

Scientists and science managers . . . but where are the science teachers?

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Scientific activities, of both research and teaching, need the attention from the 'university system' in India. Now that the national laboratories are also becoming 'deemed' universities, they need to take the responsibility of undergraduate science education, if we have to attract the dwindling student population to a career in science.

In the debate initiated by Lakhota¹, the proliferation of 'deemed' universities and the relationship with 'other' universities has raised a number of questions relating to research and teaching responsibilities of higher education institutions and national laboratories.

At the outset, it must be emphasized that the nomenclature of 'deemed' university, invented by the UGC, in Section 3 of the University Grants Commission Act, has created a lot of confusion within and outside the country, as regards the identity of these designated 'universities'. Here no attempt will be made to differentiate the universities into these categories.

Universities in India

S. Radhakrishnan², founder of the university system in India, had said: 'While the term "University" is a modern one in India, its meaning has been familiar to us for ages past . . . The famous seats of learning belonging to Nalanda, Vikramsila, Dharaminikota, Benares and Navadvipa were cultural centres to which flocked not only crowds of Indians, but many eager students from distant parts of Eastern Asia . . . They helped to produce what we might call a university world, a community of cultural ideas, a profound like-mindedness in basic aims and ideas. In the altered circumstances of to-day, it is the universities that have to assume the leadership in the world of ideas and ideals.' This philosopher-scholar had given serious consideration to the question of formation of a University Education (Radhakrishnan) Commission, soon after national independence in 1947. A look at the recent proliferation of universities gives us an impression that surely we have rushed in where the angels had feared to tread!

Emphasizing the importance of art and culture in our university education, Radhakrishnan² had said: 'In these days of star-

ling scientific developments, it may not be useless to point out that reconstructing the mosaic of the long forgotten past is not a less ennobling performance on the part of human mind than calculating the movements of the stars or making ships fly in the air.' This comment is relevant today as many of our national laboratories, primarily set up for scientific research, have now taken some of the responsibilities of the traditional university. Today a large number of universities that are involved in education and research in the fields of science and engineering are not providing any opportunities for their students to study some of the subjects in the field of 'liberal arts'. Our technical graduates are therefore not prepared for contributing to the 'higher mind of the country', as envisaged by Radhakrishnan.

Universities and science education

Let us now briefly examine the limited role that all these 'universities', including the newly 'christened' national laboratories, are playing in 'science education' – a subject bemoaned by many as we find that increasingly fewer talented and motivated students are being attracted to science degrees in undergraduate education.

In December 1994, the Indian Academy of Sciences, Bangalore³, had come up with a frank and comprehensive analysis of the problem of science education, in the form of a report of the Academy Panel on University Education in Science. Some of its recommendations were taken up by the Academy itself, in terms of starting of the journal *Resonance* for science education by university teachers. While this has been a useful initiative, unfortunately the large number of other recommendations meant for the UGC, the national laboratories and government agencies have not been followed up. Science education in the university system is still a major concern.

Commenting on the state of science education in Indian colleges and universities, the report had stated that 'There are of course fortunate exceptions, but the general view is that standards in all respects have declined rapidly and alarmingly, and unless something is done soon to remedy the situation, the country is definitely heading for disaster'. Are we approaching the disaster predicted over a decade ago? The report of the Academy is still relevant if we need to bring about an improvement in our science education system.

The role of the national laboratories – the new 'deemed' universities

Many national laboratories have started running PhD programmes for their researchers. Since the degree awarding function is assigned only to a university recognized by the UGC, national laboratories were at the mercy of the administration of the university, whose degree the researchers were trying to get. Rather than working with the university system (albeit with its problems), national laboratories have now sought from the government, the status of being designated as 'deemed' universities for the main purpose of granting degrees to their researchers. The other broad functions of a true university, mentioned earlier are being conveniently avoided. Thus a minimum of teaching, and that too even at the Master's level, is taken up for a limited number of potential future scientists. How and why the government agreed to dilute the true function of a university, by opening the Pandora's box of deemed universities, is an enigma that the academic community must resolve as soon as possible.

A few national research institutions in social sciences and other specialized areas, that are being given the deemed university status, have taken the responsibility

of training undergraduates. Thus undergraduate students in these fields are being trained in the research environment right from the time they start their undergraduate degree. They are justifying the role of the university status that was given to them in a significant way.

On the other hand, the undergraduate science education responsibility does not seem to have been considered important by the scientific community from the national laboratories. In the interest of the growth of quality science education in the country, one should now insist that the national laboratories that have been given the status of 'deemed' universities, must admit a minimum of 40 to 50 bright science students coming out of the 10 + 2 system, especially those that have participated in the competitive and challenging Olympiads and other science talent search programmes at the high-school level. These Olympiad winners, often, lose their interest in science and join job-oriented courses in engineering and management. If the national laboratories pick up these students and train them for their Bachelor's and Master's degrees in the environment of the elite research institutions, we could perhaps retain the students in the science stream. Scientists from these institutions must be treated like the faculty of a university with the responsibility of teaching as well as research in various disciplines of science pursued in the institution.

We hear popular stories of the famous research scientist Richard Feynman enjoying (and even missing) his undergraduate teaching classes. Surely there are some Feynmans in our national laboratories who

have the zest for research as well as teaching. Further, to provide a complete and total education, these institutions should also offer, with the help of guest faculty from regular universities, if necessary, a few courses in the fields of humanities and social sciences. After all, universities in science cannot isolate science from society. The question arises whether the scientists working in these institutions, and who were hired for their research skills, can be qualified or motivated to be effective teachers? This question has been recently raised by Sunil Mukhi⁴ in an open article advocating that research scientists undertake serious teaching of science in their own interest of pursuing research. If a research institution wants to have the university status attached to it, it must ensure that competent scientists are employed, who can be researchers as well as teachers. We have always demanded that regular university faculty should also be involved in research. So why not demand some teaching efforts from the deemed university national laboratories? If even 50 national laboratories accept this 'science education' responsibility as part of their university status, we will see a drastic change in the young student community that is motivated to do science, but finds it difficult presently to locate itself in a challenging institutional environment. For these students, science could be a challenging profession. Young students are not always looking for a fat pay packet after getting their degrees from universities; they are also looking for challenging environments to pursue their interests in science. The pay packet is another aspect

of a student's aspiration and needs some attention too. But that is another issue for another day, where everyone will want to have a say.

Some of the major national laboratories have produced outstanding scientists. Many of them have later moved to performing useful tasks of managing and planning science for the country. It is high time that the national laboratories who are becoming deemed universities should start producing outstanding science teachers for the country. If such national laboratories do not perform this role of science education, they may be soon classified as 'doomed' universities.

And finally, if Vikram Dixit referred to in the Guest Editorial⁵, had accepted some undergraduate teaching responsibilities, it is quite likely that he may not have been so unhappy or been in a state of depression as reported.

1. Lakhota, S. C., *Curr. Sci.*, 2005, **89**, 1303–1304.
2. Radhakrishnan, S., *Reader – An Anthology*, Bharatiya Vidya Bhavan Publication, 1990, p. 481.
3. Indian Academy of Sciences, *Academy Papers* No. 1, December 1994.
4. Mukhi, S., *Times of India*, Pune, 15 January 2006.
5. Chatterji, D., *Curr. Sci.*, 2006, **90**, 141–142.

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