

Teaching research students

This is the season that a fresh academic year commences at universities across the country; indeed, in the period stretching from August to October a fresh cycle begins at academic institutions spread over the globe. There is the annual festival of student selection, a process marked by entrance tests, qualifying examinations and interminable interviews as sizable groups of students seek entry to Ph D programs, which will eventually certify their entry into a scientific career. Students working towards Ph D degrees (graduate students in American parlance) form the core of academic science. It is these students, in search of original and interesting results to report in their doctoral theses, who will eventually produce a substantial amount of the publishable work that finds its way into scientific journals. Ph D students often work long hours, supported by stipends that hover around subsistence level (despite periodic revision), in a scientific apprenticeship that can last for as many as five to six years (and in some unfortunate cases even longer). Several years ago many students entered research careers, driven by some intrinsic interest in the practice of science. Today, the pressure of increasing student numbers and the absence of suitable career opportunities result in a Ph D program being a logical extension of a Master's course; a device which permits a new lease of subsidized student life, postponing career decisions to a later date. For students with good academic records and superior scores in American qualifying examinations, like the GRE, the West beckons. For the others, the choices lie in the many institutions across the country that provide a haven for those in search of a Ph D degree. But, in the last few years there has been a growing feeling that the quality of students entering for research degrees is declining and that even the size of the pool from which Indian institutions make their selections is diminishing. In major disciplines of science like physics and chemistry the number of top quality students available for selection appears to be sharply declining. In mathematics (often touted as one of our strengths), the Ph D scholar is rapidly acquiring the status of an endangered species. Biology appears to be better served by numbers, driven by the relatively new fad of biotechnology; to many parents and students the suffix 'technology' seems to promise lucrative positions in industry. The decline in the input to Ph D programs is not an Indian phenomenon alone; in fact, the fall in interest in research degrees is even more marked in the West. However, Europe and America have the advantage of being able to fill their classrooms and laboratories by simply fishing elsewhere in the world; inevitably, Chinese, Indian and Korean students flood US graduate schools. It is a common sight today to find Western Universities ready for 'collaborative tie-ups' with counterparts worldwide, a thinly disguised hunt for quality scientific manpower.

But in a country with such large numbers of students in almost any discipline, should we really be complaining about limited numbers of 'good students'. Why are the vast majority

of applicants found so unsuitable for a research degree? Presumably, the answer is that most students, barring a few from exceptional institutions, are poorly trained and woefully unprepared to face interview panels which often are completely out of touch with the ground realities of science teaching (or the lack of it) at most places. Our top institutions look for students, who appear to be instantly ready to plunge into research and have little time for those who may be motivated and capable, but lack the preparation to qualify. With very, very few exceptions, Indian institutions do not have an adequate pre-Ph D training program, which is an essential feature of the extremely robust American graduate school system. The importance of courses and qualifying examinations covering the broad discipline which the student has chosen, has never been recognized. The Ph D program is most generally viewed as an almost private contract sealed between the student and the research supervisor; departments and institutions often playing only a negligible academic role. In many universities 'registered guides' can enroll students under them with complete disregard for any academic standards. At present, the CSIR-UGC National Entrance Test stands as the sole line of defence; students who would like to be paid while they do research, must at least get a reasonably high rank in this examination.

Over the entire spectrum of academic institutions ranging from the modern research laboratories to the most ill-funded of universities there is a common feeling that research students are a commodity of some utility. In the former, students are the medium by which research is carried out, presumably to fulfill the laboratories mandates. In the latter, the number of students registered for a Ph D in itself, becomes an index of a supervisor's academic importance. Should not these institutions be paying more attention to the training of research students? Why is it that most academic departments in universities are bereft of courses and seminars for Ph D scholars? Why is it that in the highly specialized cocoons of the national laboratories, Ph D students are exposed to very little outside their immediate areas of interest? Clearly, this situation is a consequence of the inability of the university faculties to view the 'teaching' component within Ph D programs, with any degree of seriousness. The tendency to shirk work, so widespread in our midst, percolates to academia too. It may be time to begin thinking of common standards for regulating entry to Ph D programs, which must at least satisfy generally accepted minimum requirements. Enhancing the training component may allow poorly prepared but intrinsically capable students to break into a research career. Teaching students to do research and to enjoy science is often hard work; wonderfully rewarding when successful. Unfortunately, hard work is not in fashion.

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