Effect of Multi Media Teaching on Achievement in Biology

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Abstract: *The term 'Multimedia instructional systems' refers to the user of appropriate and carefully selected verities of learning experiences which are presented to the learner through selected teaching strategies which reinforce and strengthen one another so that the learner will achieve predetermined and desired behavioural objectives. In the present study attempt has been made to find out the effect of Multi Media Teaching on achievement in biology. Objectives of the study were 1. to find out the effectiveness of Multi Media Teaching on achievement in biology and 2. to find out the effectiveness of Multi Media Teaching on achievement in biology among boys and girls in experimental group. Hypotheses of the study were 1. Multimedia teaching would promote achievement in biology and 2. the attainment of different objectives of achievement in biology would be same among boys and girls in experimental group. For the present study, two sections of 9th standard consisted of 38 and 39 students of Samhitha High School, Kurabrahalli, Bangalore have been chosen as the sample. Cluster and random sampling procedure was employed in the selection of the sample. Achievement Test in Biology developed by the investigator has been used for the collection of data. The major findings of the study were 1. Multi Media Teaching significantly promoted achievement with respect to knowledge, understanding, application and total achievement in biology in comparison to conventional method. 2. Different objectives like knowledge, understating, application and total achievement in bio9logy were significantly attained by both boys and girls in experimental group.*

I. INTRODUCTION

Today in the midst of social and technological explosion in various fields of knowledge as well as in the techniques by which, this out bursting knowledge is communicated, the teacher can no longer be the sole and mere information giving instruments in the class room. Further, the growing school population and its concomitantly eager and more diverse variety of classes make it increasingly more difficult for a single teacher to "reach and child" with the information giving methods that we generally follow in the class room. These methods have failed to bring about effective learning and effective learning is brought about essentially by effective teaching. By effective teaching, means the mode of teaching which can develop certain essential abilities or potentialities which the pupil are endowed with. After all learning means bring about changes in the behaviour of an individual. In other words, the learning outcomes of any educational system should be to develop certain existing potentialities of the individual and thus in the process their academic performance is improved to maximum extend.

Further, the success of an education system depends greatly on the effectiveness of its media, which play an important role in eliciting knowledge. The choice of medium is crucial in education selecting the appropriate and effective medial is a formidable task. No medium is perfect and useful under all circumstances. Each medium broadens the range and effectiveness of education. With the advent of rapid developments in electronic medial a broad range of media is available for different educational process. The report of the UNESCO regional office has laid down the following criteria for media selection in teaching institution availability, accessibility, acceptability, economics and validity. Depending upon the availability and circumstances, a media mix it, multimedia has to be used to get maximum benefit for the students. Using a combination of media for teaching is more effective than using a single medium. Multimedia is expected to accelerate the pace of education while bring it to larger selections of society.

In the process of imparting education, many teaching aids/tools such as Audio – video materials, computer aided learning, computer based training, interactive computer video disc, multimedia, etc., are being used to supplement the traditional teaching. Almost a new era was started in the field of education technology. Educators started using multimedia as effective tool for teaching. Since teaching and learning can be made easier, faster and for more interesting with the help of multimedia, it has a tremendous in the teaching and learning process. Advancement is instructional delivery technology has direct impact on teaching process. Multimedia has great potential and plays vital role in education.

Concept of Multimedia

Media combinations are generally referred to as multimedia system. Multimedia means 'Many Media'. The term 'Multimedia instructional systems' refers to the user of appropriate and carefully selected verities of learning experiences which are presented to the learner through selected teaching strategies which reinforce and strengthen one another so that the learner will achieve predetermined and desired behavioural objectives. According to Dipika B. Shah (1988) "Multimedia is more than one medium used in a single communication either sequentially or simultaneously". Experts are of the opinion that different media serve different educational functions, so that various media should not be used in isolation, in isolation, instead they should be integrated.

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Rationale for Multimedia Usages

Multimedia learning experiences represent a natural way for learning to take place. Learning pace can be accelerated by involving maximum number of senses. Sensory experiences forms the foundation of intellectual activity within any formal school situation, learners, differ in the effectiveness of their sense reception. Multimedia learning experiences have the advantage of appealing to the individual, the learners pace, interest and readiness. Besides, cognition and conceptualisation depend on a chain of events, which begin with the learner's perception of stimuli, be they auditory, visual, and tactile and affectory. It is important that these initial learning experiences be accurate, dependable and understandable. Unless the learner's initial sensory impressions are accurate, it could be impossible for them to have reliable conceptualisation and understandings. With the existing numerous kinds of aids, carefully organized presentation of information, through a variety of media should occupy the learner's conscious attention of living stimuli.

Characteristics of Multimedia

1. Multimedia storage and retrieval systems contain more information than any human training agent can possibly embrace, and have many terminals through which students have access to the information
2. The development of multimedia instructional and supports systems have provided the tools for creating learning centres in which a very large number models of learning can be actualised over a great range of content of with considerable variations in complexities.
3. By employing media technology as support systems. We can offer to the students a large number of ways to learn a large number of things.
4. Multimedia systems are not restricted to a single type of learning or instructional mode; they represent a support for a range of them.
5. The capability of multimedia systems is marketed greater than that of a ordinary classroom practice, in creating a verity of learning models.
6. Since multimedia device is striking because it provides the opportunity to learn exceedingly complex skills, which are related to sets of diverse and precise theoretical knowledge bases.
7. The development of multimedia educational systems permit many models of education that otherwise are inconceivable as long as we think of the class room and the teacher and the primary mediator of instructions.

Importance of Multimedia

Verbalism is a disease in our teaching and learning situation multimedia act as antidote to the disease of verbalism. The importance of multimedia can be summarized as under

1. Reduction in verbalism is achieved.
2. Concrete experiences can be provided
3. Concepts can be taught correctly. Sometimes it becomes difficult to convey ideas correctly through speech only.
4. Students can be motivated and their attention can concentrate on teaching points.
5. The barriers of time and place can be removed. For instance, a Video recording on any learning situation can be presented in the class.
6. Difficult concepts or any idea in man's mind can be projected with the animated films.
7. Energies of students can be channelized through their involvement in projects on the preparation of teaching aids.
8. Multimedia can be used at any phase of a lesson, introduction, presentation and evaluation.
9. Contents are retained in the mind of the students for a longer time.
10. Time and energy of both teachers as well as student's can be saved.
11. Training in problem solving skills can be imparted through the development of problem solving situations involving relevant teaching aids.

II. NEED AND IMPORTANCE OF THE STUDY

A number of studies show that the importance of science and technology has been well recognized for bringing about social transformation and modernization. The importance of educational technology for achieving the national development goals has also been recognized. Strategies are to be involved and implemented to meet the new challenges of providing increasing scientific knowledge to more people in less time with a large population to be covered for education and with inadequate resources at our disposal, strategies will have to be worked out for effective performance increasing efforts are needed to explore the potential of educational technology to sharpen instructional designs.

Biology being one of the important branch of science which permits travel in the domain if living things. The development of biology and biology education in school for example electronic microscopy, molecular biology, bionics and control of diseases, lead to number of requirements in the teaching of biology in secondary schools. Every cultured man not only should understand general laws of biology but also know how to think correctly and broadly to live up to those biological principles. Biology education helps to shape a modern and scientific out look of the world.

The teacher is ultimately responsible for deciding their own class room objectives and for the attainment of these learning outcomes. Accordingly chooses materials and method. Maul (1953) Fitzpatrick (1960) and Brandwein (1955) also felt that the teacher has the final responsibility of determining educational objectives and selecting tools to achieve the desired learning outcomes. To bring about desired learning out comes teacher has to plan, select material and method and guide the class.

From the above discussion, it is clear that science and technology bring about any significant change in the teaching of biology; there is a need to expose teachers to various strategies which will result in better teaching learning process. For success, teachers have to be provided with a material which is different and more effective than what is traditionally presented in text books.

One strategy which has been considered to be successful is multimedia approach to teaching. Review of related literature reveals that researches have been conducted in both the area of use of multimedia package and find out its effectiveness on several variables. But the researcher of research conducted which showed the effectiveness of multimedia on which are two important objectives of teaching science, achievement motivation and scientific attitude were found less. Hence, keeping in mind the importance of multimedia uses in classroom situation and also the dearth of research in this area calls for taking up the pre research. Hence the problem is sated as follows.

Statement of the Problem

Effectiveness of Multimedia Teaching on Achievement in Biology

Objectives

1. To find out the effectiveness of Multi Media Teaching on achievement in biology
2. To find out the effectiveness of Multi Media Teaching on achievement in biology among boys and girls in experimental group

Hypotheses

1. Multimedia teaching would promote achievement in biology.
2. The attainment of different objectives of achievement in biology would be same among boys and girls in experimental group

Operational Definition

III. MULTIMEDIA

Multimedia is the combination of different media like print, visual, slide, filmstrips and oral. In the present study, the multi - media included 1.Projected materials included Text on Screen, Diagram, Animated Picture, Video Clips and Graphics Pictures. 2) Visuals included Models, Specimens, Charts, Chalk board, 3) Print Media included Work sheets, Books (text, reference), and 4) Oral Media included Explaining, Questioning, Group Discussion.

IV. ACADEMIC ACHIEVEMENT

In the present study it is referred to any desirable learning that is observed in the students, any behaviour that is learnt may come within the scope of achievement. In educational set up, the achievement of the students is measured in terms of their performance in all the examination i.e. the marks that they obtain in the examination. The index of academic achievement was the total scores or marks that the students get in final examinations

Sampling Procedure

For the present study, two sections of 9th standard consisted of 38 and 39 students of Samhitha High School, Kurabrahalli, Bangalore have been chosen as the sample. Cluster and random sampling procedure was employed in the selection of the sample. The Sample distribution is shown in the table-1.

Table-1 Sample Distribution

Experimental Group		Control Group		Total
38		39		77
Boys	Girls	Boys	Girls	Total
23	15	21	18	77

Variables

In the present study, Dependent variable was Achievement in Biology and Independent variable was Multimedia Teaching

Tools

Achievement Test in Biology developed by the investigator.

Procedure for Collecting Data

This experimental study is conducted in three phase with reference to the implementation of multi – media package namely 1. Pre – implementation stage, 2. Implementation stage and 3. Post – implementation stage. In the pre – implementation stage, the level of performance of the pupils is respect of their ability to achieve was assessed by means of the pre – test. In the post – test implementation stage, test was given in order to investigate their improvement in their biology test scores. In between these two phases lies the whole gist of the entire present study, namely, the implementation of the multi – media packages. Before actually implementing this experiment, the investigator had prepared an exhaustive plan of the entire procedure. The contents taught using multi media package were 1. Characteristic features of Annelids, 2. Economic importance of Annelids, 3. Characteristic features of Arthropods, 4. Economic importance of Arthropods, 5. Characteristic features of Molluscs, 6. Economic importance of Molluscs, 7. Characteristic feature of Echinoderms and 8. Economic importance of Echinoderms. The contents been divided into terms of lessons (by lesson is meant one period of 45 minutes) as detailed later.

Treatment

During each lesson, one or more objectives kept in view with greater importance to the objectives concerning the improvement of the said academic achievement will be sought to be achieved through relevant teaching points by providing suitable learning experiences using multi – media. The detailed procedure of the media to be used, the materials to be prepared are well – planned in conformity with objectives sought.

Statistical Technique

t-test was used for the analysis of the data

Analysis and Interpretation of Data

In order to test the objectives, hypothesis has been formulated and tested for its significance by using appropriate statistical techniques i.e. mean, standard deviation and t-values were computed for the gain scores of experimental and control group for achievement in biology.

Analysis of Gain in Achievement in Biology

Comparison of Gain Scores of Experimental and Control group in Biology

Hypothesis – 1:- Multimedia teaching would promote achievement in Biology.

For the purpose of testing the hypothesis stated above, gain scores of achievement in biology of experimental and control group were obtained by subtracting pre-test scores from post-test scores. Mean, standard deviation and t-values were computed and are presented in table 4.

Table - 4
Mean, Standard Deviation and t-values of Gain Scores of Experimental and Control Group in Achievement in Biology.

	Experimental		Control		t-value
Objectives	Mean	Standard Deviation	Mean	Standard Deviation	
Knowledge	3.289	2.31	1.63	1.79	**3.529****
Understanding	6.44	2.91	0.78	2.33	**9.43****
Application	4.37	2.66	2.02	2.49	**4.05****
Total	13.90	4.78	4.46	3.75	**9.63****

****Significant at 0.01 level**

Table shows that the mean gain scores of the experimental group is more than that of the control group for knowledge, understanding, application and total scores of achievement in biology. The obtained t-values for knowledge, understanding, application and total scores are 3.529, 9.43, 4.05 and 9.63 respectively. All these values are greater than the table t-value 2.64 i.e. for 75 degrees of freedom at 0.01 level of significance. From this, it clear that there is a significant difference between the mean gain scores of experimental and control group in achievement in biology. Hence, the hypothesis is accepted. The result shows the high degree of effectiveness of multimedia teaching in fostering student's achievement in biology with respect to conventional method of teaching. From the table it also becomes clear that the mean for knowledge (M=3.289), understanding (M=6.44), application (M=4.37) and total (M=13.90) in experimental group is found higher than of mean for knowledge (M=1.63), understanding (M=0.78), application (M=2.02) and total (M=4.46) in control group.

Earlier to the present study, many researchers like (Angadi ,2011; Vellaisamy 2007; Nimavathi and Gnanadevan ,2008; Vanitha ,2002) had conducted studies and proved that the academic achievement of the students was improved through multimedia teaching techniques. The present study also supported the findings of earlier studies i.e. the result obtained for achievement measures indicated that multimedia teaching had significantly promoted achievement in biology.

Hypothesis 2

The attainment of different objectives of achievement in biology would be same among boys and girls in experimental group .

For the purpose of testing the hypothesis stated above, gain scores of different objectives of achievement in biology of boys and girls of experimental group were obtained by subtracting pre-test scores from post-test scores. Mean, standard deviation and t-values were computed and are presented in table 4.

Table - 4
Mean, Standard Deviation and t-values of Gain Scores of Different Objectives of Achievement in Biol.ogy of Boys and Girls of Experimental Group

	Boys N=23		Girls N=15		t-value
Objectives	Mean	Standard Deviation	Mean	Standard Deviation	
Knowledge	2.375	3.590	4.00	1.200	**2.020**
Understanding	6.348	3.184	6.60	3.260	**0.235**
Application	4.370	2.760	4.40	1.854	**0.040**
Total	13.090	5.500	15.40	4.070	**1.490**

****Significant at 0.01 level**

Table shows that the mean gain scores of the experimental group is less than that of the control group for knowledge, understanding, application and total scores of boys and girls in achievement in biology. The obtained t-values for knowledge, understanding, application and total scores are 2.030, 0.235, 0.040, and 1.490 respectively. All these values are lesser than the table t-value 2.o3 i.e. for 36 degrees of freedom at 0.01 level of significance. From this, it clear that there is a no significant difference between the mean gain scores of boys and girls of experimental group for knowledge, understanding, application and total achievement in biology. Hence, the hypothesis is accepted. The result shows the higher degree of effectiveness of multimedia teaching in fostering the attainment of different objectives of achievement in biology among both boys and girls. This indicates that the effective use of multi media contributes for the attainment of different objectives and achievement in biology equally among both boys and girls.

Major Findings of the Study

The major findings of the study were

a) Multi Media Teaching significantly promoted achievement with respect to knowledge, understanding, application and total achievement in biology in comparison to conventional method.

b) Different objectives like knowledge, understating, application and total achievement in bio9logy were significantly attained by both boys and girls in experimental group.

V. CONCLUSIONS

Following were some of the major conclusions drawn from the findings from the study.

a) Multi Media Teaching was more superior than conventional method in significantly promoting achievement in biology,

b) Multi Media Teaching was more superior in significantly promoting achievement in biology among both boys and girls.

Educational Implications

The positive effective of Multi Media Teaching on achievement leads to the following educational implications.

a) In the present study, the Multi Media Teaching was found far superior to the conventional method of teaching in promoting the acquisition of both lower and higher order

objectives i.e., knowledge, understanding and application. Hence, Multi Media Teaching can be effectively implemented in secondary schools to increase different objectives and total achievement in biology.

b) This method can be effective to all students with different learning abilities as individual differences can be overcome in learning through different media.

c) Preservice as well as inservice teachers can be trained in using Multi Media Teaching effectively in their classrooms.

d) On experimental basis, Multi Media Teaching can be adopted in some schools for all subjects to improve school effectiveness.

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