

# Impression of Learner Centered Teaching Strategies among High School Teachers Befitting the Instruction of Optical Concepts

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**Abstract:** Teaching is a powerful way of inculcating the essential knowledge that could be employed in helping students to become responsible citizens in future. The teachers should integrate current topics and relevant concepts into their classrooms. They should choose a strategy that suits the reality and interest of their students, which is functional and effective. Teachers have to use student-centered teaching strategies that nurture students' literacy and critical thinking skills within a respectful classroom climate. This provides children with opportunities to develop and practice higher-order thinking skills. Effective teaching strategies make the content easier to comprehend and assimilate. Physics is the key subject in many science-teaching institutions around the world. Physics teaching and learning derives importance because of its complexity and fast growing applications in many new fields. The laws of Physics are global, but the teaching strategies suitable for different concepts vary. The study collects the preferences of teachers rated on a set of the most used teaching strategies, which can be applied for the effective and meaningful teaching of selected optical concepts in Physics. The teachers are supposed to suggest three most preferred strategies, from the given set of strategies, best suited for each concept, in the order of their preference. From this, the teachers' awareness and need for training in contemporary teaching strategies are identified, for communicating new knowledge and keeping it up-to-date.

**Key Words:** Teaching, Learner Oriented Teaching Strategies, Physics, Optical Concepts

## 1. INTRODUCTION:

Today's students are into global world that demands deep understanding and skills for information processing and generating new knowledge based on it. Students need not only to understand the subject basics, but also to develop divergent thinking skills, to investigate, to solve problems and to make informed decisions. Helping students in these skills require changes in the present teaching strategies followed in our schools. The crucial factor in designing or selecting teaching strategies is the nature of the lessons given by the teachers. Teachers therefore should use effective teaching strategies. Modern Teaching Strategies are used to make learning sessions interactive and motivating. Many subject topics can be taught better and in depth with modern effective teaching strategies.

The world in the classroom can be a fun and interesting place both for the teacher and students, if the teacher has a bag of strategies and fun learning experience to rely on in specific classroom situations. In teaching, knowledge does not come from the teacher alone, so learning should be a collaborative work between the teacher and the students. The class should be student-centered and the teacher should only be the facilitator of learning.

As a fundamental basis of all natural science and technology, Physics is the key subject in many science-teaching institutions around the world. Physics teaching and learning derives importance because of its complexity and fast growing applications in many new fields. Eventhough the laws of Physics are global, the teaching and learning methods of Physics are distinctive among countries and cultures.

Appropriate strategy in teaching smoothens the process of teaching and quickens learning, thereby exploring the potentialities of learners to the fullest extent. This highlights the effective and meaningful implementation of proper strategies in teaching. The fundamental importance of teaching strategies is to make it easier to implement a variety of teaching methods and techniques. With this intention a variety of teaching strategies to help students take more responsibility for their own learning and enhance the process of teaching for learning are collected. The main aim is to create learning environments that are more interactive, to integrate technology, wherever applicable, into the learning experience, and to use collaborative learning strategies whenever appropriate.

## 2. STATEMENT OF THE PROBLEM:

'Impression of Learner Centred Teaching Strategies among High School Teachers Befitting the Transaction of Optical Concepts'

## 3. OBJECTIVES OF THE STUDY:

- To identify the prominent teaching strategies appropriate to teach Physics concepts at the secondary level.
- To identify the instructional preferences of teachers with regard to their selection of teaching strategies in the classroom.

- To analyse the teachers' preferences of teaching strategies for the effective and meaningful teaching of selected optical concepts in Physics.

#### 4. SAMPLES OF THE STUDY:

The study was conducted on a probability sample of 50 High School teachers teaching Physical Science in 16 different schools in Thiruvananthapuram District in Kerala.

#### 5. METHODOLOGY:

For the study, the investigator selected some prominent teaching strategies, which are suitable for teaching optical concepts in Physics. These are given in Figure 1.



**Figure 1: Prominent Teaching Strategies**

Based on the description, it could be noted that these strategies are not of any new genre but being used by classroom teachers for long and of them many were tested and proved its effectiveness in teaching /learning some or many subjects.

The study adopted survey to collect the preferences of teachers rated on a set of the most used teaching strategies, which can be applied for the effective and meaningful teaching of selected concepts in Physics. The teachers are supposed to suggest three most preferred strategies, from the given set of strategies, best suited for each concept, in the order of their preference.

#### 6. FINDINGS AND DISCUSSION:

Some important concepts in Ray Optics are listed. An explanation of the selected strategies in brief was also provided in the tool for the reference of the teachers.

No.	Teaching Strategy	Percentage of Preference of Strategy		
		1	2	3
1	Lecture-cum-demonstration	15	18.6	19.2
2	Computer Assisted Learning	21	20	20
3	Project Method	2	5.4	7.2
4	Activity Oriented Instruction	22	14.6	10.4
5	Correlation with Real Life	20.8	18	16
6	Problem Solving Approach	1.2	1.8	3.2
7	Laboratory Work	12.4	12.4	10
8	Heuristic Method	1	2	2.8
9	Inductive Approach	1.6	1.2	2.6
10	Deductive Approach	0.4	1.6	2
11	Mnemonics	1.6	0.6	1.8
12	Modular Approach	0.4	0.6	0.6
13	Role Playing	0	1	1.8
14	Brainstorming	0.6	2	1.8
15	Historical Method	0	0.2	0.6

**Table 1: Teachers' Preference of Teaching Strategies**

From the collected data, it is clear that majority of the Physics teachers teaching in High School classes prefer Computer Assisted Learning as the best teaching strategy suitable for teaching optical concepts even though many of them does not actually use it. The ease of driving home ideas through ICT medium may be the reason for their preference.

Correlation with Real Life experiences holds the second place in the preference of teaching strategies. It is certain that science has gone deep into our everyday affairs. We live in an age of science and all our activities are controlled and governed by science. It is therefore obligatory on the part of a science teacher to relate his classroom teaching with the complex environment by quoting examples from the daily life of the child.

The collected data suggests a pattern of instruction that relies heavily on Lecture-cum-Demonstration method. Used in conjunction with active teaching- learning strategies, this traditional method can be an effective way to achieve instructional goals. This method certainly delivers a way to communicate a huge volume of information to many listeners, augments instructor control and is non-threatening to students. But at the same time, it is not child-centered and fails to impart training in scientific attitude and learning-by-doing. The image of high school physics instruction is quite similar to what these teachers likely experienced in their college physics courses, and perhaps explains the prevalence of this instructional strategy.

It is found that Activity Oriented Instruction too holds a leading position among the teaching strategies. Many studies show that learning is enhanced when students become actively involved in the learning process. Instructional strategies that involve students in the learning process arouse critical thinking and a better awareness of other perspectives.

In the words of Dr.D.S.Kothari, 'To learn science is to do science. There is no other way of learning science'. But surprisingly, it is found that Laboratory Work does not hold predominantly high position in the rating of strategies. The achievements in modern science are mainly due to the application of laboratory methods. The things learnt by the students through purposeful activity are permanently affixed in the minds of the pupils. So it is necessary that the teachers should entuse students for sincere laboratory work and to find out something through reflective thinking.

The Project Method makes education effective because it is purposeful and arouses curiosity in students. Learning becomes practical and intimately related with life. When significant and focused activities are offered to the students, they get opportunities to familiarize themselves with the real problems of life. The students learn practical usefulness of different subjects in the curriculum. But unfortunately, the study reveals that the present day teachers do not prefer this method much.

The present educational system highlights Problem Based Learning. In each class, the students confront with new problems, which they are supposed to solve by the end of it. Posing problems brings real world problems into the science classroom and furthers students' appreciation for the process of inquiry, and develops initiative and self-dependence in them. But the astonishing fact is that the high school teachers of today give a low rating to this noble strategy.

The next preference of strategy is the Heuristic Approach. Here the students are led to discover facts with the help of experiments, apparatus and books. In this method, practically pupils learn by doing everything. The pupil should behave like a researcher and he endeavors to find answers to questions put by his teacher. The teacher is there as a friend and guide and the pupil assumes the role of an investigator. Heurists believe that children should be told as little as possible. They are to be led to find out more and more. This method initiates activity of mind.

The Inductive and Deductive Approaches are widely used in science teaching. The most significant difference between these forms of reasoning is that in the deductive case the truth of the premises (conditions) guarantees the truth of the conclusion, whereas in the inductive one, the actuality of the evidences imparts support to the inference without giving complete assertion. A good and effective teacher is one who understands this delicate balance between the two; thereby making his/her teaching begin with induction and end in deduction. But in practice, only a very few teachers prefer these strategies.

Brainstorming is an excellent teaching strategy to generate ideas on a given topic. Brainstorming helps promote thinking skills. When students are asked to think of all the things related to a concept, they are really being asked to stretch their thinking skills. Using the method of brainstorming prepares the learner to express freely what comes to mind regarding the topic. Many of our present day teachers seem to be not even aware of this brilliant strategy.

Mnemonic Strategies have been devoted to finding ways of increasing the amount of content-area information, which the students are able to remember, thereby enhancing memory for school learning. The effective use of mnemonics strategies will aid a person to use structured knowledge that is already stored, recall stored information or translate abstract information into meaningful images. It demands considerable motivation from the part of the teachers. But very often, the teachers fail to do so.

Role-playing is a teaching strategy that emphasizes the social nature of learning and considers cooperative behavior for stimulating students both socially and intellectually. The amalgamation of experiential learning activities in the classroom builds up interest in the subject and understanding of content. There is enlarged participation on the part of the students in a role-playing lesson. It teaches empathy and understanding of different perspectives. Competent teachers normally use skits, dramas, newsflashes and other varieties of drama to encourage students when new information is introduced. But the teachers rate this strategy very poorly.

Another least rated strategy is the Modular Approach. It is an attempt to make the instructions individualized so that the student learns at his own pace, according to his interests, capabilities and capacities. The philosophy behind instructional modules is based on the generally accepted fact that each learner is unique and different from others in background, experiences, habits and learning styles, and as such should be allowed to grow and develop to the fullest potential. The teachers have a positive role to play in its use in the form of directions and supervision.

The Historical Approach emphasizes the human interest for adventures. Here, teachers can use the argumentation employed by scientists in the past in illustrating the contents they teach and persuading their students to consciously reconstruct and build the new knowledge. The stories of scientists give inspiration to children. The sleeping talents of students can be awakened through this approach. It demands the story telling expertise of teachers. Since this approach secures minimum rating from the part of the present day teachers, we are forced to assume that they are almost resistant to this strategy.

## **7. CONCLUSION:**

Teaching Strategies are strong motivators for students' interest and activity and in developing their learning ability and relevant skills. For communicating new knowledge and keeping it up-to-date, it is necessary for teachers to be trained in contemporary teaching strategies in order to build on previous experience of teaching and learning in undergraduate Physics. The measure of teaching is not the amount of knowledge the students learn from teachers, but the learning skills which the students master. In fact, studies show that students learn best if they are engaged in active learning. Student-centered teaching is a teaching style more effective than the others because it is more likely to motivate students by engaging them in tune with their interests.

In order to solve the specific teaching and learning problems, science teachers should first know what the undergraduate students want to meet the society needs and what the teachers' responsibilities for the students are at present. In addition to the teacher's eagerness and passion for the topic, understanding between teacher and students during discussions in and out of class, well-defined and systematized presentation of analytical and conceptual perception of ideas, they also require a sensible mix of teaching strategies in the classroom and intellectual challenges from the teacher. Formative assessment can drive the students to improve learning and indicate an individual's understanding of the content and his abilities.

As teachers, we must think how to make the students participate in the learning process, to think and learn more actively. It is too difficult for the teacher to be certain of what the students want and what skills and attributes are to be inculcated in them. We should not imagine that we can adopt the optimal strategies without considering the background of students' knowledge, the difference between learners and the analysis of the discipline which we teach. Therefore, no matter how difficult it is, we still need to think about it, because only once we know what we want to achieve and what skills we want our students to have, can we address teaching strategies, which might achieve this.

Integrating technology into the teacher education course curriculum when appropriate is proving to be valuable. The integration of computers into Physics instruction is frequent, but it is followed by the confession by teachers that lack of preparation of teachers through inservice or preservice is a serious lacuna. Anyway, the teachers expressed the need for help in using instructional technology as a part of their professional development.

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