

## CHAPTER III

### RESEARCH METHODOLOGY

This chapter presents the methodology of the conducted study to answer the two research questions previously stated in chapter one. It covers research design, variables, hypotheses, population and sample, research instruments, research procedure and data analysis.

#### 3.1 Research design

Regarding the main aim of this study that is to investigate the effectiveness of the use of Spelling Bee game to improve students' vocabulary mastery, the study used a quantitative method with one-group pretest-posttest of pre-experimental design. This kind of design compares the students' learning achievement before and after the treatments through the pre-test and post-test results. Hatch and Farhady (1982) proposed the design as follows:

$T_1 \times T_2$
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*T1 : Pre-test*

*X : Spelling Bee game treatments*

*T2 : Post-test*

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This study used one-group pretest-posttest of pre-experimental research design for several reasons. Firstly, for limited time and cost, it was not feasible to use the true experimental design. Secondly, there was no other method had been chosen as the treatment for control group.

### **Variables**

There were two variables in this study: an independent and a dependent variable. Hatch and Farhady (1982) define an independent variable as the major variable which is selected, manipulated and measured by the researcher. On the other hand, they define a dependent variable as the variable which is observed and measured to determine the effect of the independent variable. The independent variable of this study was the use of the Spelling Bee game, while the dependent variable was students' vocabulary mastery.

### **Hypotheses**

The study proposed the null hypothesis (denoted by  $H_0$ ) and alternative hypothesis (denoted by  $H_A$ ) which are formulated as follows:

$$H_0 : \bar{x}_1 = \bar{x}_2$$

$$H_A : \bar{x}_1 \neq \bar{x}_2$$

The null hypothesis ( $H_0$ ) in this study is that “there is no significance difference in students' vocabulary mastery before and after the Spelling Bee game treatments”. While the alternative hypothesis ( $H_A$ ) is that “there is a significant

difference in students' vocabulary mastery before and after the Spelling Bee game treatments”.

Therefore, by rejecting the null hypothesis, the study was able to support the correctness of the alternative hypothesis, which means that the experiment worked.

### **3.2 Data Collection**

#### **3.2.1 Population and Sample**

The population of this study was the 8<sup>th</sup> grade students of SMP N 3 Lembang.. Based on *KTSP* 2006, there were 5 texts had to be taught to eighth grade students of junior high school. One of the texts was recount text that was used as the material in playing the Spelling Bee game.

The selected population then was narrowed into a sample. One of the 8<sup>th</sup> grade classes of SMP N 3 Lembang was chosen as the sample of this study. The class consisted of 31 students.

#### **3.2.2 Research Instruments**

In collecting the data, there were two types of instruments in the study, namely vocabulary tests and questionnaire. The vocabulary test was used in the pre-test and the post-test. Pre-test was used to know the students' prior knowledge of vocabulary that the students usually find in recount texts, particularly past tense verbs. While the post-test was used to measure the students' vocabulary mastery after

the Spelling Bee game treatments. The test contained 32 items of multiple choice from which contains four options in each number.

### **3.2.3 Research Procedure**

The research procedure included administering a pilot-test, administering a pre-test, giving treatment, administering a post-test and distributing questionnaire.

#### **3.2.3.1 Administering Pilot test**

Before conducting the study, a pilot-test was administered to investigate the validity, reliability, difficulty and discrimination of the instrument item.

The pilot-test consisted of fifty questions. The pilot-test consisted of 50 multiple choice items. It was given to 39 students of one of 8<sup>th</sup> grade of SMP N 3 Lembang. The respondent of the pilot test was a class outside the sample at the same level.

#### **3.2.3.2 Conducting Treatment**

In conducting the treatments, the researcher acted as the teacher and the judge of the Spelling Bee game at the same time. In each meeting before playing the game, students were given a recount text. There were some activities that students did with the text, for example, read the text and identified some words that they didn't know. Next, they would start to play the game. The game in this study adopted from Stone (2010). The time allocation for playing the game was twenty minutes, including grouping of students, explaining the rule and playing the game. There were some

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steps in playing Spelling Bee game. First of all, the teacher would explain about the rule of the game. It was usually in the form of demonstration of the game by asking two or three students to play the game by following the teacher's instruction. Then students started to play it. For 5 meetings there were 2 different kinds of the game's rule. One of them was Tic-Tac-Toe spelling bee. The teacher arranged a list of words. The words were from the recount text given before. Dividing the students into two teams, Team X and Team O, and draw Tic-Tac-Toe boxes on the board. Choose one student from Team X. First two students from Team X would get 1 word for each to be spelled. The teacher mentioned the word of the first student. The first students had forty seconds to spell and to ask some clues, for instance the definition of the word, the word's part of speech and the word's usage in a sentence. If both of the students spelled the words correctly, then Team X got 1 point by writing 'X' on one of the 16 boxes on the board. But if one or both of them failed, Team X didn't get a point. Team X and Team O continued to play it by turns. Both of groups competed to win the game by arranging 4 points in a row, it could be horizontal, vertical or diagonal on the boxes. The first team who could do that became the winner.

The treatments were held five times, which lasted for 80 minutes for each meeting. The lesson plans used were based on Kurikulum Tingkat Satuan Pendidikan (KTSP) and Standar Kompetensi dan Kompetensi Dasar (SK-KD).

### **3.2.3.3 Administering Pretest and Posttest**

The pretest was administered to measure the students' prior knowledge. After giving the pre-test, several treatments of the Spelling bee game were given to the

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sample. In the end, the posttest was held to investigate whether there is significant difference of students' vocabulary mastery before and after treatments. The form of the pre-test and the post-test were multiple choice vocabulary tests. The tests contained items of the valid pilot test items.

#### **3.2.3.4 Conducting Questionnaire**

The last instrument was the questionnaire. It was used to investigate the students' responses toward the use of the Spelling Bee game. The questionnaires were given after the treatment on February 9, 2012 at 11.00 – 11.20 a.m.

### **3.3 Data Analysis**

Data analysis includes scoring technique, data analysis on pilot-test, data analysis on the pretest, the posttest and data analysis on the questionnaires.

#### **3.3.1 Scoring Technique**

The test used in this study was a multiple choice test. According to Arikunto (2010), two types of formulas can be used to process the multiple choice item data; the formula with or without punishment. This study chose the without punishment formula in scoring the students' answer on vocabulary test. The formula proposed by Arikunto (2010) is as follows:

$$S = R$$

*S* : Obtained score (Raw Score)

*R* : Right answer

### 3.3.2 Data Analysis on Pilot-test

The instrument used in the study was a vocabulary test which was aimed at measuring the students' mastery in vocabulary. Before applying the instrument, the value of its validity and reliability was computed.

Moreover, the difficulty (item facility) and discrimination test of the instrument were also analyzed to discriminate between the higher ability test takers and the lower ability test takers. This test must be done to observe the relevance of the test item with the population. Below is the analysis of the instrument.

#### Validity

“Validity refers to the extent to which the results of the procedure serve the uses for which they were intended” (Hatch and Farhady, 1982: 250). A validity test was measured to support any inferences that the researcher made based on the data gained using a particular instrument.

Pearson product moment correlation was used to analyze the validity of each item. The results of the pretest were calculated using SPSS 17 for windows.

## Difficulty Level

Difficulty level (item facility) was defined as the proportion of the test takers who answer the correct item (Fulcher, 2007 in Aprian, 2009). The difficulty level test was used to measure whether the item is relevant with the students' ability level or not.

In addition, the difficulty level should neither be too easy nor too difficult. The following formula was used to calculate the index of difficulty of each item:

$$p = \frac{\sum x}{S_m N}$$

$p$  = Index of difficulty

$\sum x$  = Sum of students who answer the items correctly

$S_m$  = Maximum score (1)

$N$  = Number of students taking the test

## Discrimination

Discrimination was used to discriminate higher ability and lower ability test takers. The formula used to analyze discrimination is presented as follows (Arikunto, 2010):

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$$D = \frac{\sum A - \sum B}{n_A - n_B}$$

$n_A$   
 $n_B$

Where:

$D$  = Discrimination index

$\sum A$  = Sum of right answer for upper group

$\sum B$  = Sum of right for lower group

$n_A$  = Number of students in upper group

$n_B$  = Number of students in lower group

### **Reliability test**

According to Hatch and Farhady (1982: 244) “reliability can be defined as the extent to which a test produces consistent results when administered under similar conditions.” To ascertain the reliability of the test items, this study used Cronbach’s alpha formula through SPSS 17 for windows. Cronbach’s alpha level was used to check whether the instruments were reliable or not to be used in the pretest and the posttest.

### 3.3.3 Data Analysis on Pre-test and Post-test

After the pre-test and post-test, the next step was analyzing the output data. The output data were analyzed using an independent t-test to determine whether there is a significant difference between the means of the sample before and after treatments.

#### Normal Distribution Test

In analyzing the normal distribution, Kolmogorov-Smirnov formula was used in this study. The test was calculated by using SPSS 17 for Windows Program. Three steps were involved in testing the normal distribution. First, the hypotheses and the alpha level were stated. The alpha level was set at 0.05 (two-tailed test). The null hypothesis ( $H_0$ ) is that “the scores of the group are normally distributed”, while the alternative hypothesis ( $H_A$ ) is that “the scores of the group are not normally distributed”. Second, the normal distribution of the data was analyzed by using Kolmogorov-Smirnov formula on SPSS 17 for Windows Program. Third, interpreting the output data by comparing the significance gained with the level of significance (0.05). If the level of significance  $> 0.05$ , it means that the distribution of the sample is not significantly different from normal distribution (normal), then the null hypothesis is accepted. However, if the level of significant  $< 0.05$ , it means that the distribution is significantly different from normal distribution (Field in Yulia, 2010).

#### The Dependent *t*-test

In analyzing the results of pre-test and post-test, dependent t-test was used to compare the means' difference of the two tests. As stated by Hatch and Farhady Ratna Juwita Ningsih, 2013  
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(1982), dependent (paired sample) t-test is used to analyze the pre-test and post-test scores and to investigate whether or not the difference of pre-test and post-test means are significant.

In this study, dependent t-test was calculated using SPSS 17 for Windows Program. After getting the t value ( $t_{\text{obtained}}$ ), then it was compared with the  $t_{\text{critical}}$ . If  $t_{\text{obtained}} \geq t_{\text{critical}}$  at the level of significance ( $p$ ) = 0.05, then the null hypothesis ( $H_0$ ) is rejected and accepts the alternative hypothesis ( $H_A$ ). However, If  $t_{\text{obtained}} < t_{\text{critical}}$ , then the null hypothesis is accepted.

#### **3.3.4 Data Analysis on the Questionnaire**

The questionnaire used in this study was aimed to investigate students' responses toward the use of Spelling Bee game in their English class. Siniscalco and Auriat (2005: 3) state that "the main way of collecting this information is by asking people questions – either through oral interviews (face to face or telephone), or by self administered questionnaires, or by using some combinations of these two methods."

This study used a close-ended questionnaire with twelve questions inside. Siniscalco and Auriat (2005: 23) add that "closed (or multiple choice) questions ask the respondents to choose, among the possible set of answers, the response that most closely represents his viewpoint. The respondent is usually asked to tick or circle the chosen answer."

The questionnaire consisted of twelve statements that investigate students' responses toward the use of the Spelling Bee game in their English class. Then, the  
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questionnaire was analyzed using Likert scale (Harris, 2010). In addition, Dumas in Bucci (2003) states that “Likert scale is the most commonly used question format for assessing participants’ opinion of usability.”

To briefly explain the students’ responses toward the game, the statements then divided into three categories as follows:

Table 3.1  
Categories of Statements

No.	Category	Number of Statement
1	Spelling Bee game can enhance students’ vocabulary mastery.	3, 4, 5, 6, 8
2	Spelling Bee game creates relaxed and enjoyable atmosphere.	1, 2, 7
3	Spelling Bee game encourages students’ learning motivation.	9, 10, 11, 12

Each statement from the questionnaire would be labeled with each own score. There are five predetermined answers with scale 1-5 suggested by Likert scale. The scale categorizes the statements into two: positive and negative statements. The ranging score for positive statements are 5-1. Otherwise the negative statements are about 1-5. All statements provided in this questionnaire belong to the positive statements, so the ranging score can be seen in Table 3.2.

Table 3.2  
Range Score for Positive Statement

Answers	Score
Strongly Agree (SA)	5
Agree (A)	4
Uncertain (U)	3
Disagree (D)	2
Strongly Disagree (SD)	1

Indeed, to avoid mental perception from the students, the answer *Uncertain (U)* was eliminated from the answer given. Thus, the answers then consist of 4 choices with the ranging score 4 -1. Where, 4 for Strongly Agree (SA), 3 for Agree (A), 2 for Disagree (D), and 1 for Strongly Disagree (SD).

The whole statements of the questionnaire were written in Bahasa Indonesia to make sure that the respondents can understand all of the statements. In addition, to gain the trustworthy data, the respondents did not need to put their name on it.

### 3.4 Concluding Remark

This chapter discusses the research methodology. It provides information about research design; data collection that covers the population and sample, the instruments used in this research, and the procedure in collecting the data; and

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technique how to analyze the data. Next, chapter 4 presents findings and discussions of the study.



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