Research impact

In December I had the pleasure of being invited to IIT Kanpur and to the University of Hyderabad, in both cases to help celebrate the International Year of Chemistry 2011. During each multi-day symposium, I was able to speak with many scientists from different parts of India and learn about Indian aspirations to improve the country's scientific reputation. These interactions encourage me to share the criteria for making tenure in the Stanford Chemistry Department where I was Chairman of the Department for the past six years.

In the American university system we hire faculty and then must decide within seven years whether we want them permanently to remain with us, namely, are they given 'tenure' or not. It is always a difficult decision as those faculty we tenure determine the quality, characteristics and reputation of our Department. I am not necessarily advocating here that India adopt the US tenure system, but I do think that a careful study of its criteria might help. I am mindful of the arrogance that outsiders often display who do not know a culture. Still, let me dare to offer some advice. Many Indian academics that I know have been trained in the US and have benefited from such criteria in the way in which faculty are hired in the US. I am pleased to say that 3 of our 22 faculty members in my Department were born in India.

In the Stanford Chemistry Department I tell the young faculty we hire that they must meet three criteria to achieve tenure. First of all, they must be good departmental citizens. Our Department is a small one and we need everyone to work together for the common good. Second, they must become good teachers. Yes, we would be delighted if they become great teachers, but we only ask that they become good ones because everyone who really wants to achieve that status can do so. Stanford is a private university and receives a significant portion of its revenue from tuition it charges to its students. Thus, it really matters to us that we have good teachers for our students. Third, the Department wants them to become great researchers. This last criterion is the most difficult, and it presents the greatest challenge to our beginning faculty. It makes sense to us because Stanford University is primarily a research university.

How are we to judge whether someone is a great researcher? Of course, all tenured faculty members vote, but the process goes through many other layers of university inspection and consideration, so it is important to define this last criterion as best as we can. The greatness of a faculty member is not judged simply by the members of the Department but rather by letters we collect, typically 10 to 15, from experts outside the Department, nationally and internationally. The question we ask of these experts is whether the research of the candidate has changed the community's view of the nature of chemistry in a positive way. It is not based on how much funds the candidate has brought to the University in the form of grants. It is not based on the number of published papers. It is not based on some elaborate algorithm that weighs publications in journals according to the impact factor of the journal. It is based simply on establishing new knowledge. As a Department, we do not discuss *h*-index metrics and we do not count publications or rank them as to who is first author. We just ask has the candidate really changed significantly how we understand chemistry.

Other institutions may need to use different measures, such as size of the research group, numbers of papers published, etc., which are all simpler to explain to administrators who have little understanding of the field. We believe, however, our criteria really lead to appointing the best faculty that we can. We also think of it as the way various prizes are awarded in our field and how individuals are selected to be elected to membership in the different science academies that exist in our country.

Of course, our procedures are not perfect. Sometimes we tenure people who afterward show less interest in research than we had imagined they would. Nevertheless, I think of this procedure as the best we can do. The third criterion seems to be quite different from what I heard discussed during my most recent trip to India where I think there may be too much emphasis placed on the amount of publications as opposed to the quality and originality of the work in assessing the value of an individual researcher. No doubt our criteria are not for everyone to follow, but I do believe that they have helped us achieve true excellence and distinction in research.

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Responsiveness of academics to e-mails: India versus the West

E-mail is an easy, instant, secure, egalitarian, inexpensive and environment-friendly form of communication with the added advantages of easy sharing and archival. According to the *Journal of Educational Computing Research*, the promptness and regularity of professors in responding to e-mails are significant factors for improved professor–student social relationship and teaching/research outcomes[1].

Even in India, there is extensive penetration of computers and internet among educational institutions. However, e-communication and networking remains sub-optimal among the scientific community. As stated by Dabbish *et al.*[2], sender and message content play important roles in the user's perception of the importance of a message. The current study targets factors that are particularly

relevant to India, namely e-literacy among senior academicians and their perception of priority.

We sent a total of 410 e-mails to researchers (professor-grade) at leading science schools in India (16 institutions, 177 mails) and abroad (21 institutions, 233 mails). The content was an application to pursue a research internship in the field of molecular biology/biotechnology/biochemistry/pharmacology, depending on the research interests of the professors. In these similar mails, the applicant was stated as an undergraduate student at one of the leading pharmacy schools of India. A CV was attached to make the application more persuasive.

The list of universities abroad included the top 20 universities[3], according to the US News and World Report 2011. We received replies from University of Pennsylvania (UPenn) (60%), George Washington University (GWU), Washington (52.94%); Massachusetts Institute of Technology, Boston (50%); UZH/ETH, Zurich (50%); University of Cambridge, UK (37.5%); University of Minnesota (36.36%); McGill University, Canada (33.33%); Harvard University, Boston (28.89%); University of Massachusetts (UMass) (25%); MCPHS (Boston); University of Southern Illinois (17.39%) and British Columbia University, Canada (12.55%).

Replies from Indian institutions included Indian Institute of Science Education and Research (IISER) at Pune/Bhopal (42.86%), Indian Institute of Technology (IIT), Bombay (30.76%); Central Drug Research Institute, Lucknow (28.57%); National Institute of Immunology, Delhi (25%); IIT-Kharagpur (16.67%); IIT-Madras (15.79%); Indian Institute of Science, Bangalore (15.5%); National Centre for Biological Sciences/TIFR, Banglore (11.76%); Centre for Cellular and Molecular Biology (CCMB), Hyderabad (9.09%); IIT-Delhi (7.14%); IIT-Guwahati (5.58%); and All India Institute of Medical Sciences (AIIMS), Delhi (0%).

Only 16.38% of professors from Indian universities replied compared to 36.48% from abroad. It took 36 h on an average for a reply. The proportion of bounced e-mails (9%), possibly on account of out-dated addresses, was similar for India and abroad. The websites with obsolete e-mail addresses mainly include AIIMS, Delhi; Chemistry Department, IIT-Indore and Pharmacology and Environmental Toxicology Department, University of Madras, Chennai.

Replies from UPenn, GWU-Washington, IISER, UMass and IIT-Bombay were most responsive and encouraging. On the other hand, some of the pioneer institutions like AIIMS, IIT-Guwahati, IIT-Delhi and CCMB were placed extremely low on the replying index. University of British Columbia, Canada (12.55%) was an exception from West.

Indian professors are possibly no busier than those in the West. Indians occupying senior positions have been probably influenced by the old Indian tradition, which disregards upward communication. Another contributing reason could be that senior academics rely on their secretaries, who have a different perception of priority. Professors, heads of departments and deans are critical decision makers, and their approach and responsiveness towards students' e-mails can harm the careers of students who find e-mails the most convenient, reliable and affordable. E-mails have the potential of making scientific societies more democratic, responsive and productive, but the above results reveal a serious communication gap between students and teachers in India.

Unsurprisingly, e-responsiveness is greatly enhanced when there is a commercial interest in a transaction. For instance, when we sent queries (n = 28) regarding registrations and travel grants to organizers of conferences, we received prompt replies from all in the West and 66.67% from India.

1. Sheer, C. V. and Fung, K. T., *J. Edu. Comput. Res.*, 2007, **37**, 289–306.
2. Dabbish, L., Kraut, R., Fussell, S. and Kiesler, S., *ACM 2004*, 2004; http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.60.13
3. US News & World Report 2011; http://www.usnews.com/education/worlds-best-universities-rankings/top-400-universities-in-the-world

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A comparative analysis of NAAS ratings of 2007 and 2010 for Indian journals

The National Academy of Agricultural Sciences (NAAS), established in 1990, is among the youngest of the Science Academies of India. From time to time the Academy conducts an exercise to identify and rate journals of relevance to agricultural sciences and assigns them NAAS ratings on a scale of 10. The journals include non-impact factor (IF) journals, i.e. not covered by *Science Citation Index* (*SCI*), but considered important by NAAS in the field of agricultural sciences. The ratings are commonly adopted as a criterion to evaluate publication of candidates for selection into State and Central Agricultural Universities in India, and hence are considered important by professionals.

The NAAS has earlier released ratings for scientific research journals based on IF, quality of papers, periodicity, circulation, etc.[1]. Rajgopal and Kumar[1] conducted an analysis of these ratings and revealed that Indian scientific journals fall much short of the ratings of international standards. In 2007, NAAS released new ratings for agriculture-related journals, which has been succeeded by the latest ratings of 2010. Here, we attempt to make a comparative assessment of ratings of Indian journals provided by NAAS in 2007 and 2010 to identify the changing trends, their possible implica-