CHAPTER IV
RESEARCH FINDING AND DISCUSSION

This chapter presents the data that was collected during the experimental research. The researcher analysed the gathered data by employing statistical tool of t- test formula to respond to the objective of the study. The main purpose of this analysis is to find out whether or not there is a difference understanding in learning diphthongs between students taught by mean of nursery rhymes medium and those taught by means non nursery rhymes medium.

A. Description of the Research

To find out the effectiveness of nursery rhymes between students who were taught by using nursery rhymes and the students who were not taught by using nursery rhymes on diphthong, especially in SD N 01 Tembok Luwung Tegal the writer did an analysis of quantitative data. The data was obtained by giving test to the experimental class and control class after giving a different learning both classes. The subject of this research was two classes. They are experimental class (VA) and control class (VB) of SD N 01 Tembok Luwung Tegal.

Before the activities were conducted, the writer determined the materials and lesson plan of learning. Learning in the experimental class used nursery rhymes, while the control class without used nursery rhymes.

After the data were collected, the writer analyzed it. The first analysis data is from beginning of control class and experimental class that is taken from the pre- test value. It is the normality test and homogeneity test. It is used to know that two groups are normal and have same variant. Another analysis data is from the ending of control class and experimental class. It is used to prove the truth of hypothesis that has been planned.

B. The Data Analysis

1. Analysis of Students' Pre- Test Scores for the Experimental Class and the Control Class

Based on the test given to the experimental class and the control class, the pre- test scores were gained from the students before the treatment was administered. The average score reached by experimental class was 42.65 while the control class reached 41.21 as their average score. The result of pre- test was used to know if the class is normal or not and if the class is homogeneous or not, those are called by normality test and homogeneity test. The complete data is follows:

Table 1

The List of Pre- Test Value of the Experimental Class and the Control Class

No	Experimental Class		No.	Control Class	
	Code	Pre-Test		Code	Pre- Test
1	E- 01	30	1	C- 01	20
2	E- 02	40	2	C- 02	20
3	E- 03	60	3	C- 03	40
4	E- 04	40	4	C- 04	50
5	E- 05	30	5	C- 05	50
6	E- 06	50	6	C- 06	20
7	E- 07	30	7	C- 07	40
8	E- 08	30	8	C- 08	50
9	E- 09	30	9	C- 09	60
10	E- 10	30	10	C- 10	50
11	E- 11	60	11	C- 11	50
12	E- 12	40	12	C- 12	60
13	E- 13	20	13	C- 13	40
14	E- 14	40	14	C- 14	30
15	E- 15	50	15	C- 15	60
16	E- 16	40	16	C- 16	20
17	E- 17	40	17	C- 17	50
18	E- 18	60	18	C- 18	50

19	E- 19	30	19	C- 19	40
20	E- 20	50	20	C- 20	70
21	E- 21	30	21	C- 21	30
22	E- 22	40	22	C- 22	40
23	E- 23	20	23	C-23	30
24	E- 24	50	24	C- 24	30
25	E- 25	40	25	C- 25	70
26	E- 26	40	26	C- 26	40
27	E- 27	60	27	C- 27	50
28	E- 28	70	28	C- 28	30
29	E- 29	60	29	C- 29	40
30	E- 30	70	30	C- 30	30
31	E- 31	20	31	C- 31	30
32	E- 32	50	32	C- 32	30
33	E- 33	30	33	C- 33	40
34	E- 34	70	34		
Σ	=	1450	Σ	=	1360
N	=	34	N	=	33
X	=	42.65	X	=	41.21
S^2	=	213.99	S^2	=	192.23
S	=	14.63	S	=	13.86

a. The Normality Test of Pre- Test of The Experimental Class

The normality test is used to find out whether data of experimental class and control class which have been collected from the research come normal distribution or not. The result computation of Chi- square (x^2_{count}) then was compared with table of Chi- square (x^2_{table}) by using 5% alpha of significance. If $x^2_{count} < x^2_{table}$ meant that the data spread of research result distributed normally.

Hypothesis:

Ha: The distribution list is normal.

Ho: The distribution list is not normal

H_O accepted if $x^2_{count} < x^2_{table}$ with α= 5% and dk= k-1

Test of hypothesis:

The formula is used:

$$X^2 = \sum_{i=1}^{k} \frac{(O_i - E_i)^2}{E_i}$$

The computation of normality test:

Length of the class = 8

Maximum score = 70

Minimum score = 20

K/ Number of class = 6

Range = 50

Table 2

Distribution value of pre test of the experimental class

Class	f_i	X_i	X_i^2	$f_i.X_i$	$f_i.X_i^2$
20 – 28	3	24	576	72	1728
29 – 37	9	33	1089	297	9801
38 – 46	9	42	1764	378	15876
47 – 55	5	51	2601	255	13005
56 – 64	5	60	3600	300	18000
65 – 73	3	69	4761	207	14283
Sum	34			1509	72693

$$\overline{X} = \frac{\sum fixi}{\sum fi} = \frac{1509}{34} = 44.382$$

$$s^2 = \frac{n\sum fi.xi^2 - (\sum fixi)^2}{n(n-1)} = \frac{34 * 72693 - (1509)^2}{34(34-1)} = 173.334$$

$$s = 13.1656$$

Table 3

Observation Frequency Value of Pre-test of the Experimental Class

Class interval	Bk	Z_i	$P(Z_i)$	Wide of Area	Ei	Oi	$\frac{(O_i - E_i)^2}{E_i}$
	19.5	-1.89	-0.4706				
20 – 28				0.0845	2.0	3	0.4670
	28.5	-1.21	-0.3862				
29 – 37				0.1867	4.5	9	4.5556
	37.5	-0.52	-0.1994				
38 – 46				0.2663	6.3	9	1.1368
	46.5	0.16	0.0639				
47 – 55				0.2369	5.7	5	0.0827
	55.5	0.84	0.3008				
56 – 64				0.1360	3.3	5	0.9246
	64.5	1.53	-0.4367				
65 – 73				0.0498	1.2	3	2.7310
	73.5	2.21	0.4865				
					X^2	=	9.8977

With α = 5% and dk = 6-1 = 5, from the chi-square distribution table, obtained X_{table} = 11, 07. Because X^2_{count} is lower than X^2_{table} (9, 8977<11, 07). So, the distribution list is normal.

b. The Normality Test of Pre- Test of the Control Class

Hypothesis:

Ha: The distribution list is normal.

Ho: The distribution list is not normal

Ho accepted if $x^2_{count} < x^2_{table}$ with α= 5% and dk= k- 1

Test of hypothesis:

The formula is used:

$$X^2 = \sum_{i=1}^{k} \frac{(O_i - E_i)^2}{E_i}$$

The computation of normality test:

Length of the class = 8

Maximum score =70

Minimum score = 20

Number of class (k) = 6

Range = 50

Table 4

Distribution Value of Pre-test of the Control Class

Class	f_i	X_i	X_i^2	$f_i.X_i$	$f_i.X_i^2$
20 – 28	4	24	576	96	2304
29 – 37	8	33	1089	264	8712
38 – 46	8	42	1764	336	14112
47 – 55	8	51	2601	408	20808
56 – 64	3	60	3600	180	10800
65 – 73	2	69	4761	138	9522
Sum	33			1422	66258

$$\overline{X} = \frac{\sum fixi}{\sum fi} = \frac{1422}{33} = 43.09091$$

$$s^2 = \frac{n\sum fi.xi^2 - (\sum fixi)^2}{n(n-1)} = \frac{33 * 66258 - (1422)^2}{33(33-1)} = 155.71$$

$s = 12.4784$

Table 5

Observation Frequency Value of Pre-test of the Control Class

Class interval	Bk	Z_i	$P(Z_i)$	Wide of Area	Ei	Oi	$\frac{(O_i - E_i)^2}{E_i}$

	19.5	-1.89	-0.4707				
20 – 28				0.0918	2.2	4	1.4654
	28.5	-1.17	-0.3789				
29 – 37				0.2059	4.9	8	1.8922
	37.5	-0.45	-0.1729				
38 – 46				0.2806	6.7	8	0.2379
	46.5	0.27	0.1077				
47 – 55				0.2323	5.6	8	1.0534
	55.5	0.99	0.3400				
56 – 64				0.1169	2.8	3	0.0135
	64.5	1.72	0.4569				
65 – 73				0.0357	0.9	2	1.5250
	73.5	2.44	0.4926				
					X^2	=	6.1784

With α = 5% and dk = 6-1 = 5, from the chi-square distribution table, obtained X_{table} = 11.07. Because X^2_{count} is lower than X^2_{table} (6.1874<11.07). So, the distribution list is normal.

c. The Homogeneity of Pre- Test of the Experimental Class and the Control Class

The homogeneity test is used to know whether the group sample that was taken from population is homogeneous or not. In this research, the homogeneity of the test was measured by comparing the obtained score (F_{count}) with (F_{table}).

Hypothesis:

$H_o : \sigma_1^2 = \sigma_2^2$

$H_A : \sigma_1^2 \neq \sigma_2^2$

Ho accepted if $F_{count} < F_{table}$

The Data of the research:

Variance Sources	Class VA (Experimental)	Class VB (Control)
Sum	1450	1360
N	34	33
$\overline{X}$	42.65	41.21
Variant (S^2)	213.99	192.23
Deviation Standard (S)	14.63	13.86

By knowing the mean and the variant, the researcher was able to test the similarity of the two variants in the pre- test between experimental and control classes. The computation of the test of homogeneity as follows:

$$F = \frac{biggest\ \text{var}iance}{smallest\ \text{var}iance}$$

$$F = \frac{213.99}{192.23} = \quad 1.132$$

On α= 5% with dk numerator (k-1)= 34-1= 33 and dk denominator (k-1)= 33-1= 32 it was found $F_{table\ (0.05)(33/32)}$ = 3.989 because of (F_{count}) < (F_{table}), so it could be conducted that both experimental and control class had no differences. The result showed both classes had similar variants or homogenous.

d. Testing the Similarity of Average of the Initial Data between the Experimental Class and Control Class

To test the similarity of average used t- test.

Ho: $\mu_1 = \mu_2$

Ha: $\mu_1 \neq \mu_2$

Where:

μ1 : average data of experimental group

μ2 : average data of control group

The researcher used formula:

$$t = \frac{\overline{x_1} - \overline{x_2}}{S\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

$$S = \sqrt{\frac{(n_1 - 1)S_1^{\,2} + (n_2 - 1)S_2^{\,2}}{n_1 + n_2 - 2}}$$

The average similarity test of pre test of the experimental class and the control class

Variance Sources	Class VA (Experimental)	Class VB (Control)
Sum	1450	1360
N	34	33
$\overline{X}$	42.65	41.21
Variant (S^2)	213.99	192.23
Deviation Standard (S)	14.63	13.86

$$S = \sqrt{\frac{(n_1 - 1)S_1^{\,2} + (n_2 - 1)S_2^{\,2}}{n_1 + n_2 - 2}}$$

$$= \sqrt{\frac{(34 - 1)213.9929 + (33 - 1)192.2348}{34 + 33 - 2}}$$

$$= 14.2577$$

So, the computation t-test:

$$t = \frac{\overline{x_1} - \overline{x_2}}{S\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

$$= \frac{42.65 - 41.21}{14.2577\sqrt{\frac{1}{34} + \frac{1}{33}}}$$

$$= 0.412$$

Based on the computation above, t_{count} = 0.412 and opportunity (1-α) from the distribution, we got t_{table}= 1.997 with α= 5%, and dk= 34 + 33 – 2= 65 because $t_{count} < t_{table,}$ so Ho is accepted. So, it can be concluded that there is not significant different of the average pre test between

experimental and control classes, because t_{count} at the reception area of Ho. It meant that experimental and control classes had same condition before getting treatment.

2. Analysis of Students' Post- Test Score for the Experimental Class and Control Class

The experimental class was given post- test on 13th May 2013 and control class was given 13th May 2013. Post- test was given after all treatments were done. Nursery rhymes were used as a medium in teaching diphthong pronunciation to students in experimental class. While for students in control class, they have been given treatment without using nursery rhymes. This analysis contains of normality test, homogeneity test and the difference average test of post- test.

Table 6

The list of post- test score of the experimental class and the control class

Experimental Class			**Control Class**		
No.	**Code**	**Score**	**No.**	**Code**	**Score**
1	E- 01	50	1	C- 01	40
2	E- 02	60	2	C- 02	50
3	E- 03	70	3	C- 03	70
4	E- 04	40	4	C- 04	40
5	E- 05	50	5	C- 05	60
6	E- 06	60	6	C- 06	50
7	E- 07	50	7	C- 07	40
8	E- 08	60	8	C- 08	40
9	E- 09	70	9	C- 09	50
10	E- 10	80	10	C- 10	70
11	E- 11	60	11	C- 11	60
12	E- 12	60	12	C- 12	40
13	E- 13	40	13	C- 13	70

14	E- 14	70	14	C- 14	50
15	E- 15	60	15	C- 15	80
16	E- 16	70	16	C- 16	60
17	E- 17	80	17	C- 17	60
18	E- 18	70	18	C- 18	50
19	E- 19	80	19	C- 19	70
20	E- 20	90	20	C- 20	40
21	E- 21	50	21	C- 21	30
22	E- 22	80	22	C- 22	70
23	E- 23	80	23	C- 23	60
24	E- 24	70	24	C- 24	60
25	E- 25	70	25	C- 25	80
26	E- 26	70	26	C- 26	80
27	E- 27	60	27	C- 27	80
28	E- 28	80	28	C- 28	80
29	E- 29	90	29	C- 29	70
30	E- 30	70	30	C- 30	30
31	E- 31	40	31	C- 31	50
32	E- 32	50	32	C- 32	70
33	E- 33	80	33	C- 33	40
34	E- 34	80			
Σ	=	2240	Σ	=	1890
N	=	34	N	=	33
X	=	65.88	X	=	57.27
S^2	=	194.65	S^2	=	239.20
S	=	13.95	S	=	15.47

a. The normality of post- test of the experimental class

The normality test is used to know whether the data is normally distributed or not. Test data of this research used the formula of Chi-square.

Hypothesis:

$H_{1:}$ data distributes normally

$H_{o:}$ data does not distribute normally

H_o accepted if $x^2_{count} < x^2_{table}$ with α= 5% and dk= k- 1

Test of hypothesis:

The formula is used:

$$\chi^2 = \sum_{i=1}^{k} \frac{(O_i - E_i)^2}{E_i}$$

The computation of normality test:

Length of the class = 8

Maximum score = 90

Minimum score = 40

K/ Number of class = 6

Range = 50

Table 7

Distribution value Post Test of the Experimental Class

Class	f_i	X_i	X_i^2	$f_i.X_i$	$f_i.X_i^2$
40 – 48	3	44	1936	132	5808
49 – 57	5	53	2809	265	14045
58 – 66	7	62	3844	434	26908
67 – 75	9	71	5041	639	45369
76 – 84	8	80	6400	640	51200
85 – 93	2	89	7921	178	15842
Sum	34			2288	159172

$$\overline{X} = \frac{\sum fixi}{\sum fi} = \frac{2288}{34} = 67.2941$$

$$s^2 = \frac{n\sum fi.xi^2 - (\sum fixi)^2}{n(n-1)} = \frac{34*159172 - (2288)^2}{34(34-1)} = 157.668$$

s = 12.5566

Table 8

Observation Frequency Value of Post Test of the Experimental Class

Class Interval	Bk	Z_i	$P(Z_i)$	Wide of Area	Ei	Oi	$\frac{(O_i - E_i)^2}{E_i}$
	39.5	-2.21	-0.4866				
40 – 48				0.0538	1.3	3	2.2617
	48.5	-1.50	-0.4328				
49 – 57				0.1505	3.6	5	0.5431
	57.5	-0.78	-0.2823				
58 – 66				0.2571	6.2	7	0.1116
	66.5	-0.06	-0.0252				
67 – 75				0.2685	6.4	9	1.0138
	75.5	0.65	0.2433				
76 – 84				0.1714	4.1	8	3.6710
	84.5	1.37	0.4147				
85 – 93				0.0699	1.6	2	0.0974
	93.5	2.09	0.4816				
					X^2	=	7.6897

With α = 5% dk = 6-1 = 5 from the Chi- square distribution table, obtained x_{table} = 11.07 because x^2_{count} is lower than x^2_{table} (7.6897 < 11.07). So, the distribution list is normal.

b. The normality of post- test of the control class

Hypothesis:

H_1: data distributes normally

H_o: data does not distribute normally

H_o accepted if $x^2_{count} < x^2_{table}$ with α = 5% and dk = k- 1.

Test of hypothesis:

The formula is used:

$$\chi^2 = \sum_{i=1}^{k} \frac{(O_i - E_i)^2}{E_i}$$

The computation of normality test:

Length of the class = 8

Maximum score = 80

Minimum score = 30

K/ Number of class = 6

Range = 50

Table 9

Distribution Value of Post-Test of Control Class

Class Interval	f_i	X_i	X_i^2	$f_i.X_i$	$f_i.X_i^2$
30 – 38	2	34	1156	68	2312
39 – 47	7	43	1849	301	12943
48 – 56	6	52	2704	312	16224
57 – 65	6	61	3721	366	22326
66 – 74	7	70	4900	490	34300
75 – 83	5	79	6241	395	31205
Sum	33			1932	119310

$$\overline{X} = \frac{\sum fixi}{\sum fi} = \frac{1932}{33} = 58.5455$$

$$s^2 = \frac{n\sum fi.xi^2 - (\sum fixi)^2}{n(n-1)} = \frac{33*119310 - (1932)^2}{33(33-1)} = 193.756$$

s = 13.9196

Table 10

Observation frequency value of post test of control class

Class Interval	Bk	Z_i	$P(Z_i)$	Wide of Area	Ei	Oi	$\frac{(O_i - E_i)^2}{E_i}$
	29.5	-2.09	0.4815				
30 – 38				0.0565	1.4	2	0.3069
	38.5	-1.44	0.4251				
39 – 47				0.1383	3.3	7	4.0392
	47.5	-0.79	0.2863				
48 – 56				0.2312	5.5	6	0.0517
	56.5	-0.15	0.0584				
57 – 65				0.2542	6.0	6	0.0000
	65.5	0.50	-0.1913				
66 – 74				0.1839	4.4	7	1.5556
	74.5	1.15	-0.3741				
75 – 83				0.0875	2.1	5	3.8024
	83.5	1.79	-0.4635				
						X^2 =	9.7559

With α = 5% and dk = 6-1 = 5, from the chi-square distribution table, obtained X_{table} = 11.07. Because X^2_{count} is lower than X^2_{table} (9.7559 < 11.07). So, the distribution list is normal.

c. The homogeneity of post- test of the experimental and the control class

Hypothesis :

$H_o : \sigma_1^2 = \sigma_2^2$

$H_A : \sigma_1^2 \neq \sigma_2^2$

Test of hypothesis:

The formula is used:

$$F = \frac{Biggest\ \text{var}iant}{smallest\ \text{var}iant}$$

The Data of the research:

Variance Sources	Class VA (Experimental)	Class VB (Control)
Sum	2240	1890
N	34	33
$\overline{X}$	65.88	57.27
Variant (S^2)	194.65	239.20
Deviation Standard (S)	13.95	15.47

Biggest variant (Bv) = 239.20

Smallest variant (Sv) = 194.65

Based on the formula, it is obtained:

$$F = \frac{239.20}{194.65} = 1.22887 = 1.23$$

With α = 5% and dk = (34-1 = 33) : (33-1 = 32), obtained F_{table} = 1.796. Because F_{count} is lower than F_{table} (1.23 < 3.989). So, Ho is accepted and the two groups have same variant / **homogeneous.**

d. Testing the different of average of the final data between the experimental class and the control class

The hypotheses in this research is a significance difference in diphthongs test score between students taught using nursery rhymes medium and those taught using non-nursery rhymes medium.

To test differences of average used t- test.

H_o: $\mu 1 \leq \mu 2$

H_a: $\mu 1 > \mu 2$

Where:

$\mu 1$: average data of experimental group

μ2: average data of control group

T-test formula is as follows:

$$t = \frac{\overline{x_1} - \overline{x_2}}{S\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

$$S = \sqrt{\frac{(n_1 - 1)S_1^{\ 2} + (n_2 - 1)S_2^{\ 2}}{n_1 + n_2 - 2}}$$

The data of the research:

Variance Sources	TBI 2A (Experimental)	TBI 2B (Control)
Sum	2240	1890
N	34	33
$\overline{X}$	65.88	57.27
Variant (S^2)	194.65	239.20
Deviation Standard (S)	13.95	15.47

$$S = \sqrt{\frac{(n_1 - 1)S_1^{\ 2} + (n_2 - 1)S_2^{\ 2}}{n_1 + n_2 - 2}}$$

$$= \sqrt{\frac{(34 - 1)194.65 + (33 - 1)239.20}{34 + 33 - 2}}$$

$$= 14.717$$

So, the computation t-test:

$$t = \frac{\overline{x_1} - \overline{x_2}}{S\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

$$= \frac{65.88 - 57.27}{14.717\sqrt{\frac{1}{34} + \frac{1}{33}}}$$

$$= 2.394$$

With α = 5% and dk = 34 + 33 – 2 = 65, obtained t_{table} = 1.669. Because t_{count} is lower than t_{table} (2.394 > 1.669). So, Ha is accepted and there is significant difference between experimental and control class on the test the

experimental class is higher than the control class. From the result, it can be concluded that using nursery rhymes medium is more effective than without using non-nursery rhymes medium in teaching diphthongs. The hypothesis is accepted.

C. Discussion and Research Finding

The data were obtained from the students' achievement scores of the test. They were pre-test and post-test scores from the experimental and control group. The average score for experimental group was 42.65 (pre-test) and 65.88 (post-test). The average score for control group was 41.21 (pre-test) and 57.27 (post-test). The following was the simple tables of pre and post-test students' average score.

Table IV. 7 The Pre-test and Post-test Students' Average Scores of the Experimental and Control Group

No	Group	The Average Value of Pre-test	The Average Value of Post-test
1	Experimental	42.65	65.88
2	Control	41.21	57.27

Based on the result on the table above, the data shows that result test in experimental class is higher than result of test in control group. It can be concluded that students in experimental class have higher motivation in learning diphthongs, thus, their achivement in post-test is better. On the other hand, the test of hypothesis using t-test formula shows the value of the t-test is higher than the critical value. The value of t-test is 2.394 while the critical value on $t_{s0,05}$ is 1.669. It means that using medium more effective than without using medium (conventional) in teaching diphthongs.

According to Wendy Scott about the general characteristics of students in elementary school are as follow[1]:

1) They love to play and learn best when they enjoy themselves.
2) They are enthusiastic and positive about learning.
3) Their own understanding comes through eyes, hands, and ears.
4) They have very short attention and concentration span.

Based on the characteristics of young learners especially in elementary school above, the nursery rhymes is effective to facilitate students' pronunciation of diphthong. Certainly, the class of the experimental which use nursery rhyme is better than the class of the control class which without use nursery rhyme.

[1] W. A. Scott and L. H. Ytberg, *Teaching English to Children, (New York: Longman, 1990), p. 2- 4.*