

*** Integrating Ethics and Values into Engineering Education**

Seminar sub-theme- Values and Patriotism

Vidushi B. Sharma
Lecturer in English
Department of Applied Sciences and Humanities
Manav Rachna College of Engineering
Sector 43, Faridabad-121001
Phone: 91-0129-4198000
India
([E-mail-Vidushis32@gmail.com](mailto:Vidushis32@gmail.com))

Abstract:

There is a growing awareness that engineers need an acquaintance with the Subject of Ethics and Values as the study of these will teach the young scholars the virtues of humanism and qualities of human-being-ism. These virtues and qualities will develop in them righteousness, self-discipline, fellow feeling, loyalty to duty and reverence for the aged which will help them become effective, humane professionals tomorrow.

It has been observed that development of technology is a part of development of ideas, attitudes and actions which give to human civilization an infinitely vital scope for positive change.¹ Though technical education has considerably eased the ways of human happiness on the body level, yet it has posed a danger of producing feelingless human beings without a developed sense of humanism on the spiritual level. In the 21st century, we need those technocrats whose physical hands must work for physical

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happiness, but mind and soul must speculate higher purposes for further research. The 'how' of this proposition covers the text of this paper. Therefore, the one dictum suggested in the conclusion of this paper is: ' Study Engineering, implement your study in life, in study of Nature and in the process of knowing thyself', so that you become a truthful and useful human beings in the vast scheme of human civilization.

About the author

Dr Vidushi Sharma has done B.A (Hons.) and master in English Literature from M.D.University, Rohtak (India) and is PhD in English literature from Dr. B.R Ambedkar University, Agra, India. She has a teaching experience of five years to undergraduate and postgraduate students and is teaching students of Engineering at Manav Rachna College of Engineering, Faridabad, India.

She has to her credit an active participation as a presenter in various national and International Conferences on Communication Skills.

Her area of specialization is Business Communication, Communication Skills, Philosophy, American Poetry, and American Literature.

Objectives

It is a universally acknowledged fact that most of the problems of the modern world rotating important issues like environmental preservation, global competitiveness, and other areas arise in part from a substantial lack of presence of engineers and scientists in leadership roles in government and industry.² The cause of this drawback is attributable to lack of opportunity in curriculum for students of technical programmes to secure

adequate education that should inspire them to take up leadership positions in private and public sectors. Though North Carolina State University (NCSU) is doing a lot to solve this problem,³ yet still there is a growing need on the global level to understand the psyche behind the issue and to take effective measures to solve this problem. The aim of this paper is to underscore the importance of integrating ethics and values into Engineering Education as a teacher of humanities in a reputed Engineering College in India.

Ethics and values: Definition

To define Ethics and Values is to deny ethics and values. Therefore, without parading any theoretical definitions of these terms I come direct to the pragmatic side of ethics and values.

God is or not. It is a subject of those who are exclusively interested in spirituality. But one thing is certain: that life is there and death is bound to come one day; that between life and death, we have to live. How do we want to live, - happily or grouchingly? The answer to this pertinent question that comes from within is 'happily'. Where does my happiness lie? Does it lie in wealth and prosperity in terms of material achievements? Are all those people happy who possess material prosperity? Or my happiness lies in sharing my meal with the needy; or giving some help to a person who needs it. The answer to this question that comes from within is that my happiness lies in doing something for another person and forgetting it. When I think of the well-being of another person, it means I am thinking 'ethically' and 'morally'. The inference is that the one and the only aim of human life is to lead a life of ethical values, and students should be properly educated to act morally and ethically.

The problem with modern education is that we have made it so external and the learner gets so lost in its formal activities that his inner potentialities are left unexplored; with the result that the present scientific world is blamed for lack of moral and spiritual values and for its hopelessness, faithlessness, rootlessness. Should we hope for the promotion of ethical understanding from this kind of exterior education? No. But, I certainly don't mean to point out the drawbacks of the present system of education. If it has drawbacks, it has advantages too, and, perhaps on the material level its advantages are no less in numbers than its drawbacks. My point is that something is lacking somewhere in its imparting. The mind of a student is a clean slate; we may write whatever we like to on it. If we can draw on this clean slate the drawing of a computer, we can draw also on it the light of the rising sun so that under the influence of 'wonder' connected with the sunlight the learner gets inspiration to know something more behind its rays; to dig deep into the recesses of his mind and to bring the clay out to compare and contrast it with the one he had left outside. But, who will draw the rays of the sun on the mind of the young scholar? The answer is his 'sun' in human form. From here emerges the role of the teacher as a beacon light for self-realization of the pupil. And, no one can deny the fact that a self-realized teacher alone will have ethical understanding of life which he will practice in all his activities as a natural consequence of his self-realization, and he will inspire his students to go for this understanding.

However, if education is allowed to mean merely a stereotyped and formal effort of supplying information and even injecting in the mind of the student some narrow religious dose under the semblance of 'morals' and 'ethics', its effect on the personality of the student will not be more than the effect of training on a parrot or a monkey for the

delight of kids. For the trainers of 'parrots' and 'monkeys' running educational institutions, Tagore has an indirection: "I do not put my faith in any...institution but in the individuals all over the world, who think clearly, feel nobly and act rightly, thus becoming the channels of moral truth"⁴ Tagore goes on to say: "Our moral ideals do not work with chisels and hammers. Like trees they spread their roots in the soil and branches in the sky, without consulting the architect of their plans."⁵ What clinches from Tagore's contention is that it is the 'good' individuals (who think clearly feel nobly and act rightly and thus become channels of moral truth) that make a healthy society based on the principle of "One Life".

But even trees and plants need to be watered. Education is something which the student needs and the teacher can impart, but, unfortunately, a handful of those at the helm of affairs who plan its curricula in air-conditioned rooms and offices do neither consult the student what he needs nor the teacher what he wants to give. The teacher has no powers to do away with the existing system, but he should not throw down his spears; instead he should devise ways and means, within the existing system, to inspire the student to try to find the unseen meaning in the seen objects, to see the moral in the physical. By moral, I do not mean that the student should be fed with some already established religious dose. If the word religion has some 'sectarian' label, it is very dangerous for impressionable minds. Mostly by religion we mean some sectarian approach where there are three things-one personal God, One book, and the feeling that this personal God and this Book is the only truth"⁶ It is this interpretation of Religion that has divided the contemporary world and has created various forms of intolerance and discrimination among peoples. It is this narrow approach to religion that has snatched human rights. Instead, the teacher should

carve such methods in his teaching as by which the inner self of the student reveals itself to him to the extent that he realizes himself as an integral of 'Onelife'. He thinks himself neither superior to nor inferior to anyone but an equal and essential component of the machine of life. Such a person will definitely sympathize with the suffering humanity and will lead a life of ethical values and he will act instinctively to illumine what is dark around him and raise and support what is low.

Methodology for the teachers

To the question what methods can a teacher carve out of the existing system of education, there may be many theoretical answers, but as a teacher of English language and literature I have been able to keenly observe the attitudes and interests of students, and I feel that Emerson's method of learning and teaching is convincing. I am convinced of the workability of motivating of motivating students to follow Emerson's formula of 'Study Nature' and 'Know Thyself'. Emerson says:" The first in time and the first in importance of the influences upon the mind (of a scholar) is that of nature."⁷ Everyday, the child sees the rising in the East, every evening, he sees it setting in the West; at nightfall he sees the moon rising, surrounded by stars. Ever he feels the winds blowing, the grass growing, the gnats mourning among the river shallows, the lambs bleating, the birds chirping, men and women conversing. If he is made conscious of this spectacle, he will find himself engaged in its study. And one fine morning he will have realized what nature is to him and what he is to her. There is never a beginning, there is never an end to the inexplicable continuity of this web of life, but always a circular power emerging from itself and returning into itself. Herein resembles his own spirit whose beginning, whose continuity and whose ending he perhaps can never spot, so entire, so boundless, so

infinite. To the young mind everything initially appears to be individual, something standing by itself. But by and by he himself learns how to join the individual elements into an organic whole. And the day he connects himself also to this 'whole', he is self-realized- an 'educated' man with ethical understanding and practice thereof.

The second important method to educe the impressionable minds' hidden potential to motivate him is to concentrate on the implications of the transcendental maxim; "know thyself". Why should he? To confirm himself how far he is a part of what he has already observed outside—nature and its organic unity and, for that he may be acquainted with Quarle's theory of "Poetic of Correspondences" It will not be out of place here to make a passing reference of this theory.

The term "**Poetic of Correspondences**" originated from the French writer, Francis Quarles (1592-1644) who in his preface to *Emblems* (1635) says:" What are the Heavens, the earth, nay, every creature, but hieroglyphics and emblems of His glory?"⁸ When Quarles speaks of finding in the objects of Nature the 'designs' and 'symbols' of God, he appears to be recalling the earlier philosophic theories according to which this universe was imagined to be a vast network of symbolic correspondences. Christian philosophers put this in the sense that this universe was a Book of the Living God (like the Bible) and all objects, animate or inanimate, of the universe were the words, sentences, paragraphs and pages of the Book; and that each object, however big or small exists to draw the attention of human beings towards the Creator and to sing His glory. It was commonplace in the Renaissance to speak of the world as a "universal and public manuscript"⁹ containing what Duke Senior finds in *As You Like It*, "sermons in stones, books in the running brooks and good in all."¹⁰ God himself could be imagined as the archetypal

conceitist who created the world which Saint Augustus calls “an exquisite poem”, a poem full of occult correspondences, incomprehensible to ordinary minds but an immensely rich hieroglyph to the recondite. It was held that God made man in his own image, and it was imperative duty of every man to uphold the mysteries of God by indicating toward the ‘moral’ in physical.’

From this theory of ‘poetic of correspondences’, the young learner will get inspiration to search the “unseen” meaning in the “seen” objects of the universe. He will find thrill in this effort but still he may not fully feel the real import.

When we talk about the relevance of integrating ethics and values into Engineering Education, we wish to stress the point that though an Engineering student has developed a scientific temperament and he interprets all human concepts and problems in terms of science, he should not forget that *he is biologically a product of five elements, who has a heart, a soul that unites the entire cosmos into one Reality*. Science is good, but science alone is not humanistic. It is not autotelic in itself to solve human problems.

In this brave new world of ours numerous scientific fantasies have fanatically and radically revolutionized human life. Though there appears to be progress and progress all around on the material level, but on the moral and spiritual level science has led to isolation and alienation of individuals to an alarmingly dangerous proportion. In the hub-bub of modern hectic life people have become so self-centered that their “paths cross and dramas go on within range of dramas, and yet in spite of innumerable points of superficial contact and relation, each drama is isolated and each individual remains locked within the walls of private experience.”¹¹ If science were to be the solution of all human problems, there should have been peace and peace all around in this age of time

and machine. But, it appears that machine with all its blessings and efficacy has choked under its jarring boom the serene and blessed music of human virtues. Under these appallingly dark circumstances the innate human spirit yearns in desire to express itself in opposition to the pains of hell which modern science has brought us in equipage. It is in this innate tendency of freedom and happiness of the spirit that the seed of humanism lies. The American Humanist Association has defined Humanism as “a faith in people, in all humanity and in science as a means for attaining truth. It is also a quest for ethical and spiritual values of life through Philosophy, Science, Arts and Literature.”¹² Humanism is a “philosophy of joyous service for the greater good of all humanity in this natural world and according to the methods of reason and democracy.”¹³ The long and the short of everything is that Humanism is a sense of devotion to the interests of human beings in all their activities. God made man in his own image and as such man has the right to live freely and die freely among all those who resemble him. He has the birth right to enjoy human rights.

Therefore, it is imperative for engineering students to learn what human-being-ism means. They should study human emotions through the art of drama, poetry, art, music, dancing and all those modes which give emotional release or ‘Catharsis’.

In the United States, the Accreditation Board for Engineering and Technology (ABET) has strongly recommended the study of ethics for the students of Engineering so that they acquire “an understanding of professional and ethical responsibility.” Though some teachers like Loman Corbes.¹⁴ do not feel ‘comfortable’ with the directive, yet they also feel “Ethics ought not be neglected in Engineering education, but more fundamental is... the social, the organizational-even the political complexities of practice.”¹⁵ The board

(ABET) believes that to achieve accredited status “engineering programmes must demonstrate that their graduates have an understanding of professional and ethical responsibility.”¹⁶ (ABET, 2003)

Robert McGinn’s survey conducted on 294 practicing engineers shows that 80 to 90 percent of these engineers are” likely to encounter significant ethical issues in their future engineering practice. 50 to 70 percent of these practicing Engineers admit that they had themselves “faced an ethical issue in the course of engineering practice.” About 90% of the practicing engineers feel that they “should ...be exposed during their formal engineering education to ethical issues” (Mc Ginn, 2003)¹⁷

Conclusion

Thus, the importance of exposing Engineering graduates to ethical values in their smooth practice has been felt. The foreground is ready with the wisdom of ABET. The International Conferences of engineering teachers and thinkers are being held to decide some common programme of curricula. My suggestion is that philosophy is the mother of all sciences, arts and thoughts and it should be included in the curricula of Engineering studies, even as a subsidiary subject to motivate Engineers to have an understanding of professional and ethical understanding so that they can successfully participate in leadership roles in government and industry.

Notes and References:

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- ². See: Richard L. Porter and Joseph R. Herbert, Assistant Dean for Academic Affairs, College of Engineering and President, IEEE Society on Social Implication of Technology, North Carolina State University, Raleigh.
- ³. Ibid
- ⁴. ‘Tagore’s Views on Education’, cited by Dr. S.Radhakrishnan, Vishvabharti Shantineketan, University Convocation, 9 May 1961, in Occasional Speeches and Writings, Third series, Publication Division, December 1963, p.125.
- ⁵. Ibid, p.126
- ⁶. See: Swami Vivekananda Is Vedanta the Future Religion. Calcutta; 1970, pp-1-35.
- ⁷. R.W. Emerson, “The American Scholar”, American Literature in the Nineteenth Century, New Delhi, EPH, 1983, p.47
- ⁸. Francis Quarles cited in K.K Ruthen, The Conceit, London: Methuen & Co, 1969
- ⁹. See Religico Medico, 1643, xvi, cited in The Conceit, London, Methuen & Co., 1969.
- ¹⁰. William Shakespeare, As you like It, Act 11, Scene I
- ¹¹. Leon Edel, The Psychological Novel, London. Rupert Hart-Davis, Indian rpt; 1965, p.133.
- ¹². Cited in H.H.A Journal, The Humanist, 1957.
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- ¹⁴ Louis Bucciarelli, “Ethics and Engineering Education”, MIT October 27, 2007.
- ¹⁵. Ibid
- ¹⁶. Cited in Stephanie J. Bird, “Integrating Ethics Education at all levels”, Emerging Technologies and Ethical issues in Engineering, October 14-15, 2003, P-125.
- ¹⁷. Ibid.