

## **CHAPTER 3**

### **RESEARCH METHODOLOGY**

This chapter presents overview of research methodology of this study. Statements of the problem are presented first. Then, statements of the problem are continued by the design of the study, site and participants of the study, and data collection.

#### **3.1 Statement of The Problem**

This study seeks to address the following question: Is Jigsaw technique effective in improving students' reading comprehension?

#### **3.2 Design of The Study**

This study is a quasi experimental study. It focuses on seeking the difference between before and after implementing Jigsaw technique and revealing students' perception of Jigsaw technique in reading.

Furthermore, this study is conducted by using two groups as samples, which are treatment group and control group. Before the treatment, both of the groups are given the same pre-test to measure students' prior knowledge and to identify the range of ability of both of the groups. The treatment group is given Jigsaw technique meanwhile the control group is given non-Jigsaw technique or conventional teaching technique. Post-test is given to both of the groups to measure students' ability as the result of the study. This following table shows the design of the study.

**Table 3.1 Design of The Study**

<b>Group</b>	<b>Pre-test (O<sub>1</sub>)</b>	<b>Treatment (X)</b>	<b>Post-test (O<sub>2</sub>)</b>
Treatment	O <sub>1</sub>	X	O <sub>2</sub>
Control	O <sub>3</sub>		O <sub>4</sub>

- O<sub>1</sub> = Pre-test for treatment group  
O<sub>2</sub> = Post-test for treatment group  
O<sub>3</sub> = Pre-test for control group  
O<sub>4</sub> = Post-test for control group  
X = Jigsaw technique as the treatment

### 3.2.1 Variables

The independent variable of the study is the use of Jigsaw technique. Meanwhile, the dependent variable is students' reading comprehension scores which is observed and measured to determine the effect of the independent variable. The design is adopted from Creswell (2009).

### 3.2.2 Research Hypotheses

Hypothesis is the scientists' needs to support or prove, symbolized as  $H_1$  (Suharsaputra, 2012). The hypothesis of this research is Jigsaw technique can improve students' reading comprehension. The researcher is also ready for the null hypothesis. The null hypothesis states that there is no difference in mean adjustment level before and after the Jigsaw technique was applied (Creswell, 2009). By rejecting the null hypothesis, the study was able to support the correctness of the alternative hypothesis, which means that the experiment worked.

The formulation can be seen below.

$$H_0 : \mu_1 = \mu_2$$

$H_0$  represents null hypothesis

$\mu_1$  represents first population (treatment group)

$\mu_2$  represents second population (control group)

### **3.3 Site and Participants of The Study**

This site and participants of this study were selected purposively. Purposive sampling is used for studies with non generalization purpose (Creswell, 2012). Since the purpose of this study is not to generalize the finding to other context, purposive sampling is chosen. By using purposive sampling, researcher only take some students who are likely to have the required information and be willing to share it with the researcher (Kumar, 2014).

#### **3.3.1 Site**

The site of this study was SMA Negeri 1 Subang. This place was chosen for two reasons. First, the site can be accessed easily by the researcher. Second, this school encouraged the students to master English since the school sent some students to study abroad for a student exchange program.

#### **3.3.2 Participants**

The participants of this study were XI Science 3 as control group and XI Science 6 as treatment group. These classes equally consist of 34 students from the eleventh grade of the school. The participants were chosen for several reasons. First, eleventh grader students were selected since they were considered already had enough experience in learning English. Second, the age of eleventh grader students were considered mature enough, who are able to act appropriately under the teacher's command. Third, the school encouraged the students to master English since the school sent some of the students to go abroad for a student

exchange program. The classes were selected through the assistance and suggestion of a eleventh grade English teacher.

### 3.4 Research Instruments

This study employed three research instruments to obtain the data. The instruments are pilot test, pre-test, post-test and questionnaire. The pilot test is used for testing the validity, reliability, discrimination index, and difficulty index of the items. The pre-test is used to measure students' reading comprehension in control group and treatment group. The post-test is used to investigate the result between the treatment group that was given Jigsaw technique and the control group that was not given Jigsaw technique. Meanwhile the questionnaire is used to obtain students' responses toward the implementation of Jigsaw technique.

### 3.5 Data Collection

The data collection techniques of this study were pilot test, pre-test, and post-test. Pilot test was conducted to check the validity and the reliability of the test. Pre-test and post-test were conducted to examine the score before and after treatment. The data collection techniques are presented in the following.

**Table 3.2 Data Collection**

No.	Technique	Activity	Source	Expected Results
1	Pilot test	Administering a set of items related to an exposition text.	A set of 60 items.	Students' score to analyze.
2	Pre-test	Administering a set of items related to an exposition text before the	A set of 30 items.	Students' score to analyze.

		implementation of Jigsaw technique.		
2	Post-test	Administering a set of items related to an exposition text after the implementation of Jigsaw technique.	A set of 30 items.	Students' score to analyze.
3	Questionnaire	Distributing questionnaire	Students' questionnaire results, including personal information.	Students' response of Jigsaw technique in reading exposition text.

### 3.6 Time Allocation

This study was conducted in SMA Negeri 1 Subang for four weeks. First of all, pilot test was conducted to check the validity, reliability, difficulty index and discrimination index. After that, pre-test was given in the beginning in order to determine the range of students' ability in both groups. After administering the pre-test, Jigsaw technique was given in the treatment group and non-Jigsaw technique was given in the control group. Post-test was administered at the end of the lesson for both of groups. Questionnaire was distributed after the post-test.

### 3.7 Research Procedures

In conducting this study, there were some procedures administered. First, pilot test was conducted in a class which was not taken as the sample. After checking the validity and reliability from the test, pre-test was given before delivering exposition text without implementing Jigsaw technique. Second, post-test was given after the implementation of Jigsaw technique in delivering exposition text. After the post-test, questionnaire was given in order to provide wider explanation related to the students' responses toward Jigsaw technique in improving reading comprehension.

#### 3.7.1 Organizing Teaching Procedure

The quasi experimental design was conducted to examine the use of Jigsaw technique and to investigate students' perception towards Jigsaw technique in reading exposition text. The research schedule is presented as follows:

**Table 3.3 Research Schedule**

No.	Date	Material
1	October 24 <sup>th</sup> , 2015	Administering Pilot test.
2	October 27 <sup>th</sup> , 2015	Pretest for control group
3	October 28 <sup>th</sup> , 2015	Pretest for control group
4	November 3 <sup>rd</sup> , 2015	Session 1: Control group Delivering exposition text with non-Jigsaw technique
5	November 4 <sup>th</sup> , 2015	Session 1: Treatment group Delivering exposition text with Jigsaw technique
6	November 10 <sup>th</sup> , 2015	Session 2: Control group Delivering exposition text with non-Jigsaw

		technique
7	November 11 <sup>th</sup> , 2015	Session 2: Treatment group Delivering exposition text with Jigsaw technique
8	November 17 <sup>th</sup> , 2015	Session 3: Control group Delivering exposition text with non-Jigsaw technique
9	November 18 <sup>th</sup> , 2015	Session 3: Treatment group Delivering exposition text with Jigsaw technique
10	November 24 <sup>th</sup> , 2015	Session 4: Control group Delivering exposition text with non-Jigsaw technique
11	November 25 <sup>th</sup> , 2015	Session 4: Treatment group Delivering exposition text with Jigsaw technique
12	December 1 <sup>st</sup> , 2015	Post-test for Control Group
13	December 2 <sup>nd</sup> , 2015	Post-test for Treatment Group
14	December 2 <sup>nd</sup> , 2015	Questionnaire

### 3.7.2 Conducting Pilot Test

Pilot test was administered to check the validity and reliability of items in order to get proper instruments. The test consists of 60 items which are items of pre-test and post-test that will be used in the research. Pilot test was given to students from another class which were not the sample of the research. The

following items has covered the reading comprehension based on the syllabus of 2013 curriculum.

**Table 3.4 Reading Comprehension Materials**

<b>Standard Competencies</b>	<b>Materials</b>	<b>Item Number</b>
4. 14 Comprehending exposition texts which discuss current issues in the society.	Main idea	1, 2, 11, 12, 14, 16, 17, 21, 22, 26, 31, 32, 38, 41, 44, 47, 51, 58.
	Generic structure	13, 23, 34, 42, 59.
	Vocabulary	3, 6, 7, 15, 18, 24, 25, 33, 35, 36, 43, 48, 49, 53, 55.
	Linguistic features	4, 5, 19, 20, 27, 37, 39, 40, 45, 52, 54, 60.

### **3.7.3 Administering Pre-test**

A pre-test was administered after delivering exposition text without implementing Jigsaw technique. The pre-test was in form of an exposition text and followed by five items. The result of the pre-test was used to show the difference between pre-test and post-test. The difference was shown by the scores of pre-test and post-test.

### **3.7.4 Conducting Non-Jigsaw Technique**

The control group was not given Jigsaw technique and given conventional teaching procedure instead. The steps are presented below.

**Table 3.5 Procedure of Non-Jigsaw Technique**

<b>No.</b>	<b>Steps</b>	<b>Description</b>



1	Teacher distributes the text.	Every student is given a text and asked to read it individually
2	Teacher tells the generic structure and function of the text.	Students write down the explanation.
3	Teacher makes a list of the difficult or unknown words from the text.	Students write the meaning of the difficult or unknown words from the text.
4	Teacher gives a set of items related to the text.	Students answer the items.

### 3.7.5 Conducting Jigsaw Technique

The treatment which was implemented in treatment group is Jigsaw technique. The treatments in this study consisted of several steps which were explained by Aronson (2005). The steps are presented below.

**Table 3.6 Procedure of Jigsaw Technique**

No.	Steps	Description
1	Teacher makes students work in group.	Divide the students into groups of 5 or 6 people. Diversity in terms of ability in groups is strongly encouraged.
2	Teacher chooses a leader in each group.	The teacher should make this choice the first time that the strategy is used so that a mature learner can be chosen.
3	Teacher divides the material into several parts.	The number of each group depends on the number of subtopics.
4	Teacher assigns one part to each student.	Students should not have access to more than one part. Each group

		should contain one student assigned to each part.
5	After students have looked at their assigned part, teacher sends them to "expert" groups.	All of the students assigned Part 1 form the Part 1 expert group.
6	Teacher gives the expert groups time to discuss.	Give the expert groups time to discuss and agree on the major points of their part, and to practice how they will "teach" their group members.
7	Teacher sends the students back to their original jigsaw group.	Teacher controls the situation.
8	Each student should present his or her part to the group .	Group leaders encourage other group members to ask questions of the expert if they do not understand. The expert is the main source of information about his or her part for the group.
9	Teacher controls the situation.	The instructor should be moving between groups observing and ensuring that the groups are on track.
10	Teacher gives a quiz as an assessment.	Give a quiz on the material taught in the jigsaw so that students realize this is truly instruction for which they are responsible.

### 3.7.6 Administering Post-test

A post-test was given after the whole sessions. The post-test was in the same form as the pre-test. The score from post-test were used to measure whether or not the implementation of Jigsaw technique influenced the students' score.

### 3.7.7 Administering Questionnaire

In the present study, the last instrument is questionnaire. It aimed to gather information of students' perception on Jigsaw Technique in reading exposition text. The questionnaire was modified from Qiao & Jin (2010). Also, this questionnaire has been used in a large number of students' perception on other techniques of cooperative learning method. Therefore, its validity has been tested by many researchers that are focused on students' perception.

This questionnaire is translated into Indonesian language to make the students easier in understanding each statement provided in the questionnaire. It is delivered to the students to obtain students' perception on Jigsaw Technique.

This questionnaire consists of four parts. Part one consists of four items to identify students' interdependence which assess students' coordination with their Jigsaw group's members and their teacher. The second part consisted of four items to analyze students' face-to-face interaction during the implementation of Jigsaw Technique. The third part included four items that conveyed students' individual and group accountability. The last part presented three items related to their interpersonal skills. The items used 4 points Likert's scale is ranged from "strongly agree" (SA), "Agree" (A), "Disagree" (D), and "Strongly Disagree" (SD). It is because there is tendency for participants to choose for mid-point of 5-point or 7-point scale and one of one options to overcome this is to use an even number scaling system, as there is no midpoint (Cohen, et al., 2007).

### **3.7.8 Data Analysis**

Data analysis includes data analysis on pilot test, validity test, reliability test, index of difficulty, discrimination index, normality distribution test, scoring technique, and data analysis on pre-test and post-test.

#### **1. Instrument Analysis**

##### **a. Validity**

Validity is a measurement which shows level of validity of an instrument (Suharsaputra, 2012). An instrument which has high validity is considered as a valid instrument. It is also considered as a valid instrument when it measures the data properly and meets the needs of the research.

Validity of the instrument is measured by the formulation of validity testing by Arikunto (2008). The result of this calculation can be interpreted to determine the validity of the items by referring to the following table (Arikunto, 2008).

Based on the validity test on 30 items of pre-test instrument, there are 6 items with high validity, 18 items with medium validity, 2 items with low validity, 1 item with very low validity, and 1 invalid item. According to the result of validity test analysis, items which have low validity, very low validity, and invalid cannot employed in pre-test because those items will not measure the answers properly. Therefore, five items were not employed in pre-test.

Meanwhile for the post-test instrument, there are 3 items with high validity, 22 items with medium validity, 1 item with low validity, 2 items with very low validity, and 2 invalid items. According to the result of validity test analysis, items which have low validity, very low validity, and invalid cannot be used in post-test because those items will not measure the answers properly. Therefore, five items were not employed in post-test.

### **b. Reliability**

Reliability refers to a definition whereas an instrument is reliable and can be used as a data collection (Arikunto, 2006). A reliable instrument will result a reliable data as well.

The method that is used for determining the reliability of the instruments is split half method. The reliability value is determined by counting product moment coefficient. After that, the reliability test is calculated by formulation of Arikunto (2008). Based on the reliability test, the reliability of 30 items is 0.91. This reliability value is categorized as highly reliable. Meanwhile for the post-test instrument, the reliability of 30 items is 0.88. This reliability value is categorized as highly reliable.

### **c. Index of Difficulty**

The index of difficulty shows difficulty level of the items. Good items are not very easy nor very difficult. The very easy items will not be challenging for students, meanwhile the very difficult items will make students less enthusiastic because it exceeds their ability (Arikunto, 2008).

The index of difficulty is calculated by the formulation of Arikunto (2008). Based on the difficulty index, there are 4 items with high difficulty and 26 items with medium difficulty. Meanwhile for the post-test instrument, there are 7 items with high difficulty and 23 items with medium difficulty.

#### **d. Discrimination Index**

Discrimination index is a measurement to determine the quality of an item in discriminating students with good or better ability and lower ability (Arikunto, 2008)

The discrimination index is calculated by the formulation of Arikunto (2008). Based on the discrimination index, there are 7 very good items, 17 good items, 4 average items, and 2 unusable items. According to the result of discrimination index analysis, the unusable items and good items with low and very low validity were not included in pre-test because those items cannot determine students who are mastering and not mastering the subject. Therefore, only 25 items that were used in pre-test and 5 items that were not used are number 5, 11, 17, 25, and 29.

Meanwhile for the post-test instrument, there are 2 very good items, 21 good items, 3 average items, 2 poor items, and 2 unusable items. According to the result of discrimination index analysis, the unusable items and good items with low and very low validity were not included in post-test because those items cannot determine students who are mastering and not mastering the subject. Therefore, only 25 items that were used in pre-test and 5 items that were not used are number 4, 12, 23, 26, and 30.

## **2. Test Result Analysis**

The result from pre-test and post-test are analyzed by quantitative approach which use statistical test. The analysis for both of the test are as following.

#### **a. Scoring Technique**

In this study, the scoring technique is zero fine scoring. Zero fine scoring is used by counting the correct answer. Items that are not answered will be scored zero as well (Arikunto, 2008).

Every correct answer are given 1 point. The total points which are gained by students are by counting the number of correct answers. Maximum point for each test is 25. In order to obtain the score is by using the following tests.

#### **b. Testing of Hypothesis**

Hypothesis is prediction the researcher makes about the expected relationship among variables (Creswell, 2009). Meanwhile, Sugiyono (2010) argues that “hypothesis is a temporary answer of a research question whereas the research question has been stated in a sentence”. Therefore, the hypothesis should be tested by the collected data (Sugiyono, 2010).

Testing the hypothesis employs statistical procedures in which researcher draws inferences about the population from a study sample. The testing of hypothesis is used to determine whether or not hypothesis accepted (Sudjana, 2005).

The testing of hypothesis consists of normal distribution test, homogeneity of variances test, and hypothesis test.

##### **1) Normality distribution test**

In this study, chi square is employed to determine whether or not the sample data well distributed. The steps in testing normal distribution is explained by the following formulations.

- a) Counting mean of each class by using the formulation of Russefendi (1998).
- b) Counting standard deviation of each class by the formulation of Russefendi (1998).
- c) Determining variance
- d) Determining how many interval class needed by using Sturges rule.
- e) Determining the length of interval class by using the formulation of Russefendi (1998).
- f) Arranging into the frequency distribution table which is a helper table to calculate chi square.
- g) Determining the top limit and bottom limit from each interval class. The top limit is gained from the end of top class added 0.5, meanwhile the bottom limit is gained from the end of bottom class minus 0.5.
- h) Calculating the z score from each interval class by using the formulation of Russefendi (1998).
- i) Finding the cumulative proportion (pk) by reading the z table from gained z score (Ruseffendi, 1998).
- j) Finding the cumulative frequency (fk) by timing pk with total number of students (n) (Ruseffendi, 1998).
- k) Determining the expectation frequency ( $f_a$ ) from the minus of the fk above and the under fk (Ruseffendi, 1998).
- l) Calculating the frequency value by using chi square.
- m) Referring the value  $\chi^2$  to the Chi square table towards the freedom degree of the number of classes minus 3 ( $dk = \text{the number of classes} - 3$ ) with significant test 0.01. This 0.01 is chosen because research in education field usually use 0.01 or 0.05 (Arikunto, 2006). If  $\chi^2_{\text{calc}} < \chi^2_{\text{crit}}$  in certain significance, the sample is distributed normally (Ruseffendi, 1998).
- n) After testing the normality, the homogeneity is tested as well to determine the precise parametrical statistic test for decision making.

## 2) Homogeneity test

Homogeneity test is conducted to variance value of pre-test and post-test in treatment group and control group to see whether or not there is a homogeneous in both samples. The homogeneity is tested by using the formulation of Russefendi (1998).

If the value of  $F_{\text{calc}} < F_{\text{crit}}$  then both samples are homogeneous. If the samples are homogeneous and normally distributed, the hypothesis is able to be tested.

### 3) Hypothesis test

Hypothesis test is conducted to test two means, whether there is any difference in mean of pre-test and post-test in treatment group and control group.

#### **c. Normalization of Gain Score**

The actual gain score is obtained from the difference of pre-test score and post-test score.

### **3.8 Concluding Remark**

This chapter has presented the methodology of this study. First, statements of the problem was presented first. Then, statements of the problem were continued by the design of the study, site and participants of the study, data collection, and data analysis. This study used quantitative and qualitative approach and conducted in the eleventh grade of senior high school in Subang. The data that were collected from questionnaire was analyzed descriptively. The next chapter will focus on findings and discussion of the study.