

IDENTIFYING SHORTCOMINGS OF SCHOOL SCIENCE TEACHING AND RECOMMENDING THE BANGLADESH OPEN UNIVERSITY'S ASSISTANCE TO IMPROVE THE SITUATION

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Case Study

Introduction

The school science curriculum in Bangladesh has always been the centre of thought of curriculum setters⁽⁶⁾, but success story does not really show it. Since two decades primary education has been made compulsory and since 1996 science is made compulsory up to the tenth grade of state run education system. New curriculum introduced Physics, Chemistry (and Biology) as compulsory subjects for science group students while it also introduced "a general science course" for humanities and commerce group students. There is no practical portion for this second category while the science group learners have to sit for 25 marks practical examination at the first public examination which is termed Secondary School Certificate. The author has detailed the school level science teaching scenario in her few earlier papers presented at different international symposia^(1,2,3). It can be admitted frankly that broad curriculum aims in most developing countries emphasises on the transmission of knowledge which is to be valuable for national or local economic development, social unity, political identity or cultural autonomy⁽⁷⁾.

Hence it is wiser not to criticise the curriculum but rather to identify the weak points and suggest measures so that the learners get most out of it in order to prepare themselves for their healthy existence. Modern experts on child development and early childhood education firmly believe that young children learn much more effectively if the teaching-learning techniques meet their special needs⁽⁸⁾. They think that difference in individual thinking should be accepted and they advocate that learning should be related to child's own pace. It is now universally accepted that younger children learn much more by touching and seeing and smelling and tasting than by just listening. The validity of these theories put our primary teaching techniques at fault. The whole classroom set up there seems to give no degrees of freedom to an enthusiastic learner to enter into the scientific world on his/her own. At the secondary level, which in our country starts from sixth grade, science teaching-learning activities are supposed to be centred around the goal that they will encourage the ability to plan, hypothesize, predict, design, and carry out investigations on their own; interpret results and findings, draw inferences and finally communicate about exploratory tasks and experiments⁽⁴⁾. Unfortunately, the techniques used by the teachers in these two very important areas are the weakest in primary and secondary science education set up.

Rationale of the Study

Based on the cumulative remarks drawn out of her own earlier research works in the domain of school science education, the author can place herself to a point where it becomes clear that at the end of the present decade technological advancement, blessing of fibre-optics communication technology : global networking system must have to be used in developing nations to overcome the acute and drastic shortcomings of the education field where the science-education sector shows a mountain of shortcomings. She wishes even to strengthen her idea by pin pointing the fact that in recent years it has become clear to noted regional educationists that regional cooperation can play vital role in bringing effectiveness in the field of education. Newly constructed BOU campus with its complete technical setup and the bunch of professional open learning academics can perhaps play a co-operative hand in improving the situation of school science teaching. Details are outlined in the following subsections.

Identification of Shortcomings

The research worker with her over-a-decade of personal teaching experience at different colleges, universities in France, Algeria and own country Bangladesh was in a fairly good position to identify these weak points⁽⁹⁾. Primary school teachers in Bangladesh normally teach all classroom subjects and in their hands science often becomes reduced to a simple have-to-deal topics. They almost always teach with little reference to the real world around them. Lacking interest and upto date explanations for the

common phenomena in the local environment, these teachers in most cases show complete indifference to the degrees of interest shown by their learners. With this prime drawback, nicely printed textbooks using huge amount of donated money fail to instill interest among learners. The result is that with a mere bookish knowledge primary pass-outs enter into the secondary phase. Here the science books are no longer printed on offset papers but on brownish, pinkish news print and then crammed out too with hard to understand texts. All this is done surely to minimise cost but unfortunately they reduce the learners interest to explore scientific topics to a further lower level. The teacher-student ratio remain quite same if not to further deteriorate but the teaching objectives of these two levels of science teachers take a new turn. Because at the beginning of the secondary stage students really take interest to participate in school science fairs as well as those organised at national level and eventually get themselves trained to be in other co-curricular activities, it seems a bunch of young scientists are on the road to take shape.

But unfortunately from grade eight suddenly the vast majority of these same students who were radiating brilliantly with out-of-book science knowledge and who had hopes to go for higher education in scientific subject areas isolate themselves to bookish question-answer knowledge gaining tasks. The science teachers who could quite capably guide these students for participating in co-curricular activities like science fair at the same time period mostly fail to prevent them in this task of shifting from "heuristic" to "question-answer" base. To all these is added the fact that as in most developing countries, secondary science in Bangladesh is the most neglected of science education strand. The concerned education authorities are well aware of this fact⁽⁹⁾ and they surely try to take certain measures to ameliorate the situation. The activities of "Secondary School Science Development Project" which was started in 1982 were stated by the author in two of her earlier published papers. Donor agencies quite often take part in these activities also. Government of Japan back in 1980 had donated a number of audio console units to the Education Ministry and these were installed in a number schools and teacher-training colleges with the help of now merged BIDE (merged with BOU in 1992). After a long period of eighteen years at least half of them are still in active service though the initial prime objective of broadcasting science topics from the studio of BIDE ever quite materialised. Bangladesh Open University has inherited the responsibility of sending a technical hand to repair a set when the concerned institution asks for it. This specific teaching-aid can now really help the science education sector, at least that is what the author hopes. We will come to the topic of its use later on.

Six years academic experience of the author at the School of Education (SE) of BOU had helped her a lot to gather some first hand information on classroom teaching learning techniques used by school science teachers. Through a series of small-scale but continuous research efforts the author could finally identify some of its major weak points⁽⁵⁾. Some of them can be mentioned here. They are :

- there is still shortage of trained subject-based science teacher of secondary level.
- the rural-urban classroom scenario is far from being similar.
- Laboratory classes, demonstration sessions are always kept to the minimum.
- The standard of laboratory sessions is far away from being satisfactory.
- Work load of science teachers is in most cases beyond normal tolerance level.
- Science teachers do not get sufficient incentives to enhance the subject based knowledge on their own.
- School libraries most of the time fail to play any positive role.
- Existing Library facilities at different teacher training colleges fail to attract trainee-science teachers.
- Lack of social recognition offered to school teachers.
- Complete isolation of the teaching community from the international teaching community.

Possibilities of Joint Collaboration

It is known to the author that in institutionalised education system there are three types of interaction : learner-content interaction, learner-instructor interaction and learner-learner interaction. For fruitful dissemination of scientific knowledge practical works in the form of observation, demonstration lesson, etc are there in the science curriculum and these falls in the learner-instructor interaction. Even a great deal of learner-learner interaction can be put sayely to science practical sessions. And this is one of the areas of science education where technology based package programme in the form of teaching aids can come to teachers aide.

Recently the author conducted a science classroom observation research at primary level. During the study she closely observed the classroom sessions of a number of primary schools of the capital city. The analytical results are sent to GASAT, conference to be held in July at Accra. At that time she noticed that mere presence of a wall-chart in the classrooms can neither arouse sufficient amount of inquisitiveness nor interest in the activities of both learners and teachers. This study strengthened the author's thought that as information explosion of the decade reaches alike the poor and the rich in developed as well as developing nations the idea of taking science education to the door of technology will perhaps bring good results.

She thinks that attitudes are developed by involving people in concrete actions instead of mere present "chalk and talk" activities taking place in primary classrooms primary teachers must be encouraged to prepare easy to handle teaching-aids involving learners in the real classroom set-up. And there might be introduced an appropriate version of preparation of technical teaching aids. This project can be run under the careful guidance of group formed out of academic professionals of BOU.

The huge laboratories of almost all government secondary schools are quite under utilised in our country. Maximum utilisation of existing capacity in non-traditional hours of work should be explored and thought should be given to bring primary children of easy encatchment area into these secondary schools on weekends and school vacation period. Science-trainee teachers or nearby teacher training college can use these to practice making easy teaching aids, to practice simple demonstration events, etc. Carefully produced video programmes under the guidance of BOU academic staff with appropriate science background can be used in these locals as simulation classroom sessions.

Along with the above-mentioned explorative idea the author finds it logical to lay-out few other collaborative plans to make science education a bit more challenging and goal oriented.

A. Collaborative Learning Network for Learners

BOU is soon going on air with its own transmission setup. And as it has always got some linkage with those educational institutions where the MOE had earlier distributed the audio-console units, it can manage to have these institutions linked with BOU transmission network. Then monthly interactive science classroom sessions can perhaps be run at a very reasonable cost. And in another phase of this linkage programme a reasonable number of secondary school; can be requested to act as the audio conferencing centres for nearby primary schools. A bi-weekly or monthly external tour programme in these secondary school laboratories, libraries will really augment the interest rate of child-learners of primary schools. These government educational institutions have huge green compound, a small portion of which may be allocated for the learners exploration field with consent of the authorities. BOU can also be requested or linked By MOE to produce quality video science demonstrations sessions based on school curriculum. With its six years continuous broadcasting time span, BOU educational video lessons have earned a positive position in the minds of learners of all age group. Quality classroom science teachers of both primary and secondary levels can be invited to lead these real-life demonstration classes, it will surely increase their interest in the subject matter, it will also give them a touch of social recognition of which they have a craving for.

B. Collaborative Interactive Network for Secondary Science Teachers

We know that during the years of secondary schooling the learners need to acquire higher order intellectual abilities, hence it is imperative that secondary science teachers need to have updated knowledge in their respective subject areas. They also need to have a thorough understanding of pedagogic approaches to science.

The author has many times participated as national level teacher-trainer to Physics teachers in many short or recurrent training programmes organised by the Secondary Science Development Project. At those times she has noticed that these teachers from smaller towns, villages really have craving for social respect. According to them they clearly see that though a handful of them earn "best science teachers" award every academic year, for the rest society never has done anything globally to include them in the national educationists rank. They frequently complain lack of proper opportunity for career advancement also.

The recently held International Conference on Collaborative and Networked Learning organised at IGNOU has added hope of a new dimension to broaden the horizon of these science teachers. Quite a number of papers were presented there with titles like "Networking possibilities for teaching of Physics

practicals to undergraduate students", "Empowering the neglected majority through Network-Based Educational Programmes", "Creation of a virtual institution by SAARC open Universities : prospects and limitations of creating learner based interactive network", etc.

In this second type of networking (teachers' networking) it was given a realistic planning during the year 1998. Now regional open universities like BOU, IGNOU, AIOU, OUSL have to come together to create a scope for trainer and in-service science teachers to conduct joint science syllabus related research works, to organise audio (video) conferences, to explore the possibility of conducting even virtual field works and tours, to create joint fund so that these teachers can publish and circulate news letters, journals, leaflets, etc.

Conclusion

In this cutting-edge technology era where "globalisation" wave is in full swing BOU is in a very sound position to offer a lot of ideas to school science curriculum implementations, lend its hands in a few prospective projects in order, guide projects, to save school science teaching from its present weak state. The author sincerely hopes COL will extend a helping hand by offering financial help to BOU academic professionals through the executive authority.

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