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Science Through Activities

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Abstract

In a traditional Classroom teacher transmit knowledge, student passively listen, while their minds may be day dreaming .The search for teaching science meaningfully to children has been a very challenging task for educators.

How do children learn science? Perhaps science is learnt best when it goes beyond the four walls of the classroom and addresses the concern and problems of the larger community. Then science become alive and vibrant, Also the use of local materials for making simple science models helps children assimilate them better.

Science & mathematics are considered as technical and typical subjects to children, where most children do not feel comfortable and are often afraid to take up these subjects for higher studies. It was felt that in order to overcome these barriers in children's mind these should be made more interesting & easy to understand.

National Curriculum Framework -2005 emphasis on an environment in the science classroom which is conducive for constructivist learning. The Classroom Environment is maintained in such a way that students actively participate in learning which involves inventing and constructing knowledge and new ideas. Teacher applies various approaches to teaching learning process in order to make her students inquisitive thinkers, who questions , reason , reflects , make association with prior learning , imagine and think.

A seminal paper by John Biggs argues that good teaching focuses on what students are doing (Biggs 2012). The focus should not be on what the Lecturer or tutor is saying or doing , or how much they know, it should not even be on what students are learning, rather the focus of good teaching must be on what students are actually doing with the knowledge skills and competencies they are acquiring because learning doesn't occur through just listening, action is also required.

Our senses are the gateways to acquire knowledge.

We learn

1.0% through Taste

1.5% through Touch

3.5% through smell

11% through Hearing

83% through Sight

We remember

20% of what we hear.

30% of what we see.

50% of what we see & hear.

80% of what we say.

90% of what we say & do.

Basic Things

The Thing which I Hear, I may forget.

The thing which I see, I may remember.

The thing which I do, I can't forget.

Lord Buddha rightly said, "Believe nothing, merely you have been told to, or because it is traditional or because you yourself have imagined. Do not believe what your teacher tells you... merely out of respect for the teacher. But whenever after due examination and analysis you find conducive to the good, and benefit the welfare of all beings, that doctrine believe and cling to and take it as your goal."

In most schools science is learnt by rote. Children learn definitions and formulas and write them in the exam. This is certainly not a good way to learn science. Science is perhaps a unique subject. The uniqueness stems from the fact that many of its postulates can be tested and verified by practical experiments.

If it is to be learned effectively science must be experienced. It must be learned and not learned about (**Vigyan ke teen sapan- Khoj, Shodh and Bodh**).

Ann Sayer Wiseman, Creative Director of the Children’s Museum in Boston and the author of the Landmark Book, making things, summed up the essence of good science in these words:

It is Ok to fail.

It is Ok to make mistakes.

You will learn a lot from them

It is Ok to take risks.

It is Ok to take your time.

It is Ok to find your own pace.

It is Ok to try it in your own way.

It is Ok to fail._____

Children are naturally curious and have an innate desire to learn. Children also have a tremendous power to concentrate. If they are interested in a particular thing they put their Heart & Soul into it. They want to know it. They have a tremendous desire to understand how it works. Children learn a great deal without being taught. They learn because they want to understand the world. Marksheet, certificates, medals and prizes are bad substitute for the real joy of knowing the world.

Activity based learning describes a range of pedagogical approaches to teaching. Its core promises include the requirement. That learning should be based on doing some hands-on experiments and activities. The idea of activity based learning is rooted in the common notion that children are active learners rather than passive recipient of information. If child is provided the opportunity to explore by their own and provided on optimum learning environment then the learning becomes joyful and long testing.

The key feature of the ABL Method is that it uses child –friendly educational aids to faster self learning and allows a child to study according to his/her aptitude & skill. Several pioneering experiments were done in India prior to independence to make the learning of science contextual & interesting.

Richard Greggs wrote a book titled “**Preparation for science**” in 1928; this remains the most pioneering treatise on how science should be taught to children in Indian schools.

Keith Warren, A UNICEF consultant rediscovered it in 1975, illustrated parts of it, and brought it out as **Preparation for Understanding**. The basic tenet of the book is: Before children can understand a thing, they need experience, seeing, touching, hearing, tasting, smelling, choosing, arranging, putting things together and taking things apart. Children need to experiments with real things.

After independence a few initiatives were taken in India to make science more interesting. During its formative years the NCERT reprinted a few science activity books developed by an American University. The NCERT also started the magazine **School Science**, in which many pioneering Indian Scientist Prof. D.N. Wadia and Prof. P.N. Maheshwari regularly contributed articles of a very high quality. Meera Parasnis wrote a series of 5 illustrated books titled "**Science in Action**, in the early seventies.

On 4 October 1957, the Soviet Union successfully launched the Sputnik. Sputnik's launch changed everything. It had a worldwide effect on the way science was taught in schools.

The Nuffield science programme in the U.K. in early 60's based itself on the discovery approach. Children were not doled out readymade answer instead; they were encouraged to fend for themselves and to discover the answer themselves. Children learn a great deal by themselves.

At the behest of UNESCO, J.P. Stephenson prepared a book on Science activities titled **Suggestion for science teachers in Devastated Countries**.

Good Science Teaching must be based on observation and experiment. There can be no substitute for these, but performing experiments and learning to make close observations require special facilities and these are lacking in many parts of the world, especially in the elementary and middle schools of poor countries. As a result, science teaching suffers a severe handicap in these regions.

The best Indian effort to revitalize school science education was certainly the Hoshangabad Science teaching Programme (HSTP), Started in 1972, based on the discovery method where children performed simple experiments and then answer questions based on what they did. They were not passive consumers, but "Real Constructor" of knowledge. But despite the fact that the programme had succeeded in demonstrating a paradigm shift from rote learning to understanding, it was shut down. But HSTP has inspired scores of individuals who are trying to implement it in their own region with variations and regional specificities & left behind seeds for future innovation.

Experience the world over has shown that prepackaged science kits seldom work but whenever teachers have been shown possibilities of making simple science models using everyday materials; readily available in their surroundings they have shown great enthusiasm.

We live in a consumerist society which produces mountains of junk. This stuff can be recycled back into joyous science models and toys for children. A hundred such wonderful toys have been collected in a book title "**The joy of making Indian toys**" by Sudarshan Khanna (Published by the NBT).

Over the Years there has been a shift in thinking and schools are adopting more progressive measures, one such measure is constructivist classroom. In a constructivist

classroom teacher transacts the knowledge, students are actively involved and their minds constructs the knowledge.

Constructivism sees learning as a dynamic and social process in which learner actively construct meaning from their experiences in connection with their prior understandings and the social setting (Driver, ASoko, CLeach and etal, 1994.)

Constructivist classroom places a child in the center position of the classroom. The National Curriculum Framework-2005 brought out by the NCERT emphasizing constructivist approach in the classroom states”Teacher should also nurture their classroom spaces as places where children can ask questions freely.”(p.82). NCF-2005 establishes the need to recognize the child as a natural learner and knowledge as the outcome of the child’s own activity.

Conclusion:

In many parts of the world, science education occupies a comparatively insignificant place and unfortunately what actually happens in the classroom under the label of science is often totally inadequate, teacher training both pre service and in service, is one of the keys to this problem. Training should be carried out in ways more closely related to the active methods which teachers are expected to use in their schools.

Lester and Onore (1990) propose that genuine learning comes not disregarding all prior learning but reassessing our existing belief about the world. Reflecting on one’s teaching practices enable a teacher to transit from transmission to transaction mode of her classroom. She creates an environment in which she can challenge the beliefs and practices of a traditional classroom and become a facilitator and provider of experiences to her students in which they can construct their knowledge.

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