

# **Activity Based Discovery Method for Better Science Education**

- Prakash Burte

It is only human beings that carry forward the ever growing cumulative knowledge with the help of both informal and formal ways of education to the next generations. Perhaps that is why the human beings species has evolved socially. Informal ways of education definitely have some strong points like ease of learning with individual pace but has many disadvantages as well. An example of a road side auto mechanic reveals the limitation. Normally he learns to carry out complex repairs and maintenance problem of the cars or two wheelers by experience in the atmosphere of his senior co-workers in a short while. However, it is rare to find a mechanic who can bring in design innovations in the automobiles. Not being able to become an automobile engineer is the limitations of his immediate proximity.

On the other hand, formal education has a potential to provide broader immediate proximity of varied experiences and thus help to cross over the limitation of informal education. That is why the web of quality education (to begin with primary and subsequently secondary) should reach to all sections of the society. However, what factors are responsible to achieve good quality in education is a million dollar question. As a first step, one attempts to analyse the health of existing educational system and demand removal of the apparent lacunae. The health status of the educational system, measured using four indices (underlined as below), roughly looks as follows - of course, with honourable exceptions:

## **1. Curriculum is**

- considered synonymous with syllabus and sum total of textbook contents by many people;
- fragmented, rigid, obsolete, over loaded and confined to cognitive domain;
- not appropriate to the age and not creative;
- examination oriented;
- demands rote learning and is repetitive ;
- poor in emotional quotient;
- does not stress on activities;
- teacher centred;
- suffering from unresolved controversies like prescribed vs. evolved, centralised vs. decentralised.

## **2. Teaching and learning in school**

- follows chalk and talk method;
- amounts to spoon feeding;
- stresses more on completion of portion, than on understanding;
- lacks in integrated teaching;
- is not free from 30 minutes periods;
- requires meaningful inputs on teaching methods by way of pre service and in service training

- should adopt many approaches to teaching so as to take care of a heterogeneous group of pupils;
- should cater to the emotional need of all pupils.

### **3. Physical and social access suffer from**

- poor teacher-pupil ratio, infrastructure and teaching aids
- bad working environment and infrastructural facilities like toilets, drinking water, activity centres, water pools, grounds, equipped laboratories, etc.;
- bad pay and unfair management practices;
- a need for good resource (resources of parents and society at large) management;
- lack of access to resource of parents and society at large;
- malpractice of donations, fees on various and dubious accounts and coaching classes and tuitions;
- categorising schools as being good or bad based on the paying capacity of parents – which is no different from a ‘hotel-system’;
- school timings and vacations not being in tune with nature and seasons;
- pressure of management and from the excessive number of Govt. Programmes.

### **4. School preparing for life:**

- students become self centred, intolerant because of present emphasis on competition instead on co-operation;
- education is not connected with either applying it in life situations or the life ahead;
- dignity of labour is given lip service but not followed in the learning process. This dichotomy teaches students to be hypocritical.

### **Requirements for Innovation in School Education**

Well, one may debate some of these issues, or say that the list is not exhaustive, or argue about the priority of these factors. What is without any doubt is the broad diagnosis of the ailments of the education system. If one agrees with the broad diagnosis, the first point of an agreeable prescription is removal of the above ailments of present educational system. That is:

- Strong belief that given chance, children have an immense capacity to imagine, to learn and to create- traits that needs to be nurtured and encouraged.
- Strong belief that child-to-child learning process must be given as much importance as the child-to-teacher learning.
- To bid farewell to rote learning, which is creative, at the most, in devising methods of cramming.

Seymour Papert, the great mathematician once aptly said that you can't teach people everything they need to know. The best you can do is position them where they can find what they need to know when they need to know it. The question is how to equip students to learn/ discover what they need.

Discovery Learning, an inquiry-based learning method can do that wonder because there is an intimate and necessary relationship between the processes of actual experience and education of students. The problem solving situations provide a fertile ground for discovery learning, where the learner draws on his/her own experience and prior knowledge to discover the truths. In nutshell one can say that formal education should:

- Create problem solving situations;
- Help students to work in groups to tackle the problems;
- Provide broad experience through observations during field trips, experiments, projects, etc.;
- Enthuse them to reflect upon their experiences;
- Guide the students' journey from concrete experience to abstractions - hypothesis, theories.

One can say that Discovery Learning is based upon the joy of "EUREKA". Thus, learning by discovery can be joyful. Let us see a few of the attributes of this method in comparison with the existing method of teaching:

<b>Attributes of</b>	
<b>Rote Learning</b>	<b>Learning by Discovery</b>
Not used by children outside schools	Used outside schools. Is centred around the needs and thought processes of kids
Creativity in exploring tricks for memorising, not in learning	Creativity in exploring ways of discovery, activity, observation, group discussions i.e. in learning itself
Assumes child as an empty vessel	Assumes the child to be active partner in learning
Teacher's role is to pour knowledge	Teacher's role is to create ambience for learning and thus facilitate learning
Teaching is boringly routine	Teaching is creative and so enjoyable
Spirit of enquiry is at its minimal	Development of spirit of enquiry is central
Centred around individual memorising	Centred around collective efforts in learning
Learning is a burden	Learning is joyful
The purpose is to get marks, admissions, jobs	The purpose is to first learn, understand and acquire problem solving skills

Activity Based Discovery Method (ABDM) of formal science education can improve the system. In ABDM the word ‘activity’ stands for experiments, classification, brainstorming, self-expression of pupils, excursions, games and sports, etc. In ABDM the medium of instruction is a language (Marathi, English, Hindi, Kannada, and what not) but the education itself is to discover through activities.

ABDM equips students to acquire or if needed generate information and translate it into knowledge by application. It also helps students to face the hitherto unknown problems of life and specific discipline of knowledge by inculcating open minds and creative thinking. In short, it builds confidence to face life.

One can legitimately raise a basic question about ABDM - Can all subjects and the curricular contents of each discipline be taught by discovery method? For example:

- The existence of an atom or the structure of the atom
- Meaning of words
- The constitution of a country
- History

I find above topics difficult to teach with ABDM in varying degrees. There might be some more such topics. However, I feel that solutions for the relatively more abstract topics will come around by sharing our experiences of using ABDM. Orienting students with a good amount of patience to rise up to the levels of abstraction from their concrete experiences may yield results.

**Following activities may help improve science education in schools:**

- Introduce and initiate discussion on discovery based learning amongst teachers, principals and trustees of educational institutes.
- Organise demonstration classes (2 to 3 periods at a stretch with around 30 students (teachers in the garb of students) of any class with observers from teachers, principals and trustees).
- Help build activity corners in the schools and enthuse students to build personal laboratories at low or no cost.
- Conduct workshops for students on “Fun with Science” during vacations.
- Guide student groups to carry out interesting science projects.
- Have popular science lecture for students.

Prakash Burte can be contacted on

Res. Phone 0217-2607 027,

E-mail address: [burte.burte@gmail.com](mailto:burte.burte@gmail.com)