

Salvage science education and save science

I am happy to see the concern and anguish expressed by many eminent scientists on the status of science education and the fall in its standard^{1,2}. Almost all of us are aware that the university education system is passing through a dangerous phase. Many academies of sciences have set up education panels in order to address the problems and to work for their redressal. People involved in teaching were never involved in policy-planning in the university education system. Such type of work was always handled by eminent people of prestigious institutes of science who, however, have no direct experience in university teaching. In spite of their best efforts, I do not see any policy framework which the university system should really follow. The approach of universities and autonomous educational institutions in starting new programmes is leading to chaos and merits serious attention. It is really a controversial point whether we should have a single national policy mandatory for all universities and colleges to follow. There is a lack of coordination, uniformity and collective vision. What is the role of UGC, if it was not able to address the problems of higher education? Has it really thought about any common policy for the universities? All these things require a lot of rethinking and replanning on our part.

Teaching is an art and the job involves thinking, creativity, dedication, devotion, innovation and knowledge as the prime requirements. It also means that all and sundry cannot fit into the job of a teacher. The worst started happening when people who were frustrated since they were not able to get suitable government administrative jobs, started joining research, getting their Ph D and entering universities and colleges as teachers. This frustrated lot never attempted to

enjoy their teaching profession and started trying for some kind of administrative job in the universities and colleges. These teachers have started controlling the management of universities and colleges under political patronage and/or under persons at the helm of affairs, e.g. UGC chairman, etc. Currently a debate has started on the appointments of vice-chancellors. People with no administrative and academic eligibility are being appointed as vice-chancellors, directors, etc. This starts a chain reaction in the universities and institutes. The appointment of faculty and administrative staff, distribution of research grants and other funds, selection of national and infrastructural awards/fellowships, etc. have all become dubious.

Research implies 'to see what everybody has seen, but to think what nobody has thought'. Research thus allows us to have creative ideas, to disseminate information and to develop our thinking faculty. By definition, teaching and research are inextricably connected to each other. Many research institutes were set up after independence to promote research in science, leading to phenomenal growth of researchers and experts in almost all the branches of science. But unfortunately we never had, nor did we come close to any revolutionary research ideas like those of C. V. Raman, M. N. Saha, S. N. Bose and J. C. Bose during the pre-independence period. We can safely infer that Indian science is living in mediocrity which has heralded many evils.

The teaching community is presently undergoing an identity crisis. The main ingredients required in the teaching profession, e.g. creativity, knowledge, innovation, etc. are at present missing in most teachers. Many of them are not involved in research and they are neither familiar nor do they want to know about the most

recent developments in their subject. Their presentation neither involves any innovative model nor is it artistic in nature. In most of the universities, the level of research activities is very low. No renowned scientist from any institute wants to join the universities at present. The gap between universities and institutes is widening day by day. The quality of students and scientists in the institute who take up science as a career, will not improve unless we improve our teaching in the universities and make knowledge, not a degree, the purpose of education. This requires a radical revision in our policies regarding science education. The selection policy, the working policy and giving teachers a due place in the society need a radical revision. I suggest that the universities should directly offer toppers in the postgraduate examinations the posts of temporary lecturers in the respective departments as soon as they qualify in the NET. Although we are lamenting over the quality of students going down, we still find one or two bright students in the postgraduate classes. We must encourage these students in joining the teaching profession. This was really the practice existing in almost all the universities up to the sixties. Let us start moving in the direction of salvaging science education in order to save science in the country.

1. Balaram, P., *Curr. Sci.*, 2001, **82**, 241–242.
2. Mandal, D., *ibid*, 2001, **81**, 436–437.

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Achieving excellence through development of skills

Santanu Roy and Sunil K. Dhawan (*Curr. Sci.*, **82**, 2002, 269–272) have brought out clearly what needs to be done to improve the work environment and to motivate scientists in the CSIR labo-

ratories, although they very hesitatingly call theirs only an empirical study. They have emphasized the need for better decision-making and better communication systems, and upgrading of techno-

logy. I would like to comment on the first two. With my 27 years of experience in CSIR, three years in industry (ICI India), and 10 years in University (BHU), I came to the conclusion some

ten years ago that our foremost need is to inculcate passion for excellence in whatever we do, especially in science, technology and education. Excellence is not just high marks in examination which the students aspire to get but its pursuance in later life as one embarks on a career is what matters. Anyone can scale excellence, if he/she can learn a few 'skills'. In the last few years, my colleagues and I have designed and conducted introductory 1–2 day programmes which are just about enough to make one realize the significance of excellence and development of skills. We have four basic modules: attitudinal-cum-leadership skill, communication skill, interpersonal skill and confidence building (self-improvement). Decision-making capability develops out of the above skills. Communication is the *core* skill and it includes all the four skills of effective speaking, reading, listening and writing. Learning and practising the core skill lay the foundation for all other skills and for achieving excellence. Scientists must know how to articulate effectively and convincingly. Similarly, teachers although they may know how to lecture in a class, must learn how to effectively communicate and excel in their profession. Training should begin at the postgraduate level for pure science and graduate level for engineering students.

On request, we have conducted 2–3 days better-and-faster-reading skill programmes when at the end of the course, one is able to read with at least twice the speed without of course any adverse

effect on comprehension (e.g. 250 to 500 words per minute (wpm)). It is a revelation to many that their reading speeds are much below the average of 250 wpm. What a tremendous benefit it is to gain twice the amount of knowledge within the same time-frame! Swami Vivekananda could read more than 1000 wpm and his speaking abilities were outstanding. Speaking skills, popularly known as the art of public speaking, are often considered synonymous with communication skills. The business sector lays much emphasis on this while recruiting their staff. There are profound benefits from effective writing and listening. Lee Iacocca, former President of Ford and later Chairman of Chrysler Corporation says, 'The only way you can motivate people is to communicate with them'. About listening he says, 'I only wish I could find an institution that teaches people how to *listen*. Too many people fail to realize that real communication goes in both directions'. (*Iacocca – An Autobiography*, Bantam Books, New York, 1984; I recommend every scientist and teacher to read this book).

We have successfully conducted programmes on achieving excellence for many CSIR and defence laboratories, colleges and universities, and industry and marketing sectors. Our experience has been that the Heads of almost all CSIR laboratories are convinced about our vision and mission to develop 'skills' for achieving 'excellence', but very politely they say 'no', when it comes to scientists and 'yes' for administrative

and supporting staff. We accordingly conducted such programmes with enthusiasm, but the word used to quickly spread to the research scientists and then they would request us to conduct such programmes for them. The trend is fast-changing and Director of one CSIR laboratory recently invited us to conduct a 2-day course on achieving excellence through development of skills exclusively for about 70 scientists. The feedback we got was excellent. Our programmes are participative and hence we keep the batch size to 20–25. The same trend is now visible in colleges and universities for improving the quality of teachers and quality of teaching.

The bold preliminary findings of NISTAD scientists have strengthened our commitment to spread the message of 'excellence' among scientists, engineers and teachers, especially youngsters. The spirit of excellence is not a competition with others but one's own self over a period of time. Excellence is not just an ideal, nor is it a destination. Excellence is a (life-long) journey that will make one increasingly innovative and creative, and a better performer. The urge has to be there, like an Olympic champion who wants to do better each time, even break his/her own performance record.

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Suggestions for improving the academic status of Indian research journals

A lot has been said in the past about the desire to improve the academic standard of scientific research journals published in the country. Poor impact factor of the journals (*Curr. Sci.*, 2002, **82**, 788) is said to be a dissuading factor for the competitive workers to get their work published in Indian journals. Another reason for getting their work published in prestigious foreign journals is the opportunity for the authors to learn more about

the subject from the comments of the reviewers. Yet another reason for their indifference towards Indian journals, is the fact that the comments of most of the referees are not to the point, less helpful to the authors, and do not reflect the referee's depth of knowledge (*Curr. Sci.*, 2001, **80**, 808). One of the topmost chemists of the country, in a personal communication to the author, expressed his disgust and disappointment over the incom-

petent and unhelpful comments on one of his review articles that he communicated to an Indian journal for publication.

It is true that unless competitive workers publish their work in Indian journals and the academic response of the reviewers is upgraded, the standard of the journals cannot be improved and thus the overall quality of research in the country cannot be competitive. One may suggest to the universities, institutions, national labora-