for lifelong learning in order that they remain at the cutting edge of technology and entrepreneurship. The training should enable them to realize their full potential, achieve higher productivity and harness their creativity towards socio-economic, rural and industrial development in a free global market leading to better quality of life for people, now and in the future. It is emphasized that objective of technical education can not be delinked from the concern of Wholesome Sustainable Development (WSD), Wakhlu (1993) has shown wholesome development of people (WDP) Figure 2 as a sine-qua-non of WSD which results from a proper equilaterally harmonious integration of technology, management and perceptual inner transformation. Thereby the individual, the sub-systems and the whole become a Unity.

Some key actions required for the success of the model are: Inspired communication is required for changing attitudes. Technology must be beneficial and grow accordingly. Autonomy and Decentralization are critical. Lifelong learning and learner-teacher interchange shall be ensured in TESS must see itself as a sub-system of a larger socio-economic system and must remain dynamically responsive to continue changes that happen. Change in perceptions within TESS will produce a ripple effect

of far reaching consequences.

Fig. 1 shows the line diagram of TESS within the total system. AICTE is the pivot and catalyst at the centre with engineering institution, industry and professional societies at the three corners of an equilateral network. TESS will not work in isolation from other systems, rather it will stay in dynamic interaction mode with other academic institution and universities. Diagram shows the input, output and process parts. The process within TESS has the objective outlined above and the main tasks are training of engineers, technician and skilled workers; doing research to advance the frontiers of technology; innovation and invention; and doing extension and consulting work with industry and professional practitioners. The process is in the hands of students, academic staff, administrative staff, technicians and ancillary staff. Their roles are equally vital. Integrating TESS into a harmonious, creative, economic and efficient entity is the task of management. The following basics ought to guide the process:

- Excellent leadership at the top and other levels.
- Personal example of teachers who communicate value and work ethics.
- Routine and repetitive tasks must be automated.
- Teachers must teach, do research and consult in equilateral balance.
- Administrative tasks must be streamlined/aligned with the needs of the teachers and students.
- Students are our main customers.

- They must receive quality training.
- Teachers must show humility and commonsense in relation with their students.
- Excellence must be visibly praised/rewarded.
- Dedicated hardwork, courteous and loving disposition and a fine deportment are the solid foundation of a good TESS.
- People working independently or team create excellence.
- For effective TQM all people have to be galvanized to make effective contribution to the process of change.
- TESS must become one organic whole by people working across department and boundaries.
- Everyone has to participate in achieving TOTAL QUALITY. This needs a new outlook "TQM model rests on the foundation of planned and wilful change in thinking." (Wakhlu, B. 1994).

#### PLAN OF ACTION FOR ACHIEVING RESULTS

In order to make TESS a truly vibrant system for the next century we must plan out the actions needed to avoid pitfalls. Curriculums have to be drastically revised. Departmental boundaries don't have to be like rigid walls; team work and joint problem solving are the new approaches to be used. Change represents growth, opportunity and innovation and this is the most needed input. AICTE has to help in this in order to remove fear of disorientation and upheaval. Total Quality Management approach can be fruitfully used for excellent results. TQM in the context of TESS will mean continuous learning, innovation, total quality in everything, care of students/industrial and governmental customers, proving leadership, people care, human training and development (HRD), performance planning and individual training and development. The emphasis is on doing the right things (effectiveness) plus doing things right (efficiency). The employees have to be motivated and involved in continuous improvement.

The following values and belief must become widespread in the TESS.

AICTE must develop ISO : 9000 related standards for technical education to help institutions to advance in this direction. AICTE and Directorates of Technical Education must be committed to total quality concept for the TESS model. The reengineering of TESS will effect so many other system that it must initially be a top down model for result. There are, however, a good number of critical change makers present within TESS who are developing a "critical mass" for making revolutionary change to happen. Their efforts need encouragement and support.

Admission criteria have to be clearly defined keeping in mind that selection of student must not only be legally right but also socially acceptable without sacrificing academic standards. Graduates and diploma engineers perform work in diverse fields and there is no need why they should all pass through the same black-box process and be admitted on the basis of single criterion? Flexibility and innovation in ad-

mission policies as well as prescribing curricula to suit the market needs have to be built into the TESS model. (Wakhlu, 1993).

### CONCLUSIONS

To sum up it may be mentioned that the time is now ripe for far reaching changes in the technical education sub-system (TESS) briefly shown in this paper envisages a leadership and catalytic role for the AICTE, establishing of TQM in the TESS, instal proper HRD systems and integrate different tiers of technical education. The mission statement of technical education has been spelt out to provide a clear goal. Autonomy, Flexibility and innovation in developing curricula and training of the professional engineers has been highlighted. Plan of action for achieving desirable result has

been outlined and is recommended for immediate implementation at various levels.

### REFERENCES

Khanna S. K. (1994), Technical Education: Tasks & Action Plan, ISTE, Newsletter, Vol. XIV, NO. 4, July 1994, Pp -5.

Wakhlu O. N. & Wakhlu A. (1993), A New Paradigm of Wholesome Development, Proc. ICSVBD, Fort Collins, USA, Sept.-Oct. 1993, Pp. 1531 - 1556.

Wakhlu O. N. (1993) Criteria for Selection of students of Professional Engineering Courses, Jor. of Engg. Edn. Vol. VI, No. 4, April 1993, Pp. 4 -6.

Wakhlu B. (1994), Total Quality - Excellence Through Origination Wide Transformation, (Book), Wheeler Publishing Co. New /Delhi, 61994), Pp. 375.

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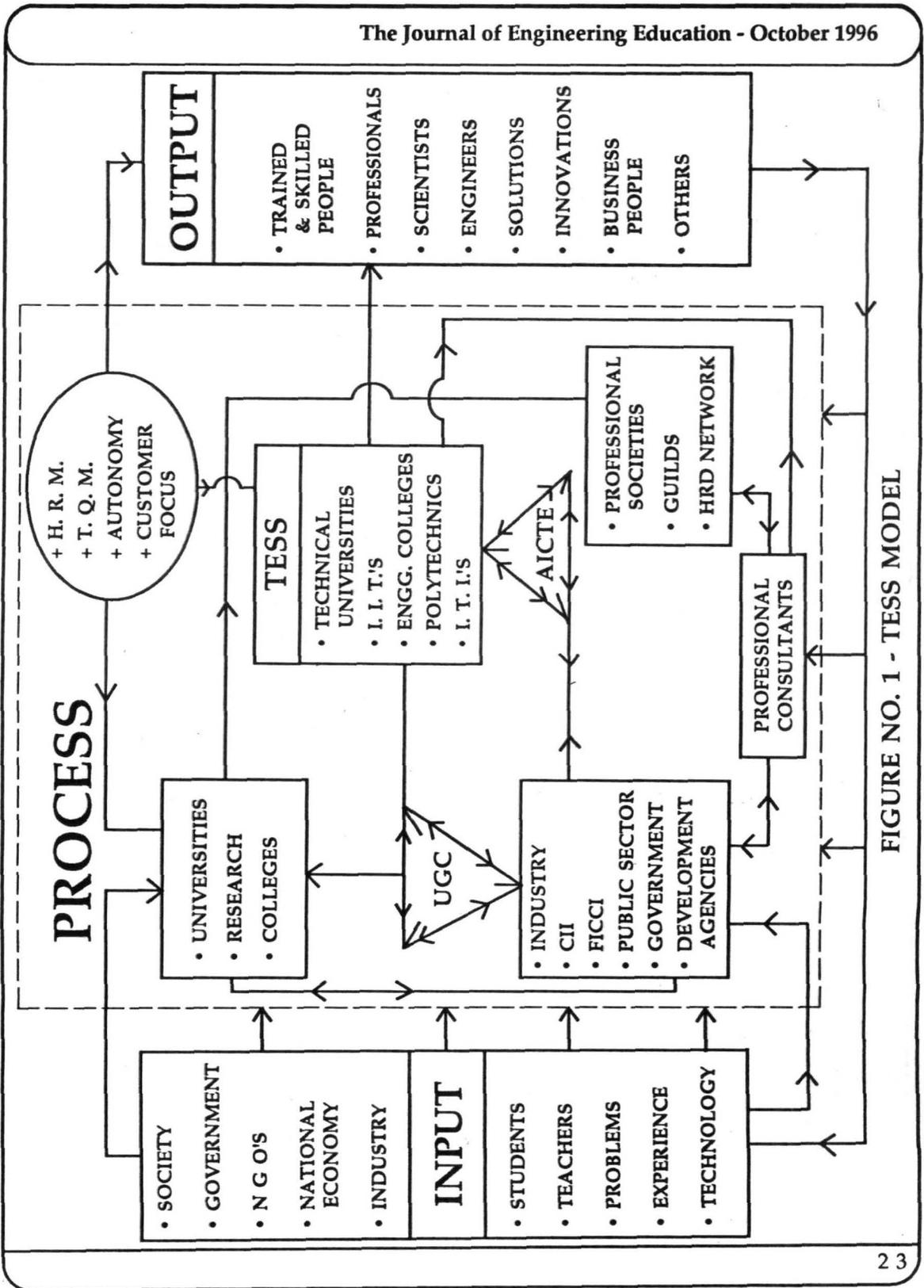


FIGURE NO. 1 - TESS MODEL

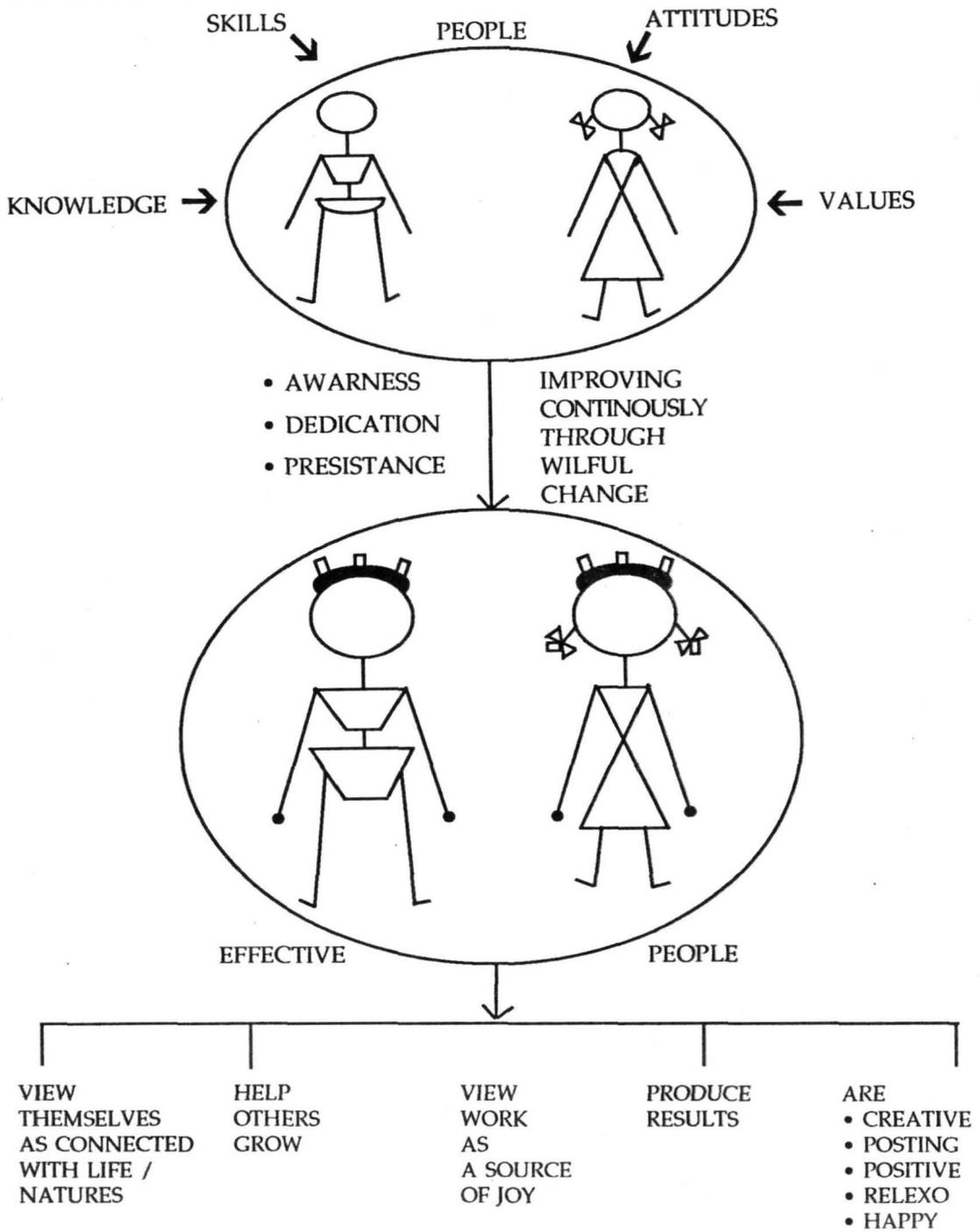


FIGURE 2 : The Process of the Wholosome Development of People