CURRENT SCIENCE

Volume 75 Number 6 25 September 1998

EDITORIAL

Research and teaching

Research and teaching are two sides of the scientific coin. In Universities and Centres which award doctoral degrees, it is generally assumed that research is an important and probably major component of the activities of science departments. In colleges and institutions, whose primary focus is science education, bachelors and masters degrees are the prize for successfully completing academic requirements. Here, of course, teaching is the dominant, and sometimes only, activity of the faculty. The importance of combining research with teaching (and presumably teaching with research) has been widely appreciated. The American university system has admirably integrated research and teaching. Many institutions have vigorous undergraduate teaching programmes, within the framework of highly visible and accomplished research departments. A considerable section of the faculties in US universities manage to combine a reasonable teaching load, with the running of productive research laboratories. Students thus, get exposed to a taste of scientific research very early in their development, attracting many highly talented and original students to scientific careers. The interaction of undergraduate students with research laboratories sometimes brings into over-specialized research groups a much-needed infusion of enthusiasm, untainted by too much formal knowledge. Of late, the growth of the research enterprise and the operation of an elaborate system of grants and rewards, has resulted in some American universities slowly accumulating an increasing number of highly acclaimed researchers, who bring in considerable sums of money by way of grants and overheads to their institutions, but who contribute relatively little to the teaching programmes. This, inevitably, results in the slow polarization of some departments into distinct faculty groups; those who shoulder the burden of teaching and others who occupy the high ground of research. Even as the best of US universities come to grips with problems created by the shifting balance in science departments, we might do well to reflect on the Indian scene.

The steady decline of research in University science departments in India and the transfer of undergraduate and sometimes even postgraduate teaching to autonomous colleges, has left many departments with minimal research and teaching commitments. Many, once famous departments, are mere shells of their former selves; a sad commentary on our times. In the colleges, teaching is a central activity, leaving little time for even modest attempts to develop research programmes. Motivated teachers can hardly be expected to sustain their interest in research, in a generally unresponsive environment, created by conservative managements and colleagues who often actively discourage any attempts to introduce the culture of research into colleges. The faculty improvement programme (FIP) devised by the University Grants Commission, to permit college teachers to acquire doctoral degrees by working at research institutions was not a great success; often the Ph D degree was really a passport to break free of the college environment. The growing gulf between research and teaching must be a matter of serious concern to most of our advanced research institutes, which depend exclusively on the University system for their new recruits. At some institutions like the Indian Institutes of Technology and the Indian Institute of Science, attempts have been made to start integrated programmes, targetting students who wish to acquire M Sc and Ph D degrees, by permitting entry after the high school and B Sc levels. The 'catch them young' strategy is based on the premise that an early exposure to a research environment would eventually provide a much higher calibre of students entering our laboratories. Sometimes, these programmes have required a high level of teaching commitment from a predominantly research-oriented faculty, often reluctant to forsake the unstructured freedom of their laboratories for the more regimented environment of the classroom. A great deal of research in India is carried out in national laboratories, where formal teaching duties are almost nonexistent. A large number of Ph D students at these places emerge with a remarkably limited view of science. There is little doubt that teaching (and teaching conscientiously) can bring great academic benefit to a teacher, interested in research. In turn, exposure to research may indeed introduce a more useful perspecive and instil greater confidence in the undergraduate teacher. Caltech of the middle years of this century may serve as a shining example of the highpoint of the fusion between research and teaching, with generations of undergraduates learning physics from Richard Feynman and chemistry from Linus Pauling. While such inspirational standards are not easy to set, we might wonder what happened to the once-important centres of both research and teaching in India – the Universities at Calcutta, Madras, Delhi and Benares. Many recent proposals to restore the importance of fostering undergraduate education in a research environment, toy with the idea of creating new institutions. Few will deny that a seamless fusion of teaching and research, is a consummation devoutly to be wished. The harsh realities are otherwise.

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