

Role of National Labs in post-graduate science education

The steady deterioration of university education in science at both undergraduate and M Sc levels has been painfully obvious to us, working in the national labs, by the falling standard of research scholars. Instead of going into the socioeconomic reasons underlying this deterioration, let me concentrate on the role the National Laboratories (including the IISc) can play in remedying the situation. While the role the National Labs can play in the undergraduate studies is limited, they can play a direct interventionist role in postgraduate education. Therefore I shall concentrate on the latter. The problems of research-oriented post-graduate science education in the present-day Indian universities are summarized below:

1. Scientific research activity has steadily moved out from the universities into the National Labs, notwithstanding some glorious exceptions, over the past 20–30 years.
2. The proliferation of universities over this period has led to subcriticality in the strength of motivated students, qualified staff as well as laboratory facility in most of these post-graduate teaching institutions.
3. A large number of career options in administrative services, banking, computer software, management of private and public sector companies (and emigration to USA in the case of IIT students) have emerged over this period, which are more lucrative than scientific research. Consequently, the postgraduate teaching institutions have increasingly oriented themselves towards these programmes with coaching classes, etc., while there is very little premium on scientific research.
4. The drying up of UGC funding has no doubt accentuated the problem. But the problem itself is more deep-rooted.
5. In this milieu it is neither possible to sustain the interest of the motivated few in research nor to tailor the postgraduate teaching programme for

providing them the necessary background.

I assume that we are not looking for large numbers, but only a small fraction of meritorious science graduates who have a natural inclination towards research. Identifying this as the target group, we can ask how to devise a postgraduate teaching programme that will sustain their interest in research as well as impart the necessary academic training.

The necessary conditions for this are:

- (a) To bring together a critical number of such students in institutions which have the critical size of research scientists and lab facility in a broad area like physical, chemical, biological or earth sciences – namely, the leading National Laboratories.
- (b) To make this career option attractive enough for the meritorious students, e.g. through suitably instituted scholarships and teaching/research associateships.
- (c) To establish an organic relationship between postgraduate teaching and the subsequent research programmes, e.g. through an integrated M Sc–Ph D programme.

As indicated above, the answer is an integrated M Sc–Ph D programme at the leading national laboratories which will select students on an all-India basis supported by suitable scholarships. The typical duration envisaged is 5–6 years. The canonical teaching component of 2 years could be spread over a 3-year duration along with a significant research component during the 2nd and 3rd years. Thus, at the end of the 3rd year the student should have a general idea about the research programmes and some involvement in it. This could be a natural exit point with an M Sc degree or, more appropriately, an M Sc cum M Phil degree as required for college teachers by the UGC norms. Depending on his/her aptitude and ability the student could decide to exit at this point or stay on for 2–3 years more to

complete the Ph D degree. Because of his exposure to the research programme after 3 years and the relatively short duration of the remaining period, it is hoped that the more competent ones will decide to complete the Ph D programme rather than opt out for alternative employment avenues (including emigration to USA) at this stage.

Many of us working in the national laboratories, which have 1 year (or more) of post-M Sc teaching curriculum along with their Ph D programmes, have repeatedly discussed this option since a decade now. But no concrete action has been taken so far for what seems to be a lack of co-ordination and will rather than any genuine obstacle. I learned that a programme started along this line at IISc may come to a halt, as did the M Sc programme started by TIFR with Pune University a few years back. But I hope we will draw appropriate lessons from these experiments to work towards a more successful one in the future rather than abandon it altogether. For I see no alternative to this. As a survival strategy the leading research centres of the country today must undertake the responsibility of training the research cadres for tomorrow. Nobody else is going to do it for them. One hopes, of course, that the research cadre so trained will not only sustain the research effort in the leading national labs but rejuvenate it in the university system as well. The entry point of these research trainees should be B Sc rather than M Sc for the practical reasons outlined above – namely, that an organic relationship between post-graduate science teaching and research is essential for sustaining the interest of the motivated students in research as well as gearing-up the teaching programme towards this goal.

D. P. ROY

*Tata Institute of Fundamental Research
Homi Bhabha Road
Bombay 400 005, India*