

The Academy document: A teacher's view

It is heartening to learn that the Indian Academy of Sciences has prepared a Paper on 'University Education in Science'. The paper outlines many steps which the Academy plans to take to improve the quality of science education in India.

The Academy is, by its very nature, an elitist organization of those involved in research in various science areas in the country. Its Fellows are held in high esteem. But I am not aware if any one doing frontier work in the field of science education, *per se*, has been elected a Fellow of the Academy. In that context I feel doubtful if the sudden interest shown by the Academy in the field of education can be fruitful, unless they plan to take the universities and science teachers into confidence at the level of equals.

Before independence, science showed a healthy growth both in teaching and research. This was primarily because the universities were the centres of attention in both. With the rapid growth of many specialized agencies for research in science, with large funding and relatively little external monitoring, the universities came to be neglected, and in successive stages they were emasculated both in manpower and funding. That is what brought the fall in standards in science education. If the Academy is unable to see this background and suggests a reversal of the process, no long-range improvement can be brought about.

As matters stand today, every time an idea to improve something comes up, we tend to think in terms of creating a new island in the ocean of education. The interuniversity centres form one big example. The thought of advanced centres and elite institutions stems from this line of thinking. The Planning Commission report which the Academy has extensively quoted, and to which the Academy Paper appears to subscribe by and large, is on the same line. The reason is simple: the Planning Commission could not identify 'good enough' teachers from the universities (just as the NCERT, for example, fails to find such people from the universities) for consultation, and the result is the report which the Academy Paper quotes in depth. Even as such proposals were afloat, the best of universities gave up under-

graduate teaching (and the worst of colleges switched from 'general' to 'honours' courses at B Sc level). In effect, the centres of excellence tended to treat undergraduate teaching as something below dignity.

Limiting myself to physics, I find that the Academy Paper fails to make even a mention of the existence of the Indian Physical Society (IPS), Indian Physics Association (IPA), and Indian Association of Physics Teachers (IAPT) as organizations with interest in the advancement of physics education. IAPT, in particular, has been publishing a monthly journal dedicated to physics education now for over 10 years, and yet, when the Academy Paper proposes publishing a new journal it does not even mention that one such journal exists, and four journals initiated and funded by UGC for this very purpose are also in existence.

The UGC itself has a Panel for each subject, like the Physics Panel presently under J. V. Narlikar. The Panels are supposed to do exactly what the Academy is now planning to step in for. I wonder if the Academy ever thought of consulting or contacting any of the UGC Panels. As one example, for UG physics laboratory, the Physics Panel conducted a Workshop at Mangalore in 1994, which does not find any mention in the Academy Paper, although efforts by individual institutions are listed there. IAPT in 1992 had moved that a Workshop to sort out a Model UG Lab in Physics be held to identify the most educative open-ended experiments, and it gave an initial list (to begin with) after a three-day seminar. The present Physics Panel of UGC has moved to set this into action, and then have it multiplied at 10 places in India for year-round training/orientation of teachers. The Academy Paper does not show that its Panel members are aware of such a move. What they suggest shows utter ignorance of how educational laboratory items are developed. Having been involved with the work of Saraf for over three decades, I know it needs sustained and exclusive attention over many years to get somewhere. Just sitting across a writing table and producing a list of 100 experiments amounts to nothing more than duplicating what the Boards of Studies at some 150 universities have

been doing for the last 50 years, it could be worse if the persons involved are leading researchers and not teachers with a special eye.

There is also reference to equity and excellence, whether it is to be *and* or *versus*. This is the reaction of those in the upper atmosphere, who are unable to see the ground situation in science education. Firstly, I see no point in dabbling with a subject which is not my own, viz. social science and democracy. These have their own pressures and consequences. Our decision to improve the quality of science education must in no way be linked with what happens in the social field. Secondly, and more importantly, we must see that science education has three clear objectives: (a) preparing candidates to take up higher education and research in a chosen science field, (b) enabling them to take up various applied areas where science is to be of direct use, and (c) creating general enlightenment and enrichment of mind to be a better citizen of tomorrow. As a recent survey by IAPT has shown, not more than 10% of those who enter B Sc have objective (a). This is nothing to be surprised about. Most of those seeking professional courses have been sorted out, and those that remain enter B Sc largely for objective (c): enlightenment and enrichment.

Here comes the major distinction between how this analysis would be seen by Fellows of the Academy and by teachers. The former would have their eyes rivetted to only students of kind (a), while we, as teachers, have as much, if not more, eye on those whose objectives fall under (b) and (c). This brings me to what has happened in the past few years. At one time the UGC Physics Panel was exclusively manned by non-university personnel. The Curriculum Development Committee of the UGC was manned largely by university teachers, but their eyes were exclusively on kind (a) objective, partly because they had to create a syllabus that should look attractive to top physics people, which means research people, not mere teachers, like me. And with the passage of time, university after university went on revising its syllabus to make it look the most attractive in the same sense; worst, the distinction between a general and honours physics course was wiped out

Typically, out of some 12 papers of the same trend, if 8 were taken it became 'general', and if 12 were taken it became 'honours'. The difference in the approach and spirit of the two, which is linked with the difference of objectives, got lost. The result has been that the general student is left high and dry, as also the teacher.

Even worse happened at the higher secondary level. The NCERT, mistaking the best research workers to be also the best teachers and educationists, invited several top elite people to head committees to write the syllabus and text materials. I do not at all cast any doubt on their honesty in such selection. These eminent people accepted the responsibility, and I again do not have the least doubt that they did mean doing good service to the society in all honesty. They are all, in my opinion, men of great honour and competence in their respective fields. What went wrong was that they did not realize that education is a separate field of specialization, requiring different talents than only knowledge of science. Further, they were not prepared to give up their current research involvements, and they left most of the work for others to do. Yet worse was that once the manuscript was handed over by them, they did not have control on the get-up, drawings, conduct of examinations, etc. This cascading series has done very considerable damage to science education in India. One

has only to compare with the effort of an agency like the Physical Sciences Study Committee in the USA to find how very poorly we have come forth in this effort. I mention this in depth because the Academy appears to be entering the same kind of role, in all honesty, of course, but without quite realizing that education is a different field from research.

Let me repeat that I have the highest respect for the Fellows of the Academy for their contributions to research. I also have the confidence that the proposal they have come up with springs from the bottom of their heart. They really mean to help education in science. In that context, I have a few suggestions to make:

(a) Let them not start a new journal in science, but send their articles and suggestions for improvement in science education to the existing journals. Their frequency can be increased; their volume per issue can also be increased. In fact, even their format can be altered. I am sure the Editors of the current journals will be only too happy to have many of the contributors on their Board of Editors.

(b) Let them use the channels of the UGC subject Panels to initiate new ideas and proposals, rather than create a new power centre of their own. Let them also use subjectwise teachers' organizations as means of executing their pro-

grammes. For physics, from IAPT, with over 3000 members spread uniformly all over India, and with its sustained work over 10 years, they can feel sure of all cooperation.

(c) Let us discuss in depth why physics is losing all interest and excitement as a subject to be learnt. In particular, the laboratory component needs to be examined in depth. (But it cannot be a casual matter.)

(d) Let them involve leading teachers from the universities (as distinct from leading researchers only) in whatever they want to do for the advancement of science education.

(e) Let the very idea of creating elite centres for elite students be shelved deep, and let us work for the uplift of the largest masses through dedicated teachers' efforts. The processes of examination, selection of candidates as also the institutions, and the selection of teachers, etc., are all fraught with great danger. They may lead to more fragmentation in the society, and particularly the teachers.

I appreciate the initiative taken by the Academy. The purpose of this correspondence is to get the best out of such a powerful initiative.

D. P. KHANDELWAL

B-31, Koregaon Park,
Pune 411 001, India

OPINION

The Indian Academy of Sciences document on science education in universities: A criticism

V. Sitaramam

I was dismayed when I read the action plan of the Academy for science education in Universities. It is necessary to assess what the Academy proposes *vis-à-vis* what its predecessors have done. The document rightly refers to the Kothari Commission, a large tract that bemoans the state of education even as it stipulates what needs to be done. The

Academy document, more prosaic, more clinical and consequently less transparent of its own shortcomings, has no insights. If it has, these are suppressed very successfully¹.

There are three players in the educational scene: the teachers, the students and, most importantly, their homes. Each of these has undergone a sea

change in the last few decades the world over. The document reflects neither their magnitude nor the implications. Most importantly, the document offers no justification as to why science education has to be given specific preference. It has some marginal statistics, as a matter of numbers. The reasons behind the numbers are anybody's guess. If