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Effectiveness of Activity-Based Learning (ABL) on the Performance of Grade 9 Students in Mathematics

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Abstract *– This study investigated the effectiveness of Activity-Based Learning(ABL) on the performance of Grade 9 students in Mathematics in San Jose National High School, San Jose, Anda, Pangasinan during the school year 2015-2016. This study used the pre-test post-test design. There were 19 respondents exposed to traditional learning method and 19 respondents were exposed to ABL. They were equally divided into two groups according to their grade point average from the first three grading periods. They were taught in five topics of the subject namely: (1) the six trigonometric ratios;(2)the trigonometric ratios of special angles; (3) angles of elevation and angles of depression;(4) the use of trigonometric ratios in solving real-life problems involving right triangles; and (5)oblique triangles. Pre-test and post-test were administered to determine the performance of the Grade 9 students. A survey questionnaire was used to find the profile of the students. All data gathered were tabulated and statistically treated using frequency count, percentage, mean, skewness, kurtosis, t-test, eta squared and Pearson-r. All the data gathered were computed through the use of MS Excel and SPSS software. Results showed that there was an increased in the pre-test and post-test performance and had an increase performance in post-test compared to pre-test. Results also told that traditional activity is as effective as the Activity-Based Learning. Findings also revealed that there was no significant relationship between the profile variables and performance in Mathematics of the Grade 9 students.*

Keywords **–** activity-based learning, mathematics, San Jose national high school

INTRODUCTION

Activity-Based Learning (ABL) is a successful teaching model in the field of medicine, engineering and science, and it has recently found its way to business schools. At its core, this approach provides a way to integrate learning within students' knowledge and by exposing them to a variety of activities helps them learn how to learn. Due to the high degree of interaction in ABL, essential instructor skills involve facilitating, motivating, enabling and coaching rather than simply presenting facts and figures didactically(Stößlein, 2009).

The knowledge and use of Mathematics affects every area of life. It plays a vital role in scientific and technological innovation and even in the development of a nation. In contemporary world, it is a gateway to many well-respected, well-rewarded, and prestigious occupation. However, throughout history, researchers show that students' performance and attitude to Mathematics are low. Thus, policy makers, researchers, teachers, parents, and students all have an interest in new instructional approaches and the factors influencing performance in, and attitudes to Mathematics. As suggested in the Commission report on Mathematics Education, in order to be successful in addressing low achievement in Mathematics, a combined strategy in which important factors including teaching strategies is required. The Commission strongly advises extensive researches on the effects of factors including students' learning strategies, reading ability and Mathematics motivation, as well as realistic Mathematics Education approach on Mathematics performance (Yuksel, 2014).

Everyone recognizes, that Mathematics is omnipresent in today's world – notably in the technological items all around us and in exchange and communication processes – but it is generally not in evidence, which makes it difficult for some to see the point of developing a Mathematics culture beyond basic numeracy, measurements and calculation. It is important for basic

education to help to bring Mathematics to the fore, especially because "Mathematical literacy" requirements far exceed needs traditionally associated with basic computational knowledge(UNESCO, 2012).

Mathematics is the subject recognized as the mother of all learning with other subjects deriving their concepts from it, in both Arts and Sciences. It is also an international language and is essential in almost every fields, such as handling money, measurements in fashion and carpentry, technical economics, among others. Mathematics is also regarded as the queen of all sciences, such as Chemistry, Physics, Biology, Economics, and others. Mathematics is a way of thinking and organizing a logical proof. It can be used to determine whether or not an idea is true, or at least, whether it is probably true as a way of thinking, as it gives insight into the power of human mind and becomes a challenge to intellectual curiosity. No wonder, any individual who is competent in Mathematical sciences, can equally have the ability to do any other course. Consequently, a good performance in Mathematics is important (Ali, 2013).

If most people were asked to recall how they were taught Mathematics they would most likely recall engaging in rote memorization of Mathematical concepts as the teacher demonstrated the procedures to solve certain problems on the board. Following the lesson the teacher would give a "drill and kill" homework assignment over the same concepts that were covered in class. The next day would consist of the same procedures but over a different concept. This method of Mathematics instruction would continue on day after day. Over the past several years, however, debate has taken place over how to effectively teach Mathematics and whether the traditional method is as effective as it once was. Skills students were required to have in order to function in society in the 20th century are different than the skills required of students in the 21st century. With this change in skill requirement comes a need for change in how students are taught (Chapko&Buchko, 2004).

Activity-Based Learning (ABL) means learning by doing and comprises many different in-and out-of-school activities practiced by students either individually or as a group. Many different activities are implemented in learning and teaching today ranging from role-playing, class discussion and case-study methods to fieldwork, projects and laboratory experiments. ABL provides students with a wide range of opportunities to gain not only subject knowledge effectively but also many general, technical and academic skills. By interacting with many different learning activities and technologies, students are also prepared as active citizens. ABL is used extensively in most subject areas around the world, as it is the better instructional method(Kaya, et.al,2010).

Today, Mathematical literacy must, in particular, make it possible for individuals to understand, analyse and critically assess multiple data delivered by various complex systems of digital, symbolic and graphical representation – most often interactively. It must enable them to make reasonable choices based on comprehension, modelling and prediction and to ascertain their effects in new situations often fraught with uncertainty. It is thus essential that all students learning Mathematics during basic education are gradually exposed to the complexity of the current digital world, learn to position them in order to act in that world and become familiar with the diversity of the modes of representation that it uses. It is important for the student to become gradually familiar with probabilistic and statistical modes of reasoning required for mathematical thought in order to understand phenomena that, in both science and social life, involve uncertainty and risk (UNESCO, 2012).

As of school year 2013-2014 to 2014-2015 students' achievement rate based from National Achievement Test (NAT) result in Mathematics at San Jose National High School, San Jose, Anda, Pangasinan is 44.18% and 34.29%, respectively. The low performance of students in Mathematics led the researcher to conduct this study.The researcher was challenged

to determine which will really improve students' performance in Mathematics. The researcher attempted to findout using the traditional learning activity and Activity-Based Learning (ABL) activities particularly with the students of San Jose National High School, San Jose, Anda, Pangasinan where the researcher teaches and handles the subject.

STATEMENT OF THE PROBLEM

This study determined the effectiveness of Activity-Based Learning (ABL) on the performance of the Grade 9 students of San Jose National High School, San Jose, Anda, Pangasinan, in Mathematics during the school year 2015-2016. Specifically, this study seeks to answer the following question: 1) What is the profile of the Grade 9 students in terms of: (a. Sex; b. Monthly family income; c. Parents' highest educational attainment and; d. Parents' occupation)? 2) What is the pre-test and post-test performances of the Grade 9 students who are exposed to traditional learning activity? 3) What is the pre-test and post-test performances of the Grade 9 students who are exposed to ABL? 4) Is there a significant difference in the pre-test and post-test performances of the Grade 9 students exposed to traditional learning activity and ABL? 5) Is there a significant relationship between the profile variables and the performance of the Grade 9 students exposed to traditional learning activity and ABL?

MATERIALS AND METHODS

The researcher used Pre-test Post-test Control Group Design for this study which involves two groups, using traditional learning and ABL. In this design both formed groups are pre-tested and after treatment, post-tested. The same pre-test and post-test were administered to the two groups(traditional learning and ABL). The pre-test post-test design was used in this study to measure change and compare participant groups because it allows the researcher to assess the effect of ABL by looking at the difference between the pretest and posttest. A total of 38 Grade 9 Section A students of San Jose National High School, San Jose, Anda, Pangasinan during the school year 2015-2016 are the subjects of the study. Two equivalent groups were formed on the bases of Grade Point Average (GPA) from the first three grading periods. The researcher got the balance distribution of the students by sorting the GPA from highest to lowest, then the students were alternately assigned to traditional learning activity group and ABL group. Since there are 38 students from Grade 9, 19 of these students were assigned to traditional learning activity group and the other 19 students to the ABL group. The study made use of a 40-item test in Mathematics and a survey questionnaire. The test was adapted from the Mathematics Learner's Material 9 from DepEd pre-assessment and post-assessment for the fourth quarter. The same test was used for the pre-test and post-test. The survey questionnaire used for the students' profile was adapted from Ortaleza (2014).

Data Gathering Procedure

The study was conducted during the fourth grading period. A letter of permission to conduct the research was sought from office of the principal of San Jose National High school. And through the endorsement of the principal, a letter of permission to conduct research study was also sought from the office of the Schools Division Superintendent.

The students were gathered in one classroom to fill-up their students' profile. At the same time, the pre-test was given to both groups before the treatment. The post-test was administered to both groups after the seven weeks treatment.The data on the performance of the Grade 9 students was obtained from the scores of the students on the pre-test and post-test. The schedule of lessons (see Appendix D) was made for regular scheduling of activities.

Each group was taught the same content but with different learning activities. Students meet daily for sixty minutes. While the researcher gives lecture to the traditional learning activity group, she guided the ABL group about their

activity to be done outside the classroom. When the ABL group are working on their activity, the researcher goes back inside the classroom to discuss with the traditional learning activity group.

There are five topics in Trigonometry. In each topic the researcher chose from the suggested activities in the Grade 9 Mathematics Learners' Material. For example, in the lesson of angles of elevation and angles of depression, the ABL group were given the activity and asked to go outside the classroom. The researcher gave a lecture to the traditional learning activity group who are inside the classroom while she is guiding the ABL group about the activity. When the ABL group are ready for their work, the researcher goes inside the classroom to discuss the topic. After the topic has been discussed the teacher gave exercises for the traditional learning activity group and while they are doing it she checked the ABL group and asks each presenter of the group to discuss about the result of their activity. Through the presentation the researcher can assess if they have followed the right procedure and if they had attained the objectives of the lesson.

Treatment of Data

This experimental research project focuses on students' performance when taught using a traditional learning activities andABL in Mathematics.

To answer the questions posed in this study and to test the hypotheses the statistical tools used are mean, standard deviation, kurtosis, skewness, eta-squared, t-test and Pearson-r.

The profile of the students was determined through the use of frequency counts and percentages.

The researcher made use of the mean,standard deviation,kurtosis and skewness to determine the performance of the Grade 9 students in Mathematics before and after exposure to traditional learning activities and ABL.

To determine if there is a significant difference in the performanceof Grade 9 students in Mathematics before and after exposure to traditionallearning activities and ABL, t-test and eta-squared were used. The following was used for the interpretation for eta squared (Cohen, 1988):

0.14- above – large effect
0.06- 0.13 – moderate effect
0.01 - 0.05 – small effect

To determine if there is a significant relationship between the profile variables of the students and their performance in mathematics, Pearson-r and p-value were used.

RESULTS AND DISCUSSION

This part presents the data gathered, the analysis and the interpretation of data.

Profile of Grade 9 Students in Mathematics

Table 1 presents the profile of the Grade 9 students who are exposed to traditional learning activity and exposed to ABL in terms of sex, monthly family income, highest educational attainment of parents, occupation of parents, and distance of students' residence to school.

The table shows that 57.9 % and 68.4% of the Grade 9 students are female in the traditional and ABL respectively. This means that female students dominate over male students.

In terms of monthly family income, it shows that 31.6% of the students who are exposed to traditional learning activity have parents with monthly income of 5,001-10,000 and 26.3% have 5,000 and below while 26.3% of the students exposed to ABL have both 5,000 and below and 10,001-15,000 parents' monthly income. It implies that most of the students have the monthly family income of Php 15,000 or less.

Based from the significant findings of this study, the following conclusions were drawn by the researcher: 1) Grade 8 students of Tagudin National High School for the school year 2015-2016 are predominantly 13-14 years old, male, they belong to low-income family with a monthly

income of Php 10,00 and below, and have fathers and mothers who are high school graduates; 2) The performance of the student before their exposure to computer-assisted instruction ranges from approaching proficiency to proficient; 3) The performance of the student after their exposure to computer-assisted instruction ranges from proficient to advance; 4) There was a significant difference between the performance of the Grade 8 students before and after their exposure to computer-assisted instruction in Mathematics. Moreover, there was a significantly increase in the performance of the students after their exposure to computer-assisted instruction; 5)There was a significant difference between the performance of the students before and after exposure to computer-assisted instruction across their sex as a variable. There was also a significant difference between the performance of the students before and after exposure to computer-assisted instruction across their age as a variable. There was also a significant difference between the performances of the students after exposure to computer-assisted instruction across their monthly family income as a variable. There was also significant difference between the performances of the students after exposure to computer-assisted instruction across their father's highest educational attainment as a variable. There was a significant difference between the performance of the students before and after exposure to computer-assisted instruction across their mother's highest educational attainment as a variable.

Table 1
Profile of the Grade 9 Students

Variable	Categories	Exposed to Traditional Learning		Exposed to Activity-Based Learning	
		f	%	f	%
Sex	Male	8	42.1	6	31.6
	Female	11	57.9	13	68.4
Total		19	100	19	100
Monthly Family Income	5,000 and below	5	26.3	5	26.3
	5,001 - 10,000	6	31.6	4	21.1
	10,001-15,000	3	15.8	5	26.3
	15,001 - 20,000	4	21.1	2	10.5
	20,001 and above	1	5.3	3	15.8
Total		19	100	19	100
Father's Highest Educational Attainment	Elementary Undergraduate	2	10.5	1	5.3
	Elementary Graduate	2	10.5	0	0
	High School Graduate	9	47.4	8	42.1
	College Undergraduate	3	15.8	3	15.8
	College Graduate	3	15.8	7	36.8
Total		19	100	19	100
Mother's Highest Educational Attainment	High School Undergraduate	0	0	1	5.3
	High School Graduate	12	63.2	6	31.6
	College Undergraduate	4	21.1	5	26.3
	College Graduate	3	15.8	6	31.6
	Vocational	0	0	1	5.3
Total		19	100	19	100

Father's Occupation	Farming	6	31.6	5	26.3
	Fishing	6	31.6	2	10.5
	Carpentry	2	10.5	2	10.5
	Driving	2	10.5	1	5.3
	Seaman	1	5.3	1	5.3
	Masonry	0	0	1	5.3
	Technician	0	0	1	5.3
	Electrician	0	0	1	5.3
	Teacher	0	0	1	5.3
	Others	2	10.5	4	21.1
Total		19	100	19	100
Mother's Occupation	Farming	1	5.3	0	0
	Fishing	1	5.3	0	0
	Vendor	2	10.5	1	5.3
	Teacher	0	0	4	21.1
	Others	15	78.9	14	73.7
Total		19	100	19	100

It can be noted from Table 1 that 47.4% of the students who are exposed to traditional learning have fathers who are high school graduate and 42.1% and 36.8% of the students who are exposed to ABL have father who are high school graduate and college graduate respectively. Students who are exposed to traditional learning have 63.2% high school graduate mothers and both 31.6% of the students who are exposed to ABL have mothers who are high school graduates and college graduates. Therefore, the students' fathers and mothers are mostly high school graduates.

The table revealed that both 31.6% the students who are exposed traditional learning have father with occupation of farming and fishing and 26.3% of the students who are exposed to ABL have father with occupation of farming. This could be attributed to the fact that Anda, Pangasinan is an agricultural and aquatic area. While 78.9 % and 73.7% of the mother of students who are exposed to traditional learning and ABL respectively are housewives.

Pre-Test and Post Test Performances of Grade 9 Students who are Exposed to Traditional Learning

Table 2 presents the pre-test and post-test performances of the Grade 9 students who are exposed to traditional learning. The table shows that the students who are exposed to traditional learning obtained a mean of 14.47 with a standard deviation of 3.454 in the pre-test. This indicates that the scores of the group members are mostly within 3 points above and below the mean. The distribution is negatively skewed by -0.160 which reveals that the larger number of students have performed higher than the mean. It has a kurtosis of -1.147 which means that the distribution is platykurtic curve indicating that the scores are almost about the mean.

Table 2
Performances of the Students who are Exposed to Traditional Learning

	Lowest Score	Highest Score	Mean	Standard Deviation	Skewness	Kurtosis

Pre-Test	9	20	14.47	3.454	-0.160	-1.147
Post-Test	12	33	23.53	5.651	-0.043	-0.586

It also shows that the students who are exposed to traditional learning obtained a mean of 23.53 with a standard deviation of 5.651 in the post-test. This indicates that the scores of the group members are mostly within 6 points above and below the mean.The distribution is negatively skewed by -0.043 which reveals that that the larger numbers of students have performed higher than the mean. It has a kurtosis of -0.586 which indicates that the scores are almost about the mean.

This implies that students who are exposed in traditional learning had an increased performance in the post-test compared to the pre-test.

The following graph illustrates the distribution. Figure 2 shows that the left tail of the distribution is longer, indicating that it is negatively skewed or skewed to the left. Its central peak is lower and broader, and its tails are shorter and thinner. The distribution is described as a platykurtic distribution which means that the scores are near to the mean.

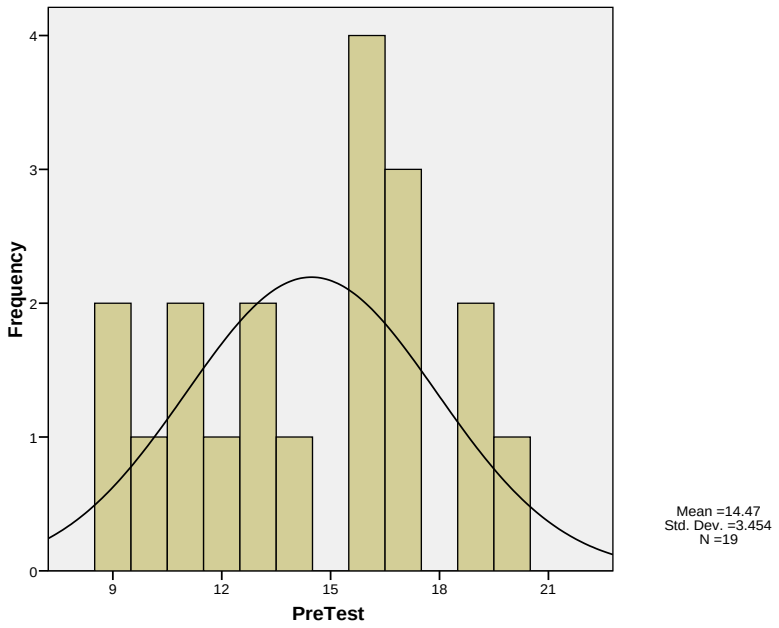

Figure 2.Performance of the Students in the Pre-Test who are to Exposed to Traditional Learning

Figure 3 shows that the left tail of the distribution is longer, indicating that it is negatively skewed or skewed to the left. Its central peak is lower and broader, and its tails are shorter and thinner.The distribution is described as a platykurtic distribution which means that the scores are near to the mean.

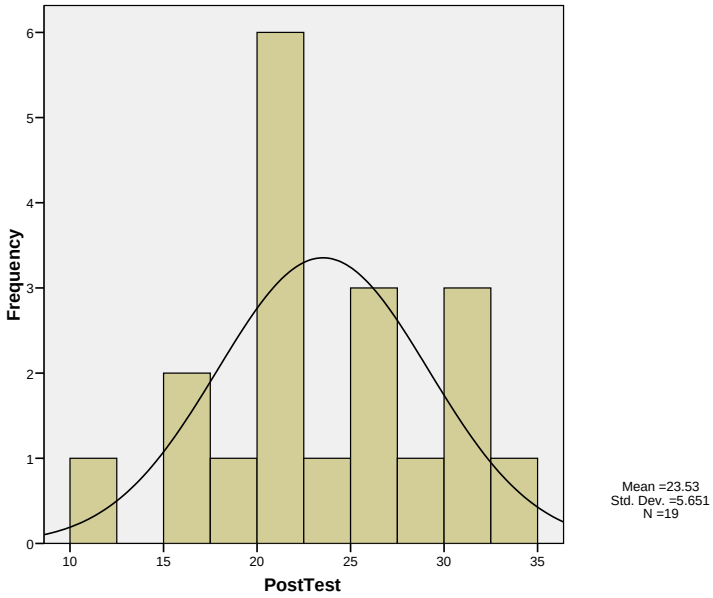

Figure 3.Performance of the Students in the Post-Test who are Exposed to Traditional Learning

Pre-Test and Post-Test Performances of Grade 9 Students who are Exposed to ABL

Table 3 presents the pre-test and post-test performancesof Grade 9 students who are exposed to ABL. The table shows that the students who are exposed to ABL obtained a mean of 14.63 with a standard deviation of 3.059 in the pre-test. This indicates that the scores of the group members are mostly within 3 points above and below the mean. The distribution is positively skewed by 0.677 which reveals that there are more scores below the mean. It has a kurtosis of 0.353 which indicates that the distribution is leptokurtic. This means that the scores are closely clustered about the mean.

Table 3
Performances of the Students who are Exposed to ABL

	Lowest Score	Highest Score	Mean	Standard Deviation	Skewness	Kurtosis
Pre-Test	10	22	14.63	3.059	0.677	0.353
Post-Test	14	35	21.68	5.803	0.707	-0.274

It also shows that the students who are exposed to ABL obtained a mean of 21.68 with a standard deviation of 5.803 in the post-test. This indicates that the scores of the group members are mostly within 6 points above and below the mean. The distribution is positively skewed by 0.707 which reveals that there are more scores below the mean. It has a kurtosis of -0.274 which indicates that the distribution is platykurtic curve which means that thescoresare near the mean. This implies that students who are exposed toABL had an increased performance in the post-test compared to the pre-test.

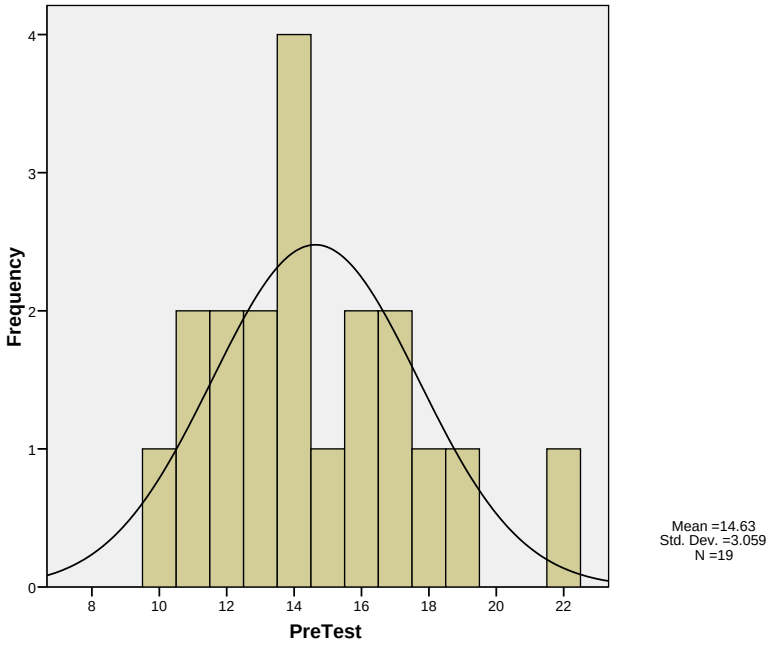

Figure 4.Performance of the Students in the Pre-Test who are Exposed to Activity-Based Learning

Figure 4 shows that the left tail of the distribution is longer, indicating that it is positively skewed or skewed to the right. Its central peak is higher and sharper, and its tails are longer and fatter. The distribution is described as a leptokurtic distribution. This high peak and corresponding fat tails means the distribution is more clustered around the mean.

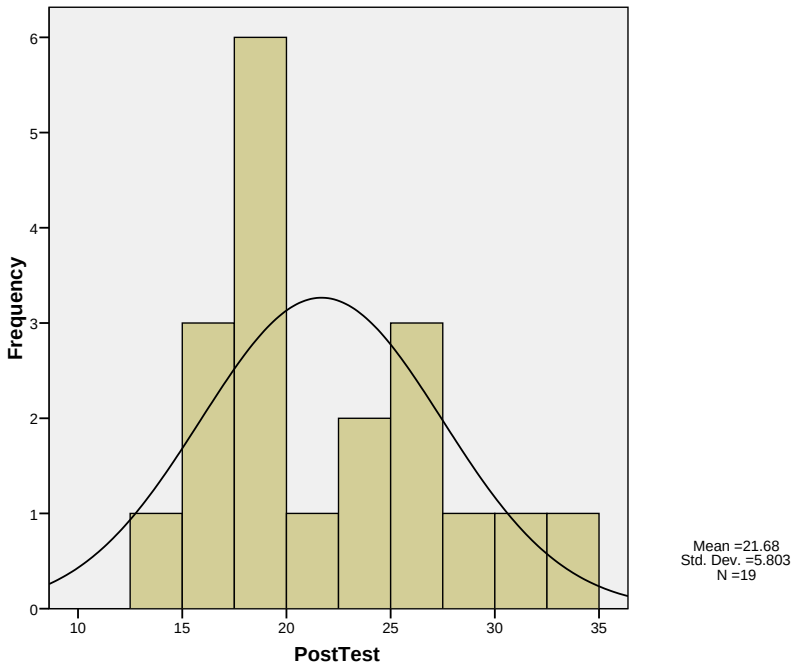

Figure 5.Performance of the Students in the Post-Test who are Exposed to Activity-Based Learning

Figure5 shows that the left tail of the distribution is longer, indicating that it is negatively skewed or skewed to the left. Its central peak is lower and broader, and its tails are shorter and thinner. The distribution is described as a platykurtic distribution which indicates that the scores are near the mean.

Testing for the Significance of Difference in the Pre-Test and Post-Test Performances of the Grade 9 Students Exposed to Traditional Learning

The result of the significance of difference in the pre-test and post-test performances of the Grade 9 students exposed to traditional learning is presented in Table 4.

Table 4
Difference in the Pre-Test and Post-Test Performance of the Students who are Exposed to Traditional Learning

	Mean	Standard Deviation	Mean Diff.	t-value	df	p-value	Eta^2
PreTest	14.47	3.454	9.053	6.740	18	.000	71.62%

PostTest	23.53	5.651					

In the table, pre-test and post-test performances obtained by the students who are exposed to traditional learning were evaluated. The mean difference of the scores is 9.053.There was a statistically significant increase in the performance of students from Pre-Test (M=14.47, SD=3.454) to Post-Test (M=23.53, SD=5.651, t = 6.740, p<.05). The effect size statistics or eta squared statistic of 71.62% indicated a large effect size.

Testing for the Significance of Difference in the Pre-Test and Post-Test Performances of the Grade 9 Students Exposed to ABL

The result of the significance of difference in the pre-test and post-test performances of the Grade 9 students exposed to ABL is presented in Table 5.

Table 5
Difference in the Pre-Test and Post-Test Performances of the Students who are Exposed to ABL

	Mean	**Standard Deviation**	**Mean Diff.**	**t-value**	**df**	**p-value**	**Eta^2**
PreTest	14.63	3.059	7.053	5.347	18	.000	61.37%
PostTest	21.68	5.803					

In the table, pre-test and post-test performances obtained by the students who are exposed to ABL were evaluated. There was a statistically significant increase in the performance of students from pre-test (M=14.63, SD=3.059) to post-test (M=21.68, SD=5.80, t = 5.347, p<.05). The effect size statistics or eta squared statistic of 61.37 % indicated a large effect size.

Testing for the Significance of Difference in the Pre-Test and Post-Test Performances of the Grade 9 Students Exposed to Traditional and ABL

The result of the significance of difference in the pre-test and post-test performances of the Grade 9 students exposed to traditional and ABL is presented in Table 6.

Table 6
Difference in the Performance of the Students who are Exposed to Traditional Learning and Exposed to ABL

	Compared Categories	**Mean**	**Mean Diff.**	**t-value**	**p-value**	**Eta^2**
	Traditional Learning	14.47	-0.158	-0.149	0.882	.06%

Pre-Test Score	ABL	14.63				
Post-Test Score	Traditional Learning	23.53	1.842	0.991	0.328	2.66%
	ABL	21.68				

It was shown in the table, that an independent-samples t-test was conducted to compare the students' Pre-Test scores of traditional learning and ABL. There was no significant difference in scores for traditional learning (M=14.47, SD=3.454) and ABL (M=14.63, SD=3.059; t=.149, p=.882). The magnitude of the differences in the means is .06%indicating a small effect.

It was also shown in the table, that an independent-samples t-test was conducted to compare the students' Post-Test scores of traditional learning and ABL. There was no significant difference in scores for traditional learning (M=23.53, SD=5.651) and ABL (M=21.68, SD=5.803; t=.991, p=.328). The magnitude of the differences in the means is 2.66 % indicating a moderate effect.

Therefore, the null hypotheses stating that there is no significant difference in the pre-test and post-test performances of the students exposed to traditional learning and exposed to ABL is accepted.

This implies that the traditional learning activity is as effective as the ABL activity. It contradicts the study of Hussain,et.al (2011) that ABL is more effective as compared to traditional method of teaching.

Testing for the Significance of Relationship Between the Profile Variable and the Performance of the Students Exposed to Traditional Learningand ABL

Using the Pearson r, table 7 and table 8 indicates the degree of relationship between the profile variables and performance of the students who are exposed to traditional learning and ABL.

The significance of .002 with a correlation coefficient of .659 indicates that there is a moderate correlation or substantial relationship between pre-test and sex of student. The significance of .025 with a correlation coefficient of .512 indicates that there is a moderate correlation or substantial relationship between pre-test and mothers' occupation at 0.05 level of significance.

Only sex and mothers' occupation have significant relationships with the students' pre-test performance in the traditional learning while the rest of the profile variables have no significant relationships with the pre-test and post-test performances of the students who are exposed to traditional learning and ABL

Table 7
Correlation Analysis Between the Profile Variable and the Performance of the Students Traditional Learning

Variable	Performance	(Pearson-r) Correlation Coefficient	Significance
Sex	Pre-Test	.659**	.002

	Post-test	.295	.220
Monthly Family Income	Pre-Test	-.118	.631
	Post-test	.080	.745
Father's Highest Educational Attainment	Pre-Test	-.368	.121
	Post-test	.056	.821
Mother's Highest Educational Attainment	Pre-Test	.047	.848
	Post-test	.086	.727
Father's Occupation	Pre-Test	.081	.741
	Post-test	.423	.071
Mother's Occupation	Pre-Test	.512*	.025
	Post-test	.162	.509

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

Table 8
Correlation Analysis Between the Profile Variable and the Performance of the Students Exposed to ABL

Variable	Performance	(Pearson-r) Correlation Coefficient	Significance
Sex	Pre-Test	.334	.162
	Post-test	.183	.454
Monthly Family Income	Pre-Test	-.285	.237
	Post-test	.055	.824
Father's Highest Educational Attainment	Pre-Test	-.252	.297
	Post-test	-.340	.155
Mother's Highest Educational Attainment	Pre-Test	.172	.481
	Post-test	-.136	.578
Father's Occupation	Pre-Test	-.076	.756
	Post-test	-.210	.387
Mother's Occupation	Pre-Test	.113	.644
	Post-test	.258	.286

Hence, the hypothesis stating that there is no significant relationship between the profile variables and the performances of the students exposed to traditional learning and exposed to ABL is accepted. It does not show the study of Raychauduri(2010) that socio economic factors like family income, mother's and father's education, and distance of schools affected the performance of the students.

CONCLUSIONS

Based from the findings of the study, the following conclusions were generated: 1) Most of the students are dominated by females. Majority of the students have the family income of Php 15,000 or less. Students' fathers and mothers are mostly high school graduates. Most of the fathers are skilled worker which include farming and fishing. While most of the mothers of the students are housewives.; 2) Students who are exposed to traditional learning activity had an increased performance in the post test; 3) Students who are

exposed to ABL had an increased performance in the post test. 4) ABL is as effective as the traditional learning activity when used as a learning strategy in Grade 9 Mathematics. 5) Only sex and mothers' occupation have significant relationships with the students' pre-test performance in the traditional learning while the rest of the profile variables have no significant relationships with the pre-test and post-test performances of the students who are exposed to traditional learning and ABL.

RECOMMENDATIONS

Based from the findings of the study and the conclusions generated, the researcher recommends the following: 1) Enhance teachers' strategies to further motivate students to study and improve their performance in mathematics; 2) Teachers and parents should work together to improve the mathematics performance of every students; 3) Proper guidance should be given by parents to improve the study habits of the students; 4) The concern DepEd officials and administrators should organize seminars/trainings for teachers to maintain and improve the ABL strategies in teaching math; 5) The study should be replicated to compare the ABL with other methods of teaching to find out the relative effectiveness of the different methods with ABL; and 6) The study should be replicated in all grades from elementary to university level.

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