

**INNOVATIVE TEACHING STRATEGIES IN PHYSICS BY USING INTEGRATED USE OF BOTH
TECHNOLOGICAL AIDS AND LOW COST TEACHING AIDS**

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ABSTRACT

Science courses are becoming difficult not only due to conceptually difficult content but also due to our formal and didactic approach of teaching science. This process of teaching and learning of Science doesn't fascinate the students and hence learning of science becomes only a tool to get a decent looking job. To make physics understandable perceivable and enjoyable I have make use of technology. My presentation 'Total Internal Reflection' explains the basic concepts of the phenomenon and its application in daily life with the help of PowerPoint presentation and the teaching aids. Slides were prepared with the help of animation to explain the phenomenon and its application. For making the concepts of physics understandable to students the teaching aids were also designed by the available resources and used to explain the phenomenon.

Keywords: Power point presentation, animations, teaching aids, Application in real life.

INTRODUCTION

Science plays an ever increasing role in the modern civilization. It is our primary duty to see that every individual should have at least an elementary knowledge of the scientific principles involved in every day life.

IMPORTANCE OF EXPERIMENTAL WORK: DEMONSTRATION AND ACTIVITIES

The national policy on education, 1986 has given due emphasis on child centered education and inculcation of scientific temper in students. Scientific temper in pupil is inculcated by experimental work in science. He gets an opportunity to handle scientific apparatus/equipment skillfully and understand principle/concepts/processes of science. The learning through demonstration also provides first hand direct experience and can arouse curiosity and interest in children.

As the Chinese proverb say:

“I read, I forget it.

I see, I remember it.

But when I do things, I understand.”

The philosophy underlying the learning of science through fun is directed towards a greater participation of children in active learning experiences in the classroom and outside. Discovery, purposeful activity and environment are the three basic elements of new teaching method. Activity should be developed utilizing local resources in such way that children perform the experiment themselves.

NEW APPROACH TO TEACHING SCIENCE

Science courses are becoming difficult not only due to conceptually difficult content but also due to our formal and didactic approach of teaching science.

Therefore science teaching should be:

1. through understanding.
2. Life oriented.
3. Lectured-cum-demonstration and activity oriented.
4. made interesting through use of local resources.

Science can thus also help in giving pupils the social education. Thus for flexible science teaching aid is essential to:

1. Involve pupils in science.
2. Help them to think about science.
3. Stimulate their participation.

Science and specially physics is being taught since years and decades only through chalk and talk. Science education has reduced to transferring some formulae, equations and statements from the teacher's lecture notes to the student's notebooks via the blackboard without affecting either of the

brains. This process of teaching and learning of Science doesn't fascinate the students and hence learning of science becomes only a tool to get a decent looking job.

To make physics understandable perceivable and enjoyable. I am trying to bring in innovations in teaching such as demonstrations experiments during the classroom teaching by designing low cost teaching aids and by using computer (Media) as technological aids.

As making teaching aids is an emotionally, intellectually, aesthetically and professionally rewarding experience. It is an act of creation. It is an affirmation-an affirmation that I as a teacher care about the pupils and believe that, with the help of these learning aids they can learn. It is an act of love.

Teaching aids provide a stimulus for exploration and thinking. With the added input of verbal, personal communication with an adult interaction and discussion arise.... And these are crucial to real, activity based learning. Adults and older children, help younger ones to interpret sensory and language experiences to clarify them and relate them to their previous understandings. Children that learn by blending language with experiences, they learn to think.

For maximum mental growth and personality development, a child's life needs to be filled with stimulating, encouraging experiences. Appropriate learning materials (teaching aids) help children to develop their innate abilities.

A classroom consists of heterogeneous ground, where they differ in their intellectual ability to abstract, generalize, reason and remember. In that sense every child is unique and has unique ways of learning as a result a teacher has to adapt different methodology in order to create understanding among all children in a class.

As teachers, we have a wealth of information from which to choose for our classrooms. We can now bring history into the classroom through pictures, music and other visuals to a degree never before possible. We can communicate with students from other countries, and we can take classes from teachers we have never met in places we have never been. We can apply the physics from classroom to simulations available to us through the internet, and we can develop projects across grade levels and campuses. Students are no longer limited by the walls of a classroom or the knowledge of a single text book. The world is available to most classrooms, even when students do not have their own computers.

We can bring media into the classroom through visuals, sounds, smells and tastes. Because our brains rely heavily on stimulus from the outside for learning, this is just one of the reasons that teaching with media is brain friendly. In addition, we should bring technology to the classroom because

- Technology is not limited by the classroom walls
- Technology does not know or care what the student's socioeconomic status may be, and thus helps to level the playing field for these students.
- Technology provides an equal opportunity for every one to learn.
- Technology is more in tune with the way our students learn today.

- Technology is so much a part of the real world that to limit its use in the classroom is to limit our student's ability to compete in the world.

WHY MEDIA IS BRAIN FRIENDLY

Most researchers define brain compatible learning as learning that occurs:

- Using modalities that are most comfortable for the learner. For example, most learners are either visual or kinesthetic, thus a brain-friendly environment will lean heavily on teaching methods that include visuals, models, or hand-on-activities.
- In an environment that is positive and friendly and incorporates high expectations for everyone.
- In a classroom that utilizes research-based methods for teaching and learning.
- In a classroom that provides a variety of opportunities for learning.
- In a classroom that is flexible in terms of time, resources and structures. For example, if something is not working, the problem is identified, diagnosed and fixed rather than just moving on. If students need more time to learn, more time is given rather than sticking to a fixed timetable, regardless of the quality of the learning.
- In a classroom where quality is important and students are given rubrics or matrices that tell them in advance what is expected.
- In a classroom where standards are used and where students know the expectations. The students are provided opportunities to review their work in terms of given standards so that they know at all times where they stand.
- When specific feedback is given consistently and frequently. Just saying "Good job" is not enough.

We are being encouraged to use brain based strategies in our classrooms: one of the best ways to do so is through the use of media in the teaching/learning processes.

THE EFFECT OF MEDIA ON STUDENT MODALITIES

About 98% of all incoming information to the brain comes through the senses. Add to that the fact that over 87% of the learners in the classroom prefer to learn by visual and tactile means and you have a recipe for failure if the primary methods of teaching are auditory. In *Growing up Digital* (1998), Don Tapscott said that this generation prefers to be active participants in all that they do.

THE EFFECT OF MEDIA ON MOTIVATION:-

According to Jensen (1997), interactive abstract learning that includes the use of various media such as CD-ROMs, the internet, distance learning: or virtual reality utilizes the categorical memory and requires little intrinsic motivation. Although traditional forms of education receive the greatest amount of the education dollars, they require a great deal of intrinsic motivation to be effective. Students must struggle to make the traditional type of learning work, since it is outside the context of its meaning.

THE EFFECT OF MEDIA ON BEHAVIOUR MANAGEMENT

We know that most of the discipline problems in the classroom are caused by such factors as boredom, not understanding the relevance of the information, and incorrect modalities for learning. We also know that over 87% of the students in any given classroom are visual learners.

Students who enter our classrooms have been a part of a multimedia world since birth. Students today are able to insert videos or DVDs of children's programs into the appropriate devices for viewing from the time that they were three years old. If they want to know something, they search the internet. It should not be surprising to us that these same students have difficulty sitting all day in classrooms that rely on low technology, such as overheads, whiteboards, lectures and note taking, as the major sources of information gathering. For the majority of students, who are visual, just hearing the information is not enough, they need to see it and to experience it. We lament the fact that students do so poorly in mathematics and yet we teach this subject primarily by lecture and homework (i.e. drill and practice). If we can find ways to help these students see how the math works and how it is applied to the real world, we are more likely to have better math students. Media can help us get there quickly.

THE EFFECT OF MEDIA ON REACHING HIGHER LEVELS OF THOUGHT.

There are so many great websites that encourage and teach higher level thinking that we do an injustice to our students if we do not lead them there. Using media is the key to moving students to higher –level thinking. Our students are already familiar with using the Internet and many of the software programs required to reach such higher-level thinking skills as creativity, problem- solving, comparison and contrast and evaluation. We need to lead them to the best of the best in terms of media and to provide feedback as they work. Real world applications, such as the physics software that explores how to design amusement park rides utilizing g-forces without damaging the body, are exciting and fun, but they also lead students into problem solving and decision making.

To make physics understandable, perceivable and enjoyable, I am delivering my lessons by using technology also, in the form of power point slide show or by using internet. I incorporated technology in my day to day teaching process to create a conducive pro-technology environment in the class. At last I also want to share my experience with you. While teaching with technological aided lesson, I found that the students were very attentively listening and observing the lesson. Their faces were smiling with satisfaction. So, teaching through technology is indeed an effective method to engage the classroom as they relate to it with interest.

References & Acknowledgements:

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2. What every teacher should know about Media and Technology by Donna walker