III. RESEARCH METHOD

3.1 Research Design

This study is quantitative research. In conducting the research, the researcher applied pretest posttest control group design to measure how far picture and realia can increase the students' achievement in preposition of place. There will be two groups. The first is the experimental group which will receives the treatment of realia. The second is control group which will receive the treatment of picture. This design is believed in having a high internal and external validity. It is because the samples are randomly chosen. The pretest is conducted to measure student's achievement in preposition before the treatment, and the pretest is conducted to both groups to find out the students' initial ability before the treatment. The pretest can be also used to ensure whether the students are in equal initial ability or not (Hatch and Farhady, 1982: 22).

The research design is being presented as follows:

G1 (random) = T1 X1 T2

G2 (random) = T1 X2 T2

In which: **G1** : experimental class

G2 : control class

T1 : pretest

T2 : posttest

X1 : experimental class treatment by using pictures

X2 :control class treatment by using realia

3.2 Population and Sample

The population of the study is the first year students of SMP N 21 Bandar Lampung in the 2010/2011 academic year. There are six classes of VII grade. Two classes will be taken as the sample of the experimental class and control class. There are seven classes of class VII, each class consists of 32-34 students. The total numbers are 227 students. The researcher will use simple random probability sampling, the class is selected randomly by using lottery, and it is used based on consideration that every class has the same opportunity to be selected in order to avoid the subjectivity in this research (Hatch and Farhady, 1982: 19). The experimental class is VII F consists of 32 students, the control class is VII D consist of 32 students and VII C which consists of 34 students is chosen as the try out class.

3.3 Data

This research aims at gaining the data of students' preposition of place achievement before and after the treatments.

3.4 Research Procedures

1. Selecting materials

   The materials, (preposition of place) are chosen from the students' textbook and internet. The selecting process considers materials that have been taught to the students and the students' interest.

2. Determining the population and sample

   The population of research is all students of SMPN 21 Bandar Lampung at Grade VII. And the sample is selected by using *simple random probability sampling* Through lottery, the researcher took three classes of class VII of SMP N 21 Bandar Lampung.

3. Trying out the instrument

   The preposition of place test tried out to the students, in order to find Out whether the test items are good or not in validity, reliability, level of difficulty, as well as the discrimination power.

4. Conducting pretest

   This test was given to experimental class 1 and experimental class 2 in order to know the students' background knowledge of preposition of place. This test is done in 45 minutes.

5. Conducting the treatment

   The preposition of place taught through picture and realia applied in four weeks. The teacher gave the students three treatments using picture and realia as had been explained in the prepared lesson plan.

6. Administering posttest

   The post-test was administered after the application picture and realia. The post-test was administered in 45 minutes and the aim is to find out the students' ability in preposition of place after the implementation of picture and realia .

7. Analyzing the Data

After conducting pretest and posttest, the researcher analyzed the data. The data analyzed by using independent group T- Test. Independent group T-Test formula is used to compare the means of the pretest ad posttest of both two groups. The data is computed through the Statistical Package for Social Sciences (SPSS) version 17.0.

3.5 Data Collecting Technique

The procedures of this research are as follows:

1. **Try-Out Test**

   This step was done in order to known the level of difficulty and discrimination power and also to found out the reliability of the test. Thus, 40 items was tested in the try out.

2. **Pretest**

   The pretest was administered before the treatment for 45 minutes. It is done to know the students' achievement of preposition before the application of picture and realia. The test used by researcher is an objective test of multiple choice forms. The number in items of the test is 20 with four alternative answer for each (A, B, C, and D), one is the correct answer and the rest are distracters. The scoring system is that the load of each correct answer is five points. So, if one participant answers all items correctly, participant gets 100 point.

3. **Posttest**

After conducting the treatment, the researcher gave post-test to both classes. It was done in order to know the result of the experimental and control class, whether they had development or not.

3.6 Criteria of a Good Test

In this research, to prove whether the test has good quality, it must be tried out first. The test can be said having a good quality if it has a good validity, reliability, level of difficulty, and discrimination power (Shohamy, 1985)

1. Validity

Validity refers to the extent to which the test measure what is intended to measure. This means that it relates directly to the purpose of the test (Shohamy, 1985: 74). There are four types of validity, namely face validity, content validity, construct validity and empirical validity. To measure whether the test has a good validity, the researcher used content validity and construct validity.

Content validity is concerned with whether the test is sufficiently representative and comprehensive for the test. In the content validity, the materials given are suitable with the curriculum. In this case, the researcher uses the preposition of place that is supposed to be comprehended by grade VII students. To fulfill this validity, the researcher should see all the indicators of the instrument and analyze them to see whether it has represented the material that measured or not. In this research, the researcher arranged the instrument based on the material given. If the measuring instrument has represented all the ideas that connected with the material that will be measured, that measuring instrument has fulfilled the aspect

of content validity. To know whether the test has a good validity, the items of the test discussed with her advisors and her classmate and the English teacher of SMPN 21 Bandar Lampung.

The content of the try out test is represented in the table of specification below:

Table 3. Specification of the Try Out Test

No	Preposition of Place classes	Numbers of Items	Percentage
1	The Point Itself	1., 3., 4., 6., 8., 11., 13., 14., 15., 21., 31., 33., 34., 35., 36., 38., 39.	42,5%
2	Higher or Lower Point	10., 12., 16., 17., 18., 25., 32., 37.	20%
3	Neighboring the Point	2., 5., 7., 9., 19., 20., 22., 23., 24., 26., 27., 28., 29., 30., 40.	37,5%
		Total	100%

(Frank, 1972: 162)

Construct validity examines whether the test is actually in line with the theory, meaning whether the test is in line with the school curriculum. Preposition of place that is supposed to be comprehended by grade VII students of junior high school (KTSP Kurikulum Tingkat Satuan Pendidikan 2006) will be used.

1. Reliability

Hatch and Farhady (1982: 243) say that *reliability* of a test can be defined as the extent to which a test produces consistent result when administered under similar conditions. Because the instrument consists of some indicators, the

researcher will use split-half technique in order to know how far each indicator will show the same result in measuring an aspect. To measure the coefficient of the reliability between first and second half, the following formula will be used:

$$r_1 = \frac{\sum xy}{\sqrt{\left(\sum x^2\right)\left(\sum y^2\right)}}$$

Where:

r_{xy} : coefficient of reliability between odd numbers and even numbers items

$\sum x^2$: the right answer of odd part

$\sum y^2$: the right answer of even part

$\sum xy$: number of students who take part in the test

(Lado: 1961 in Huges, 1991: 32)

Then "Spearmen Brown's Prophecy Formula" will be used (Hatch and Farhady, 1982: 286) to know the coefficient correlation of the whole items.

The formula is as follows:

$$rk = \frac{2rl}{1+rl}$$

rk : the reliability of the test

rl : the reliability of half test

The criteria of reliability are:

0.90-1.0 : high

0.50-0.89 : moderate

0.00-0.49 : low

(Hatch and Farhady, 1982: 286)

The result of reliability of try out test in this research was 0.98 (see appendix 4). Seeing the criteria proposed above, the reliability of this test was moderate, while a criterion for high reliability was in range 0.50-0.89. It could be concluded that this instrument would give consistent result when it was administered under similar condition to the same participant and in different time (Hatch and Farhady, 1982: 247). Therefore, it could be stated that the test had fulfilled the criteria of reliability. In other words, the test was reliable.

3. Level of Difficulty

To see the level of difficulty, the following formula will be applied:

$$\text{LD} = \frac{R}{N}$$

Where:

LD : level of Difficulty

R : number of students who answer correctly

N : the total number of students following the test

The criteria are:

<0.30 : difficult

0.30-0.70 : average

>0.70 : easy

(Shohamy, 2985: 79)

Seeing the result of item analysis from try out test, it could be inferred that there were ten items which came into the classification of easy items, those were items numbers 6, 9, 12, 17, 20, 22, 26, 31, 33 and 37 (see appendix 5).

The rest 30 items were in the level of average difficulty. The ten easy items were dropped, while the rests were administered for the pretest and posttest.

4. Discrimination Power

To see the discrimination power, the following formula will be used:

$$D = \frac{\text{correct } U - \text{correct } L}{{}^{1}/_{2}\, N}$$

D = Discrimination Power

Correct U = The number of upper group students who answer correctly

Correct L = The number of lower group students who answer correctly

N = The total number of students who take the test

The criteria are:

D: 0.00 – 0.20 = Poor items

D: 0.21 – 0.40 = Satisfactory items

D: 0.41 – 0.70 = Good items

D: 0.71 – 1.00 = Excellent items

D: - (Negative) = Bad items, should be omitted

(Heaton, 1975: 180)

Based on the calculation of discrimination index, the result of try out test showed that there were 4 items (6, 9, 12, 22) had zero discrimination. It means that the items could not discriminate the upper and lower students well. Therefore, those items were dropped. Then items number 17 was also dropped since the ID result was negative, which mean low level students answered more that the high level students. Item numbers 20, 26, 31, 33 and 37 were also dropped since the result were under 0.20. In short, 30 items had discrimination index above 0.20 and they were used in the pretest and posttest. Those items were

1, 2, 3, 4, 5, 7, 8, 10, 11, 13, 14, 15, 16, 18, 19, 21, 23, 24, 25, 27, 28, 29, 30, 32, 34, 35, 36, 38, 39 and 40. A further result of discrimination index is shown on appendix 6.

5. Scoring System

In scoring students result of the test, the highest score is 100. The scores of pretest and posttest are calculated by using formula as follow:

$$X = 100\frac{R}{T}$$

(Lyman, 1971: 95)

Where:

X : percentage of correct score

R : number of right answer

T : total number of items on test

3.7 Data Analysis

To know whether there is a significant increase of the students' preposition of place achievement, the data gained from the pre and the post tests will be analyzed. The researcher analyzes the students' structure achievement by doing these activities:

1. Scoring the pretest and posttest
2. Tabulating the result of the test and calculating the mean of the pretest and posttest.

3. Drawing conclusion from the tabulated result of the pretest and posttest administered, that is by statistically analyzing the data using statistical computerization i.e. independent group T-Test of SPSS 17.0 for Windows to test whether the increase of students' gain is significant or not, The significance is determined by $p<0.05$. The data come from the same sample or known as paired data. (Hatch and Farhady, 1982: 114)

3.8 Data Treatment

The researcher computed the data through drawing conclusion from the tabulated results of the pretest and posttest after having finished collecting the data. In doing so, the researcher analyzed the data statistically by administering the normal distribution, homogeneity test and hypothesis test.

1. Normal distribution test

This test was administered in order to find out whether the data from both groups were normally distributed.

The hypothesis of the normal distribution test was:

H_o : The distribution of the data is not normal

H_1 : The distribution of the data is normal

In this research, the criterion for the hypothesis was:

The hypothesis is accepted if sign > α. In this case, the research uses the level of significance of 0.05

2. Random Test

Random Test is used to ensure whether the data is random or not. One of the assumption should be fulfilled in using T-Test is the data should be taken from random sample in a population.

The criteria are:

H_0 : (the data is random)

H_1 : (the data is not random)

In this research, H_0 was accepted if sign > α, and the researcher used the level significant 0.05.

3. Homogenity Test

This test was used to determine whether the data fulfill the criteria of the quality of variance. This test used T-test to analyze the data.

The hypothesis for the homogeneity of variance was as follows:

H_0 : there is no significant difference in the level of ability (equal)

H_1 : there is significant difference in level of ability (no equal)

In this research, the criterions for the hypothesis were:

H_1 is accepted if sign>α. In this case, the researcher used the level of significance α = 0.05.

3.9 Hypothesis Testing

The researcher will test the hypothesis to prove whether the hypothesis proposed by the researcher is accepted or not. The formulation of the hypothesis testing (t-test) is as follows:

$$S^2 = \frac{(n_1 - 1)SD_1^{\,2} + (n_2 - 1)SD_2^{\,2}}{n_1 + n_2 - 2}$$

(Hatch and Farhady 1982:112)

$$T = \frac{\overline{X_1} - \overline{X_2}}{S\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

(Hatch and Farhady 1982: 116)

Notes:

X_1 : mean of the experimental class

X_2 : mean of the control class

S : Standard Deviation

N_1 : the number of the students in experimental class

N_2 : the number of the students in control class

The test criteria are:

If the $T_0 \rangle$ T-table, the H_0 is accepted.

If the $T_0 \langle$ T-table, the H_a is accepted.

(Hatch and Farhady 1982: 120)

Ho : is accepted if t-ratio is lower than t-table (there is no significant

difference of students' achievement between those who are taught through realia and those who are taught through pictures).

H_1 : is accepted if t-ratio is higher than t-table (there is no significant difference of students' achievement between those who are taught through realia and those who are taught through pictures).

Ho : Realia is not more effective than pictures in improving the students' achievement in preposition of place

H_1 : Realia is more effective than pictures in improving the students' achievement in preposition of place.