

Rigorous enforcement of policy crucial to enhance scientific integrity

The issues surrounding commitments and responsibilities of scientists have been debated since the 1960s (ref. 1). Scientists have an obligation to resolve humanity's concerns besides promoting public awareness on how science acts as an integral part of the contemporary society². Hence, maintenance of intellectual honesty to uphold ethics is fundamental for all scientists and scientific agencies. Without appropriate professional standards, integrity cannot be upheld and maintained in the academia. The recent increase in the incidences of scientific misconduct, plagiarism and retraction of papers shows the vulnerability of scientific integrity in society^{3,4}.

There is no easy way either to clearly define or uphold integrity in the academia since it involves several stakeholders that include scientists, scientific institutions, corporate sponsors and government agencies. As a rule of thumb, scientists are supposed to have self-discipline to follow established guidelines and ethical standards to sustain honesty in scientific work. In fact, all academic, research, funding and publishing agencies have their own ethical policies in place for decades. But, they are not in essence legally binding, since ethics and science integrity have been historically taken at face value of scientists and scientific organizations.

All countries are to some extent vulnerable to scientific misconduct due to the lack of stringent legal enforcement of science policy. So, no country is immune to this ever-growing unpleasant endeavour. Realizing the integrity dilemma in the scientific research area, an editorial in *Science*⁵ asked the US Government to establish a research integrity advisory board by highlighting the lack of a centralized professional entity to monitor and promote honesty across various disciplines on long-term basis. A month later, *Nature*⁶ followed up on the same issue in an editorial, by specifically asking funding agencies to forcefully impose on universities to upgrade the health of research laboratories in terms of scientific integrity. The latest report by the National Academies of Sciences, Engineering and Medicine submitted to the US Government further illustrates the problems in this subject (<https://www.nap.edu/read/21896/chapter/1#ii>).

The unethical endeavours associated with scientific research and paper retractions in high-impact journals are threatening the reliability of scientific growth worldwide. An article portrays the complexity surrounding the issues of plagiarism⁷. Although most academic and research institutions in India have been actively promoting courses, seminars and workshops to bring awareness on ethics and integrity in science, more efforts are needed in the form of improved policies with better implementation in colleges, universities and research laboratories.

I was surprised when the Prime Minister of India, Narendra Modi reflected a similar issue a few months before the editorials appeared in *Science* and *Nature*. While inaugurating the 104th Indian Science Congress at Shri Venkateshwara University, Tirupati, he highlighted the importance of indoctrinating the ideology of 'scientific social responsibility'. This indeed has the potential to reinforce scientific integrity across India's vast academic and research spectrum. Besides, he stressed the importance of promoting basic research in educational institutions following international standards to boost innovations (www.hindustantimes.com/india-news/pm-calls-for-scientific-social-responsibility).

Closely resembling the popular catch phrase 'corporate social responsibility' targeting the business sector, the 'scientific social responsibility' slogan focused on the academia can eventually rejuvenate integrity when societal accountability is fully realized. By 2030, India ambitiously aims to become one of the world's top three nations to lead science and technology to meet the growing aspirations of millions of people. It evidently shows that the Government is serious to improve quality and integrity of education and research. Therefore, the time is ripe for the Indian science community to follow up on the 'scientific social responsibility' undertaking to stimulate integrity and excellence in research at large.

One way to strengthen this responsibility is by creating an innovative, legally binding, integrated science policy to ultimately uphold integrity across all educational and research institutions. It will have the potential to effectively neutralize nepotism. It should not matter

whether the institution is managed by the State administration, Central Government, private sector or non-profit agency. Such a policy must incorporate detailed guidelines covering all aspects of scientific integrity, ethical codes, professional conduct of scientists and institutions, plus procedures on how violators will be investigated, processed and disciplined for breaking the public trust when they indulge in scientific misconduct. While scrutinizing the misconduct scenarios, the implementing agencies must overpower favouritism while evading the inclination towards easily compromising the established ethical values.

India's scientific community may need to lead such an imperative agenda by involving the nation's leading educational and research institutions to appoint a scientific taskforce to draft a new science policy to foster fair growth with integrity. Such an operation is certainly doable and it will have the aptitude to upgrade professionalism with integrity while eradicating degradation of scientific growth, be it plagiarized papers or predatory publishers; zero tolerance to all unethical acts in the academia must be maintained at all costs. It is time to remember what the British writer Samuel Johnson once wrote, 'Integrity without knowledge is weak and useless, and knowledge without integrity is dangerous and dreadful.'

1. Russell, B., *Science*, 1960, **131**, 391–392.
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4. Gewin, V., *Nature*, 2014, **507**, 389–391.
5. McNutt, M. and Nerem, R. M., *Science*, 2017, **356**, 115.
6. Editorial, *Nature*, 2017, **545**, 5–6.
7. Rao, K. R., *Curr. Sci.*, 2008, **94**, 581–586.

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