

VALUE BASED QUALITY ENGINEERING EDUCATION

Dr. AJIT KUMAR GUPTA

1. INTRODUCTION :

The economic progress of a country is strongly linked with the quality of education, specially with the technical education. Also the quality of life of society at large and the individuals in the society, largely depends upon the quality of education.

During past four decades, many steps have been taken in India to improve the quality of technical education. These include evolution of model syllabus, quality improvement programmes for teachers; encouraging interaction with industry through consultancy and continuing education programmes; and providing impetus for expanding infrastructural facilities in emerging technologies.

But, it is found that the quality of education, instead of improving, has begun to decline. Colleges and Universities do not count for real education. It is the culture that is the yardstick to measure the growth of "Quality Education". Many are educated without culture.

And there are cultured people without any formal education. The present system of education is generating unemployment and corruption on the one hand and intellectually brilliant people on the other in various fields without proportionate expansion in the hearts. We have engineers, doctors, lawyers, teachers, officers and ministers without enough "humaneness". Integrity and uprightness, compassion and culture are often a dear commodity in education and among educated people.

Hence, there is a need for value based education even in the engineering field also. Steps, therefore, are to be taken to restructure the engineering education with thrust on character-building. Educationists of integrity are not totally absent in this country. Let us entrust education to their hands and thereby build the nation on the strong foundation of PATRIOTISM.

Here in this paper, I would try to put before you various elements for quality education and also the values in Education, as education is the base of

Principal, College of Engineering & Tech., Bambhori, Jalgaon (Maharashtra).

human growth. If our education is sound, the society, and ultimately the nation, will stand erect.

THE BASIC STRATEGY FOR ACHIEVING QUALITY IN EDUCATION :

- Quality in higher and engineering education means 'specifying worthwhile learning goals and enabling students to achieve them'.

There are many factors to be taken into account in determining what is 'worthwhile'.

Enabling students to achieve their learning goals 'involves distinguishing between different kinds of learning and between different kinds of learners.

- To achieve quality, 'Everyone doing their best is not the answer, they must first know what to do'.

Knowing what to do involves teachers and students knowing how to match their teaching and learning to the stated goals.

Only then are quality assurance procedures needed to ensure that everyone continues to do their best.

NEW PARADIGMS OF TEACHING :

Learning is a social process that occurs through interpersonal interaction within a co-operative context. Individuals, working together, construct shared understandings and knowledge. Learning proceeds more fruitfully when relationships are personal as well as professional. Long-term, persistent efforts to achieve come from the heart, not the head, and the heart is reached through relationships with peers and faculty.

Love of learning and love of each other are what inspire students to commit more and more of their energy to their studies. The more difficult and complex the learning, the more important are caring relationships to provide the needed social support.

The following table gives comparison of new and old Paradigms of teaching : (Table on next page)

THE MULTIPLE ROLES OF ENGINEERING FACULTY :

Even though not stated explicitly, the faculty members are expected to engage in the following activities :

- instrumental activities in the classroom, laboratory development of teaching resources materials, setting and grading examination and test papers.
- academic research, personal research, supervision of student projects at the B. Tech., M. Tech., Ph.D. levels, preparation of papers for presentation / publication, publication of textbooks and monographs.
- sponsored research including preparation of proposals, reports and administrative work connected with it.
- consultancy, interaction with industry through consultancy assignments, which serves to inject realism and relevance into the teaching and research activities of the faculty.
- curriculum development activities in response to the rapidly expanding frontiers of knowledge and the

	NEW PARADIGM	OLD PARADIGM
Knowledge	Jointly Constructed by Students and Faculty	Transferred from Faculty to Students
Students	Active Constructor, Discoverer, Transferrer of Own Knowledge	Passive Vessel to be Filled by Faculty's Knowledge
Faculty Purpose	Develop Students' Competencies and Talents	Classify and Sort Student
Relationships	Personal Transaction among Students and between Faculty and Students	Impersonal Relationships among Students and between Faculty and Students.
Context	Co-operative Learning in Classroom and Co-operative Terms among Faculty	Competitive / Individualistic
Assumption	Teaching is Complex and Requires considerable Training	Any Expert can Teach

changing needs of industry and students.

The Government of Maharashtra has prepared the following list of roles to be played by engineering teachers :

- (a) Imparting instruction in classrooms, laboratories, field etc.
- (b) To develop and use of teaching resources, charts, teaching aids print or non-print learning resources.
- (c) To develop and implement curriculum.
- (d) Paper setting, Continuous assessment, Evaluation.
- (e) Resource generation, testing, consultancy, continuing education programmes.
- (f) Organizing industrial visits, short trips, educational tours.
- (g) Providing guidance and counsel-

ling for career planning, higher education, entrepreneurship, self employment, placement of students.

- (h) Organizing cultural programmes, social gathering sports, competitions, social camps.
- (i) Interacting with industry, society, parents, funding agencies, professional bodies, other organizations, institutions or higher offices.
- (j) To participate in policy making, planning and control.
- (k) To carry out research work.
- (l) Use of library, publication of books.
- (m) Participating in seminar / workshops / symposiums / conference.
- (n) Undergoing short term / long term training programmes.
- (o) Updating knowledge, enhancement

of qualification.

- (p) Preparing proposals for development of institute, reports of inspections, inquiries.
- (q) Conducting examinations, admissions and performing other administrative assignments.
- (r) To maintain record keeping, house keeping, maintenance of facilities in the premises.

In most of the colleges, the teachers as well as the management, restricts the role of teachers to the first four roles and to some extent participation in extra curriculum activities of the institute.

If so, then what is teaching? The teaching is not "Covering" the syllabus but "Uncovering" the syllabus to students. The students should feel the subject, smell the flavour of it, experience the beauty of subject and get excited to learn it. Then that experience makes him knowledgeable having the confidence of how to use knowledge. That makes him "A COMPLETE MAN".

Then how the subject is to be taught? To uncover the syllabus in front of students, the teacher should have good knowledge in it. He needs training in theoretical as well as practical aspects of the subject. The one who shifts from bench to platform in a single day cannot acquire the knowledge, so suddenly. In the U.S.A., the teacher of engineering is not allotted teaching work in the first year, but asked to collect research ideas by referring to literature. The teacher needs confidence in subject before standing in front of students.

If the students are to enjoy the flavour of the subject, then the teacher

should be trained to know how to present his ideas in an attractive way of presenting, may be using audio visual aids, models, illustrations, good use of boards, good sense of behaviour in class and if possible good language. Even today, after 25 years of the entry of overhead projector into our teaching aids, majority of our colleges and teachers do not use it; if they use it, they do not know how to operate it! What a tragedy in teaching! The teachers are not bothered to plan their teaching.

In several subjects, case studies are better in communicating the subject in relevance to practical aspects. This induces analytical ability, logical approach, application of science and technical knowledge to the problem. The students' participation in learning eliminates boredom in classes, develops boldness and positive thinking and attitude. The initial steps will be laid in making him a complete man.

The students can experience the beauty of subject if they are shown real life aspects of it instead of unlively sketches or models. The students be taken to industries to show them machines in working or let the teacher collect or prepare visual aids of such machines and show them. The experience is the best way of learning, understanding, and remembering. This develops confidence in students about their knowledge. Otherwise, many of our students study the boiler without seeing how it works.

The students can get excited in learning and get attracted if something new, something unimagined or if the real life aspect of subject is played

infront of them. For example, in carpentry practical if students are asked to prepare a small box for keeping their pens, pencils, etc. and given to them later, they will be excited more and preserve the box for a life time instead of asking them for different models of different geometrical shapes.

Therefore, the teacher, when he joins the institute, should be trained first regarding these aspects of teaching. Any learning is not proper without a teacher. Learning the art of teaching is not an exception. The information of his different roles and its importance will make him mature and motivated. If the teacher wants to excite the students in learning, he himself should experience the excitement first. For which, research is the best way of experiencing excitement. The problems of consultancy service will also bring case studies, experience, confidence and excitement to teacher. For a teacher the consultancy is not just for monetary benefits. Another defined roles of teachers will enhance their personal confidence due to knowledge in several areas.

UN-DEFINED ROLES OF TEACHERS:

There are several un-defined-roles of teachers which are difficult to define and make them mandatory. But if the teachers are to become the architects of new generations, then they should shoulder responsibilities in the following areas.

- (1) He should perform.
- (2) He should develop nationalistic feelings among students.
- (3) Induce positive attitude among the students.

- (4) Be responsible for the quality of students.
- (5) Be relevant in teaching.

DEVELOPMENT OF ENGINEERING TEACHERS :

We have seen that engineering teachers have to perform multiple defined and undefined roles. For this they have to inculcate a number of attributes in their overall personality. The following diagram gives the various elements for the holistic development of engineering teachers. (Fig. 1)

VALUE BASED EDUCATION :

Having seen the defined and undefined roles of engineering teachers and attributes required to become a good teacher, now let us see how we can make our education more meaningful by imbibing values in education.

Swami Vivekanand sees education as the manifestation of the perfection already in man, religion as the manifestation of the divinity already in man. "Each soul is potentially divine, the goal is to manifest this divine within by controlling nature, external as well as internal".

To achieve this in existing system of education, at least the following nine values should be imbibed by every student, then only education will become effective.

1. Concentration :

Concentration of mind plays an important role in mastering the various subjects of study. The more the power of concentration, the deeper is the observation, the greater is the knowledge

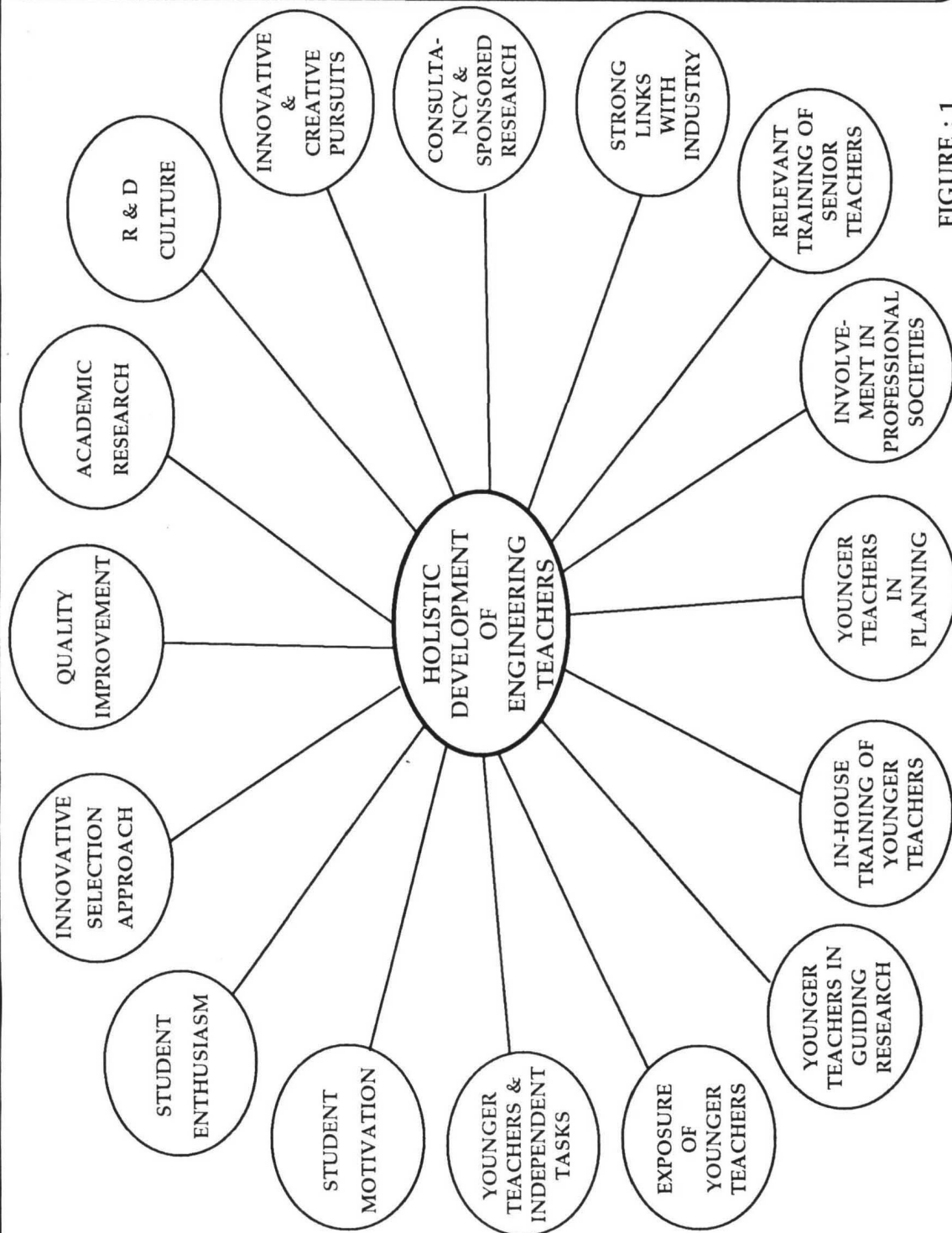


FIGURE : 1

gained, and the quicker it is achieved. We know the example of Arjun, who through concentration, seeing only the eye of the bird, shot it. Swami Vivekananda read volumes of books with lightening speed and remembered every thing in them.

2. Chastity :

Concentration comes only to a pure mind. Purity means a mind free from desires and distractions. That does not mean that we should never have desires, but we should not get restless to fulfill these desires immediately. But they can be satiated properly at proper time, in proper conditions. Let us first deserve, then desire. Chastity heightens the grasping and retention of knowledge. The student can memorize all he hears from the teachers.

3. Truthfulness :

Another value to be incorporated in the process of learning is truthfulness. It means straightforwardness in thought, deed and word. It means to think noble, relevant thoughts only. Gandhiji, through truth only, accomplished the great task of making our nation free. From truthfulness come honesty, punctuality, cleanliness, orderliness, simplicity etc.

4. Tapas :

Tapas means austerity, which has been given an important place in our Indian education. Literally, it means 'burning' or 'melting' by heating'. As by heating the metal is melted and given its desired shape, so the mind of a student has to be ridden of lethargy, lust, distracting thoughts, spurious whims and fancies and when this is done, the mind

like a molten metal can take the desired shape.

Training the body to be strong, fit for hard work, early to bed and early to rise-thus having sleep to a minimum, practising simplicity in clothing and bedding, moderation in eating and drinking, forbearing calmly when one is ill or punished for one's wrong, all these practised as a necessary part of education, will constitute tapas and will help make the student efficient and strong.

5. A Taste for Healthy Hobbies :

After attending the classes in the colleges, in the remaining time the student feel a great void and pass or literally kill their time in haphazard wanderings. This can be removed by cultivating higher tastes like reading noble literature, singing, creating edifying art forms, healthy and hard exercises like gymanastics, games and sports, long trekking, swimming, running and so on. By these activities, not only body and mind are trained, but the direction for future work will also be opened, as lower impulses get sublimated.

6. Pure Love :

Love is a value which every youth is fascinated with but almost all mistake it for lust, which is selfish and jealous and results in misery. Love cannot be bartered for money or for favours. In love there should be no place for lust, envy, rivalry or restrictions. Educators should put the youth to serve the poor, the afflicted and the needy; then they would have a taste of what unselfish love is.

7. Prayer :

To include this sterling value in

every student's life is the need of the hour. Prayer is not, as it is often thought, begging; it is rather reminding and demanding our paternal heritage from God or Supreme Spirit. It is a positive current of thoughts which makes body and mind healthy and balanced. There are many Vedic prayers full of elevating meanings which arouse the dormant powers of understanding in every student.

8. Shraddha :

Every student must cultivate this value. Shraddha does not mean only his faith in teacher but it is an indomitable will to acquire knowledge at any cost. Shraddha is self-confidence. It is faith in the unfailing cosmic power behind one's individual self. It can face failures with smiles and renew further efforts with fresh hopes. Shraddha is capacity to shoulder any responsibility with efficiency and sacrifice.

9. Wisdom, the Goal :

Wisdom, and not mere knowledge, is considered the goal of all education. Wisdom is to know what is permanent and what is not and to reject the latter. What is good and true to be accepted, and what is bad and wrong to be rejected. By doing this, many trivial quarrellings can be overcome. To cultivate this value, the lives of the great men should be read and contemplated.

CONCLUSION :

To rebuild our Great Country, our Education Policy must be re-modified. At least the nine values enumerated in this paper should be imbibed by all the students, simultaneously with their

studies. The teachers should have traditional and moral attributes and should be dedicated to the profession and committed to the sustainable development. Then only there is hope for re-generation of India. Because Swami Vivekanand had prophesied that India will never fail, because of its rich cultural and ethical heritage. It will guide all other nations of the world. For that we should get prepared. Thus, Swamiji had tried to make us-the youth of India - the instrument in this work. So let us first build our character and rebuild our Great Country.

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