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Effectiveness of multimedia in teaching biology among XI standard students

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Abstract

This paper focuses on Multimedia has deepest influence on learning the content effectively as its paves the way for virtual immerse during educative process and so the present study aims at investigating the effectiveness of multimedia in teaching biology among XI standard students. A sample of 60 XI standard students was drawn from Sethiathope district of Cuddalore. The experimental method was used for the study, with 30 students each in experimental and control groups. During the study effectiveness was given to the experimental group. The data were analyzed using't' test. As the mean value of experimental group is 36.44 and the mean value of control group is 30.44, it can be inferred that the achievement in biology of experimental group is better than the controlled group.

Keywords: biology, effectiveness, multimedia, teaching

INTRODUCTION

Education technology is a relatively new field which aims at solving problems of teaching and learning. Hardware and software are two structural components of this technology and multimedia is an important aspect related to them. Education as a system has some objectives planned for the realization of which a variety of strategies, techniques and aids have been designed and devised by educational technologists.

We live in a world of Media. We have a visual culture, living in an environment influenced by media messages of every kind. In recent years, we have also seen media assuming an increasingly important role in every aspect of instructional planning and design. As per White (2003), it is the school system that provides a foundation for future, intellectual, social, moral, spiritual and integrated world order. Competence in information technologies is the key to this development. According to Maggery (1989) the challenges and problems faced by modern educational system can be removed with the help of computers.

Learning is a steady and gradual process. Its pace, however, can be accelerated by involving maximum number of senses. Research studies have also shown beyond doubt that through selection and use of appropriate new educational communication material, and new education media, many of the obstacles to creation of an environment for effective learning can be overcome, especially by the use of educational media.

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Multimedia approach is one such innovation aimed at improving the teaching-learning process. These strategies are concerned with the systematic application of modern methods and skills to the requirement of curriculum. However combining new technologies with effective pedagogy has become a challenging task.

THE CONCEPT OF MULTIMEDIA

Media combinations are generally referred to as multimedia system. Multimedia means 'many-media'. The term 'multimedia instructional system' refers to the uses of appropriate and carefully selected varieties of learning experiences which reinforce and strengthen one another so that the learner will achieve pre-determined and desired behavioral objectives. "Multimedia" is 'more than one medium' used in a single communication either sequentially or simultaneously". *(Shah* 1988)

MULTIMEDIA APPROACH

This new kind of planning of instruction is referred to as instructional development, that means application of instructional systems approach to the analysis and development of practical solutions to the teaching and learning problems through Multi- media. This is called as Multi-media approach.

Thus Multi-media approach is a combination of a variety of instructional materials and techniques for providing series of learning experiences related to any subject. Amongst many subjects higher secondary level, the subject biology is very important. A biology student is engaged in a human activity that is directed towards seeking new knowledge about living things. A student tries to acquire new concepts of biology through practicing science or passing through the process of

biology. India needs specialists in the fields of medicine, health, agriculture and animal husbandry. The talent in these fields should come from biology. Hence the investigation is mainly focused on higher secondary biology students.

Designing a package by the teacher includes the effect of message configuration and characteristics, effective combination of multimedia elements such as text design, visual effects and the use of audio, animation and graphics. Multi-media approach refers to the use of appropriate and carefully selected varieties of learning experiences which is presented to the learner through selected teaching strategies.

This will reinforce and strengthen one another in such a way that the learner will achieve pre-determined objectives. Educational technology has rich potentialities and possibilities for accelerating the pace of human progress in general and for bringing astounding developments in various aspects of education. It has capabilities of bypassing several stages and sequences that are normally counteracted in the academic process. However, with the passage of time, the body of knowledge in different fields of learning increased and a tendency arose for experimental studies. Man's ever increasing knowledge of the world, new explorations on earth, growth of industry and trade necessitated the faster progress of scientific outlook in biological science. Hence the development of multimedia package in biology will be effective to improve the achievement of students of XI standard in biology.

Operational Definitions of the Key Terms

Effectiveness

According to oxford Advanced Learner's Dictionary (1999), Effectiveness defines having the desired effect and producing the intended result. This study measures the effectiveness in terms of the achievement scores of the students who were taught biology using multimedia in teaching biology.

Multimedia

Multimedia is the combination of text, graphic, sound, animation and video elements delivered by computer.

Teaching

According to Comprehensive Dictionary of Education (2008), teaching is the process of helping student acquire knowledge, skills, attitudes and appreciations by means of a systematic method of instruction

"Teaching", an interactive process, primarily involving classroom talk which takes place between teacher and the pupil, occurs during certain definable activities". - ***Edmud Amidson (1967)***

Biology

It is the scientific study of living things, both plants and living creatures

OBJECTIVES

1. To develop Multimedia Package to certain selected units of XI standard Biology content.

2. To study the effectiveness of Multimedia package on the achievement of XI standard students in biology.

3. To find the relative effectiveness of Multimedia Package on the achievement of students of experimental and control groups.

HYPOTHESES

1. There is no significant difference between achievement of XI standard students of experimental and control groups after the use of Multimedia package for teaching biology.

2. There is no significance difference between achievement of the boys and girls of the experimental group in biology

DESIGN OF THE STUDY

Experimental design is the blue print of the procedures that enable the researcher to test hypotheses by reaching vivid conclusions about relationships between independent and dependent variables.

In this experimental research, we have chosen the two groups **pretest-posttest equivalent-groups design** for the study.

The pre-test-post-test equivalent groups design is

$R\ O_1\ X\ O_2$ X gain = $O_2 - O_1$ O-$_1$ O_3 – Pre- tests

$R\ O_3\ C\ O_4$ C gain = $O_4 - O_3$ O-$_2$ O_4 – Post-tests

In this experimental method two groups of subjects are selected. One of the equivalent groups serves as the control group in which the subjects are taught by traditional method. The other group serves as the experimental group in which the subjects are taught using Multimedia package.

Sample

The subjects samples that were not exposed much to the multimedia approach during biology teaching were selected. The sample for the present study constitutes 60 XI standard Students of D.G.M Higher Secondary school at Sethiathope of Cuddalore district, South India. As per the scoring of a general test in biology, 30 students were chosen as control group and 30 students were chosen as experimental group. Both groups were equated on the basis of their pre-test scores (intelligence test)

Development of Multimedia Package

The title was formulated using Adobe Premier software and the supporting title with deco software. The text for multimedia package was created using above premier software. The animation pictures were downloaded from web and photo-galleries and converted into video clipping through video editing software and the Nero software was used to get the desired format.

Experimental and Control group

The experimental group was taught using Multimedia Package. The control group was taught by conventional method (i.e.) lecture method. Both the groups had same number of students and they were given equal time for each session. The treatment was given for 20 days with a schedule of one hour per day for each group and no students were absent on those days. The treatment was given without any disturbances.

Development of Achievement Test

Other than built in evaluation for each subunit and each topic, for the final performance, an achievement test was constructed. It was prepared based on the topics chosen for development of multimedia package for the biology syllabus by giving equal importance to the objectives of learning. The selected units of biology were taught by conventional approach to the control group and the achievement mean scores of the learners were measured by administering achievement test as post test.

STATISTICAL METHODS

The hypotheses were tested by using 't' test.

Hypothesis 1

There is no significant difference between achievement of XI standard students of experimental and control group after the use of Multimedia package for teaching biology.

There was a significant difference (t-test; $p<0.05$) between the achievement of the experimental and control groups of XI standard students in biology after the use of Multimedia Package as the mean value of experimental group was 36.42 and the mean value of control group was 30.44(Table 1 and Fig. 1). It can be inferred that the achievement in biology of experimental group was better than the controll group.

Table 1. The Table shows the Comparative mean scores of Achievement

	GROUP	N	Mean	S.D.	"t" value	'p'
ACHIEVEMENT	Experimental	40	36.42	5.33	4.67	<0.05
	Control	40	30.44	6.17		

(At 5% level of significance, the table value of 't' is 1.96)

Hypothesis. 2

There is no significant difference between the achievements of the boys and girls of the experimental groups in biology.

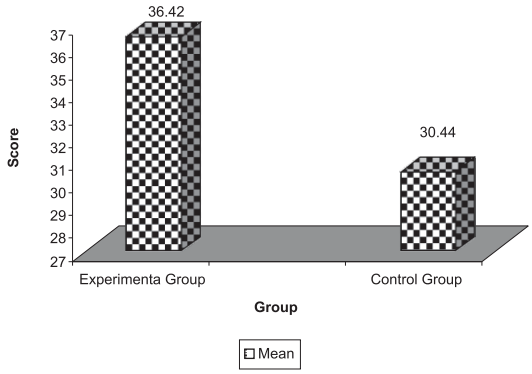

Figure 1. Comparative mean scores of Achievements

The table 2 and Figure 2 show the mean values of boys and girls of experimental groups as 40.62 and 38.52, respectively. This revealed that the mean difference is not greater between the boys and girls of experimental group. Hence there is no significant difference ($p>0.05$) between the mean values of achievement of boys and girls of the experimental groups.

Table 2. Comparative mean scores of achievements of boys and girls of the Experimental group in Biology.

	GROUP	N	Mean	S.D.	"t" value	'p'
ACHIEVEMENT	BOYS	20	34.62	6.36	1.03	<0.05
	GIRLS	20	36.52	5.18		

(At 5% level of significance, the table value of 't' is 1.96)

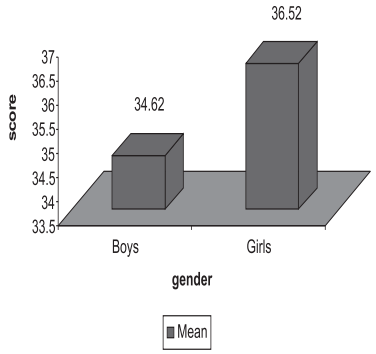

Figure 2. Comparative mean scores of achievements of boys and girls of the Experimental group in Biology.

DISCUSSION

Palten (2003) found that Instructional system for Mathematics developed under the study was more effective than conventional instructional system for both students and pupil-teachers. Xavier (2005) found that the there is significant difference between boys and girls of control and experimental group students in their gain scores. Peak (2006) found that CAI package significantly improved the performance of students in learning accountancy at higher secondary school. Hemlata(2006) found that there is significant difference in mean achievement scores between the students taught through traditional method and by taught through web-based instruction. Web based instruction has brought about positive impact on learning out comes. In this same area Nimavathi and Gnanadevan (2009) has conducted a study on *"Orienting Pre-Service Teachers to Develop Educational Multimedia Presentation A Practical Approach"*. The study showed that the students learning with the help of multimedia performed better in their study habits than the students learning through conventional method.

Similarly the result of the present study revealed that the experimental group students were better than the control group students. This may be due to the effectiveness of the multimedia package which has motivated the students to understand the aspects of biology better. Student's attention in the subject contents using pictures, power point presentations and sound effects have enhanced them to a great extent. In general, when the multimedia package was presented in a logical manner, students were highly motivated in learning biology easily. Thus this multimedia package could be effective in learning biology among XI standard students.

LIMITATIONS OF THE STUDY

1. Only a few units of biology are considered for the study.

2. Teacher made achievement tests are used at the end due to the non-availability of standardized test for the specified topics.

3. Only one school is taken for the study

4. The study is confined only to 60 students comprising both boys and girls.

CONCLUSION

This study clearly indicated that the multimedia package developed in teaching biology for XI standard students was effective. The effectiveness was found in terms of post-test of the students of experimental group taught through multimedia. Multimedia no doubt is a new information technology product and also is a new thrust area for the professionals to develop user friendly multimedia system. Computer is the primary tool used in the multimedia system. Multimedia has changed the way of information gathering, repackaging and distributing to fellow professionals with its sound and visual capabilities. The technologists are trying to overcome the problems in the method and are working progressively for different applications. Certainly multimedia will occupy a prominent place in the information centre as a modern tool in the 21st Century.

The new technology will pave the way to new opportunities and a paradigm shift. Multimedia will play a vital role in the educational field by developing self learning educational materials, computer aided instructional course materials, etc. The different author ware will help in developing, designing and production of multimedia information sources. It is the right time for the realization of new technology and the multimedia system.

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