161

তারিখ 27 NOV 1995
পৃষ্ঠা 5 কলাম 3

The Bangladesh Observer

Higher Education And Research

A K M Nowsad Alam

If science is the skeleton of an education-body, research is its heart — the principal regulatory organ. When we dissect science education, research inside the trunk is observed. Science education cannot be performed without the task of research. In another sense, both science and research are so interlinked that the latter comes to be the language of the former and if someone eliminates research from science education, science becomes unreadable. Laboratory is a media — a newspaper or a TV screen on which science is displayed. Here research forms the font of display. In any sense, research is in a key position. Therefore, to explain science education, we should consider three things : science, research, and laboratory. The principle is that science education must be taught and learned through research in the laboratory. And if it is for higher science education, without research the outcome of education will certainly be zero. A graduate of such type would probably be a good office-clerk, but not be an educationist : scientist or researcher is far ahead. This is the concept of laboratory-based higher science education.

Let us look into the higher science education system that has existed in our country. Our science education, whatever the field may be — general science, engineering, medicine, or agriculture — is not laboratory-based. Higher education categorically starts from undergraduate level. The 'Bachelor of Science' degree has been recognized as a terminal degree and most of the students who do not want to be specialized on a particular major take a job after graduation.

In our universities, mainly a theoretical curriculum is emphasized in a 4-year undergraduate course; practice of applied studies is rather limited. Lack of laboratory space and materials (instruments, glasswares, chemicals) are said to be principal setbacks. There is no true course of research or its orientation in undergraduate curriculum. Research at the under-graduate level is essential, not that he finding will bring about any change in the history of science or make the student a distinguished scientist; but that the student will learn some methodologies and acquire guidelines for research. The future scientist thereby, will be able to identify the problem which is to be solved on priority and, accordingly, be able to set his own research programme. To make a self-reliant researcher the importance of research at the under-gradute level is innumerable and unquestionable.

Set up of teaching staff is another important factor to sustain a good research atmosphere. In a department of the university, there are usually more than one professor and a number of teachers having similar specialization. Teachers do not belong to any specific laboratory relating to their majors. Under this structure, the appropriate research atmosphere for both the students and teachers does not prevail. A big department could be good for administration and community development, for example allocation of money and material, construction and maintenance, staff welfare, etc. But this structure is not effective for the academic himself, his teaching and research. Research is a nonstop team effort. Due to administrative procrastination, it often slows down or stops. On the other hand, researchers having similar specialization in a specific laboratory can create a good research team where the members are well acquianted with their limitations (physical facility, technology, personal skill and performance) and can make a research programme within their means setting an additional objective to overcome the limitations gradually. Therefore, to cultivate science effectively, suitable research atmosphere is a prerequisite, and to make this atmosphere suitable, a change in the existing structure is inevitable.

Many examples can be cited where the education is arranged realistically to fulfil social and national demands Japan is an Asian example to prove how effectively an education system can make a panel of trained population extremely needed during the crisis of a country. Hardness in education helped the Japanese overcome post-war difficulties. This hardness arises due to both their difficult language and basic education system. However, to avoid irrelevancy only a general feature of undergraduate science education is cited here. In Japan, during a 4-year undergraduate course in the university the first two years are spent for learning general sicnece and other related subjects and the next two years are for specialization the final year is characteristically significant, because the student during this year performs research under the fultime supervision of a teacher and then submits the thesis to fulfil an essential condition of the graduation degree. In most cases, research done by undergraduate students are very sound and worthy of publication inquality journals.

The higher education system in Japan is laboratory based. A laboratory in the University generally headed by a professor, sustains other 1-2 junior teachers. The teachers spend most of the day in the laboratory. To conduct a well-planned and technically sound research, a fourth-year student is to work at the laboratory for 10-12 hour from morning till night. In addition to giving lectures preparing research programmes, helping and counselling students in research, and writing research articles, teachers spend a great deal of time to do their own research. Therefore, during leisure or excursion teachers and students equally assimilate joy, forgetting their position differences.

Laboratory-based higher science education is equally suitable in a developing country like Bangladesh. Bangladeshi teachers and students always show magnificent performance while studying abroad, but after coming back, soon lose interest in research. The reason behind this apathy should be identified. In this world of superspecialization, seeking research atmosphere and asking satisfactory performance under the structure of a big department and among the teachers of different majors with huge attending students is very similar to trying to find a tiny sesame in an abysmal ocean. Rather, a laboratory under the control and direction of a single professor with 1-2 attending teachers can make a good research team and education atmosphere for both the students and teachers. In this set-up, a career-based competitive attitude will grow among the teachers one which is indicative of their professional upliftment. On the other hand, to be a good teacher, there is no gate open except to go through research. Only research can polish and modernize present knowledge which a good research-teacher can effectively transmit to his students. One of the great benefits is that in this new set-up it is easier to make skilled student researchers. Of course, to adapt the system allocation of money will be a great problem, but the number of teachers can be kept at a minimum in this system and a handsome amount of expenditure could be reduced. Moreoever, if space is arranged, locally make laboratory materials and available research systems can be used, and the laboratory can be developed gradually. Restrictions can be imposed on the use of foreign made glassware, utensils and sophisticated instruments. Plastic glassware and other locally made utensils are enough at some starting point. Researchs should select and prepare their own research materials within minimum cost. Expensive instruments can be kept in a common laboratory and there must be some strict maintenance. Laboratories of developed nations did not come by their sophisticated instruments suddenly; the history of science has taught us that those had to be started with simple local things. In the era of photon and black hole we are pronouncing a very first lesson of science. If we can at least start our science from this initial lesson it will bring some benefit for the nation.

To keep pace with the fast-moving world we have no way open other htan to be super-specialized. To cultivate science for the need of the country, to create scientists purely professional in attitude, and to make our students interested in research, the country's higher science education at the under-graduate level should be laboratory-based. Introduction of half-year fultime research systems in the final year of the undergradaute course is, therefore, urgently needed. To run laboratory-based education effectively, a reconstruction of existing higher education system is essential. Split big department into unit laboratories, where specialized teachers, not more than three, will work under the guidance and supervision of a professor of the same major. These two things are truly complementary to one another, one will not be effective in the absence of the other. The new system will obviously harm the existing teachers in many ways. But teachers should take such pains for the sake of our education.

Dr Alam is assistant professor, Faculty of Fisheries, Bangladesh Agricultural University.

৭