

An Introspection of Science, Technology, Values and Ethics

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Abstract

Values basically emerge from science, both as a product and as a process, and may be redistributed more broadly in the culture or society. Also, scientific discoveries may pose the new challenges of values in the society. Several questions help to guide the disciplined inquiry into ethics and values.

Keywords: *Values entering into Science Interaction of Values culture and Society, Values entering Science, Values exported from Science*

1. Introduction

A fundamental feature of science, as conceived by most of the scientists across the globe, is that it deals with facts, not values. Further, the science is objective, while values are not. Such views of science are also closely related to the public sphere with the authority of scientists and the powerful evidence. Sociologists of science, among others, have challenged the opinion of science and technology as value-free and thereby raised questions especially important for emerging scientists about the authority of science and its methods. The popular concept is that science is value free and that objectivity is best exemplified by scientific facts which are sometimes misleading. This does not force us to abandon science or to embrace an uneasy relativism. Science does express a wealth of inevitably incorporates the *cultural values* in practice. But this is no not necessarily a threat. Some values in science still govern how we regulate them potentially in a biasing effect of the other values and producing reliable knowledge. Indeed a diversity of values promotes more strong knowledge where they divide. And the, values can also be equally objective when they require communal justification and must thereby be based on generally accepted principles.

Broadly the relation of science and values importantly in the recent findings philosophy and sociology of science, and suggest how to address these issues. In a broad sense, technology can be understood as something that is highly ambiguous and multiples the value and standards of living. For some people, it may mean everything that is good and worth aiming for and for some people it is threatening, something that destroys living conditions and therefore should be opposed. Both the thought processes are justified in the light of the present research in the field of developing technical education and in the beam of practical experiences. At the same time, they are some prejudiced ways of examining the phenomena of science. Debate should take place on the values deriving from the omnipotence of technology. A Thorough discussion in colleges on the positive and negative shades of a technological lifestyle and changes in learning different subject areas. In several countries technology education is, at least to some extent, part of their general education.

The aim is to develop an understanding among the students to understand the use of technology and its interaction with the nature and its estimate the "good" and "bad"

repercussions, as required by the curriculum framework, in a Technical education. To be able to perform this type of analysis one has to define accurately the context to be evaluated. In other words the concept of technology has to be defined from a general and educational point of view in such a manner that the phenomenon is as comprehensive and concrete as possible. Scientific knowledge and skills are essential for the economic and cultural development of a country. It is important to work towards the development of technology to prevent the end

2. Values in Science and Research Ethics

The common characterization of science as value-free can be misleading. Scientists strongly devalue fraud, error and "pseudoscience", for example. At the same time, scientists typically value reliability, testability, accuracy, precision, generality, simplicity of concepts and heuristic power. Scientists also value novelty, exemplified in the professional credit given for significant new discoveries prestige among peers, eponymous laws, Nobel Prizes, etc. The pursuit of science as an activity is itself an implicit endorsement of the value of developing knowledge of the material world. While few would tend to disagree with these aims, they can become important in the context of costs and alternative values. Space science, the human genome initiative, dissection of subatomic matter through large particular accelerators or even better understanding of AIDS, for instance, do not come free. Especially where science is publicly funded, the values of scientific knowledge may well be considered in the context of the values of other social projects.

Technical Education has to become more meaningful and diversified when it is open for analysis in conducted about the values and lifestyles. The concept of technology that the world is obsessed is the technological way of life is based on, and where the choices will lead to. This consideration should take place during every lesson taught in different subjects. This in turn will challenge the pupils to consider the development of trends offered by future technology and to take more responsibility for their own curriculum and will start working on it. In Colleges technology should be considered from various points of view.

Integration of mathematics, science and technology introduces aspects of applying mathematical and scientific know how to technology will help the student to exploration and discovery. Integration of entrepreneurship education and technology introduces aspects of commercial manufacture, national economy and material welfare for the society. Without commerce technology we will not advance in economy. The aspect of environmental education introduces the minimization of the negative effects of technology on nature. The ethical aspect of technology will help us to repair the damage already caused and awareness of an ecological way of life. The aspect of will help us to design and form the emphasis on creativity and innovativeness which is closely related to the aesthetic aspect of arte facts of human-made constructions. The international aspect introduces studies of foreign languages and history as well as the importance of knowing different cultures and their significance, with the anticipation of the humanistic aspect.

Ethical considerations in technical education can challenge College students helps them to take a stand, at least at the attitudinal level, on what they, as the active citizens of a nation, which regards as meaningful aspects and what means they have of affecting these aspects in their life. The aim is to understand technology and science as cultural phenomena that have an effect on both our society and bio-physical environment .The present world experiences, its values will guidance the interests and of the future dreams of posterns. The ethical consideration of our environment is based purely on the fundamental values of a Society and Individual. Therefore, it is important for the teacher to familiarize her or himself with the preconceptions of the intellectual world and values of the Students of the present generation. The values, idols, hopes and dreams of today's

youngsters, in the environment in which they are growing in, have completely changed when compared to the times of agrarian culture.

Since their birth the environment has been technological and ruled and dominated by the television, computer, Internet, and social media. This era is often called by most of us as an information and communication era. There is always a chance of danger of not understanding the difference between fact and fiction. Too much use of the computer for games and the Internet may also prevent the social development of the child in the society. These facts should be considered when organizing the presentations. For all human solutions are based on the value judgments and for this reason, a discussion on everyday problems should take place among the pupils from time to time. It is important to become conscious and clarify the basis for values. For instance, if we want to develop self-motivated and intrinsic entrepreneurship among pupils, they should be encouraged to go through the agenda, their future aspirations and decide their own studies with a good prospective. Other proximate or mediating values that promote the ultimate goal of reliable knowledge involve methods of evaluating knowledge and its claims. These epistemic values include controlled observation, innovative experiments, confirmation of predictions, repeatability and, frequently, statistical analysis. These values are partly contingent. That is, they are derived historically from our experience in research. We currently tend to discount the results of any drug trial that does not use a double blind experimental design. But such was not always the case. The procedure resulted from understanding retrospectively the biases potentially introduced both by the patient and by the doctor. Each is now a known factor that has to be controlled. The elements of process of course, are central to teaching science as a process.

While the pursuit of scientific knowledge implies a certain set of characteristically "scientific" values, the relevance of other values in the practice of science are not thereby eclipsed. Honesty is as important in science as elsewhere, and researchers are expected to report authentic results and not withhold relevant information. Ethics also demands proper treatment of animals and humans, regardless of whether they are subjects of research or not. Science is not exempt from ethics or other social values. Knowledge obtained by Nazi researchers on hypothermia and the physiological effects of phosgene, for example, may pass tests of reliability, but the suffering inflicted on the human subjects was unwarranted. Hence, we may still debate whether it is appropriate to use such knowledge. Similar questions might be asked about U.S. military studies on the effects of radiation on humans. Again, social values or research ethics are not always followed in science, but they remain important values. The disparity between the ideal and the actual merely poses challenges for creating a way to achieve this valued ends-say, through a system of checks and balances. Protocols for reviewing research proposals on human subjects, for monitoring the use and care of laboratory animals, or for investigating and punishing fraud each represent efforts to protect wider social values in science.

The topics or ends of research, as much as the methods or practice of science, are also the province of ethical concern and social values. Weapons research, even if conducted according to Merton's norms and its results evaluated using scientific standards, is not ethically idle or value-neutral. -Nor is research into better agricultural methods aimed to alleviate hunger or low-cost forms of harnessing solar or wind energy in poor rural areas. In each of these cases, the researcher is an ethical agent responsible for the consequences of his or her actions, good or bad. Again, appeal to science is no escape from ethics. Where the consequences are clear, the frequent distinction in science between "pure" and "applied" research is not ethically significant. Many conservation biologists, for example, are well aware of the values inherent in their "basic" research and sometimes shape and deploy the content of their science in a politically self-conscious way. Where debates about research arise--say, about transplanting fetal tissue or gene therapy--there are real conflicts about social values; the question of the ultimate value or ethics of research in

these areas can neither be resolved by science alone nor disregarded by scientists in these fields as irrelevant.

3. Values Entering Science

Science proceeds through the agency of individuals and--not unexpectedly, perhaps--individual scientists express the values of their cultures and particular lives when they engage in scientific activity. For example, in cultures where women or minorities have been largely excluded from professional activity, they have generally been excluded from science as

While the role of values in these cases can seem obvious from our perspective, it may not be appropriate for us to interpret the scientists as exercising their values deliberately or consciously. To interpret the entry of values into science in cases such as these, one must focus on individual cognitive processes. That is, one must examine the thought patterns of particular agents rather than either abstractly reconstructed reasoning or the influences of a diffusely defined "culture". Especially valuable is the notion of cognitive resources: all the concepts, interpretive frameworks, motivations and values that an individual brings from his or her personal experience to scientific activities. Cognitive resources affect how an individual notices certain things, finds some things as especially relevant, asks questions or poses problems, frames hypotheses, designs experiments, interprets results, accepts solutions as adequate or not, etc. As a set of resources or tools, a person's cognitive orientation will both make certain observations and interpretations possible while at the same time limiting the opportunity for others. Succinctly, a person's scientific contributions will be shaped by the domain of his or her resources or values.

An individual's cognitive resources will be drawn from his or her culture, limiting what any one person can contribute to science. Further, because each person's biography and intellectual training are unique, cognitive resources will differ from individual to individual, even within the same culture. Hence, one may well expect disagreement or variation in interpretation in any scientific community. Far from being an obstacle to developing consensus, however, the variation of a community can be a valuable resource. That is, only conclusions that are robust across varying interpretations will tend to be widely perpetuated.

The many cases of bias and error in science have led to more explicit notions of the social component of objectivity for example, underscores the need for criticism from alternative perspectives and, equally, for responsibly addressing criticism. We need to deepen our standards, she claims, from "weak objectivity", based merely on notions of evidence, to "strong objectivity", also based on interpreting the evidence robustly. Both thinkers also point to the role of diversity of individuals in establishing relevant questions and in framing problems, thus shaping the direction of research more objectively. In this revised view, science is both objective and thoroughly "social". Fortunately for science educators, the classroom is an ideal location for modeling this kind of collective activity.

The role of alternative values in exposing error and deepening interpretative objectivity highlights the more positive role of individual values in science. Even religion, sometimes cast as the antipode of science, can be a cognitive resource that contributes positively to the growth of knowledge. For example, James Hutton's theological views about the habitability of the earth prompted his reflections on soil for farming and on food and energy, and led to his observations and conclusions about geological uplift, "deep time", the formation of coal, and what we would call energy flow in an ecosystem. Other diluvia lists drew attention to the anomalous locations of huge boulders, remote from the bedrock of which they were composed. These discoveries all had origins that cannot be separated from the religious concepts and motivations that made the observations possible. Values entering science from religion or from virtually any source can promote good science. As suggested above, however, they sometimes also need to be coupled with mechanisms for

balancing then with complementary values. The values we ourselves have adopted from technology which are connected to our opinions about the opportunities for affecting the direction in which technology develops. The various opportunities for solving the problem of direct technological development can be divided into two opposing views. According to technological determinism and the development of technique of technical methods as in a craft or in scientific research is determined by technical laws which are not dependent on the will of human beings. The technological imperatives, which we cannot refuse to ignore, is simply believed that technique is developed through innovations and inventions in a direction determined by itself or by the market forces and that, direction cannot be predicted in Societies.

According to this view the problems caused by technology can be best solved by the technology itself. On the other hand, the technological voluntarism represents a view that the development of technology does not follow any internal laws but that humanity can and according to its consideration will make decisions on the development and use of technology. Different viewpoints on the basis of how the negative effects of technology can be avoided or reduced, as to what type of attitude should be taken in the present state of development of technology. It becomes a question of technocratic determinism, if it is believed under determinism that the negative effects can be eliminated only by improving new technology. If technology is understood to produce dangerous things, and correcting the need of the hour necessitates by is generally referring to a choice between the so called hard or soft direction for technological development in the present society.

In today's date editing has become a new interest among the youth in India. Film editing, video editing and sound editing are the next options that the students are trying to make their careers rather than taking up the traditional courses like engineering, doctor and lawyer. This field is completely diverse from the other fields as the work involved in it is as challenging as an engineer's job. Sound technology education can fetch good reward in terms of money and status, and a few years of experience in hand any candidate can make a good career out of these new streams. The modern world is techno crazy and is always fascinated by the new developments which happen every second in the world somewhere or the other across the globe.

In day to day thinking and discussion, the concepts of technique in the technical methods, or in scientific research and technology are often regarded as synonymous. From the closer analysis, one would definitely realize that this is not the truth but on the contrary, there is a difference in the concepts which introduces the ethical viewpoint. The Technique, which is generally referred as tools, equipment and machines or know-how to use instrument and control does not inherently have both advantages and disadvantages. But the results depend on where and how it is used. Technique becomes technology when it is applied to a certain given task. Thus, only technology will be analyzed and observed from ethical viewpoints of the society, which in turn is related to values. In a technological system, the product and services, the value statements which indicates both negative and positive effects. Based on the above discussions, it will be challenging for schools to become conscious of and to analyze the ideals when framing the curriculum in the academics. Values, the way of thinking, models of acting which are entirely based on the essence of the future technology. The aim is to discuss the basic concepts and however, we challenge researchers, teachers and students to take a stand in their teaching amidst the present ideology of unlimited growth and the faith in technology. Basically the high tech and controlled by market forces and various ethical interpretations were discussed. The question is rather about the practical ethics which hopefully can be implemented in day to day technology.

4. Interaction of Technology, Culture and Society

When speaking about the culture of future one has to seldom think that technology is connected to the very society. And the very effect of technological inventions on culture is after a reflection. However, it is easy to list out many technological inventions that have been important for culture and its development. The invention of printing machine has a tremendous beginning the era of media culture. Telephone and radio were made real time communication even more possible. Television and video has brought the motion picture of media. The microprocessor and the computer based on these technologies and inventions made the various programs of the World Wide Web, has started the development of the information and computer to our society. The introduction of the concept of virtual reality made possible the publication of electronic newspapers, magazines and books. Important inventions from the our society viewpoint are, the steam engine, the spinning machine, electricity , using the combustion engine as a power source, developing car manufacturing and mass production by using the computer to control automation in the field of technology. The effects of technology on culture and society are inter related and can be understood only through mutual understanding. The above mentioned technological applications are regarded as positive and desirable for the welfare of mankind. These applications on culture and society and all the inventions also have the dark side and the negative effects should also be studied as part of learning tasks and discussions in the academics

5. Values Exported from Science

Just as values of a society can enter science, so, too, can values from the scientific enterprise percolate through society? The most dramatic redistribution of values may be the values of science itself. To the extent that science and technology are perceived as successful or powerful, things associated with them can gain authority or value. Commercial advertising, for example, can draw on the images of science to promote certain products as expressions of "scientific" research or as superior to competing products. The "scientific" nature of the comparison can even dominate over the values on which the comparison itself rests. The conclusions of science themselves are accorded an image of value. One can see the ethical implications where conclusions that themselves draw on social values such as those regarding race, sex, class, culture, etc, are given the imprimatur of scientific authority, thereby reinforcing preexisting distributions of power without justification.

The most dramatic social influence of scientific values, however, may be the image of science itself as a model for all problem solving. Science is sometimes viewed, first, as the panacea for all social problems and, second, as the exclusive or primary means for objectivity, even where other values are involved. Not all problems are amenable to scientific approaches, however, and a narrowly scientific or "technocratic" view can forestall solving problems in the appropriate realm. That is, population pressure is fundamentally an *ethical* challenge about the freedom to bear children in the context of limited global resources. Neither better agricultural efficiency nor reproductive control technology can avert a "tragedy of the commons". Instead, we must reach some consensus about the ethics of an individual's use of common resources and how we may enforce such collective judgments about reproductive rights or privileges. We often need to integrate scientific values with other ethical and social values. Science can help identify unforeseen consequences or causal relationships where ethical values or principles are relevant. In addition, individuals need reliable knowledge for making informed decisions. One archetypal hybrid project is risk assessment. Scientists can articulate where, how, and to what degree a risk exists, for example. But other values are required to assess whether the risk is "acceptable" or not. Communicating the nature of the risk to non-experts who participate in making decisions can thus become a significant element of science. Where

one expects scientists or panels of technical experts to solve the problem of the acceptability of risk, science is accorded value beyond its proper scope and others abdicate their responsibility in addressing the sometimes more difficult questions of value. Likewise, those who do not address the facts of the matter fail in their responsibility to make an informed decision. Facts and social values function in concert.

As noted above, the values of science may also be applied inappropriately as a model for decision-making. While quantification is often an asset for science, for example, it does not address all the ethically relevant dimensions of technological risk. Cases of risk assessment, in particular, require addressing questions about the distribution of risk among different persons and about the autonomy of accepting risk. Efforts to reduce the problem to a single numerical scale and then to minimize risk can obscure the central issues. What matters socially and ethically is the meaning more than the magnitude of the risk. A "scientific" approach to solving global warming, for example, might easily focus on cost-effective means of reducing greenhouse gas emissions, diverting attention away from the historical sources of the problem and the ethical need for accountability and remedial justice. Cases of uncertainty pose special problems for applying scientific values. Scientists generally refrain from advocating claims that cannot yet be substantiated. Ethically, however, one often wishes to hedge against the possibility of a worst case scenario (major floods, nuclear melt-downs, ozone depletion, etc even if the actual expected consequences are not yet proven. In cases of uncertainty, scientific values about certified knowledge and ethical values about communal action can diverge. One task in teaching is clearly to articulate the limited domain of scientific values and how they integrate with other values. Finally, scientific knowledge and new technologies can introduce new ethical or social problems, based on preexisting values. Many medical technologies allow us to express our values in preserving life and health. At the same time, however, they can bring other values into consideration. With the advent of hemodialysis and organ transplants, for example, their limited availability combined with the existing value of fairness in generating a new problem: ensuring fair access to treatment. Subsequently, ethicists developed new solutions for allocating scarce medical resources. Similarly, ecological knowledge say, about pesticides, heavy metals, toxic chemicals and other pollutants--has reduced conventional values about prudence and respect for life in reshaping our values about waste, consumption, modes of production and our relationship to the environment. Science does not create these new values. Rather, it introduces novel situations which require us to apply old values in significantly new ways. Awareness that scientific research is typically coupled with new concerns about ethics and values was reflected, for example, in decisions to couple the human genome initiative with funding of research on the humanistic implications of the project. The interpretations and decisions of technology have the direct connections with the interaction between nature and mankind is understood in this review. And People should support the sustainable development in the field of technology and green technology. It is believed that the environmental awareness and the value of nature and ecological awareness, the idea should encourage the sustainable lifestyle. The young people should, however pace with the technological developments can be controlled to some extent. The responsibility should be taken to protect the interests of the people and a deep sense of understanding the negative and positive sides of technology. During college environment education lessons the negative effects of technology could also be studied in detail.

6. A Retrospective and Prospective View

What does all this information mean to a scientist hoping to increase our reservoir of reliable and useful knowledge? How does one proceed, both in professional and public spheres? How does one analyze values in specific cases? As in science, the effective

investigator has a toolbox of methods here, a repertoire of questions. Relevant questions include:

The vision of the future technology for both the pupils and teachers makes them think through doubts and questioning the previous self-evident facts. It is important to arouse the awareness among the pupils towards technological phenomena, entrepreneurship and industry. Their value and meaning, should be considered in the development of technology and its options in a diverse manner, and to give those opportunities to influence in many ways and in a practical manner. It is very essential in the learning process, how to interpret the essence of technology and its effects shaping the future of the students thinking. The understanding of its functions develops their self-esteem and through understanding its effects shapes their values and outlook on life. A revolution for future awareness and thinking is need of the hour. There should be a change of direction towards a more consumer oriented, culturally enriching and less environmental exploitation approach.

Nowadays researchers, innovators, planners and industrialists are jointly developing such production methods in order to save natural resources to a maximum effect. To measure the consumption of raw materials and energy, various measures have been taken, such as life circle analysis, material input per service unit and ecological impact. With these the aim is to find out the consumption of material against the services or products produced. In life circle analysis the objective is to count the repercussions of the product on nature during its whole life-span.

Science and technology have transformed our societies, but the transformations have not been entirely beneficial to some extent. In concern with cultural, moral and spiritual values, attention for these needs to be focused on the effects of science and technology upon values, whether the impact is positive or negative. The images of science cooperate easily with the images of modernization. The researcher laboratories, test tubes, robotics, factories, tall buildings, freeways, jet planes, and the moon rockets, wilderness, cleared the farmlands for industrialization. They do not cooperate so easily with the images of traditional culture, rural villages, simple life, crafts, music and dance. Both sets of images are romantic, with one set, emphasizing progress of the nation. In other words, the roots of community, self expression and cultural expression can be clearly understood. They will be balanced, on one side, the recognition of environmental pollution, resource depletion and urbanization on the other, the presence of illness, hunger and discomfort on the other end.

The key point though, the context of values and ethics is that, each set of images is supported by the values which appear to be in a conflict with the traditional cultural values. The question arises now as to whether a set of values arising from within the domain of science is adequate, or whether such a set of values is inevitably in conflict with the traditional cultural, moral and spiritual values. The over-riding dominance of science and technology in the modern world lead to a situation where a person is compelled to use different sets of values for different purposes. Is it possible for a person to develop a coherent and integrated value system? Modern developments in science and technology seem to indicate that much of the existing conflicts between science and traditional values can be resolved, and the science can contribute to an integrated values system. The present scenario is to take few initiatives as to how science can contribute to the establishment of values and ethics in the society as well.

The required knowledge may or may not be generated completely in the country itself but the nation must have the capacity to make use of the inventions in a right direction. This requires, an extremely, creative scientists of high caliber and at the other end, a scientifically literate population. While there may be much in common between countries with regard to the particular mix of knowledge and skills, but each country has its own particular requirements depending upon its resources, national goals and traditions. Among the other considerations, National goals, the cultural traditions that guide curiosity

and the characteristics of the local situation determined. Science, however, is not only the knowledge and skills to be learnt in the educational institutions but the pre-eminent place accorded to science in the modern world and the assertion that is essential for the growth and development of a country, take place from the practical benefits of science and technology. In other words, the technology which science has given rise to is an essential component to be taken along with science. There are certain constraints on the availability of materials and energies leads to global survival and the global economy imposes as a matter of national policy whether any technologies should be imported or not. Even if it imports, the local knowledge and skills are necessary to utilize them and apply them to the solution of local problems. It is not necessary for local scientists to acquire knowledge and skills which are not very relevant to the needs and aspirations of the country. On the other hand, there are pressing national problems which do not receive the attention by the scientific community. Local problems are of no significance to the foreign institutes, where the local scientists receive their scientific training to address the application of science to local problems and local needs.

7. Conclusions

Scientists may need to believe that public discussion of values and ethics requires justification, just as much as in any scientific argument. Sound ethical conclusions are based on general principles, not on one person's "feelings", lifestyle or ideological values. Moral must be publicly endorsed. Ethical principles, in turn, are based on careful reasoning, specific evidence and commonly shared emotions. The willingness to experience the consequences of one's actions and the ability to universalize a decision are two common ways to "test" whether principles are ethical. A good touchstone for justifying an ethical value is a good critic: reasons must be strong enough and draw on principles general enough to convince someone with a skeptical or opposing perspective. Ethics, no less than science, aims at objectivity.

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