III.METHODS

In this chapter there there are some discussions about research methods which consist of design, subject, instrument, data collecting technique, validity and reliability, procedure, data treatment, and hyphotesis testing. These topics will be explained as follows.

3.1. Design

This research was conducted to compare students' vocabulary achievement between those who were taught through Clustering Technique and Derivational Exercises in Learning vocabulary. By comparing these techniques, the researcher found out which one was better between clustering technique and derivational exercises to increase students' achievement in learning and also how far the techniques incease sudents vocabulary achievement. The researcher chose two groups or classes for conducting the research. Both classes were experimental classes. Both of the classes were given a pre-test of vocabulary. After that, the classes were given a treatment. One class used clustering technique and another class used derivational exercises. After giving the treatment, the researcher gave a post test for both classes.

The reseacher used quantitative approach using SPSS 16.0 to analyze the result of students' vocabulary achievement before and after they were taught through clustering technique and derivational exercises. In this research, the

researcher used two groups pretest-post test design because the researcher investigated which one between clustering technique and derivational exercises that could be more effective for students' achievement in learning vocabulary.

The research design, that is two group pretest-post test design, is illustrated as follow:

G1 $T_1 X_1 T_2$

G2 $T_1 X_2 T_2$

In which,

T_1: pretest for students' vocabulary achievement before treatment is given

T_2: post test for students' vocabulary achievement after treatment is given.

X_1: clustering technique

X_2: derivational exercises

In this research there were two variables that were dependent variable and independent variable. The dependent variable was the two techniques that were used as a treatment in teaching vocabulary for the students. On the other hand, independent variable was students' score in vocabulary test. The score showed a data about students' vocabulary achievement and be used to identify which one is better between clustering technique and derivational exercises.

3.2. Population and Sample

The population of this reseach were all of the students of the second grade students of SMAN 1 Kalirejo. There were seven classes of the second grade students that consisted of 33 students for each class. Furthermore, the researcher

chose two groups or two classes as the samples for her research. After choosing the two classes, the researcher determined which one would be taught through clustering technique and which one would be taught through derivational exercises randomly by using a coin. The researcher used purposive sampling because she tried to find the sample with equal ability between two classes for conducting the research. The researcher considered the score of mid semester test, and a suggestion from English teacher who taught the samples by looking at their assigment score to determine the samples of the research.

3.3. Instrument

In this research, the reasearcher used some instruments for conducting her research. The instruments were pre-test and post test of vocabulary in form of written test using incomplete text and the students was asked to complete the text with the words that had been provided following the test. The instrument of this reaserch would be explained as follow:

a. Pre-test of vocabulary

For the pre-test of vocabulary, the researcher used matching words. The researcher made 25 incomplete senteces and provided the mising words in the left side of the test. The students should match the word to fill in the incomplete sentences in the right side of the test. The omition words were the content words that is noun, verb, adjective and adverb. The researcher distinguished the total number of the omition words for each class based on the frequency of the words appearance. So, there were different number ommited for each word classes (noun, verb, adjective, adverb) according to

word frequency level. Then, the researcher gave the direction in the test to find the suitable word to complete the sentences.

Table 1. Table of Specification of Pre-test

No	Aspect	Items	Total	Percentage
1	Noun	2,3,5,6,7,8,9,12,13,17,18,23,24	13	52 %
2	Verb	1,10,19,20,21,22	6	24 %
3	Adjective	4,11,15	3	12 %
4	Adverb	14,16,25	3	12 %
	Total		25	100%

b. Post test of vocabulary

Post test of vocabulary used a complete text. The researcher omitted 50 words in the text and listed the omitted words under the text randomly. The omitted words are the content words that is noun, verb, adjective and adverb. There were two kind of text in this test, Hortatory Exposition and Narrative text. Each text had 25 omition words to be completed by the students. The researcher chose these texts because it based on the teaching material that had been given in the treatment. Then, the researcher gave the direction in the test to find the suitable word to complete the texts.

Table 2. Table of Specification of Post test

No	Aspect	Items	Total	Percentage
1	Noun	1,3,5,10,11,13,15,16,22,23,26,31,32,33,38,40,43,45,47,49	20	40 %
2	Verb	2,4,8,9,14,17,21,28,36,39,41,42,48	13	26 %
3	Adjective	7,12,18,20,24,27,29,30,34,35,37,44	12	24 %
4	adverb	6,19,25,46,50	5	10 %
	Total		50	100%

3.4. Data Collecting Technique

For collecting the data, the researcher gave pre-test and post test of vocabulary. The test was given before and after the treatment. Then, the

researcher scored the test so that the data was in form of interval data. After conducting pre-test and post test, the researcher compared the result to find out the students' achievement in learning vocabulary and to analyze whether clustering technique or derivational exercises which gave a better improvement. Further explanation about pre-test and post test of vocabulary is given as follows:

a. Pre-test

The pre-test of vocabulary was intended to investigate that the two samples of the research are equal in vocabulary achievement. The material was based on the curriculum for the second grade of senior high school students in the second semester. The researcher made 25 incomplete sentences. The words omit was included in the content word that is noun, verb, adjective, and adverb. Time allocation is 45 minutes. The researcher gave this test in the first meeting before the students were given a treatment. The researcher gave this test on Monday February, 10th 2014.

b. Post test

Post test was done after the researcher gave a treatment in form of teaching activity. The post test was intended to know whether the students' vocabulary achievement improved or not and how far the improvement was. This test used two incomplete texts consist of 50 words omitted. The researcher provided the missing words below the texts. Time allocation to do this test was 90 minutes. This test was done on April, 1st 2014.

3.5. Validity and reliability

In order to get the data which was needed by the research, the researcher tried to use an appropriate instrument to measure the result of the reaserch. The good research was a research which the instrument is based on validity and reliability. The researcher conducted try out of the test in order to know the validity and reliability of the instrument. So, the researcher used the same test item for pre test to be tried out before it is used to test the subject. This test consist of 25 items in form of written vocabulary test by completing the sentences with an appropriate word. Try out of the test was conducted to the population of the research. Here, the researcher gave a brief explanation about validity and reliability.

a. Validity

Heaton (1991) states that validity of the test is the extent to which it measures what it is supposed to be measure. It meant that the test should measure every items that included in one aspect that would be measured. So, when we were going to conduct the test, we should know or identify what kind of aspect or content included in the topic of the subject for the test itself. Furthermore, to know whether the test has a good validity, the researcher looks from the content and construct validity.

- Content validity

Based on Hatch and Farhady (1982) content validity is the extend to which the test measures a representative sample of the subject matter content. The focus of the content validity is adequacy of the sample and not simply on the appearence of the test. The researcher also tried to match the test with

teaching material in order to fulfill the requirement of content validity. Meanwhile, the researcher constructed the test in line with the material which was given when the researcher conducted the treatments. The researcher omitted a number of words based on their word classes by looking at the word frequency level. So, the number of every word class was omitted based on the frequency of its appearance in the text.

The number of the words omitted for each word class in the instrumen was decided as follows.

$$W_o = \frac{Wc}{Wt} \; x \; T_{wo}$$

W_o = word which was omitted for each word class

W_c = total number of word in the same class in the text

W_t = total number of word in the text

T_{wo} = total word which was omitted in the test

- Construct validity

Fries (1973) as cited in Arbainaya (2012) classified English vocabulary or word into content word, function word, subtitute word, and distributed word. The content word is divided into noun, verb, adjective and adverb. Based on the theory above, the researcher wanted to measure students' achevement in learning vocabulary using written test of vocabulary. In this case, the researcher focused on vocabularies which is included in content word. These are noun, verb, adjective and adverb.

Validity for the test can be identified by using this formula:

$$r = \frac{Mp - Mt}{Sdt} \sqrt{\frac{p}{q}}$$

r = coefficient of point biserial correlation

M_p = the average score of each items

M_t = the average score from the total score

Sd_t = standard deviation of the total score

p = a number of students with correct answer

q = a number of students with wrong answer

Both content and construct validity had been tested using inter rater validity by asking seven students of English Education Study Program. Most of them stated that the tests were acceptable to measure students vocabulary achievement.

b. Reliability

Reliability is consistency of the test. Heaton (1991) stated that reliability denotes the extend to which the same marks or grades are awarded if the same test papers are marked by (i) two or more different examiners or (ii) the same examiner on different occasions. In short, in order to be reliable a test must be consistent in its measurement.

Reliability for the whole test can be found by using this formula.

$$r = \frac{N}{N-1} + (1 - \frac{m(N-m)}{Nx2})$$

Where N = the number of items in the test

m = the mean score of the test for all the testees

x = the standard deviation of all the testees' scores

r = reliability

(Heaton:1991)

The criteria of reliability:

High   : 0,90 – 1,00

Moderate   : 0,50 – 0,89

Low   : 0,00 – 0,49

After analyzing the result of pre-test and post test of vocabulary from both classes using SPSS 16.0, the researcher found that cronbach's alfa of the test was 0.457. It meant the reliability of the test was still low. This was the table of the analysis.

Table 3. Reliability of the test

Case Processing Summary

		N	%
Cases	Valid	63	100.0
	Excluded[a]	0	.0
	Total	63	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.457	2

3.6. Procedure

The procedure of this research was explained as follow:

1. Constructing instrument for pre-test and post test and materials for teaching.

2. Selecting the population and samples of the research. The population used in this research were the students in the second grade of SMAN 1 Kalirejo and the sample were class XI IPS 1 and class XI IPS 2.

3. Trying out the instrument (test of vocabulary), the try out test was done in class XI IPS 3.

4. Giving a pre-test for students in order to identify the level of vocabulary achievement.

5. Conducting a treatment. The reasercher taught vocabulary for the subject of the research using these two technique. One class used clustering technique and one another used derivational exercises.

6. After giving a treatment, the students were given a post test to identify whether the techniques give an improvement for students' vocabulary achievement.

7. The last, after getting all the data, the researcher analyzed the data by using SPSS to know the result.

3.7. Data Treatment

After collecting the data, the researcher analyzed the data by using Independent Group T-Test in SPSS (Statistical Program for Social Science). The researcher collected the data by looking at the result of pre-test and post test of

vocabulary to find out the result of the students' vocabulary achievement. The result of the test was in form of score or interval data. After getting the result the researcher analyzed how far the improvement of students' vocabulary achievement after given a treatment and which one is better between clustering techniques and derivational exercises for teaching vocabulary.

Therefore, the writer used homogeinity and normality test to treat the data taken from result of pretest. The results of the treatment were as follows.

A. Homogeinity test

The homogeinity test was used to know whether the data in both experimental classes were homogenous or not. The data which were analyzed were the score from pre-test. From the result of the analysis, the data were not homogenous based on the criteria for the hypothesis if $p > \alpha$ by using level of significant 0.05. In this test level of significancy of the test was 0.003.

B. Normality test

Normality test was used to know whether the data in both experimental classes were normally distributed or not. Based on the analysis using SPSS 16.0 the data showed that there were distributed normally. In this research, the criteria for the hypothesis are H_1 is accepted if $p > \alpha$ by using level of significant 0.05.

3.8. Hypothesis Testing

After collecting the data, the researcher tried to analyze them in order to find out how far clustering technique and derivational exercises improve students'

vocabulary achievement and which technique gave better improvement for the students vocabulary achievement.

The hypothesis were as follow:

H_0 : There is no significant difference between the students' vocabulary achievement taught through clustering technique and derivational exercises.

H_1 : There is significant difference between the students' vocabulary achievement taught through clustering technique and derivational exercises.

After all the data had been collected, the writer used statistical analysis using Independent Group T-Test to test the hypothesis. Based on the result of the analysis, the data showed that both technique gave an improvement in students' vocabulary achievement. But, there was a difference result gave by the techniques. Clustering Technique gave more significance improvement to the students' vocabulary achievement than Derivational Exercises.