



## **TEACHING OF PHYSICAL SCIENCE – IMPACT OF AUDIO-VISUAL AIDS**

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### **INTRODUCTION**

Technology is a systematic way of doing things by applying scientific and other organized forms of knowledge in the solution of problems for the improvement of the society. Relating technology to education, two concepts emerged according to Olowu (2005), technology in education and technology of Education. He defines technology in education as the application of technology to all the processes which support education within institutions. It involves the use of teaching, machine or audio- visual aids to enrich teaching functions. Technology of education deals with methodology. This is characterized by the adoption of a systematic or process approach to instruction based on clearly stated learning objectives. Ogunranti (2005) described educational technology as a principle and method which bring together men and resources in a systematic bid to effectively resolve educational problems. Ademoyin (2005) who perceived educational technology as a systematic organization of men, machine, ideas and procedures in designing, planning, implementing and evaluating the teaching and learning process in a bid to promote effective learning through a meaningful teaching. Olawale (2013) stated that the use of technology based materials as instructional materials in the teaching and learning process in physical and health education could best be grouped into three forms: audio, visual and audio-visual aids. The audio deals with sound only, the visual deals with sight (that is seeing only) and audio-visual combines both audio and visual i.e. sound and vision) for instance: audio include such things as radio, record players cassettes gramophone etc.

The materials aid teaching through the sense of hearing. They can be used in teaching of so many topics in Physical Science as a subject to aid efficiency in teaching and learning process of Physical Science in secondary school classroom. Visual category consists of maps, film strips, specimen, pictures, charts, blackboard, posters etc. This category appeals to the students through the sense of sight. Until facts and instructions are presented in form of visual

aid, physical and health education students in junior secondary schools may not readily grasp the meaning of ideas, concepts and facts which are likely to be perceived as abstract by the learners. Audio-visual is the group that consists of a combination of both audio and visual materials. They are therefore materials like television films and projector etc, the use of these aids learning greatly (Olawale, 2013).

### **What is Science?**

Science is a cumulative and endless series of empirical observations which result in the formation of concepts and theories which both concepts and theories being a subject to modification in the light of further empirical observations. Science is both a body of knowledge and the process of acquiring.

Science is an accumulated and systematized learning, in general usage restricted to natural phenomenon. The progress of science is marked not only by an accumulation of fact, but by the knowledge and the process of acquiring it. In other words, scientists are both a product and process.

Henri Poincare explains the idea this way “Science is built of facts as a house is built of stones but an accumulation of facts is no more a science than a heap of stones”.

In other way, it could be said that science is more a verb then it is a noun.

### **Science Education in India**

Today the world is facing three major problems of population increase, pollution and poverty. The development efforts of the developing countries, such as India, are being nullified by increasing population and increasing poverty. Although science and Technology have improved the lot of large number of human beings. Some of the worst problem of humanity. Education is one of the potent instruments in the development process if it is properly geared for that purpose. Science Education begin an important component of the education system should contribute in the solution of the problems of the country by developing desirable understandings, skills, abilities and attitudes. The greatest challenge is to humanize. Science that is to make it relevant to human needs and aspirations.

### **Meaning of Physical Science:**

“The Science concerned with the study of inanimate natural objects including Physics, Chemistry”.

### **Physics:**

“Physics has been defined as the study of the properties of matter and energy”.

## **Chemistry:**

“Chemistry has been defined as the study of the composition of substances and of their effects upon one another”.

### **1 Importance of teaching Science in the Existing School Curriculum:**

“What all the great teachers appear to have in common is love of their subject, an obvious satisfaction in arousing this love in their students, and an ability to convince them that what they are being taught is deadly serious”.

- Epstein [1981.P XII]

“Science is taught – because of the recognized need for general scientific literacy, our dependence upon Scientists and engineers and the value that we place upon Critical thought”

- John S. Richardson

### **The Kothari Commission has rightly recommended.**

“At the Secondary Level, Science as a discipline of the mind and a preparation for higher education deserves a special emphasis”.

### **Objectives of Teaching Science as In Various Reports:**

#### **I. Taradevi Report, 1954:**

The aims and objectives of teaching science at different stages have been summarized in the proceedings of All India Seminar on the teaching of science in secondary schools, Published by Ministry of Education in 1956.

#### **High and Higher Secondary Level:**

At the high and higher secondary stage the aim of General Science teaching should be

1. To acquaint him with the “Scientific Method” and to enable him to develop the scientific attitude.
2. To give pupil a historical perspective, so that he may understand the evolution of the scientific development.

#### **II Kothari Commission (1964-66)**

The Indian Education Commission (1964-66) has suggested the aims and objectives of teaching Science at various levels.

#### **Secondary Stage:**

1. At the Secondary stage science should be taught as a discipline of the mind and a preparation of higher education.

2. At the lower secondary classes Physics, Chemistry, Biology and earth sciences should be taught as compulsory subjects.
3. At the higher secondary stage there should diversification of courses and provision for specialization.

### **III. Ishwarbhai Patel Committee (1977):**

Objective of Secondary Education:

1. Acquisition of the skills and habits of self learning.
2. Acquisition of habits of helpful living and participation in games, sports and athletics for the maintenance of physical fitness.
3. Developing aesthetic appreciation and creativity through participation in artistic activities.

### **TEACHING AIDS (AUDIO VISUAL AIDS)**

#### **Meaning:**

For the smooth, powerful and uninterrupted flow of communication between the teacher and taught, a teacher has to make use of different type of aid material in the form of effective communicating link between him and his students. The charts, maps, models, slides, films, projectors, radio, television etc. which help the teacher in a good communication, healthy classroom interaction and effective realization of his teaching objectives may be termed as aids in the field of teaching and learning.

#### **Definition:**

“Audio-visual aids are those aids which help in completing the triangular process of learning i.e, motivation, classification and stimulation”

*Carter V. Good*

“Audio –visual aids are any device which can be used to make the learning experience more concrete more realistic and more dynamic”

*Kinder S James*

“Audio Visual aids are anything by means of which learning process may be encouraged or carried on through the sense of hearing or sense of sight”.

*Goods Dictionary of Education*

## **IMPORTANCE OF AUDIO-VISUAL AIDS**

Audio-visual aids used in the teaching-learning process have wide significance from the view points of teachers as well as learners. The importance of audio-visual aids are summarized below

### **1. Use of maximum senses**

Senses are said to be gateway of knowledge. Audio-visual aids call for the utilization of as many senses as possible and thereby facilitate the acquisition of maximum learning on the part of students.

### **2. Based on maxims of teaching**

The use of audio-visual aids provide assistance to the teacher for following maxims of teaching like 'simple to complex', 'concrete to abstract', 'known to unknown', and 'learning by doing', etc.

### **3. Helpful in the process of attention**

Attention is a key factor in any process of teaching-learning. Audio-visual aids help the teacher in creating proper situations and environment for capturing as well as maintaining the interest and attention of the students in the classroom activities.

### **4. Reduce Verbalism**

According to Raymond Wyman "Verbalism both printed and spoken does not prove much effective in the process of teaching and learning". Teaching aids reduces this verbalism.

### **5. A good motivating force**

Audio-visual aids match with the inner urges, instincts, basic drives and motives of the students and thus prove a potent motivating force for energizing learners to 'learn effectively'.

### **6. A good substitute for direct experience**

Audio-visual aids provide valuable substitute for the real object or phenomena for making the learning as realistic and meaningful as possible.

### **7. Provide adequate impression or image**

The key for the effective learning lies in the quality of sensory images or impressions made through the experiences gained at the time of learning. Audio-visual aids help in adequate retention by leaving behind a permanent mark in the form of adequate impressions or images and thus aid to effective and relatively permanent learning.

**8. Clarity of the subject matter**

Audio-visual aids bring clarity to the various difficult and abstract concepts and phenomena related to various subjects.

**9. Helps in fixing up the new learning**

Audio-visual aids help in achieving their objectives by providing numerous activities, stimuli and experiences to the learners.

**10. Save time and energy**

Much of the time and energy of both the teacher and the students may be saved on account of the use of audio-visual aids as most of the abstract concepts and phenomena may be easily clarified, understood and assimilated through their use.

**11. Meet the individual differences requirements**

These are wide individual differences among learners. The use of various types of Audio-visual aids helps in meeting the requirements of different types of pupils.

**12. Encouraging healthy classroom interaction**

Success of a teaching-learning act depends upon an appropriate classroom interaction. Audio-visual aids through its wide variety of stimuli, provision of active participation and vicarious experiences encourage healthy classroom interaction for the effective realization of teaching-learning objectives.

**13. Solve the problem of Indiscipline**

With the introduction of Audio-visual aids, there is less room for the creation of a passive, dull and uninteresting environment in the classroom.

**14. Help in the development of scientific attitude**

Use of Audio-visual aids help in cultivating scientific attitude among students.

**15. Help in the development of higher faculties**

Verbalism leads to memorization. It does not aid to the development of higher faculties of mind. Use of Audio-visual aids stirs the imagination, thinking process and reasoning power of the students.

**16. Provide reinforcement to the learners**

Audio-visual aids prove effective reinforcing agents by increasing the probability of the re-occurrence of the responses associated with them and thus render valuable help in the process of teaching and learning.

## **17. Help in positive transfer of learning and training**

Use of Audio-visual aids helps in the direction by making possible the appropriate positive transfer of learning and training to the other learning and training situations in the classroom as well as in the real world.

Audio-visual means all those sources which make the audio and visual sense organs of the pupils activated and they understand minute and difficult ideas of the lesson very conveniently. Thus, audio-visual aids include all those sources which make the pupils interested in the lesson and the learning objectives are achieved very easily. It is termed as Educational Technology while the use of audio-visual aids is termed as the Hardware Technology.

### **Some Audio-Visual Aids:**

#### **1. Science Excursions and Visits:**

Excursions play an important role in physical Science. This is a massive and real method to obtain knowledge. The students can understand and examine the various problems of science in a natural and social atmosphere.

#### **2. Science- Kits:**

Science-kit an answer to the new challenges posed by compulsory science teaching, remote single teacher village schools, and the problems of science teacher. Science- Kits serve the purpose of laboratory. "Science Kit is a device of preparing folded apparatus and material and then to arrange them in a box which may serve as the demonstration table."

#### **3. Display- Slides:**

The teacher should make ample use of display-slides. They can see movement and reality in motion picture film presentations. It is difficult to stop a film presentation at a given point for discussion purposes. The use of slides provides ample opportunities to stop a presentation and discuss the contents when needed. In fact, it is highly recommended that pupils raise questions and present related ideas pertaining to any one slide.

With the help of this, the students take a lot of interest and can study the various scientific functions in an apparent manner. In display slides each subject is given in systematic sequence and in data and gives a clear knowledge of the subject. In idea, now the display slides, on various subjects are being prepared commercially.

Education Department, Government of India, N.C.E.R.T; and other institute are producing various slides related to science teacher can procure the necessary slides and show them the students and then return them.

### **5. Epidiascope:**

With the help of epidiascope printed figures, pictures, diagrams etc. can be enlarged and projected on the screen. This is a boon for the teacher who monotony of the class teaching is broken up.

### **6. Projector, Tape:**

Recorder, Television and Radio- The teacher can make use of the tape-recorder to make his teaching interesting. The teacher can show the students slides, film-strips and films and make the teaching interesting with the help of the projector. Sounds of different animals and birds, lectures of prominent scientists and specialists can be taped and can be reproduced before the students when required. The audio-visual section of N.C.E.R.T. has collected various tapes and established a tape-library.

### **7. Science Museum:**

In a museum, we preserve substances, material and apparatus etc. These provide quite useful information for many topics of physical science. In a school, establishing science museum should be prime necessity.

### **8. Apparatus and Material:**

These are very essential for all science subjects. Without these no real science teaching is done. Demonstrations and experiments are very useful and they make use of apparatus and material. The students can learn the skill in proper handling and using apparatus and material

### **9. Models:**

If due to some reasons it is not possible to show the real objects to the students in the class then they are shown the models of the objects. These models should have a close resemblance to the objects so the students perceive a true picture of it. The teacher should use the models of different types of scientific apparatus and scientific processes. These models can also be prepared by the students, with guidance from the teachers.

### **10. Real- Objects:**

Real- objects are very important in the field of science. The student gets experience on the basis perception of objects. Objects like rocks, soils, minerals etc. can apparently be shown in the class. To show the object and to make this process more natural the students can be taken for excursions. Seeing the objects face to face the students get familiarized with these objects. Here these objects are considered very useful and lively means of teaching.

Modern education gives lot of importance to co- curriculum activities. It is now believed that classroom teaching is not sufficient to complete the education. Education should be designed



and planned in such a way that the students may get an opportunity to come in contact with the realities of life. Co-curriculum activities provide such opportunities to the students.

Curriculum activities are also helpful in doing away with monotony of the classroom. In classroom, there is a formal discipline. The teacher and the taught have to remain in a much disciplined manner. In other words, the process of teaching in the classroom goes in a much formalized manner. This is not true of curriculum activities. In curriculum activities there is an opportunity for freedom to the students.

### **Conclusion**

It is clear that audio visual aids are important tools for teaching of Physical Science. It helps the teacher to present the lesson effectively and students learn and retain the concepts better and for longer duration. Use of audio visual aids improves students' critical and analytical thinking. It helps to remove abstract concepts of Physical Science through visual presentation. However, improper and unplanned use of these aids can have negative effect on the learning outcome. Therefore, teachers should be well trained through in-service training to maximize the benefits of using these aids in teaching Physical science. The curriculum should be designed such that there are options to activity based learning through audio-visual aids. In addition, government should fund resources to purchase audio-visual aids in schools.

At the outset it is clear that in this technological era, Physical Science play vital role in the development of the society by its innovations. To sustain this development, understanding the physical science at school level plays vital role. In conceptual understanding of Physical Science use of audio-visual learning material is essential. Hence all the teachers who taught physical science at secondary level should involve the audio-visual aids in teaching learning process.

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