

CHAPTER IV

FINDING AND DISCUSSION

This chapter discussed research finding and discussion. The contents of this chapter could be presented as follow.

A. Finding

The research was started on January 28 2019 until February 8 2019. It was carried out in SMA Muhammadiyah Ponorogo. It consisted of pre-test, treatment, and post-test from experiment and control class. Pre-test was carried out in the first meeting in each class. After that, the material given was conducted in two meeting each class (giving treatment in experiment class by using android application as media and giving material by using pocketbook for control class). After that, the researcher gave post-test to experiment and control class.

Before the researcher carried out the research, the researcher also tested instrument of collecting data. Before the instrument was given to the experiment class and the control class, the researcher conducted the instrument trial on populations outside the sample. The aim was to know the quality of the instrument such as the level of validity, reliability, and objectivity. Instrument testing conducted on class XI IPS 1 with a total of 27 students. The researcher also consulted the instrument to the judgments experts.

As for the detail of result, description, analysis of data, and hypothesis testing presented in some points below.

1. Description of Pre-test

The pre-test description of experiment and control class was obtained from the calculation using SPSS program version 18 with the steps: *Analyze -> Descriptive Statistic -> Frequencies*. Then put pre-test into *variables -> Click Statistic -> Checklist the entire menu (mean, mode, median, variance, standard deviation, and sum) -> Click OK*. The calculation produced as follows:

Table 4.1: Table of Pre-test Description of Experiment Class

Statistics		
Pre_test_Experiment		
N	Valid	19
	Missing	0
Mean		59.74
Median		60.00
Mode		60
Std. Deviation		9.200
Variance		84.649
Minimum		45
Maximum		75
Sum		1135

Table 4.1 showed that the total data of XI MIPA 3 as the experiment class consisted of 19 students ($N = 19$). The total of all data which were divided with the number of data determined as mean score from experiment class was **59.74**. The data which were located in the middle after being sorted according to the number determined as median score was **60**. The element which appeared most frequently in a set of elements determined as the mode score was **60**. The score of standard deviation was **9.200**. The sum of squares of the difference in the value of the observation data from the mean score, then divided by the number of observations determined as the variance score was **84.649**. The highest score of

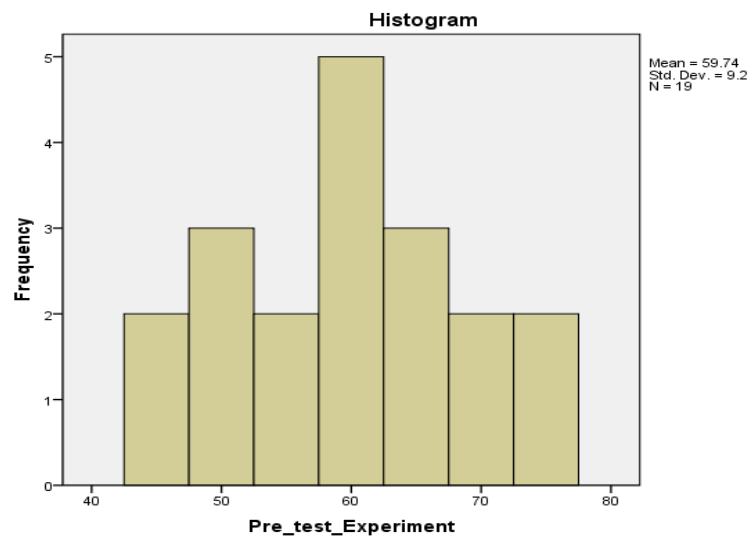
the experiment class was **75** and the lowest was **45**. Standard deviation was statistical values were used to determine how the data in the sample were distributed, and how close the individual data points were to the mean. The sum gained from the total scores was **1135**.

Meanwhile, the table of frequency distribution could be presented as follows:

Table 4.2: **Table of Pre-test Frequency of Experiment Class**

Pre_test_Experiment					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	45	2	10.5	10.5	10.5
	50	3	15.8	15.8	26.3
	55	2	10.5	10.5	36.8
	60	5	26.3	26.3	63.2
	65	3	15.8	15.8	78.9
	70	2	10.5	10.5	89.5
	75	2	10.5	10.5	100.0
	Total	19	100.0	100.0	

Table 4.2 was tool of presentation consisting of columns and rows and there were numbers which described the division and the percentage of frequency distribution. The table above could be described in the form of a bar diagram as follows:



Picture 2. Frequency distribution of Pre-test of Experiment Class

Meanwhile, acquisition result from a pre-test in XI MIPA 1 class as the control class of this research was presented in a table below:

Table 4.3: Table of Pre-test Description of Control Class

Statistics		
Pre_test_Control		
N	Valid	19
	Missing	0
Mean		66.58
Median		65.00
Mode		70
Std. Deviation		7.827
Variance		61.257
Minimum		50
Maximum		85
Sum		1265

Table 4.3 showed that the total data of XI MIPA 1 as the control class consisted of 19 students ($N = 19$). The total of all data which were divided with the number of data determined as mean score from experiment class was **66.58**.

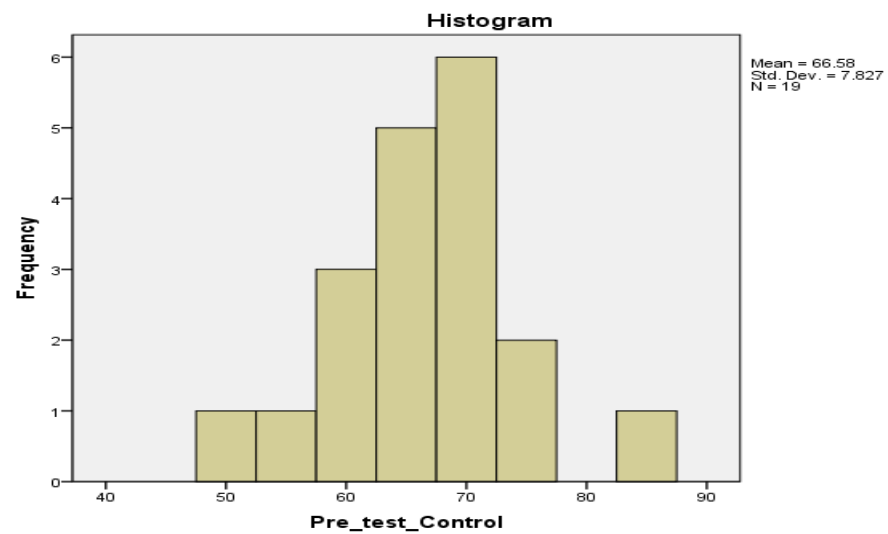
The data which were located in the middle after being sorted according to the number determined as median score was **65**. The element which appeared most frequently in a set of elements determined as the mode score was **70**. The score of standard deviation was **7.827**. The sum of squares of the difference in the value of the observation data from the mean score, then divided by the number of observations determined as the variance score was **61.257**. The highest score of the experiment class was **85** and the lowest was **50**. Standard deviation was statistical values were used to determine how the data in the sample were distributed, and how close the individual data points were to the mean. The sum gained from the total scores was **1265**.

Meanwhile, the table of frequency distribution could be presented as follows:

Table 4.4: **Table of Pre-test Frequency of Control Class**

Pre_test_Control					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	50	1	5.3	5.3	5.3
	55	1	5.3	5.3	10.5
	60	3	15.8	15.8	26.3
	65	5	26.3	26.3	52.6
	70	6	31.6	31.6	84.2
	75	2	10.5	10.5	94.7
	85	1	5.3	5.3	100.0
	Total	19	100.0	100.0	

Table 4.4 was tool of presentation consisting of columns and rows and there were numbers which described the division and the percentage of frequency distribution. The table above could be described in the form of a bar diagram as follows:



Picture 3. Frequency distribution of Pre-test of Control Class

2. Description of Post-test

The post-test result of experiment and control class was obtained from the calculation using SPSS program version 18 with the steps as follows: *Analyze* -> *Descriptive Statistic* -> *Frequencies*. Then put pre-test scores into *variables* -> *Click Statistic* -> Checklist the entire menu (*mean, mode, median, variance, standard deviation, and sum*) -> *Click OK*. The calculation produced as follows:

Table 4.5: Table of Post-test Description of Experiment Class

Statistics		
Post_test_Experiment		
N	Valid	19
	Missing	0
Mean		80.79
Median		80.00
Mode		80
Std. Deviation		6.070
Variance		36.842
Minimum		70
Maximum		90
Sum		1535

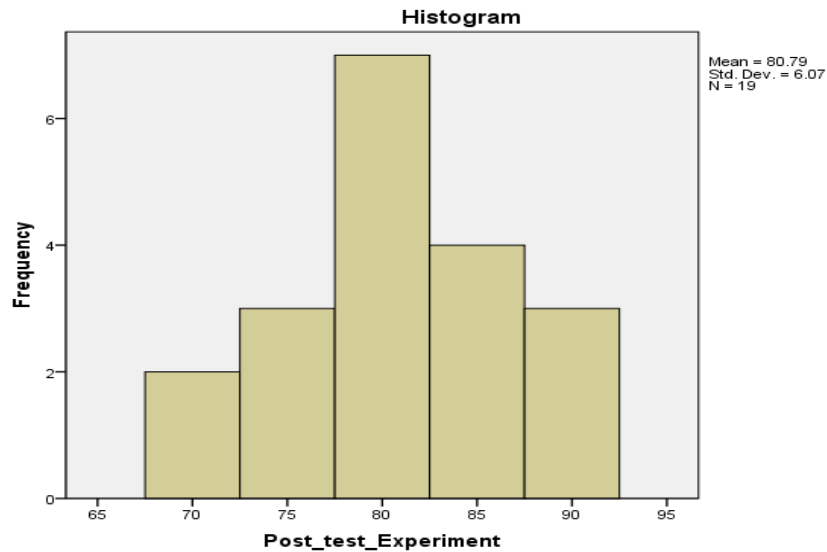
Table 4.5 showed that the total data of XI MIPA 3 as the experiment class consisted of 19 students ($N = 19$). The total of all data which were divided with the number of data determined as mean score from experiment class was **80.79**. The data which were located in the middle after being sorted according to the number determined as median score was **80**. The element which appeared most frequently in a set of elements determined as the mode score was **80**. The sum of squares of the difference in the value of the observation data from the mean score, then divided by the number of observations determined as the variance score was **36.842**. Standard deviation was statistical values were used to determine how the data in the sample were distributed, and how close the individual data points were to the mean. The score of standard deviation was **6.070**. The highest score of the experiment class was **90** and the lowest was **70**. The sum gained from the total scores was **1535**.

Meanwhile, the table of frequency distribution could be presented as follows:

Table 4.6: **Table of Post-test Frequency of Experiment Class**

Post_test_Experiment					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	70	2	10.5	10.5	10.5
	75	3	15.8	15.8	26.3
	80	7	36.8	36.8	63.2
	85	4	21.1	21.1	84.2
	90	3	15.8	15.8	100.0
	Total	19	100.0	100.0	

Table 4.6 was tool of presentation consisting of columns and rows and there were numbers which described the division and the percentage of frequency distribution. The table above could be described in the form of a bar diagram as follows:



Picture 4. Frequency distribution of Post-test of Experiment Class

Meanwhile, acquisition result from a post-test in XI MIPA 1 class as the control class of this research was presented in a table below:

Table 4.7: Table of Post-test Description of Control Class

Statistics		
Post_test_Control		
N	Valid	19
	Missing	0
Mean		75.26
Median		75.00
Mode		70 ^a
Std. Deviation		7.164
Variance		51.316
Minimum		60
Maximum		85
Sum		1430

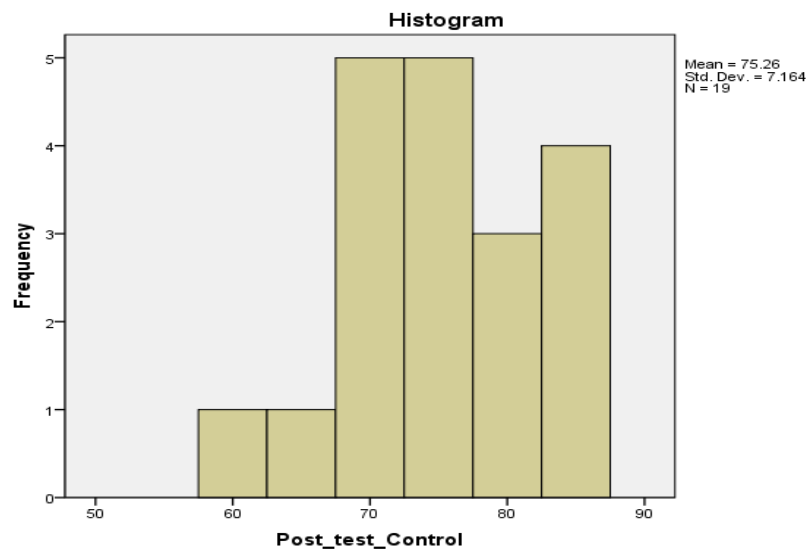
Table 4.7 showed that the total data of XI MIPA 1 as the control class consisted of 19 students ($N = 19$). The total of all data which were divided with the number of data determined as mean score from experiment class was **75.26**. The data which were located in the middle after being sorted according to the number determined as median score was **75**. The element which appeared most frequently in a set of elements determined as the mode score was **70**. The sum of squares of the difference in the value of the observation data from the mean score, then divided by the number of observations determined as the variance score was **51.316**. Standard Deviation was statistical values were used to determine how the data in the sample was distributed, and how close the individual data points were to the mean. The score of standard deviation was **7.164**. The highest score of the experiment class was **85** and the lowest was **60**. The sum gained from the total scores was **1430**.

Meanwhile, the table of frequency distribution could be presented as follows:

Table 4.8: Table of Post-test Frequency of Control Class

Post_test_Control					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	60	1	5.3	5.3	5.3
	65	1	5.3	5.3	10.5
	70	5	26.3	26.3	36.8
	75	5	26.3	26.3	63.2
	80	3	15.8	15.8	78.9
	85	4	21.1	21.1	100.0
	Total	19	100.0	100.0	

Table 4.8 was tool of presentation consisting of columns and rows and there were numbers which described the division and the percentage of frequency distribution. The table above could be described in the form of a bar diagram as follows:



Picture 5. Frequency distribution of Post-test of Control Class

3. Normality Test

The normality test was obtained from the calculation using SPSS program version 18 with the steps as follows: Clicking *Analyze -> Descriptive Statistic -> Explore -> Put Variables into Dependent List and Factors List -> Plots -> Checklist Normality Plots with Test -> Continue -> Ok*. The normality test was a prerequisite before hypotheses tested by using t test. This test was tested by using Kolmogorov-Smirnov and Shapiro-Wilk with Lilliefors significance correction. The test was for two group, both pre-test and post-test group, to determine if the distribution of the data from the sample was normal. If the normality score result

was above the level of significance (**0.05**), the score was normally distributed. The calculation result of normality test could be presented as follows:

Table 4.9: **Table of Normality Test**

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pre-test Experiment	.143	19	.200*	.949	19	.380
Pre-test Control	.173	19	.136	.952	19	.420
Post-test Experiment	.185	19	.086	.922	19	.121
Post-test Control	.146	19	.200*	.927	19	.151

Based on Kolmogorov-Smirnov and Shapiro-Wilk test, data were stated as distributed normally when sig. score was above **0.05**. In the table Kolmogorov-Smirnov by using Lilliefors significance correction above, it showed that both experiment and control class distributed normally. The sig. score of pre-test in experiment and control class were **0.200 (0.05 < 0.200)** and **0.136 (0.05 < 0.136)**. The sig. score of post-test between both of the class were **0.086 (0.05 < 0.086)** and **0.200 (0.05 < 0.200)**.

Meanwhile, based on Shapiro-Wilk, in the table above, it showed that both experiment and control had normal distribution data. The sig. score in pre-test experiment and control class were **0.360 (0.05 < 0.360)** and **0.420 (0.05 < 0.420)**. The sig. score in post-test between both of the class were **0.121 (0.05 < 0.121)** and **0.151 (0.05 < 0.151)**.

4. Homogeneity Test

The homogeneity test was obtained from the calculation using SPSS program version 18 with the steps as follows: Clicking *Analyze* -> *Compare Mean* -> *One Way Anova* -> Put Variables into *Dependent List and Factors List* -> *Option* -> Checklist *Homogeneity of variance Test* -> *Continue* -> *Ok*. Homogeneity test was a test used to find out whether the data from two groups had the equal variances or not. This test was a prerequisite before the hypotheses tested by t-test. In this calculation, Homogeneity test was tested by using Levene test. The following table contained the result of test of homogeneity between both of class and could be presented as follows:

Table 4.10: **Table of Homogeneity Test**

Class	Significance Value (P Value)	Notes
Pre-test Experiment	0.486	If the significance Value (P) > 0.05 = Homogeny
Pre-test Control		
Post-test Experiment	0.110	
Post-test Control		

In the result of homogeneity test, data were called as homogeny or had equal variances when sig. score was above **0.05**. From the table above, Sig. score in those columns were **0.486** and **0.110**. Those results were above **0.05** (**0.486 > 0.05 < 0.110**) which mean that these data had homogeny distribution. Complete calculation by using SPSS program version 18 could be seen in appendix.

5. Independent Sample T-test

The independent sample test was obtained from the calculation using SPSS program version 18 with the steps as follows: Clicking *Analyze* -> *Compare Mean*

-> *Independent Sample T-test* -> Put Variables into *Test Variable and Grouping Variable (Defining Group 1 and 2)* -> *Continue* -> *Ok*. This analysis technique aimed to determine the differences of mean scores of experiment and control class in the post-test. The result used to determine the hypothesis testing of this research. T-test calculation for the experiment and control class was listed in the table as follows:

Table 4.11: Table of T-test Calculation of Post-test

Group Statistics					
	Class	N	Mean	Std. Deviation	Std. Error Mean
Score	Control	19	75.26	7.164	1.643
	Experiment	19	80.79	6.070	1.393

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Post-test	Equal variances assumed	.497	.486	2.566	36	.015	5.526	2.154	9.895	1.158
	Equal variances not assumed			2.566	35.055	.015	5.526	2.154	9.899	1.154

Before t-test of post-test was carried out, a variance similarity test (homogeneity) was conducted with F test (Levene Test), which mean that if the

variances were same then the t test used Equal Variance Assumed and if the variances were different, the t test used Equal Variance Not Assumed. As for the steps of the F test as follows:

1. Determining hypothesis of F test

Ho: Two variances were not different (variances group of post-test of experiment and control class were same)

Ha: Two variances were different (variances group of post-test of experiment and control class were not same)

2. Testing Criteria (based on probability / significance)

Ho was accepted if $P \text{ value} > 0.05$

Ho was rejected if $P \text{ value} < 0.05$

3. Comparing probabilities / significance

P value (0.486 > 0,05) then Ho was accepted.

4. Conclusion

Because the probability value (significance) with equal variance assumed (assumed to be the same variances) was **0.486** and higher than **0.05**, Ho was accepted, so it could be concluded that the two variances were the same (group variances of post-test of experiment class and control class were same). With this result, the use of the t test used equal variance assumed (assumed to be the same two variances).

And the next step was testing independent sample t-test. As for the steps of independent t-test as follows:

1. Determining hypothesis of t-test

Ho: There was no significance of difference mean scores of post-tests between experiment and control class

Ha: There was significance of difference mean scores of post-tests between experiment and control class

2. Determining significance level

The test used 2-tailed test with a significance level of $\alpha = 5\%$. The level of significance in this case mean that the researcher took risk the decision to reject the correct hypothesis as much as 5% (significance of 5% or 0.05 was a standard measure).

3. Determining t_{count}

From the table above the value of t_{count} (equal variance assumed) was **2.566**.

4. Determining t_{table}

The t_{table} distribution was taken at $\alpha = 5\% : 2 = 2,5\%$ (2-tailed test) with degrees of freedom (df) $n-2$ or $36-2 = 34$. Using 2-tailed testing (significance = 0.025), the result of t_{table} was obtained **2.032** (see appendix).

5. Testing criteria

Based on comparing t_{count} and t_{table} :

Ho was accepted if $t_{\text{table}} > t_{\text{count}}$

Ho was rejected if $t_{\text{table}} < t_{\text{count}}$

Based on probability:

Ho was accepted if P value (sig.2 tailed) $> 0,05$

Ho was rejected if P value (sig.2 tailed) $< 0,05$

6. Comparing t_{count} and t_{table} and probability

$t_{table} < t_{count}$ (**2.032 < 2.566**) and P value (**0.015 < 0.05**).

7. Conclusion

Because the value of $t_{table} < t_{count}$ (**2.032 < 2.566**) and P value (**0.015 < 0.05**) then H_0 was rejected and H_a was accepted. It means that there was significance of difference mean scores of post-tests between experiment and control class.

6. Hypothesis Testing

The alternative hypothesis (H_a) proposed in this study was “there is effectiveness of android application learning to students’ writing achievement of the eleven grade senior high school Muhammadiyah Ponorogo”. For the purpose of testing, the alternative hypothesis was consulted to the null hypothesis (H_0): “There is no effectiveness of android application learning to students’ writing achievement of the eleven grade senior high school Muhammadiyah Ponorogo.”

To measure which hypothesis would be accepted and which hypothesis would be rejected, it could be seen from two things, from the t-test of post-test of experiment and control class. If t_{count} was higher than t_{table} with a certain level of error used was 5% and related df (34), then H_0 was rejected and H_a was accepted.

The second was comparing the difference mean score of experiment class and control class. If the mean score of experiment class (given treatment class) was higher than control class in post-test, it could be concluded that H_0 was rejected and H_a was accepted which mean that “there is effectiveness of android application learning to students’ writing achievement of the eleven grade senior high school Muhammadiyah Ponorogo”. As for the result of t-test calculation and

difference of mean score of experiment and control class which to determine the accepted hypothesis could be seen in the table 4.11.

From the result of t-test calculation of post-test (See table 4.11), the result showed that t_{count} was higher than t_{table} ($2.032 < 2.566$) with a certain level of error used was 5% and related df (36), then H_0 was rejected and H_a was accepted. Table 4.11 also showed that the mean score of experiment class was higher than control class ($80.79 > 75.26$) and the difference mean score between experiment and control class was **4.74**, it could be concluded that H_0 was rejected and H_a was accepted.

B. Discussion

Based on t-test calculation and hypothesis testing, the discussion of this research result could be presented in the table as follows:

Table 4.12: Summary of T-test of Post-test

Data	t_{count}	t_{table}	Df	P	Notes
Post-test of Experiment Class and Control Class	2.566	2.032	36	0.015	$t_{\text{count}} > t_{\text{table}}$ and P value $< 0,05 =$ Significance

Table 4.13: Summary of Mean Scores

Data	Mean	Increasing Score
Pre-test Experiment	59.74	21.05
Post-test Experiment	80.79	
Pre-test Control	66.58	8.68
Post-test Control	75.26	

From the table 4.12 and 4.13 above, it could be presented that after being given treatment in the experiment class and carried out the post-test, the result of

post-test of experiment and control class indicated that there was significance difference. It could be seen from the table 4.12 that $t \text{ count} > t \text{ table}$ (**2.032** < **2.566**) and $P < 0.05$ (**0.015** < **0.05**) which mean that there was difference ability between the experiment class and the control class after being given treatment. The difference could also be seen from the mean score (see table 4.13). The table showed that experiment class had mean score **80,79** with increasing **21,05** from its pre-test score while control class had mean score **75.26** with increasing **8.68** from its pre-test score, so the experiment class had higher score and higher increasing score than control class.

From the description of the result of t-test and hypothesis testing above, it could be concluded that there was effectiveness of android application learning to students' writing achievement of the eleven grade senior high school Muhammadiyah Ponorogo.

