

EFFECTIVENESS OF SMART BOARD AS TECHNOLOGY IN LEARNING OF BIOLOGY AMONG STUDENTS AT SECONDARY LEVEL

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Abstract

Each student should be educated to take up challenges to derive logical solutions to inculcate learning experiences, which can help them in education and real life situations. Technology is an aid in acquisition and development of knowledge and understanding in order to demonstrate and influence behaviours of learners in constructive way. Modern classroom teaching methods engage students in virtual learning, group discussions, projects and activities. These methods enable students to solve abstract problems, and develop qualities such as working in harmony with others, skills and interaction with fellow students and teachers. In the modern era, technology is of supreme importance in the education. This research paper aims at finding out the effectiveness of smart board instruction approach rather than the traditional approach in the secondary school level.

Keywords: *Effectiveness, smart board, technology, biology, secondary level*

Introduction

Assimilation of technology with education is an asset to impart quality education. In the beginning of 21st century, the educational institutions have embarked an adoption of technologies along with the curriculum transaction in the teaching-learning process, thereby increasing level of education. With the Indian perceptive in mind, technology in education will certainly bring a drastic change in the students in terms of their learning behaviour, attitude and achievement.

Smart board technology is one of the method to provide quality education to the students in terms of knowledge, skill and values. Knowledge is the area which can be provided and polished through the best use of smart board technology in education which is associated with tool or software. It enables student centered teaching approaches which create the interest among secondary school students, in teaching-learning process and offers the opportunities to become confident, skilled and knowledgeable throughout their lives and carriers. The students of today's world can be touched, moved and inspired by this smart board technology.

Need and Significance of the study

New Information and Communication Technologies have profoundly affected our society which is now knowledge based, technology driven and fast changing. To compete and survive in the competitive world of education, it is essential to create, adopt and utilize new technologies which will allow efficient flow of data, voice and images to all those who want to remain updated in the fast changing world. With the present infrastructure, class size, availability of teachers, quality and training of teachers, it is difficult to achieve all the

objectives of the teaching process. Therefore the use of new media in the educational process is of vital importance today. With the help of ICT, education will cross the borders and will change the world into a global village. It changes the way the teacher teaches and the students learn.

Operational Definitions

Effectiveness: The investigator refers “Effectiveness” as the positive effect of blended learning strategy model in biology on achievement of secondary school students.

Smart Board Technology (SBT): A smart board is an interactive white board, which attached to the wall or stand, and connected to the projector, computer. It is operated either with an attached pen, figure or any other instrument. It is used for teaching and training, which is done through presentations and merged media. Its working manifests itself as per the installed software.

Learning biology: Learning biology is termed as the behavioural pattern for the acquisition of knowledge in biology.

Secondary school students: Secondary school student are the students typically between the ages of 11-16 that is they take the education which is between primary school and high schools.

Objectives of the study

To find out the effectiveness of smart board instruction in learning biology among secondary school students.

Hypotheses of the Study

1. Learning Biology through smart board instruction will be effective.
2. There is no significant difference in the performance among the control group and experimental group pre and post test score.
3. There exists no significant difference between the experimental and control groups in their pre test performance.
4. There exists no significant difference in the performance among the experimental and control groups in their post test score.
5. There exists no significant difference in the performance among the experimental and control groups in their gain score.

Method used for the study

The basic experimental design adopted in the present investigation was Pre-test Post-test Non- equivalent Group Design. Two groups were taken for the experimental study namely the experimental group and control group. For this purpose 80 IX standard

students (40 as Control group and 40 as Experimental group) studying in a higher secondary school in Madurai was randomly selected.

Research Tool

For this study an achievement test was developed to obtain relevant data from the students. This test aimed at finding out the entry behaviour of the learners and their exist behaviour. Reliability and validity of the tool was established with the help of senior science teacher and subject experts.

Analysis of Data

The collected data underwent analysis using 't' test and they are tabulated based on the hypotheses as follows;

Table 1: Level of Students achievement in biology pre test scores of Experimental and Control groups

Level of Ability	Experimental Group		Control Group	
	Percentage (%)	No. of Students	Percentage (%)	No. of Students
Low	8	3	5	2
Moderate	69	27	87	35
High	23	10	8	3

The above table reveals that from the experimental group 8% of IX standard students secured low, 69% moderate and 23% of students secured high level in their pre test. It is inferred from the above table in the control group 5% of IX standard students secured low, 87% moderate and 8% of students secured high level in their pre test.

Table 2: Level of Students achievement in biology post test scores of Experimental and control groups

Level of Ability	Experimental Group		Control Group	
	Percentage (%)	No. of Students	Percentage (%)	No. of Students
Low	15	6	5	2
Moderate	60	24	75	30
High	25	10	20	8

The above table reveals that from the experimental group 15% of IX standard students secured low, 60% moderate and 25% of students secured high level in their post test. It is inferred from the above table that in the control group 5% of IX standard students secured low, 75% moderate and 20% of students secured high level in their post test.

Table 3: Descriptive Statistics of Biology achievement of Experimental and Control group students

Group	Pre test/ Post test	Mean	Median	Mode	N	SD	Kurtosis	Skewness
Experimental	Pre test	3.435	3	4	40	1.4060	-0.4194	-0.1424
	Post test	16.5	15	12	40	4.9458	-1.3986	0.2703
Control	Pre test	3.923	4	2	40	1.8241	-0.9422	0.0860
	Post test	10.825	9	8	40	4.8826	-1.0868	0.6792

The values presented above indicate comparable distribution between the pre test and post test scores of experimental and control groups. Moreover, the values of mean, median and mode of the pretest and post test scores of the experimental and control groups do not differ significantly for any particular variable. Therefore the distribution is implied to be normal. The values of skewness of the pretest and post test scores fall between +1 and -1 and the kurtosis values between +2 and -2 this again gives impetus to consider the distributions as normal.

H₀2: There is no significant difference in the performance among the control group and experimental group pre and post test score.

Table 4: Results of paired t-test between pre and post- test scores of achievement in biology of 9th standard students in experimental and control groups

Group	Test	Mean	SD	Paired t	Level of Significance
Experimental	Pre test	3.435	1.4060	17.8874	S
	Post test	16.5	4.9458		
Control	Pre test	3.923	1.8241	9.6905	S
	Post test	10.825	4.8826		

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

It is inferred from the above table that there is a significant difference between the pre test and post test scores of the experimental group and pre test and post test scores of the control group. While comparing the mean scores of pre test (3.435) and post test (16.5) of experimental group post test score is better than the pre test score. This shows that smart board instruction significantly enhance the achievement of the students. While comparing the mean scores of pre test (3.923) and post test (10.825) of control group post test score is better than the pre test score. This shows that traditional method of instruction effective even today. Hence there is significant difference between the performance among the control group and experimental group pre and post test score. So the null hypothesis is rejected.

H₀3: There exists no significant difference between the experimental and control groups in their pre test performance.

Table 5: Results of paired t-test between the mean scores of the Control and Experimental groups Pre test

Group	Test	Mean	SD	Paired t	Level of Significance
Experimental	Pre test	3.435	1.4060	1.6456	NS
Control	Pre test	3.923	1.8241		

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

It is inferred from the above table that there is no significant difference between the pre test scores of the experimental and control group. While comparing the mean scores of the experimental (3.435) and control (3.923) groups pre test score control group is better than the experimental group. This shows that homogeneity of the two groups during the pre test period. This indicates the systematic composition of both control and experimental group for experimentation purpose. Hence there is no significant difference between the the experimental and control groups in their pre test performance. So the null hypothesis is accepted.

H₀₄: There exists no significant difference in the performance among the experimental and control groups in their post test score.

Table 6: Results of paired t-test between the mean scores of the Control and Experimental groups Post test

Group	Test	Mean	SD	Paired t	Level of Significance
Experimental	Post test	16.5	4.9458	14.8191	S
Control	Post test	10.825	4.8826		

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

It is inferred from the above table that there is a significant difference between the post test scores of the experimental and control group. While comparing the mean scores of the experimental (16.5) and control group (10.85) experimental group is better than control group. This substantiates the validity of the smart board instruction over the conventional method of instruction. Hence there is significant difference between the performance among the control group and experimental group post test score. So the null hypothesis is rejected.

H₀₄: There exists no significant difference in the performance among the experimental and control groups in their gain score.

Table 7: Results of paired t-test between the gain ratio of the Control and Experimental groups

Group	Test	Mean	SD	Paired t	Level of Significance
Experimental	Post test	61.08	22.59	4.0455	S
Control	Post test	33.25	22.34		

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

It is inferred from the above table that there is a significant difference between the gain ratio of the experimental and control group. While comparing the mean scores of the gain ratio of the experimental group (61.08) and control group (33.25) experimental group gain ratio higher than the control group. This indicates the soundness of the technology in learning biology. Hence there is significant difference between the performance among the control group and experimental group gain ratio. So the null hypothesis is rejected.

Findings of the Study

1. Smart board instruction proves to be effective in learning biology at secondary school students.
2. There exist significant difference between pre test and post test mean scores of the control group. This indicates the effectiveness of convictional approach in teaching biology.
3. Experimental group differs in pre and post test mean scores. The post test mean scores are much higher than that of the pre-test scores of the group. This indicates the validity of the smart board instruction.
4. Control group and experimental group do not show any variation in their pre test performance. This shows homogeneity of the group before the experiment.
5. When compared with the control group, the performance of the experimental group in the post test performance is better. This reveals the effectiveness of smart board instructional approach.
6. When compared with the gain ratio, the experimental group gain ratio is better than the control group. This reveals that technology based teaching learning approach definitely motivate the students towards learning.

Implications of the Study

The present study was taken up in the context of smart board instruction in biology learning. The study highlights positive effects of smart board instruction over the conventional approach in fostering higher order thinking and learning biology among secondary school students. The study stresses the need to change the classroom

environment for promoting higher order thinking and learning biology by incorporating a collaborative learning atmosphere through a planned effort.

Conclusion

As the present study showed that the experimental group which was exposed to smart board technology showed significant improvement in achievement in biology compared to the control group which was taught through the conventional method. The result is indicated by the t value ($t = 14.8191$ at 0.05%). The result in present study is in agreement with that of Crystal (2012) who analysed the student learning with the help of technology, in his observations he found that student level of engagement increased along with use of technology in education. From this study it is inferred that technology helped to enrich content and support students learning as it was a crucial part of education. Discussions from the study suggested that the incorporation of the smart board technology into teaching had benefits such as increase in student's engagement, peer collaboration, and strengthening of understanding which resulted into stronger teaching and learning process.

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