

## A Study on Effectiveness of Educational Software on Achievement in Biology among XI Standard Students

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### Abstract

The instruction through Educational Software has been making wonders in the class room activities. 'Eureka Educational Software' has developed Educational Software in the name of "Design mate" for different subjects such as Mathematics and Biology from VI to XI. More animations and interactions are incorporated in this Software. The Investigator wanted to know, the effectiveness of the Eureka Educational Software on the Achievement in Biology. Hence the sample was aimed to study the Effectiveness of Educational Software on Achievement in Biology among the Students of Standard XI .The study belongs to an Experimental Research. The sample of the study based on the half -yearly performance of the students, they are divided into two groups. The total number of students 79, of which 37 belonged to Control Group and 42 belonged to Experimental Group. The Eureka Educational Software "Design mate" was the Dependent Variable and the Achievement in Biology was the Independent Variable. The developed Achievement Test in Biology by the Investigator was conducted before and after the treatment for both Control and Experiment Groups. Then the Investigator taught Biology through Educational Software to the Experimental Group. Similar topics in Biology were taught through Lecture Method to the Control Group. The collected data was analyzed by using different statistical techniques such as Mean, Standard Deviation and 't' test. The study found that the Achievement made through Educational Software by Experimental Group was significantly higher than the Control Group.

**Key Words:** Educational Software - animations - interactions - effectiveness

### INTRODUCTION

Computer Assisted Instruction (CAI) has emerged as an effective and efficient media of instruction in the advanced countries of the world. CAI is being used in the formal and non - formal educations at all levels. In India too computer has been introduced in most of the areas such as data processing, decision making, etc., It has impact on the working methods of research and development in the field of Biology and Technology. First CAI attempt was made around 1961 when University of Illinois produced Programmed Logic for Automatic Teaching Operation (PLATO). Hence, the use of computer in general education started from early studies. The Computer Assisted or Aided Instruction may be defined as the use of computer as an integral part of an instructional system, the learner generally engaging in two - way interaction with the computer via terminal.

"Design mate", is a Educational Software developed by Eureka Educational Software which is a 17 years old Multimedia Production House, involved into various activities like making of interactive presentation, animated films, music videos, special effects. They are the first people in India to do a full four minute animated music video where a live character interacts and dance with a computer generated character Anaida's " Hoo Halla Hoo". They received an award for Best Animation from Autodesk. Eureka Educational Software

developed 'Design mate', which were converting the entire textbooks into colourful 3D animated movies with interactive games and puzzles. Bringing a visually beautiful and interesting learning experience, enhancing the student's learning and retention capabilities. This Education Software covers Biology and Mathematics subjects from class VI to XII.

### **OBJECTIVES OF THE STUDY**

The objectives of the study are:

1. To find out the significant difference between the Pre-Test Scores of the Control and Experimental group.
2. To find out the significant difference between the Post-Test Scores of the Control and Experimental group.
3. To find out the significant difference between Control and Experimental group at the Pre- Test and Post-Test Scores.
4. To find out the effect of Educational Software on Achievement in Biology with respect to different variables such as of Gender, Caste and Biology Marks secured in Standard X.

### **HYPOTHESES**

The following hypotheses were formulated to realize the above objectives.

1. There is no significant difference between the Pre-Test and Post-Test Scores of the Control group and Experimental group.
2. There is no significant difference between the Control group and Experimental group at the Pre-Test and Post-Test Scores.
3. There is no influence of Gender, Caste and Biology Marks secured in Standard XI over the effect of Educational Software on Achievement in Biology.

### **NATURE OF THE RESEARCH**

The present investigation is Experimental in nature, because the investigators aimed to compare the Effectiveness of Teaching Biology to the XI Standard Students through Teaching and through Eureka Educational Software.

### **SAMPLE SELECTION**

The investigators selected XI Standard Students of Periyar Centenary Memorial Matriculation Higher Secondary School, K.K. Nagar Trichy to carry out the Experiment because the School has been posed with well equipped computer facilities. Based on the half - yearly performance of the Students, they are divided into two groups. The total number of students 79, of which 37 belonged to Control Group and 42 belonged to Experimental Group.

### **DEVELOPMENT OF TOOL**

The Eureka Educational Software, 'Design mate' was the Dependent Variable and the Achievement in Biology was the Independent Variable. The Eureka Educational Software was given to the Post Graduate Teachers who are handling Biology in the nearby schools for content validity. The opinion of them was highly satisfactory.

The developed Achievement test questionnaires were framed by the investigator with the guidance of the subject experts covering the following items such as Knowledge, Understanding, Application and Skill. These questionnaires were validated by Test-Retest method among the Student of XI Standard. The obtained 'r' value 0.74 shows that the tool is highly valuable. Thus the Validity and Reliability of the tool were established. The developed Achievement Test in Biology was conducted before and after the treatment for both Control

and Experiment Groups. Then the Investigators taught Biology through Educational Software to the Experimental Group. Similar topics in Biology were taught through Lecture Method to the Control Group.

After the finalization of the tool, the investigators had given 40 items to the Students. Each item was in the form of multiple choices with an incomplete statement. For each item four alternative answers were given. Only one was the correct answer. The Students were requested to write the response in the form of correct alpha bates a, b, c and d. Each response carries 1 mark.

**DATA ANALYSIS**

Thus the data collected in this manner undertake analysis by using different statistical technique. Mean and SD were calculated for each Variables to calculate ‘t’ values which is the test of significance of the difference between two means. The following tables contained the data regarding the Control group and Experimental group with the following variables such as Gender, Caste and Science Marks secured in Standard X (SMSX).

*Table 1: Mean and SD of the Student towards Achievement Score for different Category of Control Group*

Sl.No	Variable	Category	Sample Size	Mean		SD	
				Pre-Test	Post-Test	Pre-Test	Post-Test
01	Gender	Boys	18	20.83	65.97	9.09	13.31
		Girls	19	15.53	62.5	12.05	17.37
02	Caste	OC/BC	23	22.07	65.43	11.48	16.57
		MBC/SC/ST	14	11.61	62.14	6.09	13.69
03	SMSX	Above 70%	21	21.55	68.21	10.73	11.34
		Below 70%	16	13.59	62.66	9.72	16.31
04	<b>Total</b>		37	18.11	64.19	11.03	15.63

From the above Table 1 it is revealed that the average Mean Score of the Student towards Achievement Score for different category is 18.11 at Pre-Test level and 64.19 at Post-Test level which shows the effectiveness of Lecture Method. Moreover at the Pre-Test level the minimum score at the 11.61 and the maximum score is 22.07. At the Post-Test level 62.14 was the minimum score and 68.21 was the maximum score.

*Table 2: Mean and SD of the Student towards Achievement Score for different Category of Experimental Group*

S.No	Variable	Category	Sample Size	Mean		SD	
				Pre-Test	Post-Test	Pre-Test	Post-Test
01	Gender	Boys	21	25.6	81.67	9.66	10.24
		Girls	21	13.81	70.12	7.82	10.62
02	Caste	OC/BC	26	21.63	76.44	10.56	11.99
		MBC/SC/ST	16	16.56	74.68	9.84	12.58
03	SMSX	Above 70%	18	18.89	78.89	10.28	9.33
		Below70%	24	19.9	73.65	11.24	13.11
04	<b>Total</b>		42	19.70	75.89	15.63	11.93

Above Table shows that the average Mean Score of the Student towards Achievement Score for different category is 19.70 at Pre-Test level and 75.89 at Post-Test level which shows the Eureka Educational Software has considerable effect in Teaching Biology. Moreover at the Pre-Test level the minimum score is 13.81 and the maximum score is 25.6. At the Post-Test level 70.12 is the minimum score and 81.67 is the maximum score.

**Table 3:** Significant Difference between the Mean scores of Control Group and Experimental Group at Pre -Test level

Group	N	Mean	SD	't' value	Remarks
Control	37	18.11	11.03	0.661	NS
Experimental	42	19.70	10.58		

NS: Not significant

The above Table 3 reveals that the obtained mean Achievement Scores in Biology of the Control group and Experimental group are more or less same. The calculated 't' value also indicates there is no significant difference at 5% level between Control group and Experimental group at Pre-Test level. Hence, the stated Null Hypothesis that, there is no significant difference between the mean Student Achievement Scores in Biology of the Control group and Experimental group at the Pre-Test level is accepted.

**Table 4:** Significant Difference between the Mean scores of Control Group and Experimental Group at Post-Test level

Group	N	Mean	SD	't' value	Remarks
Control	37	64.19	15.63	4.01	S
Experimental	42	75.89	11.93		

S: Significant

It is evident from the Table 4 that the obtained mean value of Experimental group is greater than the control group. The calculated 't' value shows that there is significant difference between the Control group and Experimental group. Hence the stated Null hypothesis that there is no significant difference between Student Achievement Scores in Biology of Control group and Experimental group at Post-Test level is rejected.

**Table 5:** Influence of various Categories over the performance of the Control Group and Experimental Group at Pre-Test level

Category	Group	N	Mean	SD	't' value	Remarks
Boys	Control	18	20.83	9.09	1.59	NS
	Experimental	21	25.6	9.66		
Girls	Control	19	15.53	12.05	0.54	NS
	Experimental	21	13.81	7.82		
OC/BC	Control	23	22.07	11.48	0.14	NS
	Experimental	26	21.63	10.56		
MBC/SC/ST	Control	14	11.61	6.09	1.68	NS
	Experimental	16	16.56	9.84		
Above 70%	Control	21	21.55	10.73	0.78	NS
	Experimental	18	18.89	10.28		
Below 70%	Control	16	13.59	9.72	1.88	NS
	Experimental	24	19.9	11.24		

The above Table 5 shows that the calculated ‘t’ values of Control group and Experimental group at the Pre-Test level at various Categories has no significant difference at 5 % level. Hence it is concluded that Gender, Caste, SMSX has no influence over the performance of Control group and Experimental group at the Pre-Test level. Therefore, the stated Null hypothesis that, there is no influence of Gender, Caste, SMSX over the performance of Student Achievement Scores in Biology of the Control group and Experimental group at the Pre-Test is accepted.

**Table 6:** Significant Difference between the Mean scores of Pre-Test and Post-Test for Control Group

Test	N	Mean	SD	‘t’ value	Remarks
Pre	37	18.11	11.03	<b>14.62</b>	<b>S</b>
Post	37	64.19	15.63		

It is evident from the Table 6 that the obtained mean value of Post-Test is greater than the Pre-Test. The calculated ‘t’ value shows that there is significant difference between the Pre-Test and Post- test conducted for the Control group. Hence, the stated Null hypothesis that there is no significant difference between Student Achievement Scores in Biology for the Pre-Test and Post-Test of Control group is rejected.

**Table 7:** Significant Difference between the Mean scores of Pre-Test and Post-Test for Experimental Group

Test	N	Mean	SD	‘t’ value	Remarks
Pre	42	19.70	10.58	<b>22.61</b>	<b>S</b>
Post	42	75.89	11.93		

The above Table 7 reveals that the obtained mean Student Achievement Scores in Biology of the Post-Test is greater than Pre-Test of Experimental group. The calculated ‘t’ value also indicates there is significant difference at 5% level between Pre-Test and Post-Test of Experimental group. Hence the stated Null Hypothesis is that, there is no significant difference between the mean Student Achievement Scores in Biology for the Pre-Test and Post-Test of Experimental group is rejected.

**Table 8:** Influence of Gender over the performance of the Control Group and Experimental Group at Post-Test level

Gender	Group	N	Mean	SD	‘t’ value	Remarks
<b>Boys</b>	Control	18	65.97	13.31	<b>4.02</b>	<b>S</b>
	Experimental	21	81.67	10.24		
<b>Girls</b>	Control	19	62.5	17.37	1.52	NS
	Experimental	21	70.12	10.62		

The above Table 8 shows that the calculated ‘t’ values of Control group and Experimental group at the Post- Test level of the Boys has significant difference between the mean scores at 5 % level. The above table also reveals that the calculated ‘t’ values of Control group and Experimental group at the Post-Test level of the Girls has no significant difference between the mean scores at 5 % level. Therefore the stated Null hypothesis is that, except Boys the Girls has no influence over the performance of Student Achievement Scores in Biology of the Control group and Experimental group at the Post-Test is accepted.

**Table 9:** Influence of Caste over the performance of the Control Group and Experimental Group at Post-Test level

Caste	Group	N	Mean	SD	't' value	Remarks
OC/BC	Control	23	65.43	16.57	2.63	S
	Experimental	26	76.44	11.99		
MBC/SC/ST	Control	14	62.14	13.69	2.62	S
	Experimental	16	74.68	12.58		

The calculated 't' values from the above Table 9 reveals that Control group and Experimental group at the Post-Test level of the Caste has significant difference between the mean scores at 5 % level. The mean values of the above table shows that there is influence of caste over the performance of Control group and Experimental group at the Post-Test level. Hence the stated Null Hypothesis is that, there is influence of caste over the performance of Student Achievement Scores in Biology of the Control group and Experimental group at the Post-Test is rejected.

**Table 10:** Influence of Students secured Biology Marks in Standard X over the performance of the Control Group and Experimental Group at Post-Test level

SMSX	Group	N	Mean	SD	't' value	Remarks
Above 70%	Control	21	68.21	11.34	3.43	S
	Experimental	18	78.89	9.33		
Below 70%	Control	16	62.66	16.31	2.45	S
	Experimental	24	73.65	13.11		

It is evident from the Table 10 that the obtained mean value of Experimental group is greater than the Control group. The calculated 't' value shows that there is significant difference between the Control group and Experimental group at the Post-Test level with respect to SMSX at 5 % level. The mean values of the above table shows that there is influence of SMSX over the performance of Control group and Experimental group at the Post-Test level. Hence, the stated Null Hypothesis is that, there influence of SMSX over the performance of Student Achievement Scores in Biology of the Control group and Experimental group at the Post-Test is rejected.

**FINDINGS & DISCUSSION**

The salient findings of the study are i) the Eureka Educational Software has considerable effect in Teaching Biology, ii) there is a significant difference between the mean scores of Pre-Test and Post-Test level for both Control Group and Experimental Group, iii) Gender, Caste and SMSX has no influence over the performance of Student Achievement Scores in Biology of the Control group and Experimental group at the Pre-Test level, iii) Caste and SMSX has influence over the performance of Student Achievement Scores in Biology of the Control group and Experimental group at the Post-Test level and v) Experimental group Boys show significant higher mean scores in the Achievement Scores than the Control group, but Girls has no influence over the performance of Student Achievement Scores in Biology of the Control group and Experimental group.

While conducting the Pre-Test it was observed that both Control and Experimental groups possess similar level of pervious knowledge on the selected contents in Biology. The same trend was observed with respect to different variables such as Gender, Caste and SMSX. When the analysis was made between Pre-Test and Post-Test Scores of the Control and Experimental groups it was observed that both methods of teaching such as traditional Lecture Method and Educational Software method, Educational Software method is found to be effective method.

While comparing the Mean Achievement Scores between Control and Experimental group it was observed that students who learnt through Eureka Educational Software score significant higher than the Control group Students. The significant difference of the Experimental group may be due to the reason that the Eureka Educational Software has incorporated with interactive presentation, animated movies, special effects and puzzles, these special features might have attracted the Experimental Students to score more marks.

It is interesting to note when comparing the Achievements of Girls Students between Control and Experiment groups the effectiveness was not significant as the Girls Students might not show interest towards Computer Assisted Instruction at XI Standard level.

### **EDUCATION IMPLICATIONS**

This Experimental Study established the positive result on Achievement, so the Educational Institutions may be encouraged to use the Computer Assisted Instruction for the Teaching Learning process. Subject experts may concentrate on preparing Software packages in all the units of the all the subjects and distribute them to Schools. This may make the Students more interest towards Educations and it also make the Teachers to save their time.

### **CONCLUSIONS**

Eureka Educational Software is more suitable method for teaching Biology at XI Standard level. Eureka Educational Software is the one of the best method in the Teaching Learning process of Biology for XI Standard Students without considering the individual variables such as Gender, Caste and SMSX this is due to the subject contents are taught through more animations and interactions. Due to this Educational Software Students concentrations increased and they easily understood the subject contents. At the Post-Test level, the Girls show no significant difference in the Achievement Scores in Biology of the Control group and Experimental group.

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