Science, Technology and Ethics : Hype Vs Hope

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Abstract: Technology as the double-edged phenomenon now poses a serious challenge to human reflection and demands our immediate attention because due to productive process and effective strategy, it has evolved from science as assumed the form of ever-fertile source of power and thus has been a great temptation for the power seeker. Critics of technology sometimes point out that new or prospective technologies raise difficult moral questions, and they insinuate that this is a reason not to develop or introduce such technologies in the first place. Biotechnology, or medical technologies like genetic engineering or network technology, and now Environmental Engineering, often receive criticism of this sort. It should be mandatory to observe social responsibility in science and technology, and above all in medicine and environment. Consequent problems of limits, restraints and control relating to this mighty force require wide ranging awareness and a critical dialogue to meet the challenges. The logics based upon the adolescent brain and age-related behavioral manifestations may be the proposed strategic and premeditated theory on ethical education on the use of technology. Author proposes strategy with an emphasis on educational policy right from light learning activities in the classroom to a short term but long-lasting impact for the young children through certain planned ways which could make a brain-etching luminous pathways as ethics is not taught but it is caught, it makes an imprint in brain and impression in the subconscious minds that are the result of prolonged exposure of stimuli to brain through receptor organs in various manners. The principle of 7 Es *i.e.* how exposure to experiences, education, enrichment of knowledge, elimination of fear and engravings in brain lead to ethics of technology. It will be giving us enlightened citizens and future policy-makers and leaders. Author advocates the inclusion of certain lessons in curriculum whereby children should cultivate rationality of the use of science and eliminate fear against technology. This would enable us to permeate the right learning in their brains leading to the development of their right mindsets and associate behaviour.

The author also discusses issues like the moral obligation to prevent morally problematic situations and related regulatory mechanism and with their torch bearers with an intention tap this occasion to go into the matter as it is long term process.

Key words: Technology, Double-edged, Environmental Engineering, Brain, Ethics.

Introduction

Rapidly changing society at present has two main issues globalisation and complexity of scientific knowledge. Ethics is at one and the same time the moral standard for action and a reflexion on risk. It is apparent that no one would deny that technology has become an intrinsic component of life. It has affected the structure and quality of life in various ways. To what extent it has improved the quality of life and to what extent it has posed dangers to it is a matter of an on-going debate.

The values like integrity and trust are the hallmarks of the scientific discovery and its technological transformation. The elucidation of the multiple aspects needs more comprehensive analysis of ethical issues in application of science and technology. As a productive process and effective strategy, technology has assumed the form of ever-fertile source of power and thus has been a great temptation for the power seeker. Due to the atomic power and other sophisticated war equipment for the moment, gone are the superpower wars or the fears of superpower wars.

But it is also true that it has replaced them by the varieties of terrorism, from the threat of nationalistic fundamentalism to the home grown variety of anarchistic militias. But equally and alongside these are the new transformations, which have occurred within secular pluralistic settings.

Critics of technology sometimes point out that new or prospective technologies raise difficult moral questions, and they insinuate that this is a reason not to develop or introduce those technologies in the first place. Biological or medical technologies like genetic engineering or artificial organs often receive criticism of this sort. The implementing machinery of the Government is also many a times skeptical towards emerging technologies and take long time to decide in favor, due to lake of proper guidance and self awareness, as many of them did not have a previous background of science. At best, it may be said that the critics' argument is incomplete, for they need to explain why difficult

moral issues should be averted. Do we have a moral obligation to prevent problematic technological situations on account of scientific illiteracy of politicians? That is what is happening with biotechnology and nuclear reactors installations. Soon this is also likely to happen with nanotechnology. Even space science also suffers on account of lack of proper knowledge as well as due to invisibility of net productive results out of this technology. The plea from scientist of scientific excellence and maturity and as well as technological future advancement many a times go in vain. If so, what should be various ways? And if the reasons for rejecting morally troublesome technologies are not moral reasons, then what kind of reasons are they and why are they important?

If it is a fact that a technology would create difficult moral decisions is reason enough to discourage the development of that technology, then does it not follow that the fact that a technology would enable us to avert difficult moral decisions is good reason to encourage its Although : development? Although neither critics nor defenders of technology have raised this question, it seems an appropriate one to ask. And if the answer is yes, it suggests a new way in which technologies might be defended on moral grounds (Sharma, 2003).

Points to Ponder

We have some points to ponder. Ethics for technology today is now a global effort the gap among the rich and poor nations, rich and poor citizens exist. How can it be eliminated or reduced ethically and morally to provide information and services that will move them to into the world of cyberspace? Will the poor be cut off from job opportunities, education, entertainment, medical care, shopping, voting - because they cannot afford know how in technological globe? Whose laws will apply in this world when hundreds of countries are incorporated into the global network? Where our knowledge is right to correct wrong? We are infact missing an opportunity to introduce ethics at an early age in children by not integrating these thoughts and practices in video games? More controls and regulations should be introduced into the system. They will actually help to improve our moral and ethical behavior. Unethical behavior continues to permeate industry, what measures, policies, codes of conduct be adopted to change this behavior?

Catch Them Young

From that we are all humans, certain intersubjective norms follow. All humans subscribe to certain normative facts, like 'protect your young', 'try to maximize your own survival' etc. It can be seen as basis for all and any moral theories, so doesn't really answer which one(s) we ought to follow. Teaching anything new or transferring a thought or an idea to a youngster is far easier than teaching or transferring to a grown up. Western nations are fully aware of this fact and have fully developed programmes for energy awareness and environment for school kids. In India the same kind of detailed attention or concentration to inculcating the values of environment protection and use of technology is lacking. Most schools consider these topics as a "chore" imposed from "above" to be "got over with". Not only at school but also at home these topics deserve to be given more attention and a gentle emphasis by parents. Of course Government plays a key role in education and awareness as it alone has the resources to mobilize such programmes and run awareness programmes country-wise.

The Psychological and Sociological Impact of Ethical Education

Neurologically it can be hypothesized that the term mind is an abbreviation of ill-defined groups of mental activities, memory, emotions, intelligence and behaviour. Anatomically such activities are governed by certain areas of the brain. The frontal lobes play important roles in a variety of higher psychological processes - like planing, decision making, impulse control, language, memory, and others. There is mounting evidence that neuronal circuitry in the frontal lobes is shaped and fine tuned during adolescence, and that experience plays a prominent role in these changes.

These are orbofrontal neocortex, limbic lobe, hypothalamus and upper brain stem. At the core of these structures lies the medial forebrain bundle, the complex set of ascending and descending fibres that connect these structures rostrally and caudally. Impressions and engravement of new and newer learnings in mind are the results of formation of new and newer connectivities of neurons, qualitatively and quantitatively as well as formation of new proteins. But it is all depending on the types and quality of stimuli being fed to the young brain through sensory organs or one can say exposure to the atmosphere created around him. The bare fact should not be ignored that more strenuously you put a fact in this developing brain more it engraves the fact deeper for that learning just by forming more and elaborated connectivities. It is also be included in his curriculum that he or she should cultivate rationality, eliminate fear towards emerging and prevailing but refractory technologies only then he will be able to permeate the right learning in his mind forming his behaviour.
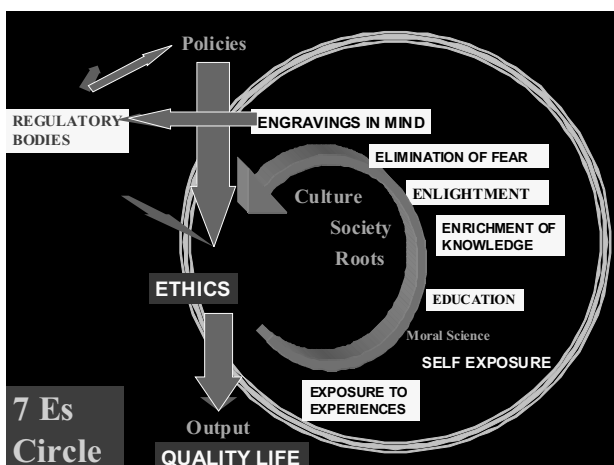
Recent developments in brain research provide scientific support to the theories on the youth's learnings. Researchers at UCLA, Harvard Medical School and the National Institute of Mental Health have traced the development of a child's brain to adulthood. Through neuroimaging technology researchers have discovered that in a process called "myelination" a normal healthy adolescent brain develops during adolescence. The brain's maturation process continues through adolescence and is not complete until the early 20's. The area not yet fully refined and focused in the adolescent mind is called the prefrontal cortex. The prefrontal cortex is the largest section of the brain, slowest to develop, and undergoes the most drastic changes during adolescence.

The prefrontal cortex is responsible for complex thinking. It allows the mind to organize, perform abstract thinking, prioritize, anticipate consequences, control impulses and conform behavior accordingly. To compensate for the underdevelopment of the prefrontal cortex, the adolescent brain relies heavily on another area of the brain called the amygdala, which creates a tendency to react on instincts. Biologically, adolescents do not have the same abilities as adults to control their actions and make sound decisions.

7 Es Circle

The concept of 7 Es may be called the *ETHICS CIRCLE*. By creating a circle that links all part equally, *i.e.* exposure to experiences, education, enrichment of knowledge, elimination of fear and engravings in mind will lead to ethics of radiation. By dedicating ourselves, individually and collectively, through such august gatherings and cooperation we should create an environment that ensures the protection of human subjects, as well as the advancement of science (Bhatia,

2004). It may provide valuable clues like CCMS as 'Threats and Challenges' activities also include the programmes of both the Science and Technology Policy and Organisation (STP) as well as of the Security-Related Civil Science and Technology (SST) panels, both of which operate under the Science Committee. The objectives of STP are to support training and education in the policy, organisation and administration of science programmes, and to facilitate the transfer of research to industry. Further information about the activities of both STP and SST can be found on www.nato.int/science.

Technology as the double-edged phenomenon now poses a serious challenge to human reflection. Consequent problems of limits, restraints and control relating to this mighty force require wide ranging awareness and a critical dialogue to meet the challenge various questions arise:

Is it entirely a recent phenomenon, if not, why does it demand our immediate attention? What specific features have brought it into focus for human reflection? As an intervening, modifying, and correcting process, what kind of inroads it has made in our modes of thinking? As a growing complex phenomena (in medicine, information, transport, communication, architecture and in human relationships) what challenges does it present to human action and thought? or in ways of adjustment? Affecting our ways of thinking what changes are being brought about in our evaluative sensibility? Are they desirable? In brief, what sort of possibilities and potentialities technology including robotics and nano forms is supposed to unfold in relation to human life and situation? We quietly submit to them?

There may be more issues, which may come up for the discussion. The point is we should have an occasion to go into the matter.

References

Bhatia A.L (2005a) : Natural Disasters and Their Management Current Trends In Global Environment/ Publisher - New India Publishing Agency

Bhatia A.L. (2005b) : Interactive workshop at Jaipur on climate change. Maharaja Sawai Mansingh Vidyalaya, Sawai Ram Singh Road, Jaipur. India (November 2005)

http://edugreen.teri.res.in/paccify/happenings.htm

Bhatia A.L. (2004): "Catch the Young Strategy" for the Ethical Education on Radiation Technology: A Concept of 7 'Es'. ISRE04 : Proceedings of the

Third International Symposium on Radiation Education, Nagasaki Brick Hall, Japan, August 23-26, 2004

Cairns, J. Jr. (2006): Ecological Restoration in an Era of Ecological Disequilibrium. *Asian J. Exp. Sci.,* **20**, (1), 1-8

Cairns J. Jr. (2004): Is human society in denial regarding the tough questions about sustainability? Ethics in Science and Environmental Politics. http://www.int-res.com/articles/esep/ 2004/ E54.pdf.

Cairns J. Jr. (2005): Avoiding a posthuman world. *Science and Society* **3**(1), 15-24.

Cairns K., Wicks D. (2005) : Environmental education: The keystone for Green City initiatives. Sustain Spring/Summer, 44-53.

Environmental News Service (2005) : Carbon emissions turning oceans acid, hostile to marine life. 6 July http://www.ens-newswire.com/ens/jul2005/2005-07-06-04.asp.

Lynas M. (2004) : High Tide : The Truth About Our Climate Crisis. (New York : Picador).

National Research Council (1992) : Restoration of Aquatic Ecosystems : Science, Technology, and Public Policy. (Washington, DC : National Academy Press).

Threats and Challenges, Committee on the Challenges of Modern Society (CCMS) http://www.nato.int/ ccms/about/threats_challenges.htm