CHAPTER III
METHODS OF INVESTIGATION

A. Research Design

The approach used in this research is quantitative. While the method employed is through experimental research in which its purpose is to search or compare the certain treatment toward other within controlled condition.[1] This kind of experiment is true experimental design in form of pretest-posttest control group design. Here, there were two groups which had been chosen randomly (R). Both two groups were given pretest to know the first condition whether or not there is a difference of competence level between them. The pretest result is said well if there is no significant difference. After giving pretest, the experimental group was given a certain treatment (X) while the control one is not.[2] Here, the treatment refers to the teaching by means of picture-cued drill technique. The design can be figured out as follow.

Figure 1.The design of experimental research[3]

R	O_1	X	O_2
R	O_3		O_4

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[1]Sugiyono, *Metodologi Penelitian Pendidikan, (Pendekatan Kuantitatif, Kualitatif, dan R&D)*, (Bandung: Alfabeta, 2010), p. 107.

[2]Sugiyono, *Metodologi Penelitian Pendidikan, (Pendekatan Kuantitatif, Kualitatif, dan R&D*, p. 113.

[3]Sugiyono, *Metodologi Penelitian Pendidikan, (Pendekatan Kuantitatif, Kualitatif, dan R&D)*, p. 112.

In which: O_1 = Pretest value of experimental group

O_2= Posttest value of experimental group

O_3= Pretest value of control group

O_4= Posttest value of control group

X = Treatment

R = Random sample

B. Setting

This study was conducted at SMP Negeri 3 Kandangan. It located at Jalan Tlogopucang KM 5 Kandangan Temanggung 56281. This school was chosen because the students' interest and mastery of preposition still low. They still difficult in using preposition. In addition, the writer wants to know how far they know about preposition and the effectiveness of picture-cued drill as a technique in teaching preposition for them.

C. Subject of the Research

The subjects of this study were the seventh grade students of SMP Negeri 3 Kandangan in the academic year of 2012/2013.. The writer used two classes as sample (VII B and VII C). There were 24 students of VII B as the control class and 24 students of VII C class as the experimental class. Sample of the research was taken randomly because all of the class of seventh grade that consist of VII A, VII B, VII C, VII D are homogeny.

D. Variables and Indicators of Study

Variable is the object of research or something that become the concern of research.[4] In this study there are two variable.

1. Independent Variable

It is a variable that influences or causes of change or emergence of the dependent variable.[5] Independent variable in this research was the use of picture-cued drill.

Indicators of independent variable were:

a. Preparing some pictures as the cue that show the position of something and guide students to mention prepositions based on the picture.

b. Distributing pictures to each student that show the use of preposition in sentence context.

c. Asking students to identify and write the information they get from the picture.

2. Dependent Variable

It is variable that is affected resulting, because of the existence of the independent variable.[6] Dependent variable in this research was students' understanding of preposition.

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[4]Arikunto, *Prosedure Penelitian Suatu Pendekatan Praktik*, p.161

[5]Sugiyono, *Metodologi Penelitian Pendidikan, (Pendekatan Kuantitatif, Kualitatif, dan R&D)*, p. 61

[6]Sugiyono,*Metodologi Penelitian Pendidikan, (Pendekatan Kuantitatif, Kualitatif, dan R&D)* , p. 61

Indicators of dependent variable were:

a. Identifying the meaning of preposition

b. Explaining the information related to the use of preposition

c. Using preposition of place in conveying information

E. Data Collection Technique

In gaining the data, the researcher attempted to employ these following methods.

1. Documentation

Documentation method was used to look for the data concerning matters or the variables that were taken in the form of the note, transcript, book, newspaper, magazine, notes of meeting , agenda, etc.[7]It refers to the archival data that helps the researcher to collect the needed data. The researcher used the document related to the object research such as students name list and the English subject schedule.

2. Test

Test is a set of questions and exercises that is used to measure the achievement or capability of the individual or group.[8]In this research, there were two kinds of test, pre test and post test those were given to the students as participants. Each test have been given to two groups, first group have been taught

[7]Arikunto, *Prosedur Penelitian: Suatu Pendekatan Praktik*, p.201.

[8]Arikunto, *Prosedur Penelitian Suatu Pendekatan Praktik*, p.193.

by picture-cued drill and second group with non picture-cued drill.

F. Technique of Data Analysis

The writer analysis the data through giving test. It needs some steps in analyzing of the data. The following were the steps have been taken by the writer:

1. Try-out test instrument

Before the experiment was conducted, the writer gave the students try out test to analyze validity, reliability and also difficulty level of each item.

a. Validity

Validity is a measurement which shows validity of the instrument.[9] Validity is the most important variable in judging the quality of a measurement of an instrument before we use. Validity is counted by using product moment correlation formula:[10]

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

[9]Suharsimi Arikunto, *Dasar-Dasar Evaluasi Pendidikan* (Jakarta: PT Bumi Aksara, 2007), Ed. Rev. p. 64.

[10]Arikunto, *Dasar-Dasar Evaluasi Pendidikan,* p.72.

r_{xy}= The correlation coefficient between X variable and

Y variable

N= The number of the 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.

b. Reliability

Reliability refers to the consistency of test score, if it measured twice or more because each research can be possibly wrong.[11] Alpha formula is used to know reliability of test is K-R. 20.

$$r_{11} = \left[\frac{n}{n-1}\right]\left[\frac{S^2 - \sum pq}{S^2}\right]$$

Where:

r_{11} = The reliability coefficient of items
n= The number of items in the test
p = The proportion of students who give the right answer
q= The proportion of students who give the wrong answer
S^2 = The standard deviation of the test[12]

[11] Arikunto, *Dasar-Dasar Evaluasi Pendidikan*, p.86.

[12] Arikunto, *Dasar-Dasar Evaluasi Pendidikan*, p. 100.

Calculation result of r_{11} is compared with r_{table} of product moment by 5% degree of significance. If r_{11} is higher than t_{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.

$$P = \frac{B}{JS}$$

Where:

P = The difficulty's index
B = The number of students who has right answer
JS = The number of students.[13]

The criteria are:

$P = 0,00 \leq P \leq 0,30$ Difficult question

$P = 0,30 \leq P \leq 0,70$ Sufficient

$P = 0,70 \leq P \leq 1,00$ Easy

d. Discriminating Power

It is used to know how accurate the question differ higher subject and lower subject. The formula for discriminating power is Split Half:

$$D = \frac{B_A}{J_A} - \frac{B_B}{J_B} = P_A - P_B$$

Where:

D : The degree of question distinctive
JA : The number of participant the upper group

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[13]Arikunto, *Dasar-Dasar Evaluasi Pendidikan*, p. 208.

JB : The number of participant in the lower group

BA :The number of participants in the upper group who answered the item correctly

BB :The number of participants in the lower group who answered the item correctly

PA :The proportion of participants in upper group that answered true

PB :The proportion of participants in lower group that answered true[14]

The criteria are:

$0,00 \leq D \leq 0,20$ Less

$0,20 \leq D \leq 0,40$ Enough

$0,40 \leq D \leq 0,70$ Good

$0,70 \leq D \leq 1,00$ Excellent

2. Pre-Test

   a. 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: [15]

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

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[14]Arikunto, *Dasar-Dasar Evaluasi Pendidikan*, p. 213-214.

[15]Nana Sudjana, *Metode Statistika* (Bandung: Tarsito, 2005), p.273

Notice:

x^2= Chi square

O_i= Frequency from observation

E_i= Expected frequency

Calculation result of x^2 is compared with x_{table} by 5% degree of significance. If x^2 is lower than x_{table} so the distribution list is normal.

b. Homogeneity Test

According to Nunan, a test should be given to both classes of students before the experiment just to make sure that the both classes really are the same.[16]It is used to know whether experimental group and control group that are taken from population have same variant or not. The formula is:[17]

$$F = \frac{Vb}{Vk}$$

Notice:

Vb : bigger varian

Vk : smaller varian

The hypotheses in homogeneity test are:

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

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

[16]David Nunan, *Research Method in Language Learning* (Cambridge: University Press, 1992) p. 27.

[17]Sugiyono, *Statistika untuk penelitian* (Bandung: Alfabeta, 2010) p.140

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

c.   Test of the Average

It is used to examine average whether experiment group and control group have been decided having different average.[18]T-test is used to analyze the data of this research. It is 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

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

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

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[18]Suharsimi Arikunto, *Prosedur Penelitian Suatu Pendekatan Praktik* (Jakarta : PT Rineka Cipta, 2006), p. 311.

S_2^2 : The standard deviation of both groups

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

$$t^1 = \frac{\overline{X} - \overline{X_2}}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_1^2}{n_2}}}$$

The hypotheses are:

Ho $= \mu1 = \mu2$

Ha $= \mu1 \neq \mu2$

$\mu1$: average data of experiment group

$\mu2$: average data of control group

Criteria test is: Ho is accepted if $-t_{\left(1-1/2\alpha\right)} < t < t_{\left(1-1/2\alpha\right)}$, where $t_{\left(1-1/2\alpha\right)}$ obtained from the distribution list t with $dk = (n_1 + n_2 - 2)$ and opportunities $\left(1 - 1/2\alpha\right)$. Values for other t Ho rejected.[19]

3. Post-test

   a. Normality Test

       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.

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[19]Sudjana, *Metode Statistika*, p. 239-240.

c. Test Average (Right-hand Test)

Proposed hypothesis test in average similarity with the right test is as follows:

Ho $= \mu_1 \leq \mu_2$

Ha $= \mu_1 > \mu_2$

If $\sigma_1^2 = \sigma_2^2$ (has same variant), the t-test formula is used.

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

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 class

$\bar{X}_2$: The mean of the control class

n_1 : The number of experimental class

n_2 : The number of control class

S_1^2 : The standard deviation of experimental class

S_2^2 : The standard deviation of both classes

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

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

Testing criteria that apply Ho is accepted if $t_{count} <$ t_{table} with determine dk = $(n_1 + n_2 - 2)$ and α = 5% with opportunities $(1 - \alpha)$ Values for other t Ho rejected.[20]

The steps were same with the steps on data analysis technique that is to prove the researcher hypothesis about the difference of students' achievement on preposition between the students who were taught by using picture-cued drill and who were not taught by using picture cued drill. Here, the t-test formula was used.

G. Research Procedures

The data was collected by the researcher by doing some efforts. The steps of collecting the data included preliminary visit, contacted the headmaster, asked the data about the students as participants, gave pre-test, gave the treatments, gave the post-test, conducted the observation and interviewed. The procedures of collecting the data could be seen in the following table.

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[20]Sudjana, *Metode Statistika* (Bandung: Tarsito, 2005), p. 243.

Table 3.2
The sequences of administration of the data collection

No.	Task	What to prepare	Date
1.	Preliminary visit (meet the administration officer)	Letter of pre research	Monday, 25th February 2013
2.	Contact the headmaster	Research permission letter	Thursday, 28th February 2013
3.	Contact the English teacher to ask data of data of students' as participants		Thursday, 28th February 2013
4.	Give try-out test	Try-out test worksheet	Monday, 4th March 2013
5.	Give pre test	Pre test worksheet	Monday, 18th march 2013
6.	Give treatment	Lesson plan, handbook, worksheets,	1.Wednesday, 20th March 2013 2.Thusday, 21st March 2013 3.Thusday , 4th April 2013
7.	Give post-test	Post-test worksheet	Sunday, 6th April 2013

1. Preliminary Visit

    The researcher visited the school to get information about the students and teacher as participants. To gain the information, the researcher asked the administration officer whether the school possibly become the setting of research or not by describing the researcher's intention and asked for information about setting and participants.

2. Contact the Headmaster

    Having got the information about setting and participant, the researcher did the second visit to meet the headmaster of the school by giving the permission letter.

3. Contact the English Teacher

    After receiving research permission from the headmaster of the school, the researcher met the English teacher, asked for the data of students and arranged the schedule of the research.

4. Give Try-out test

    In this session, the researcher gave try-out test of English preposition to the eight grades that have been taught English preposition in the seventh grade. It was used to analyze validity, reliability and also difficulty level of each item that would be used as the pre-test and post-test.

5. Give Pre-test

    In this session, the researcher gave the pre-test of English preposition. Both experimental and control group

were given this kind of test. This test was to ensure that both two groups were the same in vocabulary proficiency.

6.   Give the Treatment

In this session, the experimental group was given the treatment and taught by researcher as the experimenter by means of picture-cued drill technique while the control group was taught by the same teacher and material but was different in teaching technique that was by means of non-picture cued drill technique. The students received the treatment two times in which the two different items of English preposition. During the treatment, the observation was also conducted.

7.   Give Post-test

Having administered the treatment for three times, the post-test was given to both groups to test their understanding on English preposition.