A. Research Design

Research design refers to the outline, plan, or strategy specifying the procedure to be used in collecting data in a research. This research is quantitative, because the result of the students’ vocabulary achievement will be expressed in the language of mathematic, evaluated consequently and also interpreted by appropriate statistical procedures.

In this research, researcher uses an experimental method. In applied linguistic, experimental study might involve research that test whether method A or method B is more effective in teaching.\(^1\) An experimental research is divided into two groups, they are experimental group and control group. An experimental group uses a new treatment while control group received without treatment. According to Nunan, experiment is designed to collect data in such a way that threats to the reliability and validity of the research are minimized.\(^2\)

The researcher uses true experiment (pretest-posttest control group design) to identify and to know the effectiveness of

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Touch and Go game in teaching vocabulary. There are two groups in pretest-posttest control group design that are chosen randomly, and then they are given pre-test to know the initial condition between experimental group and control group are same.

B. Research Setting

This research conducted at SMP Askhabul Kahfi Semarang located at Jalan Raya Cangkiran-Gunung Pati, Km 3, Polaman, Mijen, Semarang. The subjects of the research are seventh grade students of SMP Askhabul Kahfi Semarang in the academic year of 2012/2013. This study conducted in the second semester.

Table 3.1
List of Time of The Research

<table>
<thead>
<tr>
<th>No</th>
<th>Activity</th>
<th>Month/Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>April</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8\textsuperscript{th}</td>
</tr>
<tr>
<td>In Experimental Class</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Pre test</td>
<td>√</td>
</tr>
<tr>
<td>2.</td>
<td>Treatment I</td>
<td>√</td>
</tr>
<tr>
<td>3.</td>
<td>Treatment II</td>
<td>√</td>
</tr>
<tr>
<td>4.</td>
<td>Post test</td>
<td>√</td>
</tr>
<tr>
<td>In control Class</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Pre test</td>
<td>√</td>
</tr>
<tr>
<td>2.</td>
<td>Explaining I</td>
<td>√</td>
</tr>
<tr>
<td>3.</td>
<td>Explaining 2</td>
<td>√</td>
</tr>
<tr>
<td>4.</td>
<td>Post test</td>
<td>√</td>
</tr>
</tbody>
</table>
C. Population and Sample

Before choosing the sample, the researcher has to determine the population first. Population is a set (or collection) of all elements possessing one or more attributes of interest. The population of this research are the seventh grade students of SMP Askhabul Kahfi Semarang in the academic year of 2012/2013.

Sample is part of population which is chosen as source of data. Sample is a representative group from population to serve as respondents. Arikunto said that sample is a part that can represent all the 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 study. The total number of the population is 90 students which are divided into three classes, the process of selection will be taken use purposive sampling technique.

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3 Suharsimi Arikunto, ..... p.130.

4 Sukardi, Metodologi Penelitian Pendidikan, (Jakarta; PT Bumi Aksara, 2009)p.54


6 Suharsimi Arikunto…..,p.131
Table 3.2
List of population

<table>
<thead>
<tr>
<th>No.</th>
<th>Class</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>VII A</td>
<td>29</td>
</tr>
<tr>
<td>2.</td>
<td>VII B</td>
<td>28</td>
</tr>
<tr>
<td>3.</td>
<td>VII C</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>90</td>
</tr>
</tbody>
</table>

D. Variable and Indicator

Variable can be defined as an attribute of a person or from an object. From the design of experiment, two variables can be involved in this research are:

a. Independent Variable (x)

According to David Nunan, independent variable is variable that the experimenter expects to influence the other.\(^7\) The independent variable of this research is the effectiveness of Touch and Go game in teaching vocabulary.

Indicators to measure The Effectiveness of Touch and Go Game in Teaching Vocabulary as follow:

a. Students can memorize the meaning of certain words.

b. Students can identify the synonym and antonym of certain words.

\(^7\) David Nunan….., p.25
c. Students can compose sentences using the certain words.

d. Dependent Variable (y)

The dependent variable is variable that measures the influence of independent variable. The dependent variable in this research is the students’ achievement in the vocabulary test score.

Indicators to measure the students’ achievement on vocabulary as follow:

a. Students can identify the certain vocabulary in a text.
b. Students can identify the meaning of certain vocabulary.
c. Students can use the certain vocabulary to make a good sentences.

E. Data Collection Technique

Data are the most important things in doing research. The procedure of data collection should be appropriate to the kind of the study. Therefore, in conducting this study, especially in collecting the data, the researcher needs some methods in order to obtain the expected data.

1. Test

Test is a question which is used to measure competence, knowledge, intelligence, and ability of talent
which is possessed by individual or group to collect data. In this research, the researcher will give the test twice (pretest and post test) in both experimental and control groups in the same way. Pre-Test, before the teacher explains material by using Touch and Go Game, the teacher will give a test to the students. Pre-test will be given before the experience is running. Post-Test, this test will be given to the experimental class and the control class. The test will be given in order to know the improvement of students’ ability in vocabulary. Post-test will be given to the both of class after receiving treatment. The experimental class taught by using Touch and Go game, but the control class taught without using Touch and Go Game.

2. Documentation

Documentation is the accumulation, classification, and dissemination of information. It refers to the archival data that help the researcher to collect the needed data. In this study, this method is used to get the data that related to the object research such as students name list are included in the population. In this case, the data is gained by the help of the English teacher.

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9 Suharsimi Arikunto, *Prosedur Penelitian*, p. 231
F. Data Analysis Technique

The data analysis technique which is used in this research is quantitative analysis. Quantitative is concerned with the amount or number.

1. Test
   
a. Pre-Requisite Test
   
1) Normality Test

   It is used to know the normality of the data that is going to be analyzed whether both groups have normal distribution or not.

   Chi square is used here: $^{10}$

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

   Adopted from Sudjana$^{11}$

   Notice:

   $\chi^2$ : Chi square

   $O_i$ : Frequency from observation

   $E_i$ : expected frequency

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$^{11}$ Sudjana, *Metode Statistika*, (Bandung: Tarsito, 2002). P.273
Calculation result of $\chi^2$ is compared with x table by 5% degree of significance. If $\chi^2$ is lower than x table so the distribution list is normal.

2) Homogeneity Test

Is used to know whether experimental group and control group, that are decided, come from population that has relatively same variant or not. The formula is:

$$F = \frac{V_b}{V_k}$$

Adopted from Sugiono.\textsuperscript{12}

Notice:

$V_b$ : bigger varian

$V_k$ : smaller varian

The hypotheses in homogeneity test are:

$H_0$ : homogeny variant: $\sigma_1^2 = \sigma_2^2$

$H_1$ : non homogeny variant: $\sigma_1^2 \neq \sigma_2^2$

If calculation result of F is lower than F table by 5% degree of significance so $H_0$ is accepted, it means both groups have same variant.

\textsuperscript{12} Sugiyono, Statistika Untuk Penelitian, (Bandung: Alfabeta, 2007), p.140
3) Average same Test

It is used to examine average whether experimental group and control group have been decided having different average.  

T-test is used to analyze the data of this research. It used to measure or to compare the mean scores of the two groups.
If $\sigma_1^2 = \sigma_2^2$ (has same variant), the formula is:

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

With

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

Adopted from Sudjana

Where:

$\bar{X}_1$ : The mean score of the experimental group  
$\bar{X}_2$ : The mean of the control group  
n$_1$ : The number of experimental group  
n$_2$ : The number of control group  
$S_1^2$ : The standard of deviation of experimental group

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14 Sudjana.....p.239
the standard deviation of both groups

If \( \sigma_1^2 \neq \sigma_2^2 \) (has no same variant) the formula is:

\[
t^1 = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}}
\]

The hypotheses are:

- Ho = \( \mu_1 = \mu_2 \)
- Ha = \( \mu_1 \neq \mu_2 \)

\( \mu_1 \): average data of experimental group
\( \mu_2 \): average data of control group

Criteria test is: Ho is accepted if

\[ -t_{(1-1/2\alpha)} < t < t_{(1-1/2\alpha)} \]

where \( t_{(1-1/2\alpha)} \) obtained from the distribution list \( t \) with \( df = (n_1 + n_2 - 2) \) and opportunities \( (1 - 1/2\alpha) \). Values for other \( t \) Ho rejected.\(^{15}\)

b. Try-Out Instrument of Test

1) Validity of Test

Validity is measurement that shows the validity of instrument. It is counted using product moment formula.

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\(^{15}\)Sudjana, *Metode Statistika*, p. 239-240.
\[ r_{xy} = \frac{n \sum_{i=1}^{n} x_i y_i - (\sum_{i=1}^{n} x_i)(\sum_{i=1}^{n} y_i)}{\sqrt{\{n \sum_{i=1}^{n} x_i^2 - (\sum_{i=1}^{n} x_i)^2\}(n \sum_{i=1}^{n} y_i^2 - (\sum_{i=1}^{n} y_i)^2)}} \]

Notice:

R_{xy} : question correlation coefficient

N : number of students

X : number of each item score

Y : 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.

2) Reliability

“Reliability is consistency of measurement”. A reliable test score will be consistent across different characteristics of the testing situation. It means can be believed. Besides having high validity, a good test should have high reliability too. To get the coefficient of correlation, the researcher applied product moment formula and then continued to the spearman-brown formula. The formula of product moment as follow:

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

Where:

- \( r_{xy} \): 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
- \( \sum x \): The score of first part.
- \( \sum y \): The score of last part.

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 first and last part.

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.\(^7\)

\(^7\)Suharsimi Arikunto, *Prosedur Penelitian*, p. 187-188
3) Degree of test difficulty

A good question is a question that not really difficult and not really easy. Formula for degree of test difficulty is:¹⁸

\[ P = \frac{B}{JS} \]

Notice:
P : difficulty’s index
B : number of students who has right answer
JS : number of students

The criteria are:
P = 0,00 too difficult question
0,00 < P \leq 0,03 difficult question
0,03 < P \leq 0,70 average question
0,70 < P \leq 1,00 easy question
P = 1 too easy question

4) 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. The formula for discriminating power is:

\[ D = \frac{BA}{JA} - \frac{BB}{JB} \]

¹⁸Suharsimi Arikunto, Prosedur Penelitian., p.208
Where:

D : discrimination index
JA : member of student in upper group
JB : member of student in low group
BA : member of students in upper group who answer the item correctly
BB : member of students in low group who answer the item correctly

The criteria are:

D < 0.2 is poor
0.2 < D ≤ 0.4 is fair
0.4 < D ≤ 0.7 is good
0.7 < D ≤ 1 is very good.

c. Phase End Analysis

To examine the hypothesis that have been stated, these following steps are used.

1) Normality Test
   The steps are same with the steps on data analysis technique.

2) Homogeneity Test
   The steps are same with the steps on data analysis technique.

3) Average Same Test
   The steps are same with the steps on data analysis technique that is to prove the researcher hypothesis
about the difference of students’ achievement on the vocabulary mastery between the students who were taught by using Touch and Go game and who were not taught by using Touch and Go game. Here, the t-test formula is used.

\[ H_0 = \mu_1 = \mu_2 \]

\[ H_a = \mu_1 \neq \mu_2 \]

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

\[
t = \frac{\bar{X}_1 - \bar{X}_2}{S \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}
\]

With

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

Where:

\( \bar{X}_1 \) : The mean score of the experimental group

\( \bar{X}_2 \) : The mean of the control group

\( n_1 \) : The number of experimental group

\( n_2 \) : The number of control group

\( S_1^2 \) : The standard of deviation of experimental group

\( S_2^2 \) : The standard of deviation of both groups

If \( \sigma_1^2 \neq \sigma_2^2 \) (has no same variant) the formula is:
\[ t^1 = \frac{X - X_2}{\sqrt{\frac{S^2_1}{n_1} + \frac{S^2_2}{n_2}}} \]

Testing criteria that apply Ho is accepted if \( t_{score} > t_{table} \) with determine \( dk = (n_1 + n_2 - 2) \) and \( \alpha = 5\% \) with opportunities (1-\( \alpha \)). Values for other t Ho rejected.\(^{19}\)

\(^{19}\) Sudjana,... p.243