

No science in 'cut and paste'

There is an urgent need for an institutional mechanism to deal with plagiarism and other violations of academic ethics.

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A few months ago, I helped to organise a workshop on Academic Ethics at the Institute of Mathematical Sciences, Chennai. It was a well-attended meeting, with many eminent participants from the sciences and social sciences, including the heads of some of our leading institutions. Over two days, several themes were emphasised relating to various forms of academic misconduct. Now that one of our leading scientists has hit the headlines over plagiarised text in some of his own publications, it seems it is time to revisit these issues and discuss them more widely.

It was widely reported in mid-February that an apology had appeared in the December 2011 issue of the journal *Advanced Materials*, by the authors of a paper that had been published in that journal in June 2011, for incorporating verbatim text from an earlier paper by a different set of authors. The newsworthiness of this arose from the identity of the last author: C.N.R. Rao, former director of the Indian Institute of Science, Bangalore, founder of the Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, fellow of the Royal Society (U.K.), scientific adviser to the Prime Minister of India, and one of the most celebrated living Indian scientists.

How it unfolded

The initial reaction of many scientists, including myself, was that this was a non-story: the plagiarism was in the introductory section, probably committed by a junior author inadequately

schooled in the ethics of writing, and unnoticed by the senior authors; it was a short passage that did not affect the reported results in the paper; and, once alerted to this transgression, the authors quickly issued an apology. And there the issue should have ended.

Unfortunately, the senior authors (Rao, who was the last author, and S.B. Krupanidhi of IISc, Bangalore) did three other things. They both publicly blamed the first author, a graduate student of Krupanidhi. They both denied that it was plagiarism. And Rao declared that he had had little personal involvement with this paper. Suddenly, many topics discussed at the ethics meeting appeared starkly relevant.

Some major issues that came up for discussion in that meeting were plagiarism and data manipulation; authorship issues; and institutional mechanisms for dealing with reported transgressions. (Numerous related matters were discussed, including inadequate citation, victimisation of scientists, gender issues, and perspectives from scientific journals and funding agencies.)

It was observed by many speakers that students have a limited understanding of what plagiarism is; and the Indian educational system, which encourages rote learning and verbatim reproduction of answers from memory, was squarely blamed. Rao and Krupanidhi, by denying that plagiarism occurred, have demonstrated that the understanding of senior scientists is not much better. Plagiarism in the introduction is better than plagiarism of the results, but it is plagiarism nonetheless. It is disheartening to see a scientist of Rao's eminence claiming that a verbatim cut and paste is not plagiarism. But, on the bright side, one speaker (T.A. Abinandanan of IISc, Bangalore) noted that, since automatic plagiarism-detection software became widespread, about four years ago, the number of retracted papers from India (as reported by the PubMed database) has plummeted: most such cases are now caught by journals at the pre-publication stage.

Grey area

But cut and paste plagiarism is only the simplest kind. What if a researcher borrows the essential ideas from a previously published paper, re-expresses them in new languages, and fails to cite the original? Here, in my opinion, Rao's paper is in a grey zone. The paper that they plagiarised the introduction from deals with a very similar material (graphene thin films; Rao *et al.* also consider nanoribbons); measures similar physical properties (photocurrent, electrical transport properties, time response) using similar techniques (infrared laser); and even contains similar graphs. Rao and his colleagues were undoubtedly aware of the previous paper, since they plagiarised from it; yet they cite it only once, briefly and without discussion, in the introduction. Not only do they fail to compare their results with a very relevant prior publication: they nowhere even hint to the reader that such work exists.

Issues of authorship

Rao's response to journalists, essentially passing the buck to Krupanidhi and his student, also raises questions of appropriate authorship. There is a widespread convention in the experimental sciences that the student who does the hard work is the first author; the student's adviser, who plans and conceives the experiment, is the last author; and anyone else who contributes appears in the middle of the author list. In this case, by Rao's own account, the work was primarily that of Krupanidhi and his student: yet Rao is the last author (which is usually the case in Rao's papers). To claim "senior authorship" and then disclaim the paper in this manner is rather unsatisfactory. Though media attention has focused on just one paper (for which an apology was published), an anonymous commenter on my blog has given four other examples of papers authored by Rao that contain plagiarised text; none of these have, I believe, been apologised for. One paper, published in *Applied Physics Express* in 2010, is notable in that it does not include the aforementioned student as an author; the three authors are Rao's own student, Krupanidhi, and Rao. It lifts the first part of its abstract, much of its introductory paragraph, and some text elsewhere, from a 2008 paper by Matheu *et al.*, published in *Applied Physics Letters*. Both papers deal with scattering from gold nanoparticles in silicon photovoltaic devices (in addition, Matheu *et al.* consider dielectric silica nanoparticles, while the Rao paper considers metallic ReO nanoparticles); the figures in both papers deal with I-V characteristics and photocurrent response. And, on this occasion, Rao and co-authors make no reference at all to the paper they plagiarised from.

Ethics body

So the *Advanced Materials* paper cannot be dismissed as a one-time incident, and it seems inappropriate to blame it entirely on one student. This does not, of course, invalidate the work that Rao has earned respect for over the decades. Rao is a prolific scientist — he has over 1,500 published papers, an unthinkable number for most scientists. Five questionable papers may seem a small number in comparison, but they should not be ignored. A scientist of Rao's stature needs to ask himself some hard questions, and then share his answers with the scientific community.

There was widespread agreement among the participants at the ethics meeting on the need for institutional (and perhaps governmental) mechanisms to deal with cases of lapses in academic ethics in an impartial manner, without fear of influence or conflict of interest. Rao himself has previously urged the necessity of such a body. It is a pity that he is now demonstrating, in word and deed, the need for such a mechanism.

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