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ISSN 2249-3352 (P) 2278-0505 (E)
Cosmos Impact Factor-5.86

EFFECTIVENESS OF ACTIVITY BASED LEARNING ON CONCEPT UNDERSTANDING IN SCIENCE AMONG GRADE IV STUDENTS IRRESPECTIVE OF GENDER

[1]Bharati Ajay Jadhav, [2]Dr. V.K.Sharma
[1]Research Scholar, [2]Supervisor
[1-2] Department of Education, NIILM University, Kaithal, Haryana

Abstract:

This research work defines and investigates the effects of Activity Based Learning (ABL) on the understanding of concepts of science in the boys and girls of grade IV.It also considers the difference in achievement of boys and girls of grade IV in science.The newly designed method using activities is applicable to all students irrespective of any board in India Different Experiments were conducted to teach the concepts in science under different conditions of various school environments. The schools of Rural and Urban areas were taken under consideration.

Keywords- ABL (Activity Based Learning), student's achievement, gender bias

The research is a pre-test and post-test equivalent group design for that, a sample of 100 students each from 3 different schools was selected randomly from grade IV. Each of the 3 schools namely Gurukul Academy Day Care School Ponda Goa (following CBSE Curriculum), Holy Faith English Medium School (following State Board syllabus) at post Rukadi andNobel English Medium School (following State Board syllabus) at post Alate Taluka Hatkanangale in Maharashtra constituted the population A sample of 60 students of grade IV, 30 boys and 30 girls were thus selected and Control group and Experimental Group was made of girls as well as boys of 15 students each in respective groups, in each of the 3 schools taken for Study.

The Experimental group of boys/girls were taught science subject with relevant topic through Activity Based Learning method whereas Control group of boys and girls were taught same science topics with traditional "chalk and talk" method.

Total of 4 chapters were selected from the grade IV science textbook and were taught for 6 weeks in three different selected Schools.

A post-test was conducted at the end of the teaching in both the Experimental Group and Control group boys and girls. The results showed that the Experimental group of boys and girls performed better than the Control groups of respectively boys and girls.

More over no significant difference was found between achievements of boys and girls in experiment groups.The study shows that there is no gender bias on understanding of concepts in science while teaching through activity-based methods.

Objectives of the study

To examine the effect of activity-based learning in concept understanding in science on boys of grade IV

To examine the effect of activity-based learning in concept understanding in science on girls of grade IV

To compare the achievement of boys and girls in science from grade IV.

Introduction

The present study is to see how we can bring about improvement in the education system in the primary level. This study compares grasping ability of boys and girls through activity-based learning by using a variety of methods to make learning more meaningful and interesting for students irrespective of gender.

The present research was conducted to find out whether there is any difference in the achievement of boys and girls when taught using activities.

This will be useful for teachers to understand that irrespective of the gender of the students ABL is equally effective on boys as well as girls in the learning concepts in science. Both boys as well as girls can improve equally when taught using ABL as compared to traditional methods while teaching science concepts of grade IV. The notion that girls perform less than boys or visa-versa is proved wrong. The achievement in the science of grade IV is not based on the gender of the student**.**

Methodology: The design of the study conducted was pre-test and post-test equivalent group.

Population: All boys and girls studying in grade IV of Gurukul Academy Day Care School Ponda Goa, Holy Faith English Medium School at post Rukadi and Nobel English Medium School at post Alate Taluka Hatkanangale were population of this study.

Sample

A group of 100 students was selected randomly from grade IV. From among them, 60 students, 30 boys and 30 girls were selected based on the achievements of the pre-test conducted on them.Out of the 30 boys Control group /Experimental group of 15 boys each respectively were made. Similarly, out of 30 girls Control group/Experimental group of 15 girls each respectively were made.The two groups were made ensuring that the boys in Control Group / Experimental Groups have scored equally. Similarly, the girls in Control Group / Experimental Group also were distributed equally based on their scores. In this way two equivalent group in

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ISSN 2249-3352 (P) 2278-0505 (E)
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terms of concept understanding were formed. Thus, four groups were made Control Group/ Experimental Group for boys and girls each consisted of 15 students

Research Instrument

Pre-test and post-test were research instruments in this study.

The teachers developed a pre-test consist of 40 items as per the grade level of the students in the Science subject. To develop a reliable and valid test senior teachers /educationist and science teachers were consulted.

Keeping their viewpoints, changes were made to adjust the validity and difficulty level.

The post-test was prepared after selecting 4 topics from grade IV General Science textbook

1 More About Flowers

2 More about Insects

3 Our Teeth

4 Air Pollution

The post-test was prepared which consisted of 40 questions based on several competencies such as understanding, knowledge, application, skill based and so on.

Procedure

The present study was a Quasi experimental method. A population of 100 students was randomly selected from grade IV in each of the 3 selected schools Gurukul Academy Day Care School Ponda Goa, Holy Faith English Medium School at post Rukadi and Nobel English Medium School at post Alate Taluka Hatkanangale.

All students were given the same Pre-test prepared by the teachers of grade IV. The question paper of 40 marks based on the concepts in science from grade 1 to 4 was prepared. The question paper was checked and approved by the senior teachers of science of Gurukul academy daycare school Holy Faith English Medium School and Nobel English Medium School respectively.

From among 100 students which formed the sample population for study, 30 girls and 30 boys were selected based on the pre-test scores. The students were distributed into four groups, 2 groups of boys and 2 groups of girls 15 each respectively. The researcher ensured that the scores of the boys and girls selected were the same thus ensuring that the performance level of boys and girls in the sample population are the same.

The two groups of boys were formed, the Control Group and the Experimental Group of 15 students each.

Similarly 2 groups of girls were formed, the Control group and the Experimental group of 15 students each.

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UGC Approved Journal

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4 topics from grade IV science textbook were selected and lesson plans were prepared by the teachers. One group, Control group were taught using Traditional method that is "chalk and talk" and the Experiment group was taught the topics using Activity Based Learning such as hands-on Experience, discussions, Projects, Assignments so on for 6 weeks in each of the boys and the girl's group.

This was done under supervision of the researcher who guided the teachers as and when required. After 6 weeks Post-test was administered to find out the achievements of boys in the Control group and Experimental group and the girls in the Control group and Experimental group respectively

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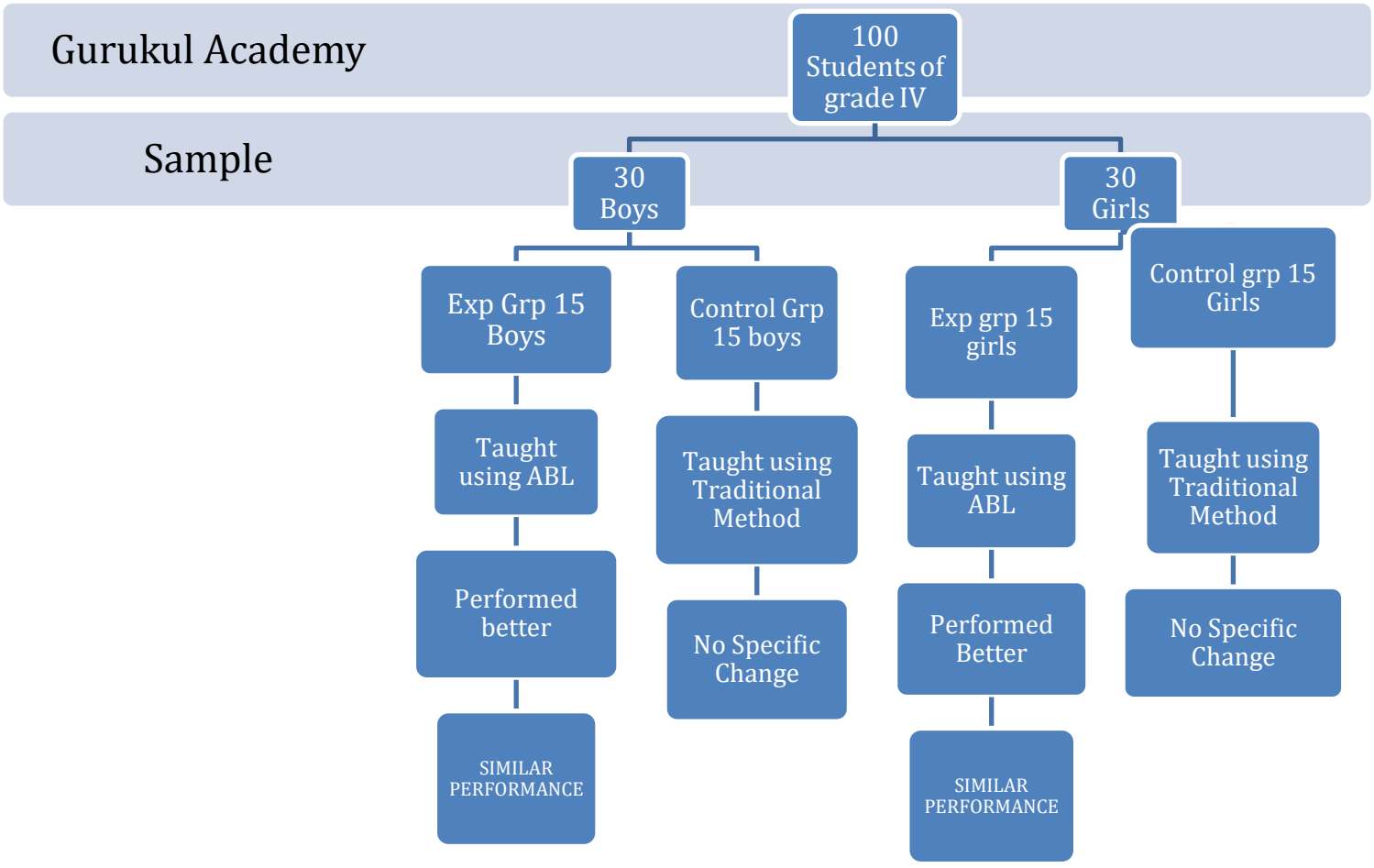

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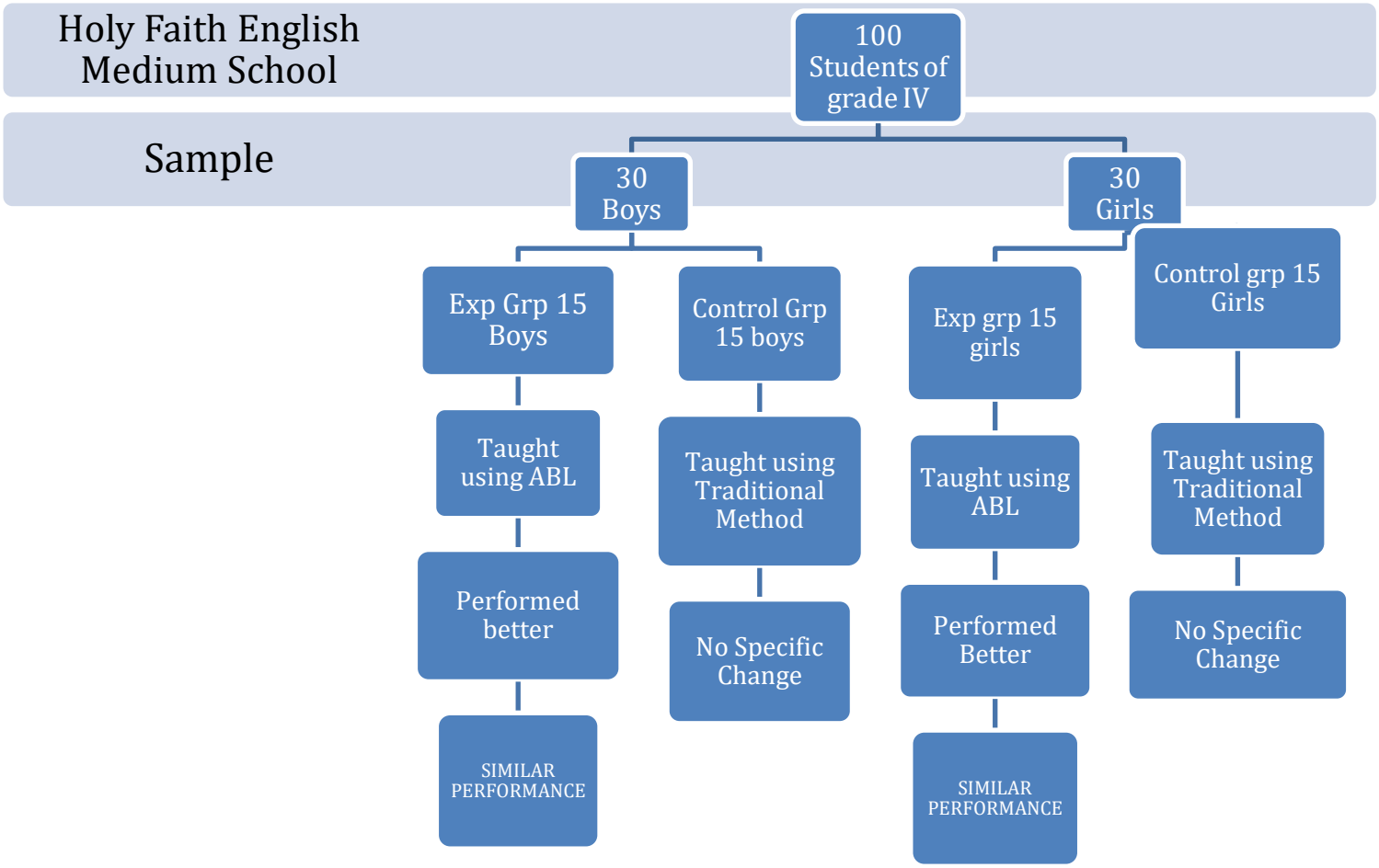

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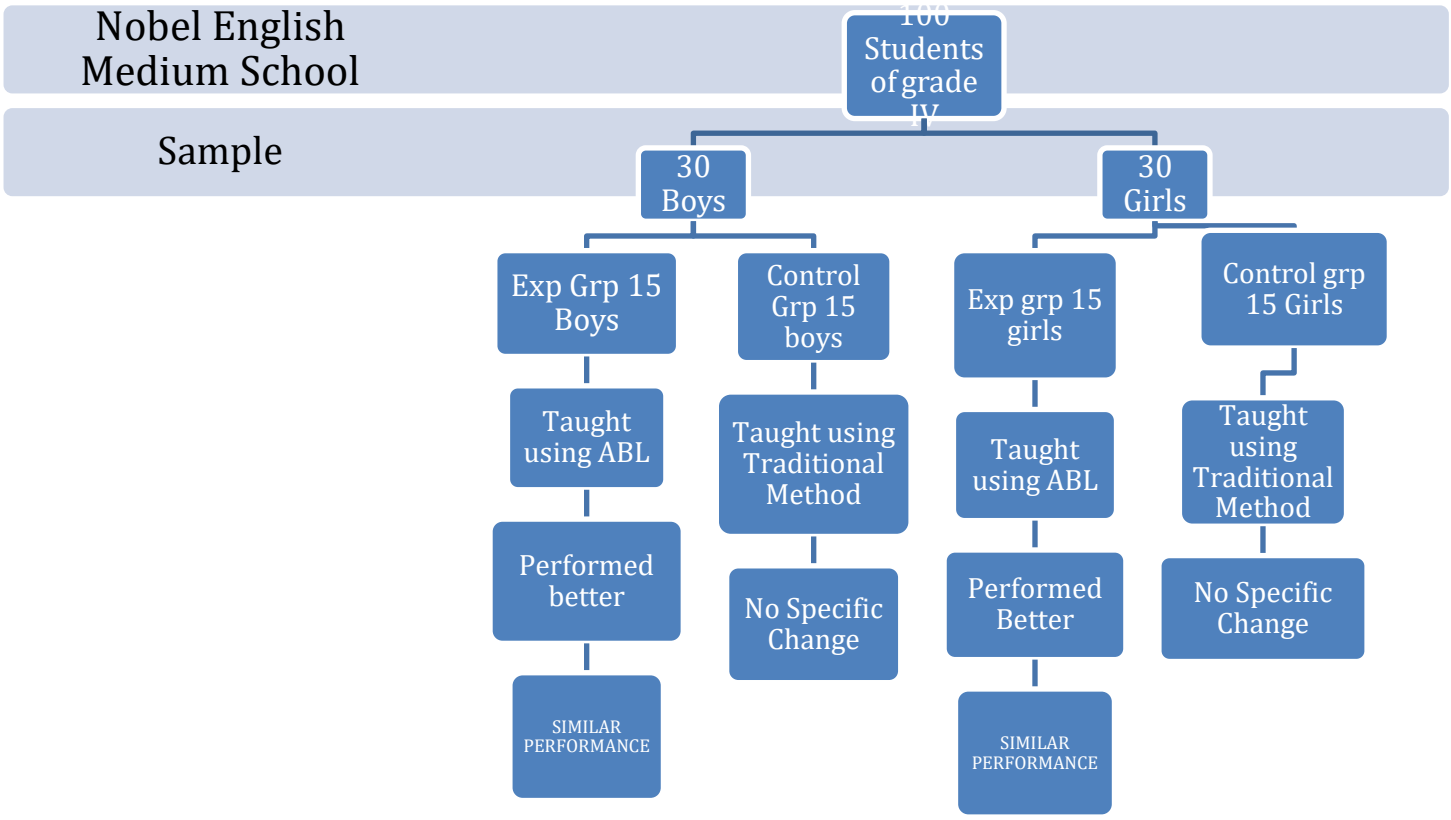

Data analysis and interpretation

Pre-test and Post-test were developed to collect the data for study.

t-test for independent samples was used to collect the data

Table 1A

Pre-test scores of Boys Control group and Experimental group Gurukul Academy

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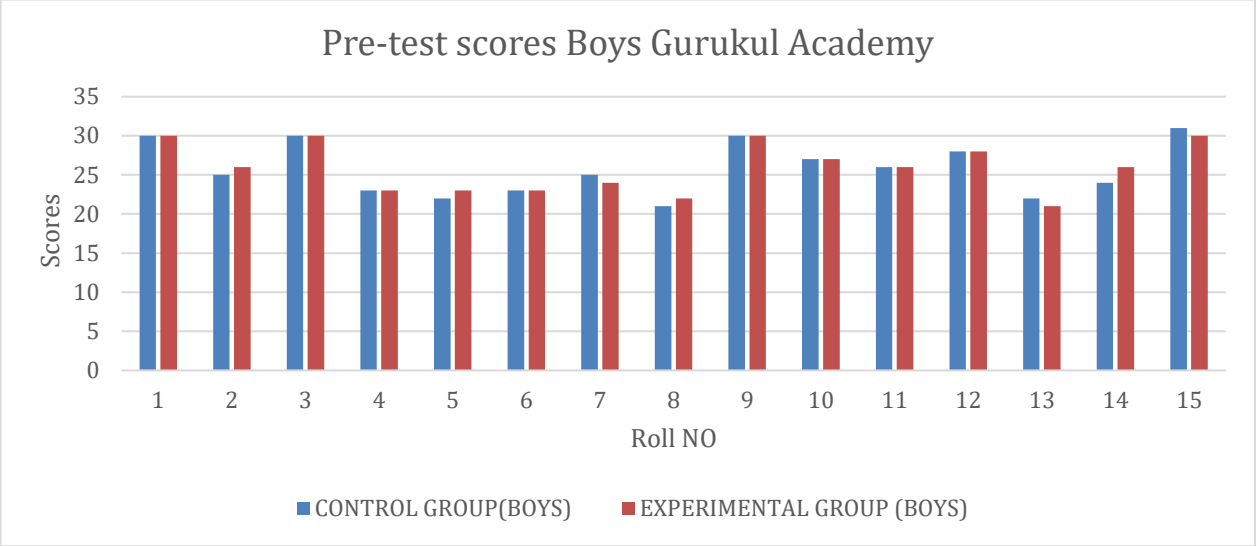

The graph shows that the boys in the Control group and the Experimental Group have similar scores in the pre-test conducted

Table 1 A

Pre-test scores of boys Experimental group and Control group Gurukul Academy

Two-Sample T-Test and CI: Pre-test Ctrl grp, Pre-test Exp Grp

Two-sample T for Pre-test Ctrl grp vs Pre-test Exp Grp

	N	Mean	St Dev	SE Mean
Pre-test Ctrl grp	**15**	**25.80**	**3.36**	**0.87**
Pre-test Exp Grp	**15**	**25.93**	**3.17**	**0.82**

Difference = μ (Pre-test Ctrl grp) - μ (Pre-test Exp Grp)
Estimate for difference: -0.13
95% CI for difference: (-2.58, 2.31)
T-Test of difference = 0 (vs ≠): T-Value = -0.11 P-Value = 0.912 DF = 28
Both use Pooled St Dev = 3.2696

The table 1A shows the control group mean is 25.80 Experimental group mean is 25.93 Standard Deviation for Control group is 3.36 and Experimental group is 3.17 the calculated P- value is 0.912 which is > (greater than) the estimated p-value of 0.05 level of significance

This means there is no significant difference between Control group and Experimental group regards achievement level in the beginning of the experiment. Thus, both the groups are at the same proficiency level.

Table 1B

Pre-test scores of Boys in Control group and Experimental group Holy Faith English Medium School

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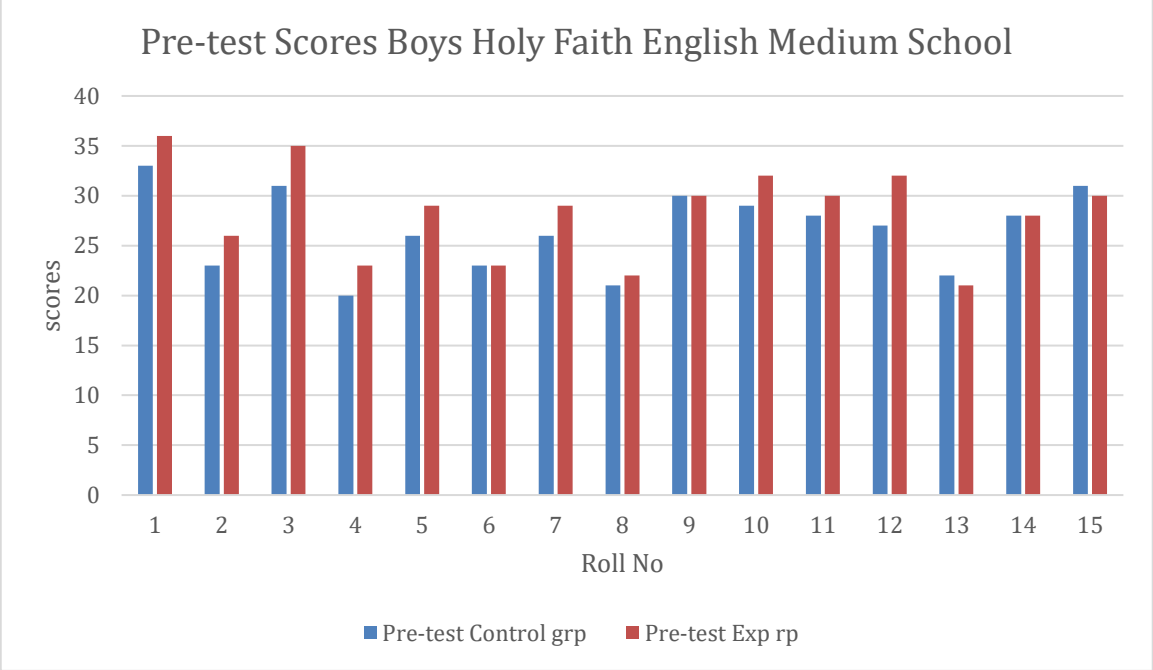

The graph shows that the boys in the Control group and the Experimental Group have similar scores in the pre-test conducted

Table 1 B

Pre-test scores of boys Experimental group and Control group Holy Faith English Medium School

Two-Sample T-Test and CI: Pre-test Ctrl grp, Pre-Test Exp Grp

Two-sample T for Pre-test Ctrl grp vs Pre-Test Exp Grp

	N	Mean	St Dev	SE Mean
Pre-test Ctrl grp	15	26.53	4.00	1.0
Pre-Test Exp Grp	15	28.40	4.60	1.2

Difference = μ (Pre-test Ctrl grp) - μ (Pre-Test Exp Grp)
Estimate for difference: -1.87
5% CI for difference: (-1.97, -1.77)
T-Test of difference = 0 (vs ≠): T-Value = -1.19 P-Value = 0.245 DF = 28
Both use Pooled St Dev = 4.3067

The table 1B shows the control group mean is 28.40 Experimental group mean is 26.53 Standard Deviation for Control group is 4.60 Experimental group is 4.00 and the calculated p-value is 0.245 which is > than estimated p-value 0.05 level of significance

This means there is no significant difference between Control group and Experimental group regards achievement level in the beginning of the experiment. Thus, both the groups are at the same proficiency level.

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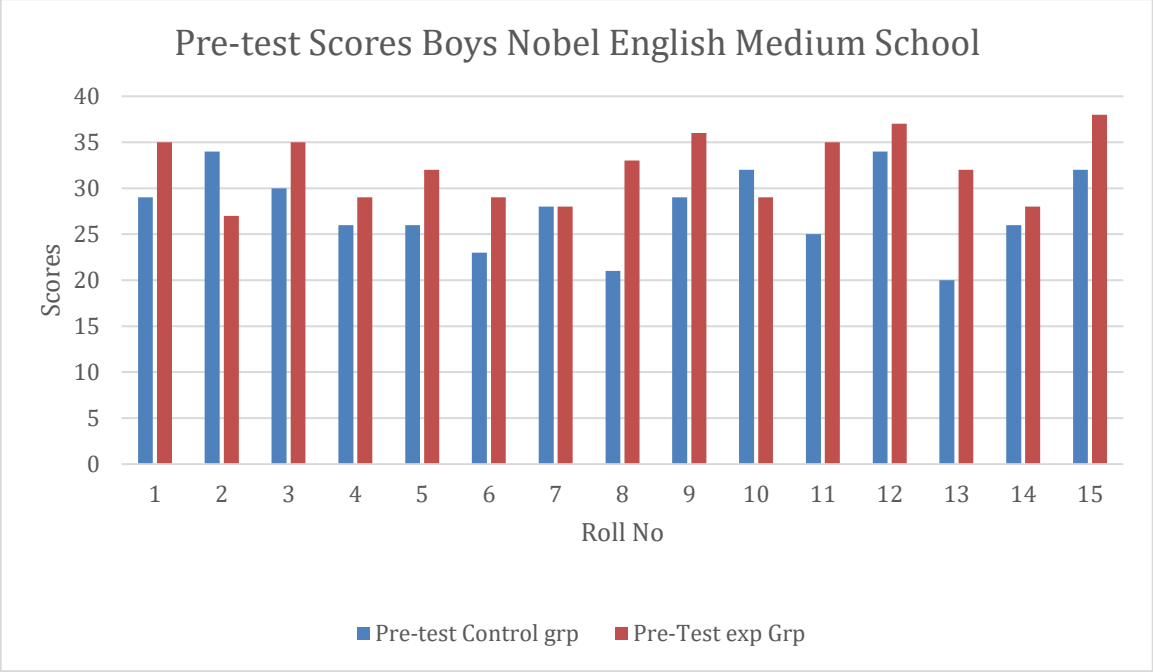
Table 1C

Pre-test scores of Boys Control group and Experimental group Nobel English Medium School



The graph shows that the boys in the Control group and the Experimental Group have similar scores in the pre-test conducted

Table 1 C

Pre-test scores of boys Experimental group and Control group Nobel English Medium School

Two-Sample T-Test and CI: Pre-test Ctrl grp, Pre-Test Exp Grp

Two-sample T for Pre-test Ctrl grp vs Pre-Test Exp Grp

	N	Mean	St Dev	SE Mean
Pre-test Ctrl grp	15	27.67	4.37	1.1
Pre-Test Exp Grp	15	29.87	4.53	1.2

Difference = μ (Pre-test Ctrl grp) - μ (Pre-Test Exp Grp)
Estimate for difference: -2.20
5% CI for difference: (-2.30, -2.10)
T-Test of difference = 0 (vs ≠): T-Value = -1.35 P-Value = 0.187 DF = 28
Both use Pooled St Dev = 4.4524

The table 1C shows the control group mean is 27.67 Experimental group mean is 29.87 Standard Deviation for Experimental group is 4.53 and Control group is 4.37 the calculated P value is 0.187 which is > greater than estimated P value 0.05 level of significance

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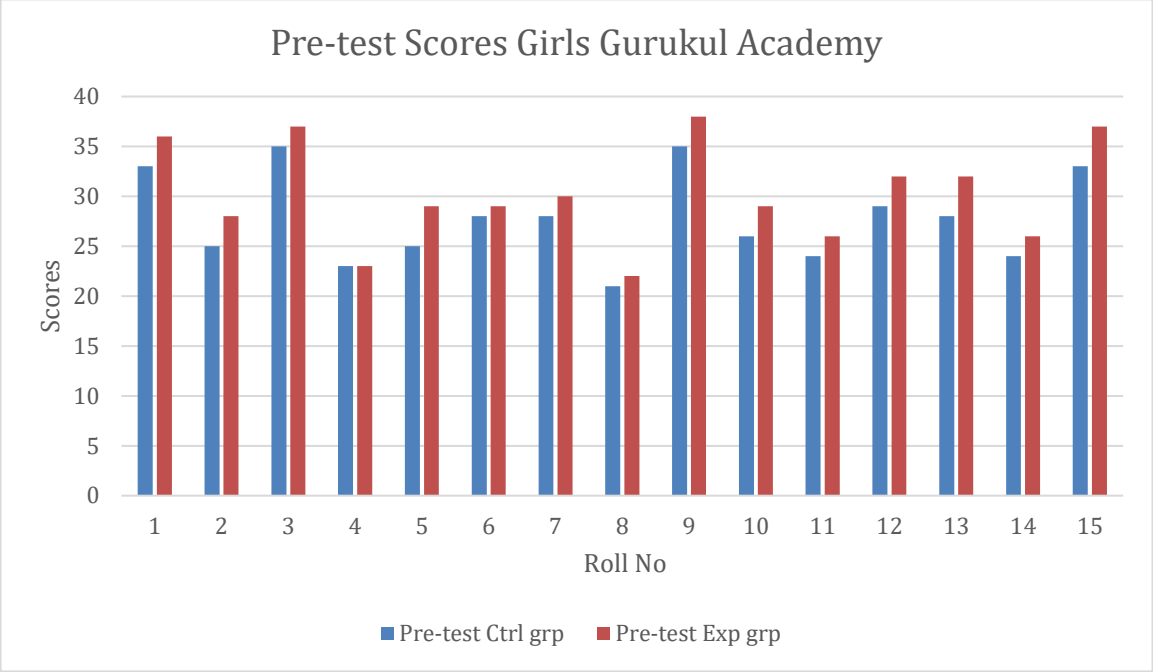
This means there is no significant difference between Control group and Experimental group regards achievement level in the beginning of the experiment. Thus, both the groups are at the same proficiency level.

Table 2A
Pre-test scores of Girls Control group and Experimental group Gurukul Academy



The graph shows that the girls in the Control group and the Experimental Group have similar scores in the pre-test conducted

Table 2A
Pre-test scores of Girls Experimental group/Control Group Gurukul Academy
Two-Sample T-Test and CI: Pre-test Ctrl grp, Pre-Test Exp Grp

Two-sample T for Pre-test Ctrl grp vs Pre-Test Exp grp

	N	Mean	St Dev	SE Mean
Pre-test Ctrl grp	15	27.80	4.44	1.1
Pre-test Exp grp	15	30.27	5.05	1.3

Difference = μ (Pre-test Ctrl grp)- μ(Pre-Test Exp Grp)
Estimate for difference: -2.47
5% CI for difference: (-2.58, -2.36)
T-Test of difference = 0 (vs ≠): T-Value = -1.42 P-Value = 0.167 DF = 28

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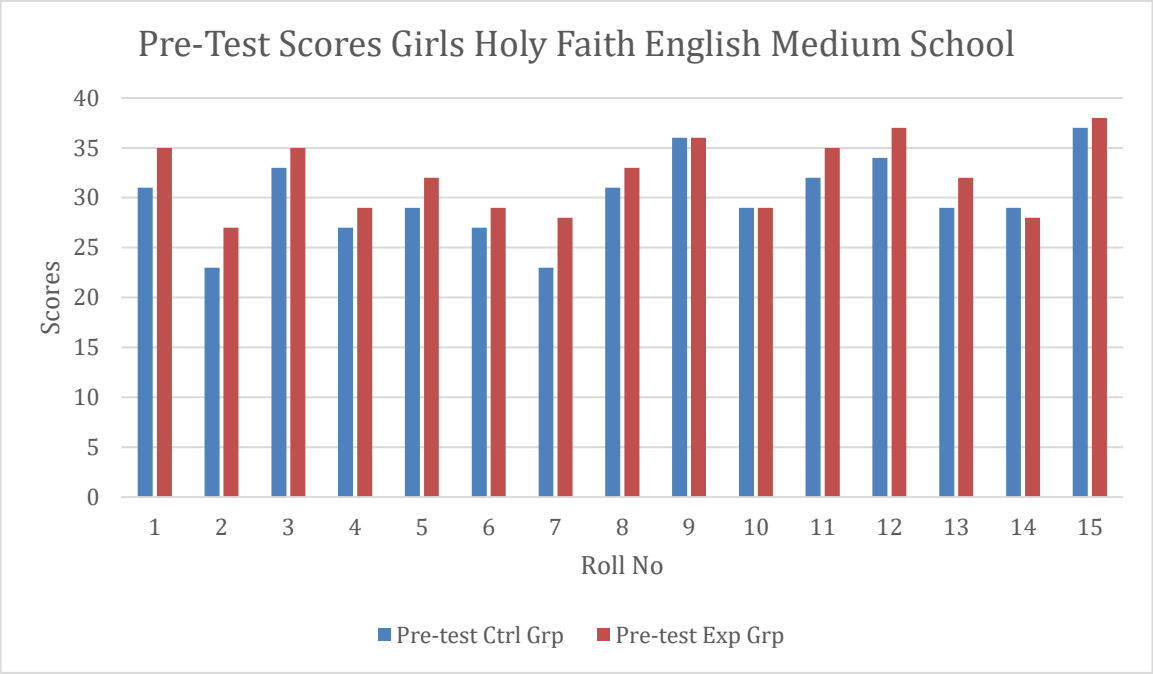
Both use Pooled St Dev = 4.7559

Table 2A shows mean scores of Control group 27.80 and mean of Experimental group is 30.27 The standard Deviation for Control Grp is 4.44 and for Experimental grp is 5.05 The calculated P-value was 0.167which was greater than the P-value of 0.05 level of significance and no significant difference in the achievement of both groups Therefore we can safely say that both the groups, Experimental Group and Control group girls are at same proficiency level.

Table 2B

Pre-test scores of Girls Control group and Experimental group Holy Faith English Medium School



The graph shows that the girls in the Control group and the Experimental Group have similar scores in the pre-test conducted

Table 2B

Pre-test scores of Girls Experimental group/Control Group Holy Faith English Medium School

Two-Sample T-Test and CI: Pre-test Ctrl grp, Pre-Test Exp Grp

Two-sample T for Pre test Ctrl grp1_41 vs Pre Test Exp Grp 4

	N	Mean	St Dev	SE Mean
Pre-test Ctrl grp	15	30.00	4.11	1.1
Pre-test Exp grp	15	32.20	3.67	0.95

Difference = μ (Pre-test Ctrl grp) - μ (Pre-Test Exp Grp)
Estimate for difference: -2.20

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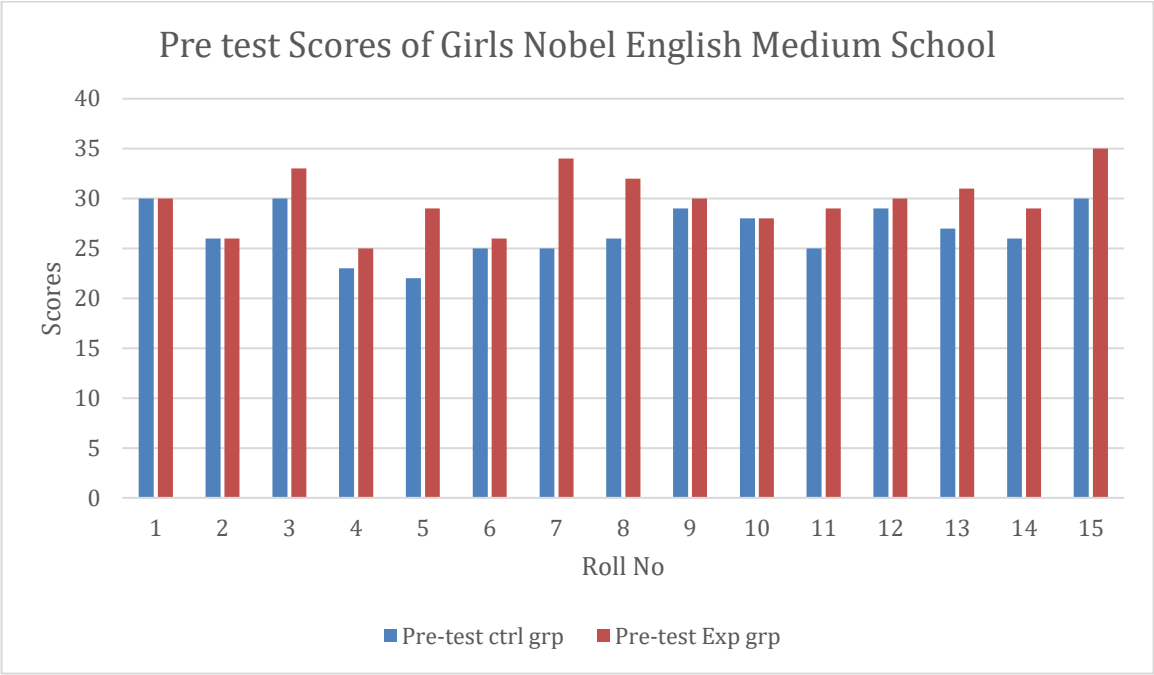
5% CI for difference: (-2.29, -2.11)
T-Test of difference = 0 (vs ≠): T-Value = -1.55 P-Value = 0.133 DF = 28
Both use Pooled St Dev = 3.8932

Table 2B shows mean scores of Control group is 30.00 and Mean score of Experimental group is 32.20. The SD of Control group is 4.11 The SD of Experimental group is 3.67 The calculated P value was 0.133 which was Greater than 0.05 level of significance Therefore we can safely say that both the groups i.e Experimental Group and Control group girls are at same proficiency level.

Table 2C

Pre-test scores of Girls Control group and Experimental group Nobel English Medium School



The graph shows that the girls in the Control group and the Experimental Group have similar scores in the pre-test conducted

Table 2C

Pre-test scores of Girls Experimental group/Control Group Nobel English Medium School

Two-Sample T-Test and CI: Pre-test Ctrl grp, Pre-Test Exp Grp

Two-sample T for Pre-test Ctrl grp vs Pre-test Exp Grp

	N	Mean	St Dev	SE Mean
Pre-test Ctrl grp	15	26.73	2.55	0.66
Pre-Test Exp Grp	15	29.80	2.91	0.75

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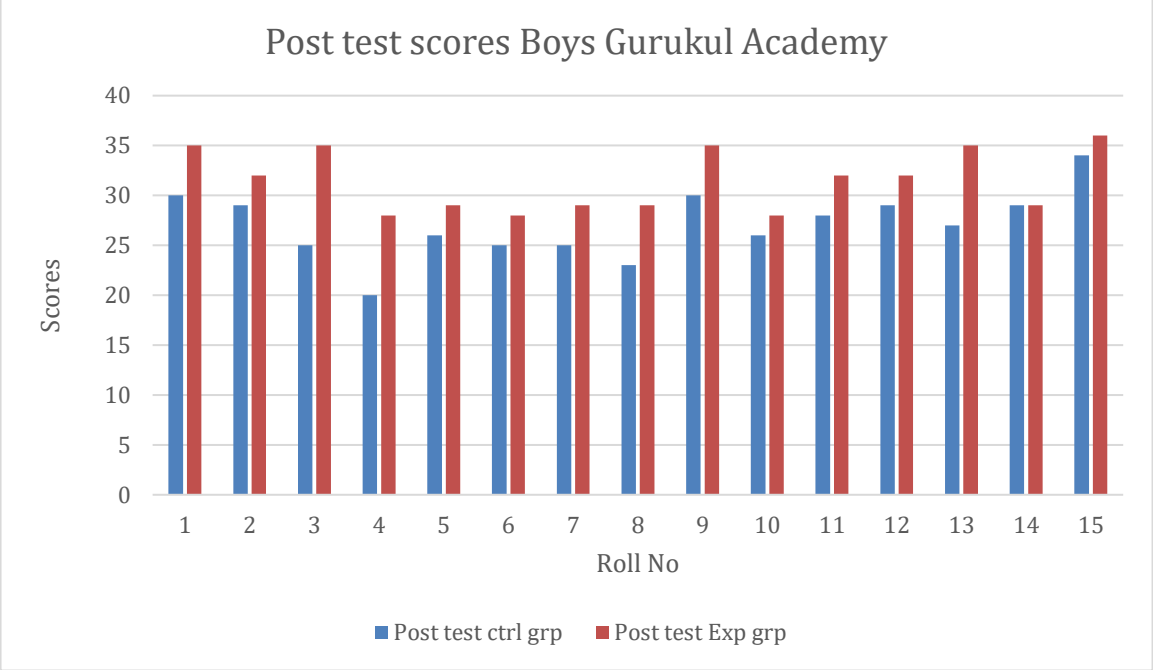
Difference = μ (Pre-test Ctrl grp) - μ (Pre-Test Exp Grp)
Estimate for difference: -3.067
5% CI for difference: (-3.130, -3.003)
T-Test of difference = 0 (vs ≠): T-Value = -3.07 P-Value = 0.105 DF = 28
Both use Pooled St Dev = 2.7343

Table 2C shows mean scores of Control group 26.73.and the mean scores of Experimental grp 29.80 Experimental Group SD is 2.91 and Control group SD 2.55. The calculated P- value was 0.105 which is Greater than the P value 0.05 level of Significance Therefore we can safely say that both the groups Experimental Group and Control group girls are at same proficiency level.

Table 3A
Post-test scores of Boys Control group and Experimental group Gurukul Academy



The graph shows that the boys in the Experimental Group performed better than the boys of Control group in the post-test conducted

Table 3 A
Post test score of boys Experimental Group and Control group Gurukul Academy
Two-Sample T-Test and CI: Post test Ctrl grp, Post test Exp grp

Two-sample T for Post test Ctrl grp vs Post test Exp grp

	N	Mean	St Dev	SE Mean
Post test Ctrl grp	15	28.00	3.74	0.97

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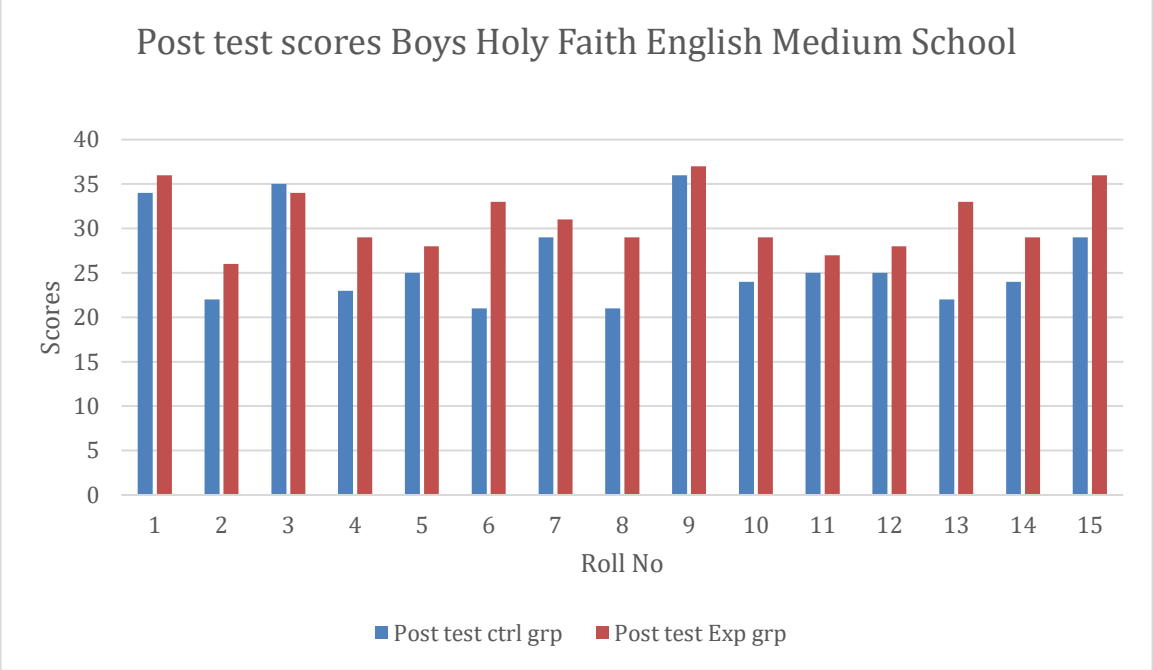
Post test Exp grp 15 31.47 3.07 0.79

Difference = μ (Post test Ctrl grp) - μ (Post test Exp grp)
Estimate for difference: -3.47
5% CI for difference: (-3.55, -3.39)
T-Test of difference = 0 (vs ≠): T-Value = -2.77 P-Value = 0.010 DF = 28
Both use Pooled St Dev = 3.4212

Table 3A Shows the mean value of Control group (boys) is28.00 and Experimental Group(boys) – 31.47 the SD of the Experimental Group(boys) was 3.07 it was 3.74 in case of Control group(boys). The calculated P value is 0.010 which less than 0.05 level of significance.
Therefore, there was a significant difference in the achievement of the two groups. The boys who were taught using Activity Based Learning (ABL) methods performed better in the post-test as compared to the those in the Control group. The Activity Based Learning (ABL) method, therefore proved to be better than the traditional method of chalk–n-talk in teaching concepts in Science.

Table3B

Post-test scores of Boys Control group and Experimental group Holy Faith English Medium School



The graph shows that the boys in the Experimental Group performed better than the boys of Control group in the post-test conducted .

Table 3 B

Post-test score of boys Experimental Group and Control group Holy Faith English Medium School

Two-Sample T-Test and CI: Post test Ctrl grp, Post test Exp grp

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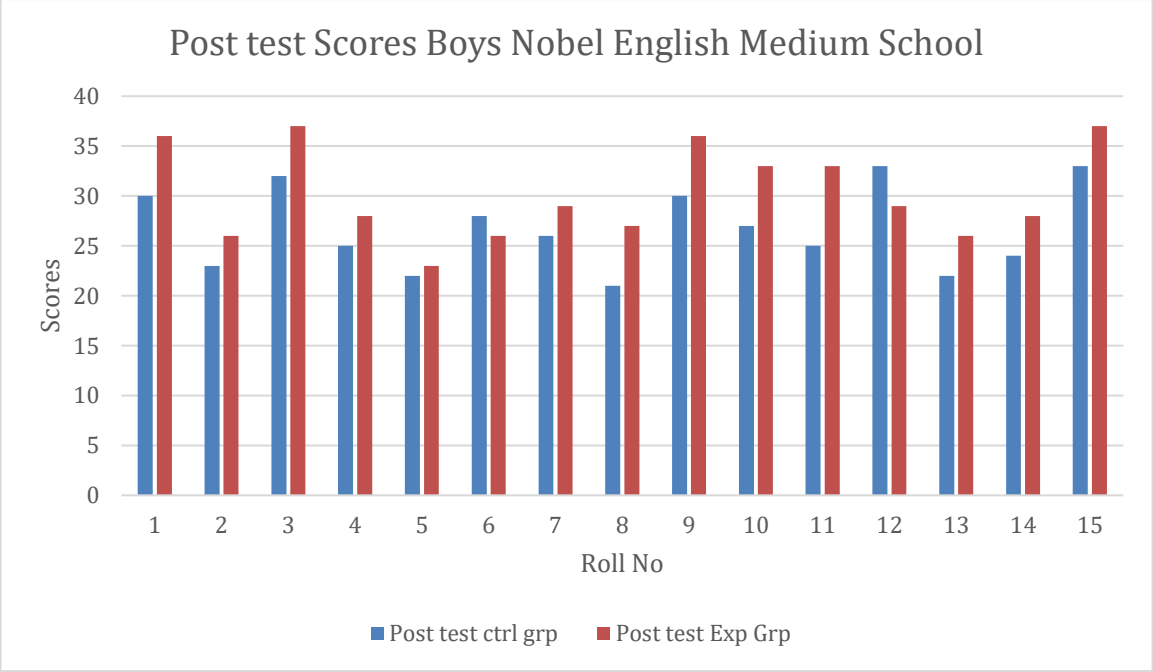
Two-sample T for Post test Ctrl grp_12 vs Post test Exp grp_12

	N	Mean	St Dev	SE Mean
Post test Ctrl grp	15	26.33	5.09	1.3
Post test Exp grp	15	31.00	3.57	0.92

Difference = μ (Post test Ctrl grp_12) - μ (Post test Exp grp_12)
Estimate for difference: -4.67
5% CI for difference: (-4.77, -4.57)
T-Test of difference = 0 (vs ≠): T-Value = -2.91 P-Value = 0.007 DF = 28
Both use Pooled St Dev = 4.3970

Table 3B Shows the mean value of Experimental Group(boys) – 31.00 and Control group(boys) 26.33 Similarly while the SD of the Experimental Group(boys) was 3.57 it was 5.09 in case of Control group(boys). The calculated P value is 0.007 which is less than 0.05 level of significance.
Therefore, there was a significant difference in the achievement of the two groups. The boys who were taught using Activity Based Learning (ABL) methods performed better in the post-test as compared to the those in the Control group. The Activity Based Learning (ABL) method, therefore proved to be better than the traditional method of chalk–n-talk in teaching concepts in Science.

Table 3C
Post-test scores of Boys Control group and Experimental group Nobel English Medium School



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The graph shows that the boys in the Experimental Group performed better than the boys of Control group in the post-test conducted

Table 3 C

Post test score of boys Experimental Group and Control group Nobel English Medium School

Two-Sample T-Test and CI: Post-test Ctrl grp , post-test Exp grp

Two-sample T for Post-test Ctrl grp vs post-test Exp grp

	N	Mean	St Dev	SE Mean
Post-test Ctrl grp	15	26.73	4.10	1.1
Post-test Exp grp	15	30.27	4.65	1.2

Difference = μ (Post test Ctrl grp) - μ (post-test Exp grp)
Estimate for difference: -3.53
5% CI for difference: (-3.63, -3.43)
T-Test of difference = 0 (vs ≠): T-Value = -2.21 P-Value = 0.036 DF = 28
Both use Pooled St Dev = 4.3829

Table 3C the mean value of Experimental Group(boys) is 30.27 and Control group(boys) is 26.73. Similarly, while the SD of the Experimental Group(boys) was 4.65 it was 4.10 in case of Control group(boys). The calculated value of P is 0.036 which is less than 0.05 level of significance

Therefore, there was a significant difference in the achievement of the two groups. The boys who were taught using Activity Based Learning (ABL) methods performed better in the post-test as compared to the those in the Control group. The Activity Based Learning (ABL) method, therefore proved to be better than the traditional method of chalk–n-talk in teaching concepts in science.

Table 4A

Post-test scores of Girls Control group and Experimental group Gurukul Academy

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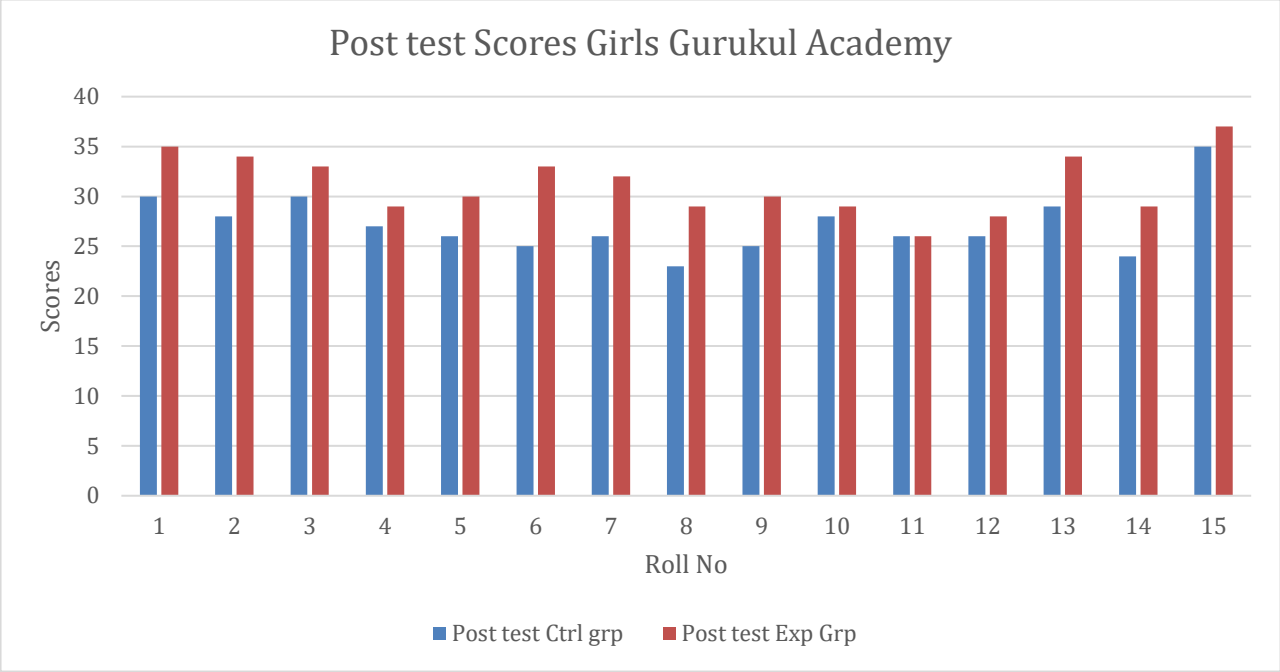

The graph shows that the girls in the Experimental Group performed better than the girls of Control group in the post-test conducted

Table 4A
Post-test score of girls Experimental Group and Control group Gurukul Academy
Two-Sample T-Test and CI: Post-test Ctrl Grp , Post-test Exp grp

Two-sample T for Post-test Ctrl Grp vs Post-test Exp grp

	N	Mean	St Dev	SE Mean
Post test Ctrl Grp	15	27.53	3.00	0.77
Post test Exp grp	15	31.20	3.05	0.79

Difference = μ (Post test Ctrl Grp) - μ (Post test Exp grp)
Estimate for difference: -3.67
5% CI for difference: (-3.74, -3.60)
T-Test of difference = 0 (vs ≠): T-Value = -3.32 P-Value = 0.003 DF = 28
Both use Pooled St Dev = 3.0245

As seen from table 4A the mean value of the Experimental Group(girls) was 31.20 In contrast, the Control group (girls) showed mean value of 27.53. The Standard Deviation of the Experimental Group(girls) was 3.05 and Control group(girls) was 3.00. The calculated P-value was 0.003 which is less than the 0.05 level of Significance.

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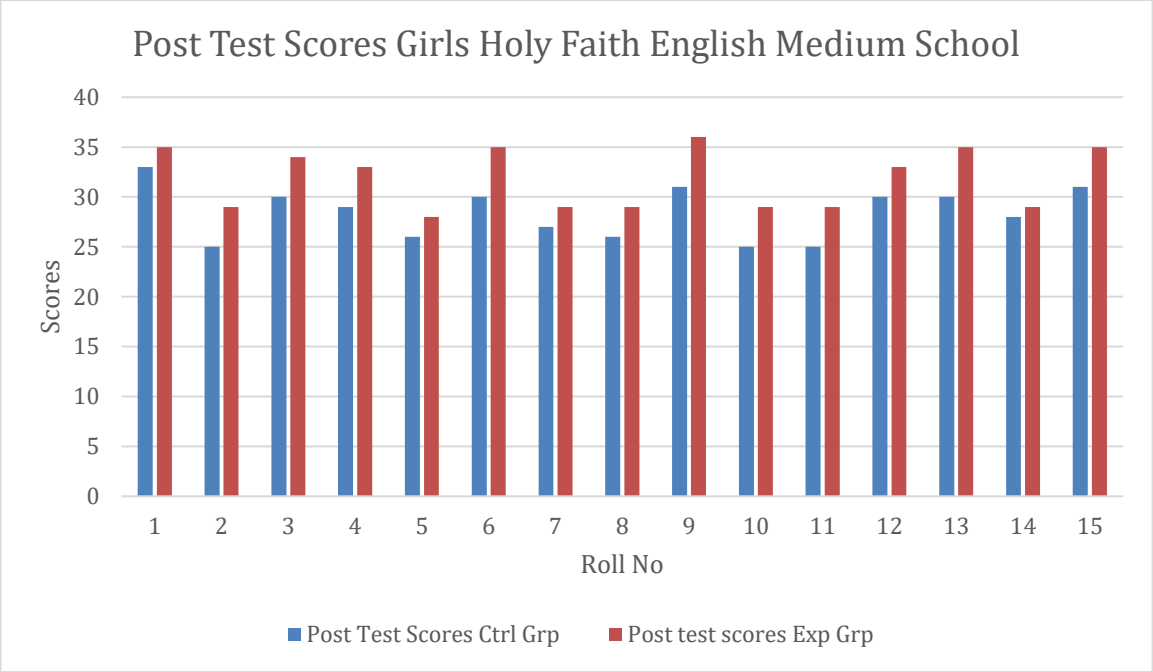
Thus, there was a significant difference found between the two groups regarding the achievement in the concept understanding in science.

The girls who were taught ABL methods performed better in post-test than those in the control group who were taught using Traditional method. It further reinforced that the ABL method is better than the traditional method of teaching concept in science.

Table 4B

Post-test scores of Girls Control group and Experimental group Holy Faith English Medium School



The graph shows that the girls in the Experimental Group performed better than the girls of Control group in the post-test conducted

Table 4B

Post-test score of girls Experimental Group and Control group Holy Faith English Medium School

Two-Sample T-Test and CI: Post-test Ctrl Grp , Post-test Exp grp

Two-sample T for Post-test Ctrl Grp vs Post-test Exp grp

	N	Mean	St Dev	SE Mean
Post test Ctrl Grp	15	29.80	2.48	0.64
Post test Exp grp	15	31.87	3.02	0.78

Difference = μ (Post test Ctrl Grp) - μ (Post test Exp grp)
Estimate for difference: -2.07
5% CI for difference: (-2.13, -2.00)

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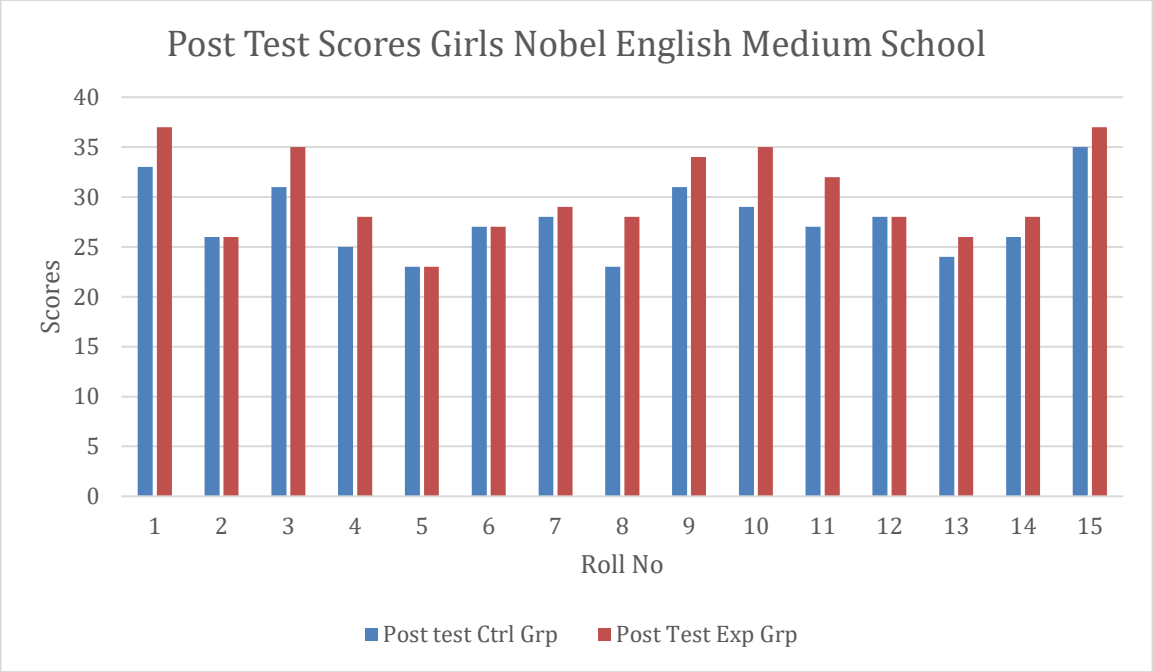
T-Test of difference = 0 (vs ≠): T-Value = -2.05 P-Value = 0.030 DF = 28
Both use Pooled St Dev = 2.7654

As seen from table 4B the mean value of the Experimental Group(girls) was 31.87 In contrast, the Control group (girls) showed mean value of 29.80. The Standard Deviation of the Experimental Group(girls) was 3.02 and Control group(girls) was 2.48. The calculated P-value was 0,030 which is less than 0.05 level of Significance level. Thus, there was a significant difference found between the two groups regarding the achievement in the concept understanding in science.

The girls who were taught ABL methods performed better in post-test than those in the control group who were taught using Traditional method. It further reinforced that the ABL method is better than the traditional method of teaching concept in science.

Table 4C

Post-test scores of Girls Control group and Experimental group Nobel English Medium School



The graph shows that the girls in the Experimental Group performed better than the girls of Control group in the post-test conducted

Table 4C

Post-test score of girls Experimental Group and Control group Nobel English Medium School

Two-Sample T-Test and CI: Post-test Ctrl Grp , Post-test Exp grp

Two-sample T for Post-test Ctrl Grp vs Post-test Exp grp

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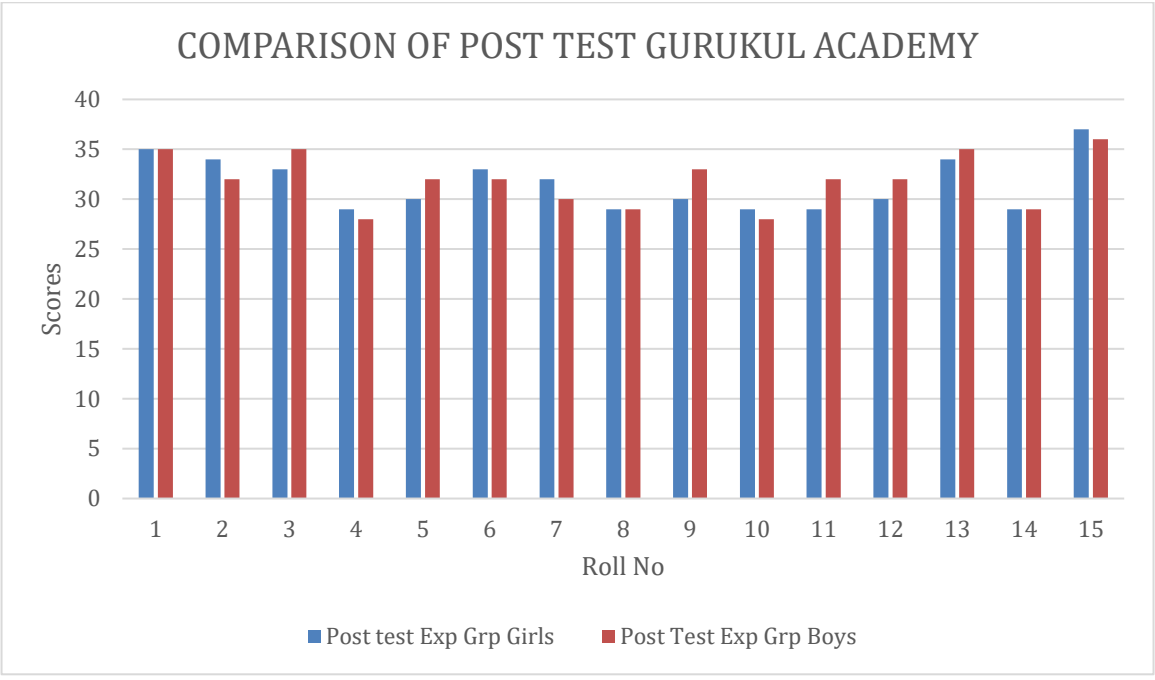
	N	Mean	St Dev	SE Mean
Post test Ctrl Grp	**15**	**27.73**	**3.56**	**0.92**
Post test Exp grp	**15**	**30.20**	**4.43**	**1.1**

Difference = μ (Post test Ctrl Grp) - μ (Post test Exp grp)
Estimate for difference: -2.47
5% CI for difference: (-2.56, -2.37)
T-Test of difference = 0 (vs ≠): T-Value = -1.68 P-Value = 0.004 DF = 28
Both use Pooled St Dev = 4.0149

As seen from table 4C the mean value of the Experimental Group(girls) was 30.20 In contrast, the Control group (girls) showed mean value of 27.73. The Standard Deviation of the Experimental Group(girls) was 4.43 and Control group(girls) was 3.56. The calculated P-value was 0.004 which is Less than 0.05 level of Significance level. Thus, there was a significant difference found between the two groups regarding the achievement in the concept understanding in science.
The girls who were taught ABL methods performed better in post-test than those in the control group who were taught using Traditional method. It further reinforced that the ABL method is better than the traditional method of teaching concept in science.

COMPARISION OF POST-TEST
Table5A
Post-test scores of Girls and Boys Experimental Group Gurukul Academy



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The graph shows that the girls and boys in the Experimental Group performed at the same level in the post-test conducted

Table – 5A

A Comparision of Post-test Scores of girls and boys of Gurukul Academy

Two-Sample T-Test and CI: Post-test Exp G, Post t Exp B

Two-sample T for Post t Exp G vs Post t Exp B

	N	Mean	St Dev	SE Mean
Post t Exp G	15	31.20	3.05	0.79
Post t Exp B	15	31.47	3.07	0.79

Difference = μ (Post t Exp G) - μ (Post t Exp B)
Estimate for difference: -0.27
5% CI for difference: (-0.34, -0.20)
T-Test of difference = 0 (vs ≠): T-Value = -0.24 P-Value = 0.813 DF = 28
Both use Pooled St Dev = 3.0597

Table 5A shows that the mean value of the Experimental group(girls) was 31.20 while the value of the Experimental group(boys) was 31.47. Moreover, the Standard Deviation of the two groups were 3.05 and 3.07 respectively. The calculated P-value was found to be 0.813 which is More than 0.05 level of significance. Since both the boys and girls were taught using ABL Methods. It shows no significant differences in the achievement of the two gender groups.

COMPARISION OF POST-TEST

Table5B

Post -test scores of Girls and Boys Experimental Group Holy Faith English Medium School

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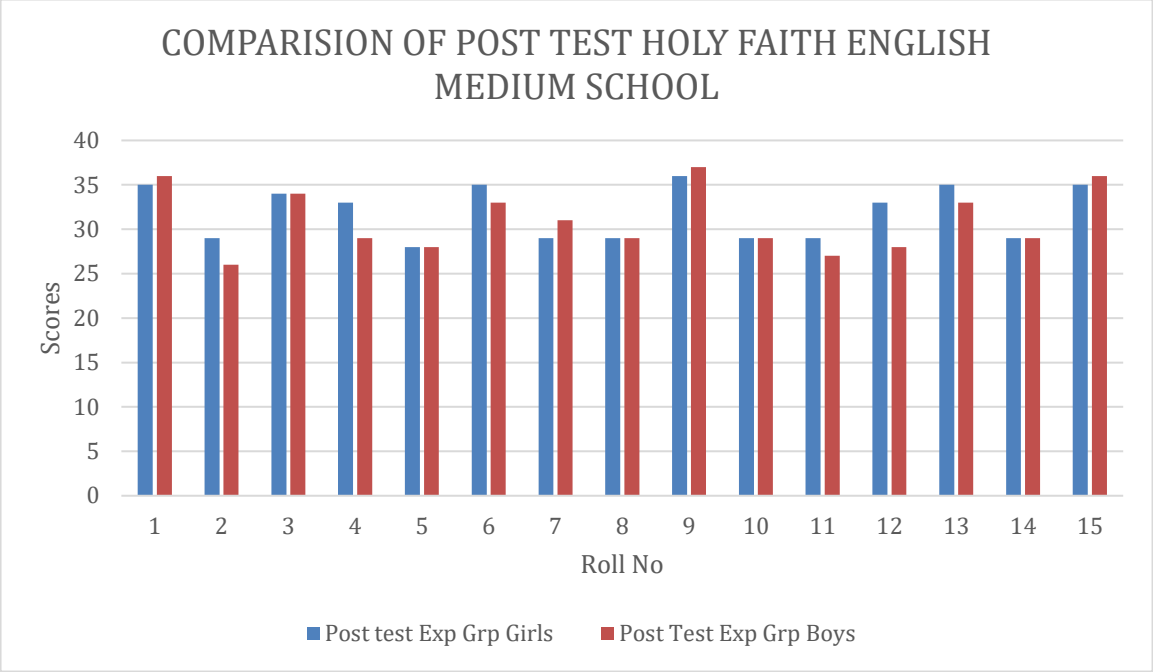

The graph shows that the girls and boys in the Experimental Group performed at the same level in the post-test conducted

Table – 5B

A comparision of post-test

Scores of girls and boys of Holy Faith English Medium School

Two-Sample T-Test and CI: Post-test Exp Girls, Post-test Exp Boys

Two-sample T for Post-test Exp Girls vs Post-test Exp Boys

	N	Mean	St Dev	SE Mean
Post-test Exp Girls	15	31.87	3.02	0.78
Post-test Exp Boys	15	31.00	3.57	0.92

Difference = μ (Post-test Exp Girls) - μ (Post-test Exp Boys)
Estimate for difference: 0.87
5% CI for difference: (0.79, 0.94)
T-Test of difference = 0 (vs ≠): T-Value = 0.72 P-Value = 0.479 DF = 28
Both use Pooled St Dev = 3.3044

Table 5B shows that the mean value of the Experimental group (girls) was 31.87 while the value of the Experimental group(boys) was 31.00. Moreover, the Standard Deviation of the two groups were 3.02 and 3.57 respectively. The calculated P- value was found to be 0.479 which is More than the P value at 0.05 level of

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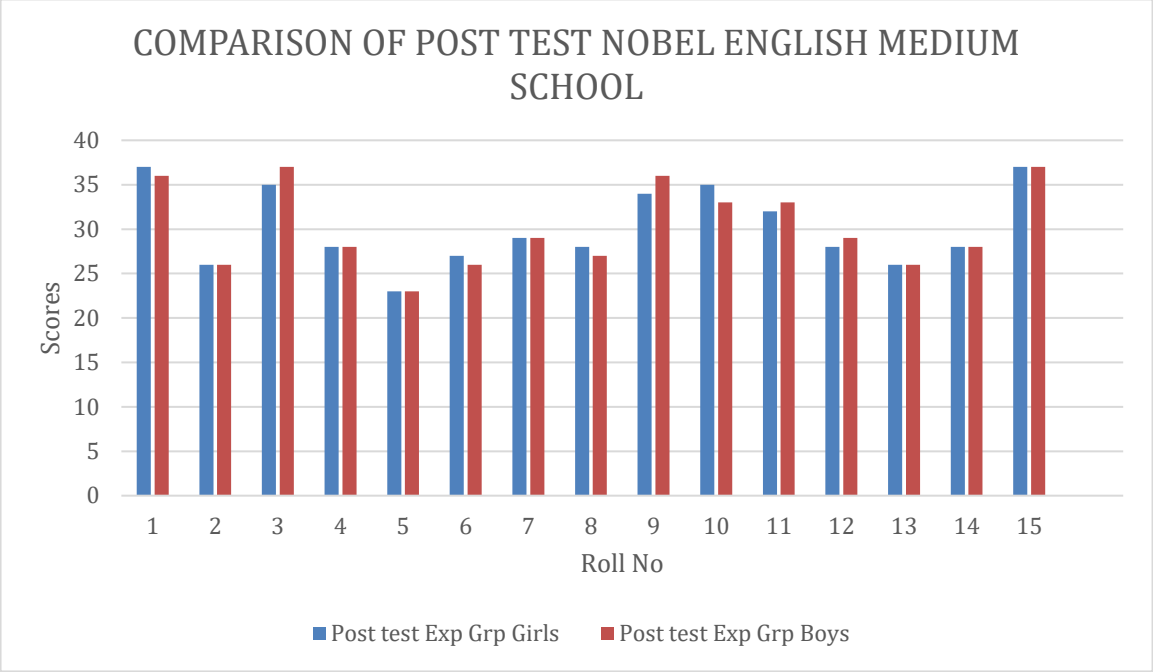
significance. Since both the boys and girls were taught using ABL Methods. It shows no significant differences in the achievement of the two gender groups.

COMPARISION OF POST-TEST

Table 5C

Post-test scores of Girls and Boys Experimental Group Nobel English Medium School



The graph shows that the girls and boys in the Experimental Group performed at the same level in the post-test conducted

Table – 5C

A Comparision of post-test

Scores of girls and boys of Nobel English Medium School

Two-Sample T-Test and CI: Post-test Exp Girls, Post test Exp Boys

Two-sample T for Post-test Exp Girls vs Post-test Exp Boys

	N	Mean	St Dev	SE Mean
Post-test Exp Girls	15	30.20	4.43	1.1
Post-test Exp Boys	15	30.27	4.65	1.2

Difference = μ (Post-test Exp Girls) - μ (Post-test Exp Boys)
Estimate for difference: -0.07
5% CI for difference: (-0.17, 0.04)
T-Test of difference = 0 (vs ≠): T-Value = -0.04 P-Value = 0.968 DF = 28

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UGC Approved Journal

www.ijbar.org
ISSN 2249-3352 (P) 2278-0505 (E)
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Both use Pooled St Dev = 4.5408

Table 5C shows that the mean value of the Experimental group (girls) was 30.20 while the value of the Experimental group(boys) was 30.27. Moreover, the Standard Deviation of the two groups were 4.43 and 4.65 respectively. The calculated P- value was 0.968 which is More than the P value at 0.05 level of significance. Since both the boys and girls were taught using ABL Methods. It shows no significant differences in the achievement of the two gender groups.

Conclusion

The study concludes that ABL is more effective and engaging for boys as well as girls as they both participated actively in the learning process. The students learnt the concepts in science better since the activities were planned in such a way so as to seek attention of the students as well as engage them in constructing their own knowledge of the concepts taught in science.

Improved Experiential Learning makes the students grow in his ability to understand and Learn things more meaningfully.The activity-based methods help the students in overall Personality Development is confident to seek answers to different topics develops enquiry-based learning skills which are necessary for further competitive Exams

Furthermore, it was also found that both boys and girls performance in the post-test of the Experimental group was the same as seen in each of the schools under study. Hence girls and boys who learned through the ABL method have the same level of achievement in understanding concepts in science.

Recommendation

The following recommendation has been made

1. The NEP-2020 that employees ABL should be implemented in the curriculum. This shall definitely facilitate the need of developing skill required for the students in the 21st century
2. The test books have to be upgraded that will include suggested activities for teachers in the class using resources for the lesson planning. This will facilitate teachers with readymade activities as most of the teachers are not as creating to create such tasks.
3. The teachers are required to be trained and upgraded to enable them to think out of the box so that there is involvement of students as well as teachers while developing concepts in science using the common resources.
4. Most of the activities of our life are Science related. Hence, wherever possible incorporating real life experiences in classroom was found to be an effective way of inculcating problem-solving ability in students
5. The assessment system should not only be the pen and paper test but also involve practical hands-on activity demonstration by the students to get the better understanding of the achievement of the student

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