

## **CHAPTER III**

### **RESEARCH METHOD**

In this chapter, research method is briefly outlined for this study including research design, variable and hypothesis. This chapter also consists of population and sample, data collection, evaluating test instrument (instrument validity and instrument reliability with discrimination and difficulty index), treatment implementation, data analysis (analyzing data on test score, pretest, posttest, and from observation) and research procedure.

#### **3.1. Brief Explanation to Research Method**

Research method is clearly stated by Dawson (2009) as the way or means to gather the data. Meanwhile research, as Creswell (2008) gives meaning, is as a series of actions or steps used to collect and analyze information to enhance our understanding of a topic or issue. Fraenkel and Wallen (1996) express that, the essence of all research originates in curiosity, a desire to know how and why things happen, including why people do the things they do, as well as whether or not certain ways of doing things work better than other ways. In short, research is simply defined as a systematic approach to finding answers to questions (Hatch and Farhady, 1982). Therefore, it can be concluded that research method is the way or means we use to collect the data in our research in order to find the answer of the research problems.

There are three recognized methods for conducting research: quantitative, qualitative and mixed methods (Creswell, 2008; Migiro and Magangi, 2011).

Qualitative research is a term with various meanings in educational Research (Savenye and Robinson, 2003). According to Hancock (1998), qualitative research is concerned with the opinions, experiences and feelings of individuals producing subjective data and it is concerned with developing explanations of social phenomena as they occur naturally and no attempt is made to manipulate the situation under study. Fraenkel & Wallen (1996) refer qualitative research as the research studies that explore the quality of relationships, activities, situations or materials. Moreover this method is given shape by the theory from Dawson (2009: 14) who states that “qualitative research explores attitudes, behavior and experiences.”

Meanwhile, quantitative research is described as empirical, using numeric and quantifiable data (Belli, 2008). Marczyk, DeMatteo, & Festinger (2005: 17), state, “Quantitative research involves studies that make use of statistical analysis to obtain their finding.” Experiment is frequently regarded as prime examples of quantitative research and is evaluated against the strengths and weaknesses of statistical, quantitative research methods and analysis (De Vaus, 2001).

The last one is mixed method. This method involves both collecting and analyzing quantitative and qualitative data (Creswell, & Plano Clark, 2006). Johnson, Onwuegbuzie, and Turner (2007: 112) express,

“mixed method research is as becoming increasingly articulated, attached to research practice, and recognized as the third major research approach or *research paradigm*, along with qualitative research and quantitative research.”

Bazeley (2002), argues that when thinking mixed method, in terms of some combination of qualitative and quantitative approaches to research are considered by most social scientists. And according to Bryman (2006: 97) “There can be little doubt that research involves the integration of quantitative and qualitative research has become increasingly common in recent years.”

There are three types of mixed method according to Creswell (2008): 1. triangulation mixed method (equal priority to both quantitative and qualitative data), 2. embedded mixed method (priority to the major form of data collection, e. g., often quantitative data, and secondary status to the supportive form, e. g. often qualitative data collection as additional to the primary form), 3. explanatory mixed method (a priority on quantitative data collection and analysis followed by small qualitative data collection and analysis in the second phase of the research or conversely)

This study used embedded mixed method (combining quantitative and qualitative methods, priority to the major form of quantitative data collection, and secondary status to the supportive form qualitative data collection as additional to the primary form).

### **3.1.1. Research Design**

There are eight research designs often used in educational research as mentioned by Creswell (2008). He states the first three are quantitative, the next three are qualitative, and the final two combine quantitative and qualitative approaches. The designs are: experimental research design, correlational research

design, survey research design, grounded theory design, ethnography design, narrative research design, mixed method design, action research design.

To find out the answer for the first research question, this study used experimental research design. According to Marczyk, DeMatteo, & Festinger (2005: 3), “Experiment research involves comparing two groups on one outcome measure to test some hypothesis regarding causation.” In other words, it is a study in which an intervention is intentionally introduced to observe its effects (Shadish, Cook, & Campbell, 2001). Hatch and Farhady (1982) mention that there are major classes of this design, as can be seen in the table below:

Table 3.1

Major Classes of Experimental Research Design

Class	Explanation
Pre-experimental design	It is not really considered model experiments because it does not account of extraneous variables which may have influenced the results.
True experimental design	It has three basic characteristics: (1) a control group (or groups) is present, (2) the students are randomly selected and assigned to the groups, and (3) a pre-test is administered to capture the initial differences between the groups.

Quasi-experimental design	It is practical compromises between true experimentation and the nature of human language behavior to be investigated.
Ex post facto design	It is used when the researcher does not have control over the selection and manipulation of the independent variable. The researcher looks at the type and/or degree of relationship between the two variables rather than at a cause and effect relationship.
Factorial design	It is simply the addition of more variables to the other designs. There will be more than one independent variable (i. e., moderator variables) considered and the variables may have one or many levels.

In this case, the type of experimental research design employed was quasi-experimental design. This design as Fraenkel, & Wallen (1996); Creswell, (2008) state, is an experiment in which units are not assigned randomly. It is two or more intact groups (members of which were not randomly assigned) are compared after one (or more) has been given a specified treatment (Fraenkel, & Wallen, 1996).

Therefore, to know whether TPR method is effective in English vocabulary mastery of elementary school children this study employed a quantitative method research and it used a quasi-experimental design because it did not include the use of random selection involving two groups (control and experiment). For clearer description the design can be seen in the table below:

Table 3.2  
Description of Research Design

Experiment Class	Pretest	<i>X</i> (treatment with TPR method)	Posttest
Control Class	Pretest	<i>X</i> (treatment with conventional method)	Posttest

Besides using quantitative method involving a quasi-experimental design, this research employed qualitative method conducting observation using field notes to investigate students' responses toward teaching English vocabulary using TPR method. Observation was employed to know students' behavior and responses during the treatment given to the experiment group. The field note was to describe their behavior and responses toward the method during the class. To transcribe, classify and interpret the data from observation, therefore, qualitative approach was used because in this research as according to Nunan (1992: 4), qualitative research emphasizes "understanding human behavior from the actor's own frame of reference, naturalistic and uncontrolled observation, subjective close to the data the 'insider' perspective."

### 3.1.2. Variable

There are two variables involved in this research, independent and dependent variables. Variable according to Hatch and Farhady (1982: 12), "is as an attribute of a person or of an object, which varies from person to person or

from object to object.” They state that independent variable is major variable to be investigated, which is selected, manipulated, and measured by the research. On the other hands, in their opinion, dependent variable is variable to be observed and measured to determine the effect of the independent variable. In line with their opinion, Lane (2003: 1) mentions variables are as “properties or characteristics of some event, object, or person that can take on different values or amounts.” He states when conducting research, experimenters often manipulate variables. He further explains that the variable manipulated by an experimenter is named independent variable and dependent variable is the variable when the experimenter seeks to determine the effect of the independent variable.

This research is about the effectiveness of Total Physical Response method in English vocabulary mastery of elementary school children. Therefore the independent variable of this research is Total Physical Response method, and the dependent variable is English vocabulary mastery.

### **3.1.3. Hypothesis**

Hypothesis, according to Marczyk, DeMatteo, & Festinger (2005: 8), is “simply an educated—and testable—guess to your research question.” Based on their opinion, it can be concluded that hypothesis is prediction about expected relationship between two variables tested in our research.

Null hypothesis ( $H_0$ ) was used in this research as foundation. It means that there will be no differences between groups being studied (Marczyk, DeMatteo, & Festinger, 2005). It would indicate that there was no difference between the

experiment and control group in English vocabulary mastery at the time the pretest had given to both groups.

Alternative hypothesis ( $H_a$ ), on the other hand, means that there will be difference between groups being studied (Marczyk, DeMatteo, & Festinger, 2005), was used to indicate that there was significant difference between the experiment and control group in English vocabulary mastery at the time the posttest had given to both groups.

### **3.2. Population and Sample**

A “population” consists of all the subjects to be studied and “sample” is a (smaller) group of subjects which represents a (larger) population (Yount, 2006).

The population of this research was elementary school children in one Islamic elementary school in Cibiru Bandung. The sample was students of the first class, class A (21 students) as control group and class B (21 students) as experiment group. The participant, as students involved in this research learnt English only at school and received the subject of very basic English once in a week. Hence the researcher hoped that materials given would be in line with their English capacity.

### **3.3. Data Collection**

The data or kinds of information obtained in this research were collected from the instruments of pretest, observation, and posttest.



### **3.3.1. Pretest**

Pretest in the form of multiple choices with 17 items of vocabularies to be taught was given to both control and experiment group after it had tested to other group as pilot test (pretesting of research instrument), to know the students' initial ability in English vocabulary and to make sure that the initial ability of the two groups was not significant difference.

### **3.3.2. Observation**

To get additional data to support the data gained from pretest and posttest, the researcher conducted observation herself during the treatment given to the experiment group. It was employed to know students' behavior and responses toward teaching English vocabulary using TPR method.

The observation was conducted in this research as it gathers first hand information about social processes in a naturally occurring context as stated by Silverman (1993). Besides, it is emphasized by Merriam (1998) who states that one of the reasons why an investigator gathers data through observation is to observe things which may lead to understanding the context. Moreover, in line with Merriam, Alwasilah (2006) states that observation is performed to make a conclusion about meaning respondents' perspective and event or processes observed.

In conducting the observation, the researcher used field notes. This instrument was used because the respondents were still the first graders and in order to make them act naturally, so that they would not know that their activities were being recorded. By using this instrument, the researcher hoped that the data

gained would answer the second question of this research, to know the students' response to teaching English vocabulary using TPR (Total Physical Response) method.

Field notes here, as Fraenkel & Wallen (1996: 459) state, are as the detailed notes observers take in the educational setting (classroom or school) about what is going on, what they hear, see, experience, and think in the course of collecting and reflecting on their data.

### **3.3.3. Posttest**

Finally, posttest in the form of multiple choices with 17 items of vocabularies the students had learnt was given to both control and experiment group to know the progress of the students' vocabulary mastery. By comparing the result of pretest and posttest, it would be known whether the use of TPR method was effective or not.

## **3.4. Evaluating Test Instrument**

To gain accurate data, the test instrument used in this research requires the two most important and fundamental characteristics of any measurement procedure, validity and reliability (Miller, 2009). Therefore, to investigate the validity and reliability of the test instrument, pilot test was conducted before implementing it to the research. The pilot test consisted of 20 multiple choice questions (about the subject to be taught to experiment and control groups) and was given to another group, the first grade of one state elementary school in Cibiru Bandung.

### 3.4.1. Instrument Validity

Miller (2009: 1) defines instrument validity as “the extent to which the instrument measures what it purports to measure over time or across raters.” According to Burton & Mazerolle, (2011: 28), “It refers to the degree that an instrument actually measures what it is designed or intended to measure.” In other words, it is about finding out if a test actually does measure what is intended (Fulcher and Davidson, 2007; Hughes, 2003).

The validity of each test item as Arikunto (2009: 78) states, can be measured by the technique of Pearson’s product moment. Therefore, the test instrument validity was measured by the technique above using Anates for multiple choices and can be interpreted by the criteria from Arikunto (2009: 75), in the table below:

Table 3.3  
Interpretation of r Coefficient

Raw Score	Interpretation
0. 800 – 1.00	Very high
0. 600 – 0.800	High
0.400 – 0.600	Moderate
0.200 – 0.400	Low
0. 00 – 0.200	Very low

The measurement result of the test instrument validity is presented in the subchapter below.

### 3.4.1.1. The Measurement Result of Test Instrument Validity

The validity of test instrument measured by the technique of Pearson's product moment using Anates for multiple choices is 0.63. Based on the table 3.3, it can be interpreted that the instrument has high validity. To give clearer description, the result of test item validity is also provided in the table below:

Table 3.4

The Result of Test Item Validity

	Item Numbers	Score	Interpretation
Validity	3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, 16, 17, 18, 19, 20	>0.361	Valid
	1, 2, 10	<0.361	Invalid

Note: The raw score of validity obtained from  $r_{critical}$  (2 - tailed) in the table of Pearson Moment Correlation with  $N = 30$  and the significance level of 0.05, is 0.361.

Based on the table above, considering the validity of each test item, the items used in the pre-test were 17, number 3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17, 18, 19, and 20. Whereas, the rest of the items, number 1, 2, 10 are not appropriate to be used as the research test instrument.

### 3.4.2. Instrument Reliability

Instrument reliability is defined by Miller (2009: 1), “as the extent to which a questionnaire, test, observation or any measurement procedure produces the same results on repeated trials.” According to Burton & Mazerolle, (2011: 27), “It refers to consistency or repeatability of a test or measurement.” In short it is consistent and dependable (Brown, 2004; Woodley, 2004).

The reliability of the test including discrimination index, “a measure of how well an item is able to distinguish between examinees who are knowledgeable and those who are not, or between masters and non-masters,” (Professional Testing Inc., 2006: 1) and difficulty index, “a measure of the *proportion* of examinees who answered the item correctly” (Professional Testing Inc., 2000: 1) were computed using Anates for multiple choice.

For the reliability of a test, it can be interpreted by the following criteria from Karlik (2002) in the next table.

Table 3.5  
r Coefficient Corelation

r Coefficient	Corelation
0.0-0.2	very weak or negligible
0.2-0.4	weak or low
0.4-0.7	moderate
0.7-0.9	strong, high, or marked
0.9-1.0,	very strong or very high

For discrimination index, according to Arikunto (2009: 218), is categorized shown in the next table:

Table 3.6

Criteria of Discrimination Index

Discrimination index	Interpretation
0.00 – 0.20	Poor
0.20 – 0.40	satisfactory
0.40 – 0.70	good
0.70 – 1.00	excellent

Moreover, in her opinion for difficulty index, it is often classified as:

Table 3.7

Criteria of Difficulty Index

Difficulty index	Interpretation
0.00 – 0.30	difficult
0.30 – 0.70	moderate
0.70 – 1.00	easy

The measurement result of test instrument reliability and the results of discrimination and difficulty index are presented in the subchapter below.

#### 3.4.2.1. The Measurement Result of Test Instrument Reliability

The reliability test instrument measured by the technique of Pearson's product moment using Anates for multiple choices is 0.77. Based on the table 3.4,

it can be interpreted that the instrument has high reliability. In addition, the results of discrimination and difficulty index measured by the same technique are also presented in the next table.

Table 3.8  
The Result of Discrimination and Difficulty Index

	Item Numbers	Score	Interpretation
Discrimination Index	1, 10	< 0.20	Poor
	2, 4, 17, 9	0.20 – 0.40	Satisfactory
	3, 5, 6, 7, 8, 11, 12, 13, 14, 15, 16, 19, 20	0.40 – 0.70	Good
	18,	0.70 – 1.00	Excellent
Difficulty Index	8, 10, 12, 14, 17	0.00 – 0.30	Difficult
	2, 3, 5, 7, 11, 13, 15, 18, 19	0.30 – 0.70	Moderate
	1, 4, 6, 9, 16, 20	0.70 – 1.00	Easy

Based on the table above, considering the discrimination index of each test item, the item numbers 1 and 10 are not appropriate to be used as the research test instrument as they are poor to be able to distinguish between examinees who are knowledgeable and those who are not, or between masters and non-masters.

For the difficulty index, from 20 test items, 6 items (number 1, 4, 6, 9, 16, and 20) are categorized easy, 9 items (number 2, 3, 5, 7, 11, 13, 15, 18, and 19)

are categorized moderate, and 5 items (number 8, 10, 12, 14, and 17) are categorized difficult.

### **3.5. Data Analyses**

#### **3.5.1. Analyzing Data on Test Score**

There are two types of formula to analyze score of multiple choice tests, with punishment and without punishment (Arikunto, 2009). In this research, the score was analyzed without punishment with the formula:

$$S = R$$

S = raw score,

R = right answer (Arikunto, 2009: 120).

#### **3.5.2. Analyzing Data on Pretest**

The pretest was given to both experiment and control group before the treatment (experiment group with TPR method, control group with conventional method) to know the students' initial ability and students' initial equality between the groups and to make sure that the initial ability of the two groups was not significant difference.

The data on pretest were measured by independent t-test, also called a between-subjects t-test to determine if the mean value on a given target variable for one group differs from the mean value on the target variable for a different group (DeCoster, 2004).

According to Hatch & Farhady (1982), in using t-test to compare two groups drawn from the population, they (1982: 114) assume that:



“(1) the subject is assigned to one (and only one) group in the experiment; (2) the scores are continuous and that there are only two levels to the variable (i. e., only two means; (3) the variances of the scores in the population are equal, and the scores are normally distributed.”

In this case, they state that we need to state null hypothesis ( $H_0$ , the difference between the two sample means is zero or not significant) and alternative hypothesis ( $H_a$ , the difference between the two sample means is significant) and set our significance level at .05.

Next, they (ibid., p. 112) mention that we can find the  $t$  value with the following formula:

$$t_{\text{obs}} = \frac{X_e - X_c}{S_{(x_e - x_c)}}$$

$X_e$  = score mean of experiment group  
 $X_c$  = score mean of control group  
 $S_{(x_e - x_c)}$  = standard error of differences between the means

At this point, in their opinion, we need the critical value for  $t$  to be compared with the  $t$  value and if the  $t$  value is below  $t$  critical, the two groups are not significant difference.

Besides, the data on pretest can be measured by independent t-test using SPSS statistical analysis package with the steps as follows:

Step 1: A statement of statistical hypothesis

$$H_0 : \mu_1 = \mu_2 \text{ or means for two groups are equal}$$

$$H_a : \mu_1 \neq \mu_2 (\mu_1 > \mu_2 \text{ or } \mu_1 < \mu_2)$$

Step 2: Setting the  $\alpha$  level of risk associated with the null hypothesis (or Type I error). The level of Type I error is .05.

Step 3: Test statistic using SPSS

Step 4: Interpreting results.

(Hayes, 2000)

### **3.5.3. Analyzing Data on Post-test**

The posttest was given to experiment and control groups after the treatment (experiment group with TPR method, control group with conventional method) to know the progress of the students' ability and students' equality between the groups and to make sure that the ability of the two groups was significant difference.

Like the data on pretest, the data on posttest was also measured by independent t-test, also called a between-subjects t-test to determine if the mean value on a given target variable for one group differs from the mean value on the target variable for a different group (DeCoster, 2004). Besides, the data gained from the posttest given to both experiment and control groups were measured by matched t-test to determine whether the difference between the two mean (pretest and posttest) scores of each group was significant.

The procedure for matched t-test according to Hatch & Farhady (1982) is similar to the t-test for independent samples. They (1982: 115) state that "the difference is more conceptual rather than computational." To make it clear they give each an example, such as for independent t-test, we compare two means

obtained from two independent groups of students, while for matched t-test we compare two means from the same students.

To measure the data using matched t-test, they also imply that we need to state null hypothesis ( $H_0$ , the difference between the pre-test and post-test means is not significant) and alternative hypothesis ( $H_a$ , the difference between the pre-test and post-test means is significant) and set our significance level at .05.

Next, they (ibid., p. 117) mention that we can find the  $t$  value with the following formula:

$$t = \frac{X_1 - X_2}{S_D}$$

$X_1$  = score mean of pre-test

$X_2$  = score mean of post-test

$S_D$  = standard error of differences between the means.

At this point, in their opinion, we need the critical value for  $t$  to be compared with the  $t$  value and if the  $t$  value is above  $t$  critical, the two groups are significant difference, there is significant difference between the pretest and posttest means. Besides, the data gained from pretest and posttest can be measured by matched t-test using SPSS statistical analysis package with the steps as follows:

Step 1 : A statement of statistical hypothesis

$H_0$  :  $\mu_1 = \mu_2$  or means for pretest and posttest are equal

$H_a$  :  $\mu_1 \neq \mu_2$  ( $\mu_1 > \mu_2$  or  $\mu_1 < \mu_2$ )

Step 2 : Setting the  $\alpha$  level of risk associated with the null hypothesis (or

Type I error). The level of Type I error is .05.

Step 3 : Test statistic using SPSS

Step 4 : interpreting results.

(Hayes, 2000)

#### 3.5.4. Determination of the Effect Size

Determining the effect size is important to know if the statistical test was significant (Creswell, 2008). “Whereas statistical tests of significance tell us the likelihood that experimental results differ from chance expectations, effect-size measurements tell us the relative magnitude of the experimental treatment.” (Thalheimer, & Cook, 2002: 2)

In other words, the effect size is a measure of the magnitude of the strength of a relationship between an independent (intervention) and dependent (outcome) variable (Dunst, Hamby, & Trivette, 2004; Marczyk, DeMatteo, & Festinger, 2005; Fraenkel & Wallen, 1996), or as “a means for identifying the practical strength of the conclusion about the relationship among variables in a quantitative study” (Creswell 2008: 195). Therefore, according to Thalheimer & Cook (2002), effect sizes are especially important because they allow us to compare the magnitude of experimental treatments from one experiment to another.

The formula to determine the effect size, as quoted from Rosenthal (1991: 19), is as follows:

$$r = \frac{t^2}{\sqrt{t^2 + df}}$$

$r$  = correlation coefficient of the effect size

$t$  =  $t$  value

$df$  = degrees of freedom

with the scale from Cohen's (1992, as cited in Thalheimer, & Cook, 2002) is interpreted in the table below:

Table 3.9  
Correlation Coefficient of the Effect Size Scale

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Effect size	$r$ value
Small	.20
Medium	.50
large	.80

### 3.5.5. Analyzing Data from Observation

The data obtained by the instrument of observation are qualitative data. Therefore, they are analyzed by using basic concepts of analyzing qualitative data. The data are transcribed, classified and interpreted.

### 3.6. Treatment Implementation

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After the pretest had been administered to experiment and control groups and there was no difference of mean statistically between two groups based on t-test calculation, treatment was given to both groups.

In conducting the treatment, the researcher did not do it by herself. There were two teachers who gave the treatment. They taught the same English vocabulary materials (single word vocabulary items) about numbers (1 up to 10), colors (red, yellow, green, blue, brown, black, purple, orange, pink and white), things in the classroom (chair, table, window, door, whiteboard, eraser, clock, broom, lamp and dustbin), animals (bird, cat, dog, monkey, rabbit, cow, fish, snake and horse), and fruits (apple, orange, grape, strawberry, tomato, avocado, banana, melon and watermelon) for eight meetings but the first teacher implemented Total Physical Response method as treatment to experiment group by introducing some language instructions (stand up, follow me, jump, sit down, draw, touch, point to, take, walk to, act like, imitate the sound of, and show us) (the syllabus and lesson plan for this group are enclosed in the appendices). Meanwhile, the other teacher treated conventional method to control group.

### **3.7. Research Procedures**

In conducting this research, the procedure was divided into two phases as follows:

#### **1. Planning the research**

- Identifying a research problem
- Conducting library research to gather theoretical foundation

- Planning an experimental research (conducting observation to school and asking permission, making lesson plan, preparing material to be taught and test instrument)
  - Conducting pilot test
2. Conducting the research
- Conducting the experiment
    - . pretest to both groups (April 4, 2012)
    - . treatment with TPR method to experiment group (April 16 – May 28, 2012)
    - . treatment with conventional method to control group (April 12 – May 31, 2012)
    - . observation to experiment group (April 16 – May 28, 2012)
    - . posttest to both groups (June 2, 2012)
  - Analyzing the data and making conclusion
  - Writing the paper/presentation describing the findings
-