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Effectiveness Of Educomp Smartclass In The Achievement Of Physics At Secondary Level

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Abstract

Learning of science subjects must be made interesting to students. The ideas and concepts conceptualized from direct or vicarious experiences will have more retention and utility. The effective learning is an outcome of the better teaching methods. Interactive White Boards are the new boon for the process of teaching and learning. Through that the content presentation has become more engaging. The quality and interactiveness of the content presented through an IWB determine the effectiveness of it on learning achievement. This study is an attempt to find the effectiveness of Educomp Smartclass in the achievement of physics at secondary level of education in Kerala. It follows the non-equivalent control group pre-test post-test design of the experimental research.

INTRODUCTION

Smartclass methodology is a technology oriented initiative for schools. It provides tools and content for interactive self-paced learning by students as well as rich-media presentations for teacher-led class room learning. Smartclass method is those forms of teaching in which instruction takes place on group basis. Smartclass method is valuable for teachers and students over the web, and can also be installed on the school's local server for faster and more reliable access to the content.

Alhayek (2003) mentioned that computer technology has been increasingly used in educational process at all levels, it becomes an integral part of most academic majors, and has changed the way of teaching and learning process. Computers and related technologies are now in almost every school across the nation. State reform efforts include the integration of technology skills a separate standard for students to achieve.

Psychology reveals that no two individuals are alike. A class is a cluster of students of different capabilities, interest, aptitudes and of course from varying background. There are fast learners as well as slow learners. All are due to social cultural background and psychological factors.

Modern educationists are externally on the lookout for innovative time saving and effective methods. As the numbers of students are large, it is not practicable to prepare materials to suit everyone's need. This difficulty can be overcome by teaching using Smartclass method.

The content available consists of pedagogically sound and visually rich curriculum resources mapped and customized as per the schools' scheme of work. This content can be streamed into the classroom and shown by teachers in the classroom to make abstract concept real.

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Teachers may also include their own learning materials for use by their students. The optional Student Assessment System (SAS) engine available with Smartclass method supports creation and management of question bank and e-tests. With this tool, teachers will be able to create multiple choice questions and deliver them to students.

Smartclass method is a model that aims to increase the quality of education and research via expanding the interaction between schools using video conference and internet technologies. Through the Educomp Smartclass method of teaching the improvement of teaching effectiveness and productivity in the class is possible. It is helped the teachers to present abstract and difficult concepts more vividly in the classrooms. Through Educomp Smartclass, learning becomes an enjoyable experience for students. This method improves the academic performance of students. It provides provisions for formative assessment of learning outcomes in the class.

OBJECTIVES OF THE STUDY

1. To find out the effectiveness of Educomp Smartclass on achievement in Physics of students at secondary level.
2. To find out the effectiveness of activity oriented method of teaching on achievement in Physics of students at secondary level.
3. To compare the effectiveness of Educomp Smartclass on achievement in Physics of students at secondary level with that of the activity oriented method of teaching.

HYPOTHESES OF THE STUDY

1. The achievement in Physics of the students taught using Educomp Smartclass is significantly higher than those who taught through activity oriented method of teaching.

METHODOLOGY IN BRIEF

The present study is an educational experiment conducted on a sample of 70 students (35 each) of two divisions in standard VIII of a government aided high school in Malappuram district of Kerala. It was practically difficult in a school situation to upset class schedules to greater subjects for obtaining a sufficiently large sample or to reorganize classes in order to employ organization for getting equivalent experimental and control groups within the limited time. Therefore the investigator decided to select non-equivalent control group pre-test post-test design for the study and he conducted the experiment in the non-equivalent intact class room groups. Pre-test and post-test are given to both the experimental and control groups. Both the groups are taught the topics motions and force from the VIII standard of Kerala state school curricula. In order to compensate for the lack of equivalency between two groups, the investigator used the statistical technique called Analysis of Covariance (ANCOVA) to analyze the scores obtained by the students of both experimental and control groups.

Variables:

Independent variables:

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1. Teaching based on Educomp Smartclass lessons
2. Teaching based on Activity Method

Dependent variable:

Achievement in Physics

Tools Used:

1. Lesson transcripts based on Educomp Smartclass lessons
2. Lesson transcripts based on the activity oriented method
3. Achievement test

ANALYSIS AND INTERPRETATION OF THE DATA

The pre-test scores obtained by the students in both the groups were organized in to frequency tables and then the arithmetic mean, median, mode, standard deviation, quartile deviation, skewness and kurtosis are calculated in order to get a clear picture of the performance of both the groups.

The frequency distribution of scores obtained from the Experimental group, together with the statistics calculated and values obtained is given in table 1.

Table 1. Frequency Distribution, Measures of Central Tendency, Measures of Dispersion, Skewness and Kurtosis of Pre-test Scores of Experimental Group

Scores in class interval	Frequency	Statistics calculated	Value Obtained
0-1	1	Mean	2.11
1-2	14	Median	2
2-3	15	Mode	2
3-4	4	Standard Deviation	0.9187
4-5	1	Quartile Deviation	0.5982
		Skewness	0.3732
		Kurtosis	0.3750

The maximum possible score of the test is 25. The mean score of the Experimental group in the pre- test is 2.11 and median is 2. It indicates the low performance of the group. The standard deviation and quartile deviation of the scores are 0.9187 and 0.5982. The distribution is positively skewed since skewness is 0.3732. So we can conclude that the students who scored

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higher marks are comparatively lower than those who scores low marks in the group. The curve is platykurtic because kurtosis is 0.375, which is greater than 0.263.

The frequency distribution of scores obtained from the Control group, together with the statistics calculated and values obtained is given in table 2.

Table 2. Frequency Distribution, Measures of Central Tendency, Measures of Dispersion, Skewness and Kurtosis of Pre-test Scores of Control Group

Scores in class interval	Frequency	Statistics calculated	Value Obtained
0-1	1	Mean	2.09
1-2	15	Median	2
2-3	13	Mode	2
3-4	6	Standard Deviation	0.9062
		Quartile Deviation	0.632
		Skewness	0.2838
		Kurtosis	0.3750

The maximum possible score of the test is 25. The mean score of the Control group in the pre-test is 2.09 and median is 2. It indicates that the performance of the group is low. The standard deviation and quartile deviation of the scores are 0.9062 and 0.632. The distribution is positively skewed since skewness is 0.2838. So we can conclude that the students who scored high marks were comparatively lower in number than those who scored low marks. The curve is platykurtic because kurtosis is 0.3750, which is greater than 0.263.

Comparison of pre-test scores of students in the experimental and Control groups

The maximum score of the test is 25. The low value of mean and median indicates that students in experimental and Control groups did not achieve high scores in the pre-test.

The arithmetic mean of the Experimental group is 2.11 and that of Control group is 2.09. The difference between the means is 0.02. This shows that the two groups do not differ much in their achievement.

The low values of quartile deviation and standard deviation for both groups show that there are only very small variations in the scores of the students.

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The skewness obtained for Experimental group is 0.3732 and that of Control group is 0.2838. The positive values of skewness indicate that the students who scored high marks are lower in number than those who scored low marks in the group.

Significance of difference between the pre-test means of the two groups

The significance of the difference between the mean score of pre-test obtained by the experimental and Control groups were found by calculating the critical ratio (C.R). The data and the result are given in table 3.

Table 3. Mean, Standard Deviation, Critical Ratio and the Result of the Test of Significance Difference between the Means of the Pre-test Scores of Experimental and Control Groups

Groups	Number of students	Mean	SD	CR	Level of significance
Experimental	35	2.11	0.918	0.1310	p>0.01
Control	35	2.09	0.906		

From the table it is inferred that the two groups, experimental and control do not differ significantly in their pre-test scores (since the calculated value 0.1310 is less than the table value at 0.01 and 0.05 level).

Students' Achievement in Physics of Experimental and Control groups After the Experiment

A post- test was administered to both the experimental and Control group, to measure the achievement after the experiment. The scores obtained by the students, were condensed in to frequency tables and the arithmetic mean, median, mode, standard deviation, quartile deviation, skewness and kurtosis are calculated in order to get a clear picture of the performance of both the groups. The frequency distribution of the scores obtained by the students is given below in the tables 4 and 5 together with the statistics calculated and the values obtained. The frequency distribution of the post test scores of both the groups are represented graphically.

Table 4. Frequency Distribution, Measures of Central Tendency, Measures of Dispersion, Skewness and Kurtosis of Post-test Scores of Experimental Group

Scores in class interval	Frequency	Statistics calculated	Value Obtained
5-10	0	Mean	17.11
10-15	9	Median	18
15-20	19	Mode	18
20-25	7	Standard Deviation	2.9835

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		Quartile Deviation	2.25
		Skewness	-0.8906
		Kurtosis	0.2961

The maximum possible score of the test is 25. The mean score of the Experimental group in the post test is 17.11 and median is 18. It indicates that the performance of the group is good. The standard deviation and quartile deviation of the scores are 2.9835 and 2.25. The distribution is negatively skewed since skewness is -0.8906. So we can conclude that the students who scored high marks were comparatively large in number than those who scored low marks .The curve is platy kurtic because kurtosis is 0.2961, which is greater than 0.263.

Table 5. Frequency Distribution, Measures of Central Tendency, Measures of Dispersion, Skewness and Kurtosis of Post-test Scores of Control Group

Scores in class interval	Frequency	Statistics calculated	Value Obtained
5-10	2	Mean	12.91
10-15	24	Median	13
15-20	9	Mode	12
20-25	0	Standard Deviation	2.5227
		Quartile Deviation	1.75
		Skewness	-0.1019
		Kurtosis	0.2652

The maximum score of the test is 25. The mean score of the Control group in the post test is 12.91 and median is 13. It indicates that the performance of the group is good. The standard deviation and quartile deviation of the scores are 2.5227 and 1.75. The distribution is negatively skewed since skewness is -0.1019. We can conclude that the students who scored high marks were comparatively lower number than those who scored low marks. The curve is platykurtic because kurtosis is 0.2652, which is greater than 0.263.

Comparison of post-test scores of students in the experimental and Control groups

The maximum score of the test is 25. The arithmetic mean of the Experimental group is 17.11 and that of Control group is 12.91. The difference between the means is 4.2.This shows that the

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students in the Experimental group achieved high scores in the post test when compared with the performance of the Control group.

The moderate value of standard deviation and quartile deviation of both the groups reveal that the scores do not vary much from the average.

The skewness obtained for the scores of achievement test for Experimental group is -0.8906.The negative symbol indicates that the number of students who scored high marks is more than those who scored low marks. The skewness obtained for the scores of achievement test for Control group is -0.1019. Here the negative value indicates the number of students who scored high marks is more than those who scored low marks in the group.

Significance of difference between the post-test means of the two groups

The significance of the difference between the mean score of post-test obtained by the experimental and Control groups were found by calculating the critical ratio (C.R). The data and the result is given in table 6.

Table 6. Mean, Standard Deviation, Critical Ratio and the Result of the Test of Significance Difference between the Means of the Post-test Scores of Experimental and Control Groups

Groups	Number of students	Mean	SD	CR	Level of significance
Experimental	35	17.11	2.9835	6.3596	p<0.01
Control	35	12.91	2.5227		

From the tabled value it is inferred that the two groups, experimental and Control groups differ significantly in their post-test scores since the calculated value 6.3596 greater than the table value at both levels.

Genuineness of the Difference in Performance of the Groups

The analysis of the pre-test scores of the experimental and Control group showed that they do not differ significantly in the initial academic abilities. After the experiment it was found that the Experimental group was better than the Control group, in achievement. So the researcher concluded tentatively that the teaching through Educomp Smartclass is more effective than the Activity Oriented Method. But it cannot be conclusively said that both the groups differ significantly by simply comparing the post test scores. It is difficult to check whether the difference between the pre-test and post-test scores results from the experimental factor or from other variables. So it became necessary that the scores be analysed using the techniques of Analysis of Covariance (ANCOVA).

Comparison of Effectiveness of Educomp Smartclass with Activity Oriented Method (Using ANCOVA)

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The scores of the experimental and Control group were subjected to Analysis of Covariance to determine the effectiveness of Educomp Smartclass based teaching over Activity Oriented Method.

Before proceeding to ANCOVA, ANOVA was done. Total sum of squares, mean square variance and F-ratio for the pre-test and post test scores of the experimental and Control group were computed. The data is given in table 7.

Table 7. Summary of ANOVA of Pre-test and Post-test scores of Experimental and Control Groups

Source of variation	df	SSx	SSy	MSx(vx)	MSy(vy)
Among means	1	0.01	308.70	0.01	308.70
Within Group	68	44.69	534.29	0.66	7.86

Fx= 0.02

Fy = 39.29

From Table F for degree of freedom (1, 68)

F at 0.05 level = 3.92

F at 0.01 level = 6.85

The obtained Fx and Fy ratio were tested for significance. The table value of F-ratio for (1,68) is 3.92 at 0.05 level (Fx= 0.02, $p>0.05$).Since the F test applied to the initial (x)scores Fx falls for short or significance at 0.05 level; it is clear that the x mean do not differ significantly. The table value of F ratio for df (1,68) is 6.85 at 0.01 level. So the obtained Fy is significant (Fy = 39.29, $p<0.01$).

Since the F test applied to the final(y) scores Fy falls beyond the 0.01 level of significance, it can be tentatively concluded that there is significant difference between the y means of the two groups.

The total sums of squares of adjusted mean square variance for post-test were computed. F – Ratio was calculated. The final Y scores were corrected for difference in initial X scores. For that the SSy has been adjusted for any variability in Y, contributed by X. The adjusted sums of squares for Y (SSy) were computed and the F-ratio (Fy.x) was calculated. The summary of ANCOVA of pre-test and post-test scores of students in Experimental and Control groups is given in table 8.

Table 8. Summary of ANCOVA of Pre-test and Post-test Scores of Students in the Experimental and Control Groups

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Source of variation	df	SSx	SSy	SSx.y	SSy.x	MSy.x (vx.y)	SDy.x
Among means	1	0.01	308.70	2.10	307.34	307.34	2.81
Within Groups	68	58.29	534.29	17.80	528.85	7.89	

Fy.x= 38.94

From the table of F for degree of freedom (1, 67)

F at 0.05 level=3.92

F at 0.01 level=6.84

The calculated value Fy.x was tested for significance. The calculated Fy.x ratio for (1,67) is 38.94 at 0.01 level, the obtained Fy.x ratio is significant (Fy.x=38.94 ;P<0.01) it is clear from this that the two final means which depend upon the experimental and control variable differ significantly after they have been adjusted for initial differences.

Comparison of Adjusted Means

The adjusted means of post-test scores (Y means) of students in the Experimental and Control groups were computed. The differences between the adjusted y means were tested for significance. The data for adjusted means for pre-test scores of students in the Experimental and Control group are given in table 9.

Table 9. Data for Adjusted Means of Post-test Scores of Students in Experimental and Control Groups

Group	**N**	**Mx**	**My**	**My.x(Adjusted)**
Experimental	35	2.11	17.1	17.11
Control	35	2.09	12.9	12.91
General Means	70	2.10	15.01	-

SEm between adjusted mean is 0.67

Calculated t value is 6.23

From table of t for degrees of freedom 67

t at 0.05 level=2.00

t at 0.01 level=2.65

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Since the calculated value is greater than the tabled value, the performance of the two groups differs significantly. Therefore Instruction using Educomp Smartclass can be considered as more effective when compared to the activity oriented method of teaching.

CONCLUSION

From the findings of this study, it has been concluded that teaching and learning by using Educomp Smartclass lessons are effective for science subjects at secondary schools than teaching and learning through activity oriented method. This difference in achievement may be due to the impact of content provided by the Educomp Smartclass. They are providing both the hardware (interactive White Board) and the software (content as well as interactive software for IWB).

REFERENCES

Books

Best, John W., & Kahn, James V. (2006*). Research in Education*. New Delhi: Prentice Pearson/Allyn and Bacon.

Betcher, Chris, & Lee, Mal. (2009). The Interactive Whiteboard Revolution: Teaching With Iwbs. Australia: ACER Press.

Corwell, Pramcos, C. (1960*). Sampling method*. In Chester W. Harris (Ed.), Encyclopedia of Educational Research. New York: Macmillan.

Garret, H.E. (1981). *Statistics in Psychology and Education*. Bombay; Vakils, Feffer and Simons LTD.

Kent,Peter (2008). *Interactive Whiteboards: A Practical Guide for Primary Teachers*.Australia: Macmillan Education.

Vardhini, V.P. (1982). *Development of a multimedia to instructional for teaching science of secondary level.* In M.B. Buch (Ed.), *Fourth Survey of Research in Education.*New Delhi: NCERT.

Articles Published in Journals

Blau, Ina. (2011).Teachers for "Smart Classrooms": The Extent of Implementation of an Interactive Whiteboard-based Professional Development Program on Elementary Teachers' Instructional Practices. *Interdisciplinary Journal of E-Learning and Learning Objects*, Vol 7.

Gunn, Alan., & Pitt, J. Sarah.(2003).The effectiveness of computer-based teaching packages in supporting student learning of parasitology. *BEE-j*, Vol.1(1)

Lazarowitz, R., & Huppert, J. (1993). Science process skills of 10^{th} -grade biology students in a computer-assisted learning setting. *Journal of Computing In Education*,Vol.25, 366-382.

Pyatt, Kevin.,& Sims, Rod. (2012). Virtual and Physical Experimentation in Inquiry-Based Science Labs: Attitudes, Performance and Access. *Journal of Science Education and Technology*, v21 n1 p133-147 Feb 2012

ISSN: 0976-5425
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Williams, Brett, & Boyle, Malcolm. (2011).Undergraduate Paramedic Students' Attitudes to E-Learning: Findings from Five University Programs. *Research in Learning Technology*, Vol. 19 n2 p89-100 Jul 2011