EFFECTIVENESS OF MULTIMEDIA INSTRUCTIONAL STRATEGIES IN TEACHING BIOLOGY AMONG XI STANDARD STUDENTS

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Abstract

This study is to examine the effectiveness of multimedia instructional strategies in teaching biology among XIth standard students. It is conducted total sample with 40 students, randomly divided into two groups; an experimental group and a control group. The presentation of multimedia procedures in the accomplishment in biology causes the test gathering to perform immensely in their accomplishment. Consequently, exploratory gathering who were trained utilizing multimedia systems in educating in their accomplishment in biology higher than control bunch who were instructed utilizing traditional strategies imagined. The research results revealed that, it is found that experimental teaching method is more effective than teacher-centered traditional teaching method in achievement in biology. There is significance difference between the post-test mean scores of students thought traditional method and experimental teaching method with respect to achievement in biology. The result reveals that the mean of the control group in post test is 65.6 and experimental group is 79.6. The effect size is found to be 6.6 which represent the large effect.

Key words: Biology, Multimedia, Teaching methods, Teacher centric.

Introduction

Media combinations are generally referred to as Multimedia system. "Multimedia is a word that means "Many Media". Multimedia is defined as "more than one medium used in a single communication, either sequentially or simultaneously". Educational experts are of the opinion that different media serve different educational functions, so that various media should not be used in isolation, instead they should be integrated. Hence most of the learning events are multi mediated. Technology integrated into the classroom is a newly innovated approach to teaching students in or outside a classroom. The challenge for students and teachers is to adjust to all of the changes
required in this environment (McLaughlin, 2005). The student's interpretation and understanding of new information depends on the available appropriate schemata.

**Significance of the Study**

Biology has played a very important role in building up modern civilization by helping the study of other subjects, even though people have only a vague idea that all progress which was possible due to advancement in sciences such as physics, chemistry, medicine, engineering etc., Biology is an important tool which is employed by all these disciplines and without these disciplines would not have made such progress. This shows that Biology has got rich utilitarian value. Therefore the students should learn Biology. Biology can be understood only when one exercises his mental abilities i.e. analyses, reasons out, compares, that means to say that all these thinking skills are involved in the process of learning Biology. Undoubtedly we are on the front end of discovering myriad ways to enrich and expand our thinking capacities which will unleash exponentially our ways of doing and constantly aspire for attainment of the pinnacle of knowledge and learning. In today’s accountability driven culture students need a profile of skills not only for managing this knowledge transition but for the development of higher order thinking skills which is the need of the hour. Instead of being arbiters of knowledge, educators provide contextual strategic scaffolding for learners to engage in automatic processing, dialectical reasoning, divergent thinking and critical understanding.

Biology pedagogy rarely resonates with the findings of children’s psychology and inadequate teacher preparation reflects as inability to link formal Biology with experiential learning. Later on, it reflects as incapacity to offer connections with in Biology or across subject areas to applications in the sciences, thus depriving students of important motivation and appreciation. To make it pretty interesting the various teaching learning materials so called interactive multimedia strategies are used to enhance the achievement in Biology and to develop critical thinking ability among the students.

**Statement of the Problem**

Developments in science and technology have enhanced methods of teaching substantially. The scientific methods adopted in developed countries have greater impact on the students. India is also advancing in this direction, but the progress is slow when compared with developed countries. Models, toys, visuals are mostly used in teaching-learning at elementary school level. The availability of enormous slow cost teaching aids paves the way for increased utilization of them in
the teaching learning process. A large number of researches were carried out to find out the effectiveness of programmed learning materials, transparencies, slides etc., at the school education level. Most of them proved the positive impact on learning especially in science and hence the utilization of multimedia in education is now on the increase. But evidences of successful use of multimedia at teacher education level are rare. It is imperative to ascertain whether, multimedia is effective in different cultural contexts for different social groups and in different subjects at different educational levels in different socio cultural settings. A study with clearly specified theoretical objectives should take such idea into consideration. Hence the study is stated as "Effectiveness of Multimedia Instructional Strategies in Teaching Biology among XI Standard Students."

Definition of Key Terms

The key terms in the statement of the problem are multimedia instructional strategies, teaching science and District Institute of Education and Training students. The operational definitions of these terms are given below.

a) Multimedia Instructional Strategies

'Multimedia Instructional Strategies' refers to specific practices of media combination used to accomplish the objective of teaching by means of deliberate arrangement of experience(s) to help students to achieve a desirable change in performance. In this study the various media used were graphic aids, three dimensional

b) Teaching Biology

Achievement in Biology means the extent to which a student have achieved something, acquire certain information, demonstrated proficiency in certain skills usually as a result of instruction in the subject of Biology. In the present study, it is represented by the scores of students in the achievement test in Biology prepared and validated by the researcher.

c) Achievement

It means accomplishment or proficiency or performance in a given skill or body of knowledge, helps in declaring the examinee successful or unsuccessful, choosing the students for various professional and academic courses and selecting the candidates for different jobs.

Design of the Study

Research design is a blue print of the procedure that enables the investigators to test the hypotheses for reaching valid conclusions about relationship between independent and dependent
variables. Selection of a particular design is based on the purpose of the study, the types of variables to be studied and the controlled variables under which experiment is to be conducted. For the present study, a Pre-test Post-test Equivalent Groups Design (Best and Kahn, 1995) was adopted. The developed software is said to be valid, if it fulfills the outcomes what it claims to be fulfilled. So the developed Multimedia was given to two subject experts and two senior teacher educators for establishing the validity. For measuring the reliability of the prepared Multimedia, the investigator selected 50 students from XI standard student’s text book of Tamil Nadu state Board, who are new to the selected concepts. The investigator taught the selected concepts, by using the selected Multimedia. The investigator gave ample chances to the students for maximum exploitation of the Multimedia. After the treatment is over, the investigator conducted an achievement test. Then it was scored. The answer scripts were splitter into two groups as odd-numbered and even-numbered on the basis of their roll numbers. The correlation coefficient between the achievement gain scores obtained by the two groups was calculated and it was found to be 0.82. Thus the reliability of the instructional strategy of the present study was established.

**Instrumentation**

Achievement test in Science was the tool used for measuring the achievement of the sample groups and Standardized tools were used in the present study. Since there was no suitable test readily available, the investigator had to develop an Achievement Test in Biology (ATB) to measure the dependent variable taken up for the study.

**Selection of the Sample**

The sample of the study consisted of 40 students of XI$^{th}$ standard in government higher secondary school Madurai district. According to the scoring of knowledge of Biology test 40 students from plus one students were purposive random sampling technique chosen 20 students as control group and another 20 students were chosen as experimental group.

**Statistical Techniques Used**

The various statistical techniques used in this study were: (i) descriptive analysis - mean, percentage and standard deviation, (ii) relational analysis - Pearson Product moment coefficient of correlation to find out the relation between the two groups and (iii) inferential analysis - t-test, to analyze the differential hypotheses in relation to two different groups and correlated t-test, to analyze the differential hypotheses in relation to the same group.
Interpretation and Data Analysis

Null Hypothesis 1

There is no significance difference between the pre-test mean scores of students thought traditional method and experimental teaching method with respect to achievement in Biology.

Significance Difference between the Post-Test Mean Scores of students thought traditional method and experimental teaching method with respect to Achievement in Biology

<table>
<thead>
<tr>
<th>Multimedia Instructional Strategies</th>
<th>No. of Students</th>
<th>Mean</th>
<th>SD</th>
<th>t’ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Group</td>
<td>20</td>
<td>55.3</td>
<td>2.79</td>
<td>1.67*</td>
</tr>
<tr>
<td>Experimental Group</td>
<td>20</td>
<td>56.9</td>
<td>1.21</td>
<td></td>
</tr>
</tbody>
</table>

* Not Significance at 0.05 level

The above table impels that calculated ‘t’ value is lesser than the critical values of 2.57 at 0.01 level of significance with df=38. Null hypothesis is accepted and concluded that there is no significance difference between the pre-test mean scores of students thought traditional method and experimental teaching method with respect to achievement in Biology.

Null Hypothesis 2

There is no significance difference between the post-test mean scores of students thought traditional method and experimental teaching method with respect to achievement in Biology.

Significance difference between the post-test mean scores of students thought traditional method and experimental teaching method with respect to achievement in Biology

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<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>Control Group</td>
<td>20</td>
<td>65.6</td>
<td>2.61</td>
<td>3.25*</td>
</tr>
<tr>
<td>Experimental Group</td>
<td>20</td>
<td>79.6</td>
<td>1.45</td>
<td></td>
</tr>
</tbody>
</table>

*Significance at 0.05 level

The above table impels that calculated ‘t’ value is greater than the critical values of 2.57 at 0.01 level of significance with df=38. Null hypothesis is rejected and concluded that there is significance difference between the post-test mean scores of students thought traditional method and experimental teaching method with respect to achievement in Biology. Hence the teaching aids strategies more effective than traditional methods.
<table>
<thead>
<tr>
<th>Test</th>
<th>Group</th>
<th>Mean</th>
<th>SD</th>
<th>Effect size (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achievement in Biology</td>
<td>Control Group of Post-test</td>
<td>65.6</td>
<td>2.61</td>
<td>6.63 Large Effect</td>
</tr>
<tr>
<td></td>
<td>Experimental Group of Post-test</td>
<td>79.6</td>
<td>1.45</td>
<td></td>
</tr>
</tbody>
</table>

The close perusal of the above table reveals that the mean of the control group in post test is 65.6 and experimental group is 79.6. The effect size is found to be 6.6 which represents the large effect. Hence, Experimental group performance is better than control group. Hence, it is concluded that the exposure of teaching aid strategies in the achievement in Biology helps the experimental group to perform tremendously in their achievement. Thus, experimental group who were taught using Multimedia strategies in teaching in their achievement in Biology higher than control group who were taught using conventional methods visualized.

**Findings**

Based on the statistical evidence, the researcher mention the following findings: There is no significance difference between the pre-test mean scores of students thought traditional method and experimental teaching method with respect to achievement in Biology. There is significance difference between the post-test mean scores of students thought traditional method and experimental teaching method with respect to achievement in Biology. Hence the teaching aids strategies more effective than traditional methods. The result reveals that the mean of the control group in post test is 65.6 and experimental group is 79.6. The effect size is found to be 6.6 which represent the large effect. Hence, Experimental group performance is better than control group. Hence, it is concluded that the exposure of Multimedia strategies in the achievement in Biology helps the experimental group to perform tremendously in their achievement. Thus, experimental group who were taught using Multimedia strategies in teaching in their achievement in Biology higher than control group who were taught using conventional methods visualized.

**Discussion**

In the post test conducted for both control and experimental groups, the Experimental group, who received the multimedia instructional strategies (MMIS) has showed better achievement than the Control group. The findings of the present study show there is significant difference
between pre-test and post-test scores of control group XI standard students in their achievement in Biology. This finding is supported by the finding of Joan, D. R. Robert (2015). There is a significant difference in the Pre-test and Post-test Scores of the control group. The post-test score has a high mean score than the pre-test of control group VII standard students in their achievement in Biology.

**Suggestions for further Research**

A research is considered to be a complete one, only when it is followed by actions to eradicate the weaknesses found from the study and follow-up studies may be carried out. The findings of the present study lend themselves to proposing fresh research areas. A research may be conducted on the availability and utilization of ET facilities in the DIETs college, University and Elementary Teacher Training institutions. Further researches may be taken up on the line of this present study by changing them samples as primary schools or middle schools or high schools or secondary teacher education institutions with the same variables. The studies may also be conducted to find correlation between the availability and utilization, availability and achievement and utilization and achievement. Qualitative studies may also be conducted in this area. Studies may be carried out to compare the impact of different media on instruction. This kind of study may also be extended to other subjects. Studies may also be taken to find the causes of the dichotomy between the pre-service training and in-service practice in using technology in teaching. With the completion of these proposed investigations, the investigator feels that the present study will achieve a better form.

**Conclusion**

At long last, this strategy can be used in educating of no solitary volume of pyramid, cone and circle yet additionally in instructing of other geometry ideas. Concerning drawbacks, exercises must be set up by educator heretofore. There has all the earmarks of being a few issues in acquiring the materials to be utilized in exercises and it requires some investment to complete Multimedia exercises in correlation with conventional instructing strategy. Subsequently, exploratory gathering who were shown utilizing showing help methodologies in their accomplishment in Multimedia better than control bunch who were trained utilizing customary techniques imagined
References


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