The Daily Star

ROUNDTABLE ON

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Decline in science education at secondary level: Problems and prospects

Bangladesh Freedom Foundation (BFF) and The Daily Star organised a roundtable on 'Decline in science education at secondary level: Problems and prospects' on September 22, 2012. We publish a summary of the discussions

-- Editor

Mahfuz Anam, Editor & Publisher, The Daily Star

Nations without a strong scientific background will get lost in today's global competition. Science is not only for scientific research but also for creating a scientific mindset. A scientific mind is a logical mindit is a fact-based mind.

I think our goal is to put emphasis, nationally, on the declining trend of science education. We have to strengthen government efforts, create awareness among people and find out whether there is any scope for private sector organisations to carry forward government efforts.

Sazzadur Rahman, Executive Director, Bangladesh Freedom Foundation

We, Bangladesh Freedom Foundation, have been working since 2009 in improving science education at secondary level as well as popularising science education. The objectives of this roundtable are: drawing governments' attention to the decline of science education; encouraging other actors, dealing with education for incorporating this issue in their programmes; and informing media and activists about this serious issue, in order to build up some sort of working network and partnership.

Syed Manzur Elahi, Chairperson, Bangladesh Freedom Foundation

Benjamin Franklin first introduced science and technology in university curriculum in the 18th century. Imagine if we were not to get Boro from IRRI-Philippines, what would have been our food situation? Boro is nothing but science and technology.

A nation has no alternative to science for growth. Our education system is now plagued by BBA. I do not think this is suitable for a student of 17 or 18 years of agea student should have 5-6 years of practical experience before completing MBA. First you should learn science then you should aim for administration.

With that realisation, the board of Bangladesh Freedom Foundation decided to work towards promoting science education, especially at secondary level, under the theme of "Freedom from Ignorance."

Professor Jamilur Reza Choudhury, VC, University of Asia Pacific (Moderator)

All the education policies taken in Bangladesh talk about the importance of science, but there is no adequate follow-up and funding to realise those suggestions.

Munir Hasan, Consultant, MoST and General Secretary, Bangladesh Math Olympiad

Summary of the Keynote: The state of our science education is not good at all. The decline rate is so horrible that one of my slides express the concern of extinction of science reading from our secondary schools.

Our parents are encouraging their children to study BBA or humanities. Students are opting for BBA because of easy reading content, less study, better job prospect, and shorter time spent on the course. In both of our studies by BFF and TQI, we find that students think science is difficultit is hard to get a GPA-5 in science. In the study of the TQI project it has been shown that a science book is equivalent to two commerce books. A science book contains 300 pages where a commerce book has only 100 pages. So it is easier to get GPA-5 reading a 100 page book rather than going through 300 pages of any science books.

The project findings even suggest that science books should be made contracted. Previously we had charismatic teachers who had influence upon students, which is quite rare today. Most of the schools do not have their own laboratories. For an exam, it is difficult not to get full marks, it is guaranteed. So no one cares about laboratories.

We do not have good science teachers; so the number of students reading science is declining; as a result we do not have adequate science based intellects and IT workers; so we are still far behind many knowledge-based societies.

In the garment sector, most of the midlevel positions are occupied by Sri Lankans. They work in science related jobs. We do not have enough efficient science graduates to meet our local demands.

In fact, we had two field studies: One conducted by Freedom Foundation in 2010 among 240 schools of 7 divisions, and another study was conducted under the Teaching Quality Improvement (TQI) project where 200 schools of 16 districts around the country were surveyed. In 2009 the percentage of science students was 14.5 which declined to 13.3 in 2011 and now it is less than 12.

The situation got worst in rural areas where they did not find any science students as they visited school after school. For example, in Kumarkhali 32 schools out of 52 do not have a single science student. This is the general picture of science education.

A study showed that among 47 male students in class VIII only 9 took science at class IX and the number was 6 in the case of female students out of 46. So, overall science education is declining as well as female's enrollment in the subject.

We asked students and teachers why students' interest are declining. Almost 60% of the students answered that the cost is high, similar to many teacher's opinions too. It is interesting to find that the number of teachers (42.1%) finding science difficult to pass is higher than the number of students (35.7%). The same thing happens to science syllabus. 35% students find science difficult where 40% teachers find it difficult! So we found that teachers are actually discouraging students rather than motivating them for an education in science.

Respondents talked less about infrastructure though 80% of the surveyed schools do not have any laboratory. However the number of teachers per school is not that bad, the ratio is 2.5 teachers per school.

So, how can we attract students to science education? In response to this question, 31.4% talked about easy teaching methods and 15.5% talked about writing books in simpler and more communicative ways. This year we have tried to write a book in a simpler way. This IT book is for class VI students, written in a different way incorporating images and style of story telling. This is a pilot project. After assessing the feedback we will suggest further on how to make a science book more communicative.

Text books are plagued with mistakes. The text book board are not bothered about it. They give excuses on not having enough time to recheck these errors. I do not think this can be a valid reason because last year we submitted the book for class VI in November and the book was printed by January.

Our research of all 420 schools shows that they do not hold science fairs regularly. It is interesting to find that in 1986 the allocated fund for science education was Tk.33 lakh which has now declined to Tk.28 lakh. This is ridiculous. In 1986 the number of districts was 21 which now stand at 64.

Back then it was possible to hold science fairs in every district annually which now takes place around 20 districts a year only. In this rotation after every 3 years, science fairs get arranged within a district. According to our survey, 95% of the schools have never arranged any science fairs. In Chittagong and Sylhet the rate is nil. Most of the students and teachers opined that science fairs, like co-curricular activities, are effective.

We get a clearer picture about why we do not have qualified science teachers from the research conducted among math teachers. In 1987 Ershad introduced the idea that a science student can pass SSC taking Islamiat avoiding higher math. In HSC level he further introduced that a mix of physics, chemistry and psychology could be termed as science education where one did not need mathematics. When these students got admitted in Honours again the government came up with new mix of B.Sc including biology, psychology and etc. So, most of the teachers, who passed in 1997, do not have mathematics at the honours level. Usually members of the school selection committees had no idea about this change. So it happened that during 1997 to 2004 science teachers got recruited in rural areas 90% of whom passed only 100 marks math in their total secondary and tertiary education. So when these teachers are scheduled to take math class they rely completely on notebooks and memorisation. They make the math a matter of memorisation.

Our survey among 4,500 mathematics teachers showed that among them 3,600 had only 100 marks math in the secondary and tertiary level education.

Another point is that usually in class VI, VII or VIII students do not get math teachers from mathematics background. These teacher are more engaged in class IX and X, and teachers from different backgrounds have to take the math classes at the foundation level. It is terribly damaging our foundation.

In the 80s, there was a board called Education Equipment Board which used to produce educational equipments. A science teacher had to spend most of time in drawing images or charts or graphs. For example a biology teacher had to draw the image of frog's digestion system and it took a lot of time, so the teacher put more emphasis on drawing rather than on content.

Students also did the same because during exams drawing was more important than content. To save time of the class education equipment was of great help, and the board was assigned for that. But, unfortunately in the 90s the board was shut down by the government.

How can we get out of this situation? We have put proper emphasis to implement our national education policy. We have to go deeper into the problem. Ad hoc solutions would not bring any result. We have to train our science teachers. Modernisation and reformulation of our text books are other important areas. If we can make the book more interesting we can attract more students. We have to set up laboratories and engage students in practical classes. To implement these suggestions we need more budget. Most of all we have to create enthusiasm in science education. Another point is that we usually put our emphasis on science from class IX but we should start at least from class VI because that is the foundation.

Dr. Aminul Islam, Emeritus Professor, Daffodil University

The most common finding is that science teaching is very costly compared to humanities and business studies and is attributed to private coaching. Lack of facilities for holding practical classes, including absence of trained teachers to conduct both theoretical and practical classes, are also considered for the decline in the number of science students. Thirdly, inadequate or almost no appearance of awareness programmes such as science fair and science Olympiads add to the problem of declining enrollment. While agreeing with the above recommendations, I like to put forward some more:

- In science subjects, along with modernisations of theory papers, practical works must also be modernised.
- A cadre of qualified science teachers should be created with suitable salary and incentive. For this a science teacher civil service may be created.
- A national standard in science education must be set in all pure subjects like physics, chemistry and mathematics with cooperation of teachers from better schools, colleges and if necessary from universities also.
- Science teaching must be enquiry based. Genuine curiosity and excitement of learning should be there.
- There is a tremendous dearth of qualified teachers in physics, chemistry and mathematics in schools and colleges and bright young scholars are reluctant to join outside cities. A special salary scale may be introduced for science teachers.
- There should be a method of evaluation of all the teachers by the introduction of student assessment which is very successful in the US and in some private universities.
- Every school must have a computer laboratory with properly trained teachers, even in remotest village of Bangladesh.
- Science parks may be established wherever possible.
- Teacher training at all levels in the schools and colleges is absolutely necessary to improve the standard of teaching in all subjects.
- There should be a reasonable salary for teachers at all levels. The salary structure may be same as in neighbouring India.
- Finally, government will and commitments are absolutely necessary for improving not only science teaching but teaching in general.

Professor Jamilur Reza Choudhury

In India, the Department of Science and Technology has started an initiative called "Inspire." Inspire is an acronym for Innovation in Science Pursuit for Inspired Research. It has three sub-projects: scheme for early attraction of talents, scholarship for higher education, and assured opportunity for research career. In the attraction programme they give five thousand Rupees each to 1 million young learners from class VI. This is a big monetary attraction to science. In the scholarship for higher education programme government provide 80 thousand Rupees per year to 10,000 student aged between 17-20 years. Under the assurance programme these students get job guaranty after completing their graduation in science. This is a lifelong commitment. I think financial benefit will attract student in rural areas.

Dr. Rezaur Rahman, Ex. Chief Scientific Officer, BAEC

We have to motivate parents, teachers and students to pursue science education. And for that reason we have to bring forth some model for them by following whom they can get inspiration. I think Dr. Alam's success will inspire our student to pursue their career in science.

Dr. SM Mahbub-ul-Haque Majumder, Professor & Dean, Daffodil International University

Our structure of science education is very weak. We have to create lab facilities. In schools, teachers emphasise more on getting 25 numbers than taking practical classes. I think the marking system of practical classes should be judicious.

Now, one can get a B.Sc degree without attending physics, chemistry and mathematics courses. When we recruit science teacher we only see his B.Sc background not what subjects he or she has completed. For this reason they fail to teach the basic science courses in school. Another thing, managing committees of a school usually recruits teachers and most of the time the committee do not look after these issues; they are only driven by their interest.

Another point is poor salary structure and social status of the teachers. This is really demotivating.