

Roadmap to irreverence, argument and critique in science education and research

The issue of reverence in Indian scientific milieu has been brought into focus by Mashelkar¹ in a recent article in *Science*. This was followed by a commendable editorial by Balaram². According to Mashelkar reverence, which in this context implies being obsequious to the extent of avoiding to express one's opinion, making queries or asking questions in the presence of seniors, is the major bottleneck in creativity and innovation. The relevance of argument and critique in the cultivation of science does not need any further emphasis³. The existence of feudalism in Indian science and the social milieu, in general, has been written earlier⁴. These articles correctly focus on the malady, but do not provide any roadmap of turn around and achievement of a culture of irreverence or to paraphrase better, candidness and encouragement for expression of 'another opinion or a different opinion'. Usually, researchers in the lower rung of scientific hierarchy hesitate to voice their opinions, howsoever correct and focused they think it might be, in order to play safe with their superiors. So, the starting point or solution is that the seniors at every level of hierarchy (e.g. Vice-Chancellors, Directors, Heads of Departments, etc.) should

make a voluntary and conscious effort to elicit opinions from all members in their group, preferably in the order of students, scholars, junior faculty and so on. Any wild idea, even a 'red herring' should be dealt with full respect, consideration, civility and scientific decorum. Rebuttal should be with facts and figures and not by virtue of position or authority. Paul Tillich rightly said: 'The passion for truth is silenced by answers which have the weight of undisputed authority.'

In any scientific discourse, the contribution of students and junior faculty provides strength in terms of the latest knowledge and skills. On the other hand, the views of science managers are complementary in terms of overall perspective and needs to showcase the institution. Quite often, seniors or science managers monopolize a discussion and encroach upon the overall time meant for a meeting or presentation. Some unfortunately give the impression of being 'know-all', which seems out of place in modern times of information and knowledge explosion, and specialization. Reverence comes in the fullest view during inaugural sessions of conferences, where the whole forenoon session is allotted to long welcome addresses and the reading of long CVs

and panegyrics of the dignitaries on the dais. This is in spite of the fact that many senior-level participants are aware of how professionally such conferences are conducted in international fora, and some councils have issued circulars not to waste time and show our conferences in poor light to international participants.

The important social ingredients of doing and managing science in advanced countries are candidness, irreverence (capacity, initiative to disagree when one has a different viewpoint) and respect for specialized skills. We need to fast-forward for a cultural change in science⁵.

1. Mashelkar, R. A., *Science*, 2010, **328**, 547.
2. Balaram, P., *Curr. Sci.*, 2010, **98**(9), 1155–1156.
3. Osborne, J., *Science*, 2010, **328**, 463–466.
4. Sharma, O. P., *Curr. Sci.*, 1998, **74**(2), 97–98.
5. Mashelkar, R. A., 2009; <http://beta.the-hindu.com/opinion/op-ed/article64716.ece>

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Irreverence and Indian science

This refers to the recent editorial¹ and comments² in *Current Science* on the desirability of irreverence in Indian science. A scientist could only be irreverent when his passion and respect for his chosen profession override his fear of antagonizing the powerful, and enchantment with 'achievements', 'decoration', etc. After all being irreverent is not palatable to those who would like to be 'revered' and is often misinterpreted as arrogance. A young scientist in India quickly learns this lesson, and since opportunities are limited both for earning a living and for practising his profession to its full potential, rarely has the courage to question it.

An essential component of irreverence for accepted scientific theories and con-

jectures is a questioning attitude toned down by a healthy respect for the fundamentals. This has long been recognized in the philosophy of science and there is probably nothing new to be added to the Popperian 'falsifiability principle', Kuhn's 'paradigm shift', etc. More relevant in a sociological context are the observations made several decades ago by Paul Feyerband, the intrepid philosopher of science. According to him '(scientists) have more money, more authority, more sex appeal than they deserve. . . It is time to cut them down to size, and to give them a more modest position in society'. Unfortunately, exaggerated claims, downright fraud and overemphasis of celebrity culture in science have only added substance to Fey-

erband's observations. The motivational aspects of Indian science are unlikely to change unless the established and much decorated Indian scientists themselves practice a little Feyerbandian irreverence, i.e. walk the talk by taking themselves a little less seriously.

1. Balaram, P., *Curr. Sci.*, 2010, **98**, 1155–1156.
2. Mashelkar, R. A., *Curr. Sci.*, 2010, **99**, 7.

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