

IMPACT OF MULTIMEDIA IN TEACHING OF SCIENCE

Dr. Umesh Chandra Kapri
Associate Professor
Gold Field College of Education, Faridabad

ABSTRACT

Best teaching strategies are necessary for making teaching smooth and effective. During the lesson design, an effective teacher selects a particular teaching strategy or set of strategies in order to make his/her teaching effective and create interest of students in learning. There are various teaching strategies for different teaching subjects. There are also strategies that are more specific for a particular subject area. This was an experimental study which analyzed the impact on achievement in science subject of class 9th students after teaching them by conventional method of teaching of science and multimedia teaching of science. The findings of the study shows that use of multimedia proved to be better than conventional direct method in teaching of Science. The teaching by multimedia approach was effective therefore not a single student was found to be under extremely low level of achievement in Science so it is obvious that multimedia approach is an effective method in teaching of Science. Implementing science lessons with use of multimedia may lead towards making a difference, which produce in students a long-term memories about the concept.

Key Words: Multimedia, conventional teaching, Science.

INTRODUCTION

The destiny of the Country is shaped in the classrooms. This shape depends upon what teacher teaches and how it goes on moulding it. In other words destiny of our youngsters falls on the shoulders of teachers. "A teacher affects eternity, he can never tell where his influence stops."

Henry Adams (1905)

Today, education encounters challenges in all aspects of social, economic & cultural life of an individual. Scarcity of trained technical and skilled teacher is one of them. Technological development & mass media are playing a significant role in teaching and learning by replacing traditional class room system. Now the student has opportunity to learn at any time and at every place. So, the teachers have to learn to handle the use the modern teaching technologies to make their teaching smooth and effective. To improve the educational productivity, the teaching staff ought to mainstream technology within education, developing traditional techniques & using new educational methods. Mainstreaming the technological media in education is called "Multimedia" which leads to infinite applications of computer technologies. The concept of this multimedia technology came into effect with appearance of sound cards, compact disks, use of digital camera and then the video which made computer an essential educational tool.

INSTRUCTIONAL STRATEGIES IN TEACHING OF SCIENCE

Teaching is the transfer of knowledge from teacher to pupils. It is the facilitation of the pupils by the teacher in the art of learning. Teaching is art and a science which is

a social act of influencing pupils by the teacher. It is doing anything that might lead to learning. According to *N.L. Gage, (1963)*, “Teaching as an act of interpersonal influence aimed at changing the ways in which other persons can or will behave. Thus teaching is imparting knowledge or skill which involves doing all things that may lead to learning”.

Multimedia provides a range of tools with a unique capacity to extend and enrich teachers’ instructional strategies and students’ learning in science. Multimedia can be used to connect students to other schools, at home and abroad, and to bring the global community into the local classroom. Computer programs can help students to collect, organize, and sort the data they gather and to write, edit, and present reports on their findings. A teacher uses instructional strategy that is designed to establish interaction between the teacher, student and the subject matter or any combination of these three dimensions. In teaching a teacher can use one or many of the undermentioned instructional strategies in the classroom.

- **Direct Instructional strategy:** deals with Drill, Practice, Mastery learning, lecture and Demonstration.
- **Indirect Instructional strategy:** creating problems and engaging students in Problem solving or concept mapping.
- **Interactive Instructional strategy:** Co-operative learning and Brainstorming are the best examples of Interactive Instructional strategy.
- **Experimental Instructional strategy:** The teacher engages the students in laboratory in doing practical which are Activity-oriented or takes them Field Trips for the knowledge of various fauna and flora and their specimen collection.
- **Independent Instructional strategy:** Computer Assisted Instruction, Learning and Activity Package etc. are the examples of Independent Instructional strategy.
- **Computer-Assisted Instructional Strategy:** Computer Assisted Instruction is a method of learning in which there is purposeful interaction between a learner and teacher with the help of computer device for helping the learner to achieve the desired learning objectives with his/her own pace. It helps in achieving educational outcomes through internet, e-mail, CD’s, video clips, virtual field-trips, virtual science museum and various other sources like e-learning.
- **Conventional Instructional Strategy:** Conventional based instruction is focused on the instructor which is teacher centered. Most of the information tends to flow from teacher to students. Students are passive listeners. Teacher has authoritarian role and transmit knowledge to the students.

MULTIMEDIA

Multimedia is nothing but the processing and presentation of information in a more structured and understandable manner using more than one media such as text, graphics, animation, audio and video. Thus multimedia products can be an academic presentation, game or corporate presentation, information kiosk, fashion-designing etc. Multimedia systems are those computer platforms and software tools that support the interactive uses of text, graphics, animation, audio, or motion video. In other words, a computer capable of handling text, graphics, audio, animation and video is

called multimedia computer. Technological innovation has accelerated in the first decade of the new century, with digital projectors as CD-ROMs or DVDs accompanying many textbooks. Today, in good schools there are high-speed internet connections in most classrooms that allow reasonable-quality video streaming, and many students now bring wireless laptops, computers, or hand-held devices into the classroom setting.

The use of multimedia materials has substantial grounding in cognitive theory and research. Several studies indicate that computer-based multimedia can improve learning and retention of material presented during teaching and learning as compared to conventional teaching where study materials do not use multimedia. Multimedia presentations are most effective when the different types of media support one another as teaching strategies which enhance students' learning.

A well -developed multimedia can do more than good. The potential pedagogical value and rationale for using multimedia in classroom is given below:

- **To raise interest level:** Multimedia raises the interest of the student in learning and they appreciate a variety of media.
- **To enhance understanding:** Multimedia materials boost students' comprehension of complex topics of science.
- **To increase memorability:** multimedia leads to better encoding and easier retrieval which confirms for long-term memory.

Multimedia is an effective way for sending and receiving messages which can be comprehended easily and smoothly. The inclusion of media elements reinforces the message and the delivery, which leads to a better learning rate. The power of multimedia lies in the fact that it is multi-sensory, stimulating the many senses of the audience. It is also interactive, enabling the end-users of the application to control the content and flow of information (Vaughan, 1998). This has introduced important changes in our educational system and impact the way we communicate information to the learners (Neo & Neo, 2000). Multimedia in Education has been extremely effective in teaching and learning of a wide range of subjects.

A lecture can be extremely informative if it integrates pictures or video images which can help a learner to retain information much more effectively. Using interactive CD-ROMs can be extremely effective in teaching students a wide variety of disciplines, most notably science. Multimedia programs provide different stimuli in their presentations which include a number of elements as Texts, spoken words, sound & music, graphics, animations and still pictures. Inclusion of these elements in teaching in a comprehensive presentation provides effective education, which in turn will support the participation of the different senses of the learners in diverse syllabi. Media in teaching are classified with regard to the senses they stimulate. The most common classification of media: audio, visual and audio-visual. With the arrival of the multimedia computer, the term multimedia is more frequently referred to computer multimedia. The necessities of using multimedia computers are appropriate computer equipment that works and computer literacy of the learner and the teacher. Multimedia in teaching shows the numerous possibilities of combining different media in class work, successively and simultaneously, based on the existing needs for developmental achievements of students. The Classic teaching resources include

verbal, textual, visual, auditory, audio-visual, manual, experimental and auxiliary technical educational resources, while modern teaching resources includes educational program back-ups, multimedia electronic communication, expert systems, teaching bases of knowledge, intelligent tutorial systems etc. Therefore, with regard to the type of sense, the information can be obtained as given below:

1. Auditory – sources of knowledge which provides information by listening.
2. Visual – sources of knowledge which provides information by watching.
3. Kinaesthetic – sources of knowledge which provides information by movement.
4. Olfactory – sources of knowledge which provides information by smelling.
5. Taste – sources of knowledge which provides information by tasting.

The students acquire knowledge, develop skills and adopt pedagogical values. The teaching content is determined by the curricula for each individual age of the student. Students along with the teacher are in a direct relationship, but in an indirect relationship with teaching contents, which means that through the mediation of the teacher's lecture, they acquire contents. Multimedia is a teaching device and instructional aid which can be bought, rented, formed for the needs of the class. Multimedia is not supplant the teacher, but serves as an excellent complement to the spoken word, blackboard, textbook, teaching transparencies, geographical maps etc. Moreover, multimedia is used in class interaction.

NEED AND IMPORTANCE OF THE STUDY

Method of teaching is extremely important. However there is little realization of this and the methods of teaching used in our schools, colleges and training institutes continue to be largely traditional. According to 'Challenge of education' published by Ministry of Education (Government of India) "Application of new technologies can convert educational institutes into learning rather than teaching institutes with vast implications for curricular and instructional methods" When imparting knowledge, every care should be employed in adopting effective teaching technique. We should provide students with meaning and relevance and a comfortable and pleasant atmosphere to learn which is pressure free. Students need a sense of self-worth. Even the best curriculum and the most perfect syllabus remain dead unless supported by the right strategies of teaching. The search for educational effectiveness has always been a primary objective for the educators. In order to achieve educational effectiveness it is important for the educators to adopt an effective teaching method that suits the individual learning style.

Science has become a part of everyday experiences and thus there is a need to initiate the students into the scientific spirit and to introduce them to a world made up of technological objects and processes where in multimedia plays a pivotal role. The Science teacher creates situations in which students may explore the concepts seeking explanations of the objects and events they observe discover relationship among objects and events. The teaching process can thus be made effective. A teacher can judge students strengths and weaknesses through an activity. In our schools Science teaching is still oral in character where the students are passive listeners. The teaching of the subject can be made more interesting and effective if some innovative

methodology is adopted. Therefore, this research aimed to establish the impact of multimedia technology against conventional teaching method in teaching of science and achievement of students in science subject after that they were taught science subject by conventional method and multimedia method. Multimedia is an effective method of teaching Science which will enhance the academic achievement of students.

Multimedia provides the teacher with many possibilities in creating teaching strategies. Using the internet, pupils quickly find the required information. Formats of stored information are smaller in comparison with video cassettes (e.g. CD, DVD and USB). Multimedia educational tools are conceived on the principle of play, as extremely powerful techniques of learning, making teaching easier etc. With regard to the features mentioned, it can be concluded that multimedia represents a turning point in improving teaching technology. So the researcher tried to find out Impact of Multimedia in teaching of Science at secondary stage.

STATEMENT OF THE PROBLEM

The title of the research is given as: *“Impact of Multimedia in Teaching of Science at Secondary Stage”*.

OBJECTIVES OF THE STUDY

1. To know how multimedia can help in improving pedagogical quality of teaching in a classroom.
2. To study the significant difference in the process of classroom teaching through conventional method and multimedia technology.
3. To find out academic achievement of students in science subject by teaching them in conventional method and using multimedia technology.
4. To find out advantages using of multimedia technology in teaching of science subject in the classroom.

HYPOTHESES OF THE STUDY

1. There is no significant difference between academic achievement in science of students taught by conventional method and using multimedia technology with respect to their post-test scores.

RESEARCH METHODOLOGY

The present research work was based on experimental research. An experimental design was used in which one section of the school acted as control group where traditional teaching method was applied. The other section was considered as the experimental group which was taught through Multimedia technology.

Population and Sample: Population for the present study comprised of the class 9th students of a private school of Faridabad. Random sampling technique was adopted for selection of a section of 20 students of class 9th as control group and another section of 20 students of same class were taken as experimental group.

TOOLS USED

1. An Achievement test in Science for class 9th students was prepared by the investigator to assess their achievement in Science at pretest as well as post-test.

PROCEDURE OF DATA COLLECTION

Achievement test in Science for class 9th students prepared by the investigator was administered on the both control group and experimental group to assess their achievement in Science at pretest. Lesson plans of selected topics in science subject were prepared then control group was taught the selected topics by conventional method and the experimental group was taught by multimedia teaching. Both the groups were taught for a period of three months. Further the achievement test in Science prepared by the investigator was administered on both the groups to know their achievement in Science at post -test. Scores obtained from both the groups in pre-test and post- test were compared by applying statistical techniques. To find difference of achievement in science between control group and experimental group their post- test scores were compared by finding their critical ratio.

STATISTICAL TECHNIQUES USED

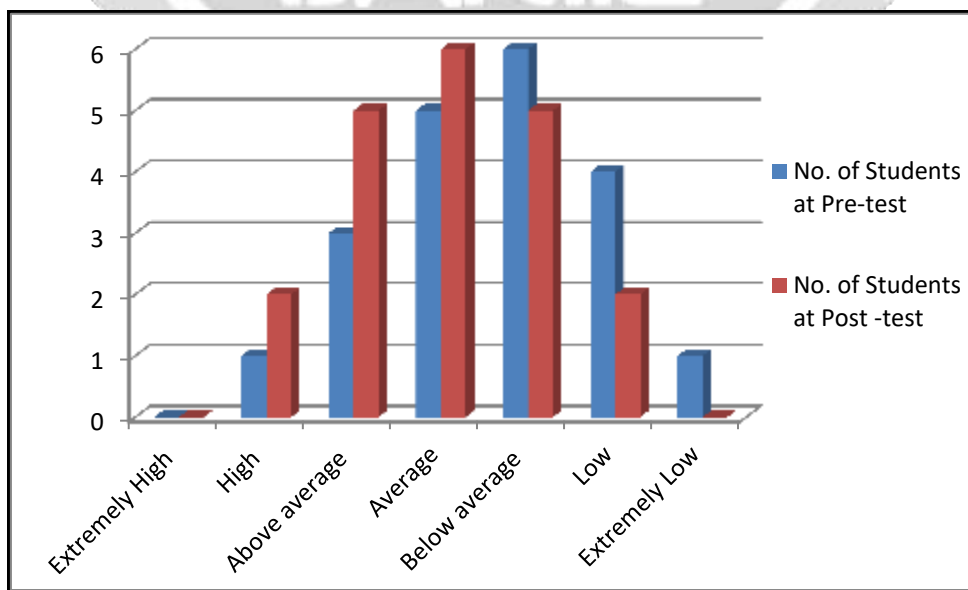
Statistical techniques such as Mean, Standard Deviation, Z-score and t-Test were used for analysis and interpretation of the data.

DELIMITATIONS OF THE STUDY

1. Only selected topics in Science were taken to teach the 9th class students.
2. The study was delimited to 9th class students of a private school located at urban area of Faridabad district of Haryana only.

ANALYSIS OF SCORES OF ACHIEVEMENT TEST IN SCIENCE

The graph-1 shows the number of students under the various levels of achievement in science at pre-test and post-test from the control group of 20 students.

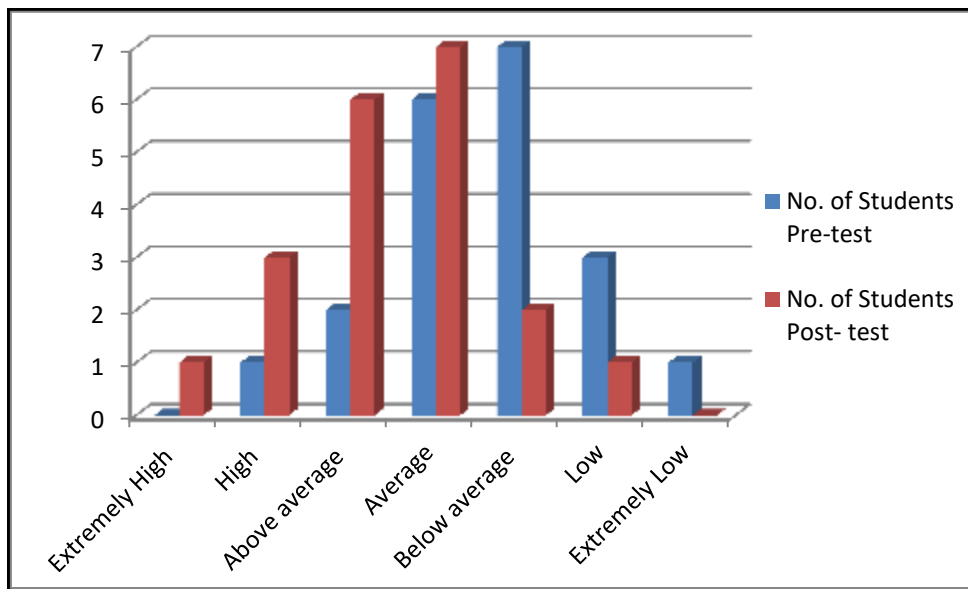


Graph-1: Number of students from Control Group at various levels of

Achievement in Science at Pre-Test and Post-Test

On analyzing the pre-test and post-test scores of Achievement in Science of 20 students of control group, it was observed that there was not significant increment of students in post-test under extremely high, high and above average level of achievement in science.

The graph-2 shows the number of students under the various levels of achievement in science at pre-test and post-test from a sample 20 students of experimental group.



Graph-2: Number of students from Experimental Group at various levels of Achievement in Science at Pre-Test and Post-Test

Out of 20 students of experimental group a large number of students scored good marks in achievement test in science at post-test and it was observed that not a single student was found at extremely low level of Achievement in Science at post- test.

Comparison of Post-Test Scores between Control Group and Experimental Group in Science subject:

Table- 1 shows mean, standard deviation and t-ratio of post- test scores of achievement test in Science.

Table 1: Comparison of post-test Scores of Achievement Test in Science between control group and experimental group					
Groups	N	Mean	S.D.	t-ratio	Remarks
Control Group	20	24.62	3.78	5.67	Significant
Experimental Group	20	31.3	3.67		

The calculated t-ratio of the post-test scores of achievement test in Science between control group and experimental group was calculated to be 5.67 which is statistically significant at 0.05 and 0.01 levels of significance, so there exists a significant difference between control group and experimental group with respect to their post-test scores of achievement in Science. Thus, it is concluded that there was a great deal of enhancement of Achievement in Science of students instructed through multimedia technology. The multimedia teaching was effective as the result shows that the

students of experimental group scored better at post-test in achievement test in Science in comparison to their counterpart the students of the control group.

MAJOR FINDINGS

- i. There was slight increment of level of Achievement in Science at posttest in comparison to the scores obtained at pre-test of control group of students who were taught by conventional method of teaching of science.
- ii. There was tremendous increment of level of Achievement in Science of experimental group of students at post-test in comparison to the scores obtained at pre-test. The use of multimedia in teaching of Science was effective as the result shows that the students scored better at post-test in achievement test in Science.
- iii. Comparing both the methods with respect to the marks achieved by the students at post-test, it was evident that students performed better on post-test in comparison to pre-test, when they were taught using multimedia.
- iv. The multimedia technology was an effective technique of teaching of science subject as the result shows that the students of experimental group scored better at post-test in achievement test in Science in comparison to the students of controlled group who were taught by conventional methods of teaching.

CONCLUSION

Multimedia method proved to be better than conventional method in teaching of Science. When the controlled group students were taught some concepts of science by the conventional method and experimental groups of the students were taught by multimedia method, it was found that the achievement of experimental group was better than the controlled group in post-test and the acquired retention was better in case of interactive multimedia method. The teaching by multimedia approach was effective therefore not a single student was found to be under extremely low level of achievement in Science so it is obvious that multimedia approach is an effective method in teaching of Science. Multimedia allows teaching a simplified strategy which leads to easy understanding on the part of the students. It raises the students' academic achievement in Science subjects.

EDUCATIONAL IMPLICATIONS OF THE STUDY

The findings of the study suggest that instruction through multimedia may be used to teach science and various other subjects at secondary stages. The study also implies that course could be completed in comparatively less time when taught through multimedia than conventional methods of teaching science and thus the spare time can be utilized for more enrichment of educational activities. The below average students may be compensated by teaching through multimedia. Teacher should be encouraged to prepare simple software package as children are more attracted toward colored visuals. Activity-oriented multimedia instructional strategy can improve competency cooperativeness, patience and develop dignity of labour among students.

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