

Values and scientific research

The social conventions of science play an important role in establishing reliability of scientific knowledge, and once these conventions are shaken, the quality of science suffers. According to Einstein¹, three kinds of motives are behind scientific research: Enjoyment of intellectual power, satisfaction of practical purposes and a sort of religious following. As pointed out earlier^{2,3}, the values emerge from science, both as a product and process, and may be distributed broadly in a society. Just as values of a society can enter science, so too can values from the scientific enterprise percolate into society. Values entering science from virtually any source can promote good science. Science does not create new values; but introduces novel situations which require us to apply old values in significantly new ways. The most dramatic redistribution of values may be those of science itself. The desire to do good science is in itself a human value and so is the conviction that standards of scientific honesty, value and objectivity need to be maintained at all costs. As correctly pointed out by Balaram^{4,5}, our scientific community is more vulnerable when the 'big bosses' indulge in unethical, questionable practices, and such persons should be exposed. 'Big science' atmosphere has gripped Indian scientists who think doing research with less facilities is below their dignity. It has become fashionable to have a big research team that does most of the work, while one goes all

over the world. This concept is a real departure from values. The best work is still done by two or three people working together with some help from postdoctoral students. In the present era of high publicity and entrepreneurial culture, even among scientists there is a strong tendency to talk more and work less, thus acquiring powerful positions.

Irrelevance and mediocrity that commonly characterize the Indian scientific community, is due to lack of accountability and ethical and moral values. Beyond a point, mediocrity completely overshadows the few bright 'spots' here and there. It is also common knowledge that mediocrity manages to dominate, which is often achieved by eliminating a better quality of scientific endeavour in universities or national institutes. We all have great responsibility to see that these 'spots' are not smudged out, but nurtured into becoming bright stars in the galaxy of international scientific community. Indian society has become either highly individualistic or sycophancy-oriented. Therefore, a real group activity wherein a scientist is recognized through his work, an ability to plan, interpret and communicate does not develop easily and he/she depends on 'science managers' or 'science lords'. Often it is said that in India, an appropriate peer-review system does not exist in the sphere of science and technology. If the system has failed, it is because of the failure of 'peers' who otherwise do not rise to the level of competence

or are partial. There is always an important aspect of Indian attitude, which often, if not always, prevents operation of impartial peer review system. The 'peers' in their judgement first realize and conclude that the achievements in the theses/projects are poor, and hence these should be rejected or closed. As soon as this decision is taken, a concern is expressed by science lords/science managers and the decision is diluted. As pointed out by Gadagkar⁶, if we only generate a cultural value of reflecting on the methods we use in the pursuit and evaluation of science, we can overcome many of the shortcomings of the scientific community. Values grow in good social soil and are not merely subjective in character; they are a means to introduce normative enquiry and to investigate consequences of actions with competence to address questions, conduct and character.

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Cosmeceuticals: Science or marketing?

'Cosmeceuticals', 'performance cosmetics', 'functional cosmetics', 'dermaceuticals', 'active cosmetics' and 'nutricosmetics' are buzzwords in personal care industry. Cosmeceuticals are topical cosmetic-pharmaceutical hybrid products intended to enhance the health and beauty of the skin. Some of the cosmeceutical products are skin moisturizers, sunscreens, bleaching agents, hair conditioning agents, hair growth stimulants, antidandruff shampoos, etc. The Egyptians were the first to

recognize the health properties of cosmetics. Up to the 19th century, there was no clear distinction between cosmetics and pharmaceuticals; the separation occurred when the first modern pharmaceutical industry was developed. Cosmeceuticals rapidly expanded in the 1980s due to hydroxy acids (natural fruit acids) used as exfoliants against wrinkles. Raymond Reed, founding member of the United States Society of Cosmetic Chemists, coined the term 'Cosmeceuti-

cal' in 1961. In 1971, Albert Klingman reactivated interest in cosmeceuticals by developing a formula to improve the appearance of UV damaged and wrinkled skin, using retinoic acid.

Even though some products claim to be unique botanical extracts or containing some rare ingredients with magic anti-aging properties, most of the cosmeceutical formulations use fundamental ingredients such as peptides, retinol, coenzyme Q-10, ceramides, alpha lipoic acid, alpha

hydroxy acids, beta hydroxy acids, aloe vera, panthenol, kinetin and vitamins A, C, E¹.

The cosmeceutical concept is used by many skin-care companies; especially those endorsed by dermatologists, to give the impression that the products contain more effective or more biologically active ingredients than just ordinary cosmetics. As more and more dermatologists are endorsing cosmeceutical products, one may forget the cosmetic products.

Despite all this medical pedigree, the cosmeceuticals are not that stringently regulated or controlled. Hence, anyone can slap the label with tall claims to promote these products saying the products are more beneficial than the existing conventional regulated cosmetic products. Cosmeceuticals are nothing more than a marketing term with illusions of grandeur. Even the United States Food and Drug Administration (USFDA) does not recognize the term 'cosmeceuticals', and considers that these products are merely

cosmetics with clever marketing language attached. It is some kind of a vague language used by cosmeceutical manufacturers that make the regulatory job complicated at times. It is difficult for them to decide 'what is a drug?' and 'what is only drug-like?'. Many consumers readily believe outrageous claims about luxury cosmeceuticals because they mistakenly think that the USFDA must have approved these claims². The hideous truth behind cosmeceutical marketing is more of advertisement of products highlighting the science and technologies used.

Cosmeceuticals are not used in the diagnosis or treatment of diseases, nor, in FDA parlance, are they intended to affect the structure or function of the human body. Cosmetic companies in order to sell their products have long made health-related claims. But these days the risk is that if these companies become too aggressive in making claims, their cosmeceutical products could result in an FDA warning or might even result in a recall.

It is therefore high time that regulatory authorities prescribe regulatory guidelines for cosmeceuticals to check which products work and which do not.

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Hard-work versus productivity

'I'm a great believer in luck and I find the harder I work, the more I have of it.'

– Thomas Jefferson

Often we try to equate hard-work and productivity. Is productivity proportional to hard-work? The answer is 'not directly'. I think productivity or output (in terms of some quantitative parameters like publications) depends upon the stage of the project. Usually, initial stages require many experiments which become a part of the spade work and may not get reflected in the finished product. Quite often, months of bench work reaches a finishing line and finds a place in print in the form of a few lines. However, these lines have to be significant. Certainly, those who have undergone the travails of long hours of bench work in research will be able to appreciate the arithmetic of hard-work vs productivity.

The conception of great ideas requires a convergence of bench work, holistic thinking, and obsession that prepares the

mind for serendipity. Hard-work is not a substitute for hard-thinking and vice versa. Who gets the great ideas is a moot question. There are umpteen examples in the history of science, where simple ideas did not occur to stalwarts of the day. For example, everyone had observed that apples fall on the ground, but only Newton could come up with the laws of gravity. It is germane to have breaks from the bench work. Ruts of thoughts or a single activity inhibits creativity. Also, according to Peter Medawar, one should not keep on reading too many papers as these block one's thinking and creativity.

Workers usually fall into two broad categories. The first is truly hard-working or workaholics. It is always a good idea to get to your laboratory as early as possible; the early birds finish their daily work on time following an organized approach. Whatever experiments you plan for the day can be finished in a decent time-frame. The second type are those who pretend to work.

According to Thomas Elva Edison: 'Being busy does not always mean real work. The object of all work is production or accomplishment and to either of these ends there must be forethought, system, planning, intelligence, and honest purpose, as well as perspiration. Seeming to do is not doing'.

There is also a concern whether the bench work has gone waste. One need not worry on this account as long as the approach is systematic. Success is a journey not a destination. Again, Edison rightly pointed out on his way to the discovery of incandescent bulb: 'I have not failed. I've just found 10,000 ways that won't work'.

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