CHAPTER III
RESEARCH METHOD

A. Research Design

In this research, the researcher conducted an experimental method. An experimental method is an approach to educational research in which an idea or hypothesis is tested or verified by setting up situation in which relationship between participants or variables can be determined.[1]

The researcher used pretest-posttest control group design. Two groups are employed in this design; one group, the experimental group, receives a treatment (X) while the second group, does not. Both groups are given a pretest and a posttest. Firstly, the test was done in both groups, experimental and control group. Secondly, the result of the test was scored by using analytic scale. Thirdly, the means score of the two groups were determined. Finally, the two means were compared by applying t-test formula. T-test was used to differentiate if the students' result of vocabulary test by using song and without using song was significant or not.

The pretest-posttest control group design can be diagrammed as shown below:

E	O1	X	O2
C	O3	Y	O4

While:

E : Experimental group

C : Control group

O1 : Pre-test for the experimental group

O2 : Post-test for the experimental group

O3 : Pre-test for the control group

O4 : Post-test for the control group

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[1] Jack C. Richard and Richard Schmidt, *Longman Dictionary of Language Teaching and Applied Linguistics*, (London: Pearson Education Limited, 2002), p. 191.

X : Treatment with song as an aid

Y : Treatment without song as an aid [2]

From the design above, subjects of research were grouped into an experimental group (top line) and a control group (bottom line). The quality of subjects was first checked by pre-testing them (01 and 03). Then, the experimental treatment (taught by using song) was applied to the experimental group, while the control group was taught without the aid of song. The test was held in the form of composition. The results of post-test (02 and 04) were then computed statistically.

In this study, the researcher used quantitative approach. T-test was used to differentiate if the students' result of vocabulary test by using song and without using song was significant or not. The data was gained by numeric and analyzed by using statistical computation.

If the obtained score was higher than t-table score by using 5% alpha of significance, Ho was rejected. It means that Ha was accepted if there was a significant difference in vocabulary achievement between the experimental and control group.

B. Research Setting

This research was conducted in SMPN 16 Semarang located at Jalan Prof. Dr.Hamka Ngaliyan Semarang. The subjects of this research were the seventh grade students of SMPN 16 Semarang in academic year of 2011/2012. This research was conducted in the second semester.

Table 1
List of Time of the Study

No	Activity	Month/Date							
		January							
		7th	12th	14th	16th	17th	20th	21th	23th
1.	Try-Out class	√							
2.	Experimental class								
a.	Pre-Test			√					

[2]Ibnu Hadjar., *Dasar-dasar Metodologi Penelitian Kuantitatif dalam Pendidikan,* (Jakarta: PT. Raja Grafindo Perasada, 1996) , p.336

					√				
b.	Treatment I				√				
c.	Treatment II						√		
d.	Post test								√
3.	Control class								
a.	Pre-Test		√						
b.	Explaining I					√			
c.	Explaining II							√	
d.	Post test								√

C. Population and Sample

According to Encyclopedia of Educational Evaluation as cited by Arikunto,

" Population is a set (or collection) of all elements possessing one or more attributes of interest".[3]

The population of this research was the seventh grade of SMPN 16 Semarang in the academic year of 2011/2012. The seventh grade of SMPN 16 Semarang was divided into six classes. There were some classes. Those are VIII A, VIII B VIII C, VIIID, VIIIE and VIII F. The population of the students of SMPN 16 Semarang can be seen as follow:

Table 2
List of the Seventh Grade Students

Class	Male	Female	Total
VIII A	18	22	40
VIII B	21	19	40
VIII C	20	20	40
VIII D	23	17	40
VIII E	28	11	39
VIII F	19	20	38
Total	129	109	237

Suharsimi Arikunto says:
"Sample is defined as a subset of individuals from a given population".[4]

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[3]Suharsimi Arikunto, *Prosedur Penelitian Suatu Pendekatan Praktik*, p. 130.
[4] Sugiyono, *Statistika Untuk Penelitian,* (Bandung: CV. Alfabeta, 2007), p. 62.

Sample is taken from population by using certain procedure, so that can be expected to represent its population. In this case, sample must be representative with the true example (population) in the field.

Sample can be stated as a part that can represent population observed. It is called sample research when we want to generalize the sample research result. The researcher selected two groups of students from the population as sample in this research. The total number of the population was 237 students divided into six classes. In this case, the researcher took sample from the seventh grade students (VII A as an experimental class and VII C as a control class) of SMPN 16 Semarang in the academic year 2011/2012.The process of selection would be discussed in the sampling technique.

D. **Variable and Indicator**

Variable is the object of research or something that become the concern of research.[5] In this research, there are two variables. They are Independent Variable (X) and Dependent Variable (Y).

According to Fred D. Kerlinger as cited by Arikunto says variable is:

> All experiments have one fundamental idea behind them; to test the effect of one or more independent variables on a dependent variable (it is possible to have more than one dependent variable in experiments).[6]

This research used song lyric as a medium in the teaching of Vocabulary had two variables. Those variables are:

1. The independent variable

    Independent variable is "variable that influences because of change or emergence the dependent variable".[7] The independent variable in this research was the use of media in the teaching learning process for both groups. The experimental group learnt vocabulary through song while the control group to learn vocabulary without the aid of song.

2. The dependent variable

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[5] Ibnu Hadjar., *Dasar-dasar Metodologi Penelitian Kuantitatif dalam Pendidikan,* p. 51.
[6] Suharsimi Arikunto, *Prosedur penelitian Suatu Pendekatan Praktik*, p. 119.
[7] Ibnu Hadjar., *Dasar-dasar Metodologi Penelitian Kuantitatif dalam Pendidikan,* p. 53.

Dependent variable is variable that is affected or that is the result because of the existence of the independent variable.[8] Dependent variable in this study was the students' score of vocabulary test about the material of vocabulary.

E. Data Collection Technique

The researcher must use instrument to get the better data. The instrument of the research is a tool or facility that is used by researcher for collecting data in order to get better result. To get the accurate data, in this study the researcher chose some instruments for collecting the data, they were:

1. Test

In simple terms, test is as a method which is used to measure competence, knowledge, intelligence, and ability of talent which is possessed by individual or group to collect data.[9] The instrument of the test in this research is objective test. By using objective test, it can measure how students' mastery on the material (vocabulary).

Objective test is frequently criticized on the grounds that they are simpler to answer than subjective test. Objective tests are divided into transformation, completion, combination, addition, rearrangement, matching, correct and incorrect (true/false) and multiple choice.[10] The researcher used one test type only. It was multiple-choice. It means students have to choose the right answer among a, b, c, or d.

The researcher used multiple choice forms. The choice of the test type is based on the consideration that multiple choice test are:[11]

a. The technique of scoring is easy.

b. It was impossible for students to avoid the grammar point being evaluated.

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[8] Suharsimi Arikunto, *Prosedur penelitian Suatu Pendekatan Praktik*, p. 129.

[9] H. Douglas Brown, *Language Assessment: Principles and Classroom Practices,* (San Fransisco: Longman, 2004), p. 3.

[10] Ngalim Purwanto, *Prinsip-prinsip dan Teknik Pengajaran,* (Bandung: PT. Remaja Rosda Karya, 2002), 11th Ed., p. 35-36.

[11] H. Douglas Brown, *Language Assessment: Principles and Classroom Practices,* p.43.

c. This is sensitive measure of achievement multiple-choice language test; it allows teachers to diagnose the students' problems.

In this research, the researcher conducted pre-test and post test. Pre-test was given before the teacher taught new material by using song, the teacher asked students to make the example of announcement and advertisement related in the materials that they was known by them before. Pre-test was given to the experimental and control classes in same way. This test was given before the experiment run.

Post-test was given to the experiment class and control class. It was given in order to know students' achievement after they were taught song (experimental class) and without song (control class). In this case, students were asked to do the objective test about Vocabulary.

The score of students' achievement can be calculated by using this following formula:[12]

$$Score = \frac{The\ number\ of\ rigth\ answer}{The\ number\ of\ questions}\ x\ 100\ \%$$

2. Documentation

Documentation is tool aiming at identifying documents or to the field of study devoted to the study of documents.[13] In this research, the researcher will get the data from the school. While during the experiment, the researcher gets the documentation from the teacher's note. In this research, the researcher will get the data from the school.

In this research, the researcher got the syllabus, lesson plan of teaching and learning process, report of students' development, teachers' name list, and sketch of SMPN 16 Semarang in the academic year of 2011/ 2012. The documentation is used to know data of the students and teachers in the school. To get the result of documentation easily and systematically, the data was gained by the help of English teacher of related in school.

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[12] Suharsimi Arikunto, *Prosedur penelitian Suatu Pendekatan Praktik*, p. 235.
[13] Houghton Mifflin Company, "Documentation", in *http://en.wikipedia.org/wiki/documentation*, accessed on Januari, 12nd of 2012

The steps of collecting the data by getting documentation are as follows:

a. The researcher got the resources from the teacher's note while conduct the experimental research. The researcher collected the documentation was gained by the help of the English teacher.

b. The researcher collected the data of students' development, teachers' name list, and sketch of SMPN 16 Semarang in the academic year of 2011/ 2012. The data was taken when the researcher conducted the research. The documentation that help researcher to collect the data is needed in this research.

In this study, the researcher collected the data of students' name list, teachers' name list from the academic office, sketch of the school and organization structure of the official SMPN 16 Semarang in the academic Year of 2011/ 2012.

F. Data Analysis Technique

1. Try Out-Test

A try out test is the result will be used to make sure that the measuring instrument has such characteristics as validity and reliability of instrument test. The instrument to be tried out was the composition test. The result of test was used to find out the validity and reliability, difficulty level and also the discrimination power of each item.[14]

The tryout was given to VIII B of the students of SMPN 16 Semarang. After finishing the test, the answer sheets were collected in order to be scored. From 30 items test of tryout, some items were chosen as the instrument of the test. The choosing of the instrument had been done by considering: validity, reliability, the degree of test difficulty and discriminating power.

a. Validity

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[14] Suharsimi Arikunto, *Prosedur Penelitian Suatu Pendekatan Praktik*, p.167.

A valid test is one that in fact measures what it claims to be measuring.[15] The result was consulted to critical score for r-product moment. If the obtained coefficient of correlation was higher than the critical score for r-product moment, it means that a paragraph was valid at 5% alpha level significance. The validity is an important quality of any test. It is a condition in which a test can measure what is supposed to be measured.

The validity of an item can be known by doing item analysis. It is counted using product – moment correlation formula:

$$r_{xy} = \frac{N\sum XY - \sum(X)\sum(Y)}{\sqrt{\left\{N\sum X^2 - \left(\sum X\right)^2\right\}\left\{N\sum Y^2 - \left(\sum Y\right)^2\right\}}}$$

r_{xy} : The correlation coefficient between X variable and Y variable

N   : The number of students

X   : The number of each item score

Y   : The number of total score

Calculation result of r_{xy} is compared with r_{table} of product moment by 5% degree of significance. If r_{xy} is higher than r_{table}, the item of question is valid.[16]

b. Reliability

Reliability means "consistent and dependent".[17] Besides validity, a good test should have reliability as well. Reliability is necessary characteristic of any good test. The method is used to find out reliability involved scoring of first and last part of the items separately by making table. To get the coefficient of correlation, the researcher applies the *product-moment* formula and then continued to

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[15] H. Douglas Brown, *Language Assessment: Principles and Classroom Practices,* p.22.

[16] Suharsimi Arikunto*., Prosedur Penelitian Suatu Pendekatan Praktik*, p. 78.

[17] H. Douglas Brown, *Language Assessment: Principles and Classroom Practices,* p.20.

the *spearman-brown* formula. The formula of product moment as follow:

$$r_{XY} = \frac{N\Sigma xy - (\Sigma x)(\Sigma y)}{\sqrt{\left\{N\Sigma x^2 (\Sigma x)^2\right\}\left\{N\Sigma y^2 (\Sigma y)^2\right\}}}$$

In which,

    r_{XY} : Coefficient of correlation between the scores of the first and last part of the items.

    N : The number of students / subject participating in the test/ testee.

    Σ_X : The score of first part.

    Σ_Y : The score of last part.[18]

    After finding r_{XY} the computation is continued to the *spearman-brown* formula as follow:

$$r_{11} = \frac{2 \times r_{xy}}{1 + r_{xy}}$$

In which,

    r_{11} : The reliability of the instrument.

    r_{xy} : Coefficient of the correlation between the first and last part. [19]

    Calculation result of r_{11} is compared with r_{table} of product moment by 5% degree of significance. If r_{11} is higher than r_{table}, the item of question is reliable.

c. Degree of Test Difficulty

    A good question is a question that is not really difficult and not really easy. Formula for degree of test difficulty is: [20]

$$FV = \frac{R}{N}$$

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[18] Suharsimi Arikunto, *Prosedur penelitian Suatu Pendekatan Praktik*, p. 181.
[19] Suharsimi Arikunto, *Prosedur penelitian Suatu Pendekatan Praktik*, p.180.
[20] Ngalim Purwanto, *Prinsip-prinsip dan Teknik Pengajaran,* (Bandung: PT. Remaja Rosda Karya, 2002), 11th Ed.p.119.

In which,

FV   : The index of difficulty.

R   : Number of students who answered the item correctly.

N   : Number of students.[21]

The level of difficulty of each item was determined by using this following categorization:

FV $\leq$ 0.00 : very difficult.

0.01 - 0.30   : difficult.

0.31 - 0.70   : medium.

0.71 - 1.0   : easy.

FV $\geq$ 1.0   : very easy.[22]

d. Discriminating Power

The discriminating power is a measure of the effectiveness of a whole test. It is used to know how accurate the question differ higher subject and lower subject.[23] The formula for discriminating power is Split Half:

$$D = \frac{Correct\ U - Correct\ L}{N}$$

In which,

D   : The discrimination index.

U   : The number of the students in the upper group who answered item correctly.

L   : The number of the students in the lower group who answered item correctly.

N   : The number of the students who answered correctly in one group.

The criteria of discriminating power as follow:

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[21] Harold S. Madson, *Technique in Testing,* (USA: Oxford University Press. Inc., 1983) p. 181.

[22]Suharsimi Arikunto, *Dasar-Dasar Evaluasi Pendidikan, Revised Ed.,* (Jakarta: Bumi Aksara, 2002), 3rd Ed., p. 207.

[23]Ngalim Purwanto, *Prinsip-prinsip dan Teknik Pengajaran,* (Bandung: PT. Remaja Rosda Karya, 2002), 11th Ed.p.120.

$D \leq 0.00$: Very Poor.

0.01 - 0.20   : Poor.

0.21 - 0.40   : Medium.

0.41 - 0.70   : Good.

0.71 - 1.00   : Excellent.[24]

2. Pre-Test

Pre-test was given before the treatments. The researcher determined the statistic analysis technique whether groups that have normal distribution. If the data have normal and homogeneity distribution, the treatment and teaching can be conducted to both classes.

a. Normality Test

It is used to know the normality of the data that is going to be analyzed whether groups that have normal distribution or not. The normality test with Chi-square is done to find out the distribution data.

Step by step Chi-square test is as follows:

1) Determine the range (R); the largest data reduced the smallest.

2) Determine many interval classes (K) with formula:

K = 1+ (3, 3) log n

3) Determine the length of the class, using the formula:

$$P = \frac{range}{number\ of\ class}$$

4) Make a frequency distribution table.

5) Determines the class boundaries (bc) of each class interval.

6) Calculating the average Xi ($\overline{X}$), with the formula:

$$\overline{X} = \frac{\sum f_i x_i}{\sum f_i}$$

7) Calculate variants, with the formula:

$$S = \sqrt{\frac{\sum f_i (x_i - \overline{x})^2}{n-1}}$$

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[24]Harold S. Madson, *Technique in Testing,* (USA: Oxford University Press. Inc., 1983) p. 183.

8) Calculate the value of Z, with the formula:

$$Z = \frac{x - \bar{x}}{s}$$

x = limit class

$\bar{x}$ = Average

S = Standard deviation

9) Define the wide area of each interval

10) Calculate the frequency expository (Ei), with formula:

Ei = n x wide area with the n number of sample

11) Make a list of the frequency of observation (Oi), with the frequency expository as follows:

class	Bc	Z	P	L	Ei	Oi	$\frac{Oi - Ei}{Ei}$

12) Calculate the chi-square (X^2), with the formula:

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

13) Determine dk = k-3, where k is the number of class intervals and $\alpha = 5\%$

14) Determining the value of X^2 table

15) Determining the distribution normality with test criteria:

If $X^2_{count} > X^2_{table}$ so the data is not normal distribution and the other way if the $X^2_{count} < X^2_{table}$ so the data is normal distribution.[25]

b. Homogeneity Test

It was meant to get the assumption that sample of research came from a same condition or homogenous. It is used to know whether experiment class and control class, those are taken from population that have same variant or not.

The steps as follows:

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[25] Sudjana., *Metode Statistika,* p. 272.

1) Calculate variants both classes (experimental and control classes), with the formula:

$$S_1{}^2 = \frac{\sum (x - \bar{x})^2}{n_1 - 1} \text{ And } S_2{}^2 = \frac{\sum (x - \bar{x})^2}{n_2 - 1}$$

2) Determine $F = \frac{Vb}{Vk}$

Where:

Vb : Bigger Varian

Vk : Smaller Varian

Determine dk $= (n_1 - 1) : (n_2 - 1)$

3) Determine F_{table} with $\alpha = 5\%$

4) Determining the distribution homogeneity with test criteria:

If $F_{count} > F_{table}$, the data is not homogeneous and the other way if the $F_{count} < F_{table}$, the data is homogeneous.[26]

c. Test of the Average

It is used to examine average whether experiment group and control group have been decided having different average. [27]

T-test is used to analyze the data of this research. A t-test would be the measure you would use to compare the mean scores of the two groups.[28]

If $\sigma_1{}^2 = \sigma_2{}^2$ (has same variant), the formula is:

$$t = \frac{\overline{X}_1 - \overline{X}_2}{S \sqrt{\dfrac{1}{n_1} + \dfrac{1}{n_2}}}$$

With

[26] Sugiyono, *Statistika Untuk Penelitian,* p. 140.

[27] Anas Sudijono, *Pengantar Statistik Pendidikan* (Jakarta: PT. Raja Grafindo Persada, 1995) 6th Ed., p. 326-327.

[28] H. Douglas Brown, *Language Assessment: Principles and Classroom Practices,* p. 205.

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

Where:

$\overline{X}_1$: The mean score of the experimental group

$\overline{X}_2$: The mean of the control group

n_1 : The number of experiment group

n_2 : The number of control group

$S_1^{\,2}$: The standard deviation of experiment group

$S_2^{\,2}$: The standard deviation of both groups

If $= \sigma_1^{\,2} \neq \sigma_2^{\,2}$ (has no same variant) the formula is:

$$t^1 = \frac{\overline{X} - \overline{X}_2}{\sqrt{\dfrac{S_1^2}{n_1} + \dfrac{S_1^2}{n_2}}}$$

The hypotheses are:

Ho $= \mu_1 = \mu_2$

Ha $= \mu_1 \neq \mu_2$

μ_1 : average data of experiment group

μ_2 : average data of control group

If $t_{count} > t_{table}$ so Ho is rejected and there is no difference of average value from both of groups. Moreover, the other way if the $t_{count} < t_{table}$ so Ho is accepted and there is significant difference of average value from both of groups.[29]

3. **Post-Test**

Post-test was held after all treatments were conducted. This test was used to measure students' achievement after they were given treatments. The result of test was analyzed statistically.

a. Normality Test

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[29] Anas Sudijono, *Pengantar Statistik Pendidikan* p.272-273.

Steps normality second step is the same as the normality test on the initial data.

b. Homogeneity Test

Steps homogeneity second step is the same as the homogeneity test on the initial data.

c. Test Average (Right-hand Test)

This test proposed that hypothesis test in average similarity with the right test as the steps right-hand test the initial data.