society, more is the overall chaos and lack of seriousness all at the cost of tax-payers' money. There is a general impression that these meetings are more for a social get-together. No doubt, there are some notable exceptions like the Society of Biological Chemists of India, which has a long record of excellence and 'means-business'. More criticism has come from none other than another Nobel laureate, David Gross, who rightly professes to be a great well-wisher of Indian science[6]. In this context it is germane to recall what Winston Churchill said: 'Criticism may not be agreeable, but it is necessary. It fulfills the same function as pain in the human body. It calls attention to an unhealthy state of things'. Sure enough, Ramakrishnan is passionate to see India, the land of his birth, a science power house. Perhaps, his observations come out of deep anguish with status quo and is a wake-up call. Put together, it is high time for a serious look for a turnaround in overall science culture for science management, doing science and organizing meetings for scientific deliberations for research, teaching and science policy[7].

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Teaching-based research is a requirement in institutions of higher learning to impart quality education

Concerns regarding the present mode of education and teaching quality in institutions of higher learning in India have been expressed recently in *Current Science*[1–4]. This can also be a warning for the education in colleges and schools, where teaching is performed by university degree holders. Both teaching and research are important requirements in the institutions of higher learning to produce quality human resources, as well as to sustain development. An imbalance between the two will affect the progress. I believe that the above concerns are an outcome of the unequal treatment towards teaching in comparison to research in the institutions. Faculty members successful in bringing out research publications get encouragement in the form of career advancements, attend conferences at national and international levels, get different awards, become member of Science Academies, and also become policy makers for academic institutions. A newly appointed faculty member is made to realize that publishing research articles is an important activity that she/he should perform. In this approach, the research problems addressed by the faculty are often a carry forward of the idea from his/her doctoral or postdoctoral research. The philosophy that 'research should complement teaching' largely gets compromised in this way.

Teaching is generally perceived as a method of collection of information from textbooks and passing it on to students, which is incorrect. Understanding the philosophy of a topic, raising fundamental questions, development of innovation in teaching methods and developing teaching aids require several years of

Table 1. Research-based teaching (RBT) versus teaching-based research (TBR)

RBT	TBR
Approach: Soon after joining, a faculty is encouraged to start research in Universities. UGC has a faculty research promotion scheme (FRPS) (http://ugcfrps.ac.in/uohyd/start-up-research-grant/application-for-start-up-grant/).	Approach: A faculty is encouraged to perform quality teaching. UGC should encourage text book writing scheme which has been there for some decades.
Impact on academic institutions: Extramural research grants help in establishing research facilities in Institutions. Research questions are addressed to publish research articles and not necessarily to support teaching. Sometimes creates an unnecessary competitive ambience that affects teaching.	Impact on academic institutions: Quality output occurs both in teaching and research activities. Teaching remains contemporary. Faculty members take up research because of their passion. Research questions addressed will not only complement teaching but will be of fundamental type.
Suitability: RBT is relevant during Ph D course work for students where the course structure is flexible. RBT is also required in case of specialized optional subjects such as molecular evolution, tRNA modifications, etc.	Suitability: TBR is more relevant in academic institutions where the course structure is defined and a student is expected to have understanding in specific areas relating to the degree she/he is obtaining.

experience of teaching. For example, it took me three years of teaching to learn differentiating between figures of right-handed and left-handed DNA double helix[5]. This basic understanding enabled me to appreciate different phenomena such as DNA supercoiling, coiling of DNA in nucleosomes, helices in protein, tendril perversion in plants, etc. There are examples of such phenomena that I could appreciate only after teaching a topic for more than ten years[6]. Therefore, teaching should also be treated as a kind of research in institutions of higher learning. To improve the present scenario of teaching and research in universities, emphasis should be given on 'teaching-based research' rather than 'research-based teaching'. Though there is significant overlap between the two approaches, Table 1 shows the subtle differences between the two.

Quality teaching in universities has also become a recent concern in other countries such as the UK (http://www.bbc.com/news/education-34197403). It is good to note that a few schemes have been recently introduced in our country to recognize passionate teachers in institutions of higher learning: the 'Inspired Teachers' Network in universities and the 'best teachers' award' by INSA are examples of such schemes (http://www.indiaeducationreview.com/news/educational-institutions-must-recognize-inspired-teacher-and-promote-innovations-prez). In this regard UGC should also introduce schemes to create additional avenues for national recognition of passionate teachers to further encourage quality teaching in institutions of higher learning.

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I, G. Madhavan, hereby declare that the particulars given above are true to the best of my knowledge.

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