Opening Remarks
by
The Session Chairman Dr. Jayant Narlikar

Our objective at IUCAA has to make Astronomy known amongst the masses. It involes populiration of scince and curing the masses of some of their superstitions. The superstitions arise due to improper understanding of the cosmos. So the question came before myself and my colleagues as to how and where we should start teaching Astronomy and Astrophysics among the students. We took a decision to start at the M. Sc. level.. Later on we found that to a create a proper base for postgraduate



Dr.Jayant Narlikar, Director IUCAA, Pune, seen offering opening remarks at First Technical session.

teaching it is highly describe that at the base B.Sc. level some Astronomy should be thought. We then discovered that one needs to come down to eleventh and twelth standards and the process further down continues reaching the primery level. Thus the roots finally take you all the way down to the school level where reform must begin. Just as it is true in case of Asronimy it is true in case of other disciplines.

I want to look at this educational problem from the school level point of view. Iam giving my perception as a paent. Two things matter mosts in school educaton,First enough basic information has to be given which may be of use to the chihld later as a responsible citizen. Secondly should provide him/her with a springboard for higher education. The school curriculum must be rich in this basic information content. The analytical ability of the student should be sharperned to enable him to undertake search for new information if needed.

A careful look at the existing school curriculum would reveal failure to meet the above stated objectives miserably. Its information content is tough and overstuffed rather than pure and simple. The child may not need all this information. Instead of sharpening his analytical powers he is required to memorise and reproduce in the tests.

A recent example has come to my notice. My daughter is astudent of a local Poona school known for using innovative mathods for teaching yet there she was given methods for teaching yet there she was given a set of cyclostyled notes on "Hamara Sanvidhan". She started memorising it and as she did not understandit she started asking me the meaning of all the words. I then realised that I myself did not fully understnd my Sanvidhan. Yet here a child of eleven was expected to remember it memorising the same and reproducing verbation in the examination. I don't think she would really know it.

So what does a child of eleven years old know all about the intricacies of the directive principle of democracy? But the directive principle of the schoool is that he has to reproduce in her examination (without understanding) everything learnt by heart. Failing this she would fail in the examinaton. The class-work and home work and the work for the examination leaves hardly any time for analytical resoning.

The additional dimension to be mentioned pertains to the first standard level expecting a child to reproduce or write several times that the sun rises in 'the east and sets in the west'. She/he has to write exactly inthe way the teacher says. But if want to change the sentence without changing the meaning the child would be terribly frightened to write it in the notebook because it would be marked as wrong. Even if I explain this to my daughter she responds by saying that no change is required b

cause the teacher would give it as "wrong". She was frightened.

Knowing this. I decided not to give her any mental breakdown. But when I asked her what happens to the sun which gose in the west and disappears to rise again in the east?

There was no response to it.

Such questions are never discussed in the school. A child knows only about the sun and the earth. This is in sharp contrast to the year 1980-81 my two daughters were going to the primary school in England. The head master reported after interviewing the two daughters that they knew more than the British children. He however made his own observation that the two daughters many things. He assured that at the end of this year in school they will be askiing us a lot of questions. Their curiosity would be encouraged during their school career. This is exactly what happened. They started asking many questions making our life miserable.

This takes me to the methods of teaching adopted in their school. They ask the children in the class to draw triangles. They have to cut outlines of the triangles and then cut them into three bits. The children were then asked to put these bits side by side to show that the three angles add up to a straight line. This was done entirely as a practical exarcise. Naturally they used to ask the reasons for it. The truth of the matter is that the three angles add upto 180 degrees. But no amonts of mugging the theorem could bring home this particular fact. This is one example of how one could bring chioldren in contact with reality by actual experimentatoin.

Mention of my mother will not be amiss. She is known to have a knack of storing a lot of things. But one of the items from my childhood she had stored was a satchel. I showed it to my daughters. They were astonished at this. It was increble for them that I had to carry such a littel bag to scool. This brings me to a practical question :- How to reduce the school bag? The heavily loaded school bag has done a lot of harm and is symbolic of our heavily laden school syllabus. In this connection some suggeestion can be made. The weight of the notebooks could be reduced by making them soft-bound. A notebook should not exceed 64 pages. A large fracton of text books could be stored in school and should learn the subject in the school. He should not up anything in the house. The information content of the curriculum could also be significantly reduced and the children should be encouraged and oriented to search for information. This searching for information has its own excitement. For example they can be trained to make use of the encyclopedia. If these efforts are not adequate other sources of information should also be made known to them. If an answer is found in this process to a question there is thrill attached to it. This cannot be enjoyed by memorising from the books or the notes given by the teacher.

This type of exercise can be done if a child has time to do it. So if we reduce the overall syllabus a lot of superself/herself will have time to whatever is to be explained. This would lead to improvement in the comprehension part of the syllabus.

This remind me of school day. I used to read geometry problems from the period icalmathematical gazatta. I used deliberately ask a teacher whether he knew answers to some of those questions.If the teacher failed to answer the question he would admit it very frankly. They used to encourage the students to try out the problem on the board. This kind of give and take prevailed in the school. In contrast nothing of give and take prevailed in the school.In contrastnothing of this sort prevals or exists in the school life today.

Let me recall my matriculation year. Everybody was asked in the class test to prove the Pythagoras theorem. All the students gave the proof based on the stndard text books figure. However I gave another proof which was very short. It saved time .

The teacher gave full marks to me but he advised me not to use this proof in the final examination because the examiner had no time to check. He would simply look at figure and draw the inference that the answer was wrong and going a zero for the question. This disappointed me. Unfortunately these are the facts of life. Even today the same remarks would be that us the answer was not as per his thinking he must reject it.

In the light of these consideractions I fully endores what Prof. Yashpal has beensaying about killing of the curiosily, killing the intiative and killing the ideas amongst the childeren undergoing training in education in the present process at the school level.

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School Education : Some Radical Suggestions for Changes.

by
Jayant V Narlikar
Director, IUCAA, Pune

In a seminar devoted to brainstorming on problems of education at all levels with special emphasis on solutions, the first point to be made here is the sequence of interlinked educational levels:

Pre-primary

→ Primary

→ Secondary

→ Higher Secondary

→ College

→ University

The problems of the present educational system cannot be viewed singly at any given level: there has to be a holistic approach to the entire sequence. This seminar will have achieved some success if this point is taken seriously. It is not, of course, expected that a typical speaker; will cover everything. The expectation is that all these levels will receive due attention.

In this spirit I wish to air a few views on the sorry state of our school education. First of all, what should one expect the child to have acquired at the end of the school tenure ? Two things matter most:

1. Information which may be of use to him/her in later life as a responsible citizen and which may provide him/her with a springboard for higher education,

2. Analytical ability which enables him/her to search for new information as and when needed and to process it for the purpose it is needed.

A glance at our school curriculum shows that it fails to meet these objectives miserably. First, it is stuffed, rather over-stuffed with information which the child may not need but which all the same must be memorised and reproduced in the tests. The class work, home work as well as the work for the exams leaves hardly any time for analytical reasoning so necessary for understanding the subject matter. There is time only for rote learning.

The satchel of books the child is made to carry on the back every day should equip him/her to do a coolie's work in adult life. Can the load not be reduced by a) having notebooks that are soft bound and having not more than 64 pages ? b) keeping a large fraction of books in a school cupboard to be taken out during class ? and c) having thinner books to reduce the load of information which the child is expected to mug up ?

Clearly we do not wish the child to be a walking encyclopaedia. Rather the child should be encouraged to find the information from source books. The delight of finding the answer after a search is far more pleasurable than the mugging up of a required set of lines without understanding them.

So the bottom line should be to reduce the course content to half drastically curtail the excessive factual details in subjects like history, geography and civics, emphasize maths and science as subjects that satisfy curiosity by analytical reasoning and/or direct verification by experiments, and present highlights of creative arts and literature that are the high points of human cultures past and present.

Reduction of teaching material will allow the motivated teacher more time to teach in the real sense by having raised the curiosity of the children in class. It will certainly help to have smaller classes as in the Central Schools, for example.

These are radical ideas against the prevailing background of school education. They are not based on sophisticated theories of education, rather they are born out of common sense. ■■■



Don't be unreasonable, I say. The rest of the text books are under print. You will get them when they are ready!