

CHAPTER III

RESEARCH METHODOLOGY

This section focuses on the methodology of the study to answer the research questions. This chapter begins with research questions and then moves on to research method. After that it explains about population and sample. Procedures for collecting data are clarified next. For the last of this chapter is the explanation of data analysis.

3.1 RESEARCH QUESTIONS

3.1.1 Is teaching English using puzzle effective in improving students' motivation in learning English?

3.1.2 What are the advantages and disadvantages of using puzzles in English classroom?

3.2 VARIABLES OF THE RESEARCH

Hatch and Farhady (1982) explain "variable is an attribute of a person or of an object which vary from person to person or from object to object." There were two variables involved in this study, namely independent variable and dependent variable.

Independent variable is the major variable which the researcher hopes to investigate. It is the variable, which is selected, manipulated and measured by the researcher. The independent variable of this study was the using of puzzle.

Meanwhile, dependent variable is the variable which the researcher observe and measure to determine the effect of the independent variable. Thus, the dependent variable of this study was the students' motivation in learning English.

3.3 RESEARCH METHOD

As it has been mentioned in chapter I, the purpose of this research is to find whether puzzle is effective in improving students' motivation in learning English, and also to explore the advantages and disadvantages of using puzzle in English classroom. Thus, the method applied in this research is quantitative with quasi experimental design. This kind of design was chosen since the researcher faced some difficulties in employing the true experimental design because of some limitations that are the limitation of time and school regulation which did not allow the researcher to randomly sample the subject. Therefore, the design used in this study was quasi experimental design.

Hatch and Farhady (1982 : 23-24) stated that "because of some limitations it is difficult to construct a true experimental design, however it does not mean that the researcher can abandon the research and let it invalid." That is why, the researcher has to reach the goal as closely as possible to meet the standards of true experimental design. The research design of this study can be presented as the table 3.1 below:

Table 3.1: The Quasi Experimental Design

Group	Questionnaire before the treatment	Treatment	Questionnaire after the treatment
Experimental	Te ₁	X	Te ₂
Control	Tc ₁	-	Tc ₂

Note:

X : puzzles treatments for the experimental group

T_{e_1} : the observation of questionnaire before the treatment in the experimental group

T_{e_2} : the observation of questionnaire after the treatment in the experimental group

T_{c_1} : the observation of questionnaire before the treatment in the control group

T_{c_2} : the observation of questionnaire after the treatment in the control group

The table above shows that both of the groups were given questionnaire before the treatment, yet, puzzle treatment was only administered in experimental group. Then, the questionnaire after the treatment was given to both of the groups and analyzed by using statistics, namely t-test. The purpose was to find out whether the students who were given puzzle treatment could achieve a different score than those of the students who use conventional technique.

3.4 POPULATION AND SAMPLE

According to Rees (1985) “population is the set of measurements about which we want to draw a conclusion.”

This research is conducted at SMK Negeri 4 Bandung with eleventh grade students as the population. It means that, there are 313 students as population of this research.

Schofield (1972: 7) stated that “sample is a subset of a population.” To determine the sample in this study, the researcher used randomized sampling technique. As mentioned in chapter I, the researcher used two classes as sample, they were class XI A and XI J. Both classes consisted of 30 students.

These classes were taken randomly, but of course based on the agreements with an English teacher of that school. Class XI A was the control group while class XI J was the experimental group. Both classes were respectively determined as control and experimental group by flipping coin.

3.5 DATA COLLECTING PROCEDURE

Some procedures of research were arranged to make the research run in a well-organized way. Those procedures were managed into some steps namely administering try-out instrument, carrying out questionnaire before the treatment, conducting treatment, carrying out questionnaire after the treatment, carrying out puzzle questionnaire and conducting some interviews.

The researcher collected the data in the SMK N 4 Bandung for about four weeks. It was conducted from September 2008 until October 2008. The time spent can be illustrated on the table bellow:

Table 3.2: Data Collecting Procedures

No.	Procedures	Date		Note
		Exp.	Cont.	
1	Questionnaire before the treatment	09/16/2008	09/17/2008	-
2	Treatments:			
	Describing Process	09/16/2008	09/17/2008	-
	Describing Facts and Figures (1)	09/23/2008	09/24/2008	-
	Describing Facts and Figures (2)	10/14/2008	10/15/2008	-
	Giving Opinion	10/21/2008	10/22/2008	-
3	Questionnaire after the treatment	10/21/2008	10/22/2008	-
4	Interview	10/21/2008	-	Exp. class only

3.5.1 Administering try-out instrument

The instrument was Attitude/Motivation Test Battery. It was a kind of rating scale questionnaire. Before the instrument was distributed to the sample,

it was tested to non-sample of research. It was intended to measure the validity and the reliability of the instruments before it is used in the research. The try-out instrument consists of 46 items of questionnaire.

The try-out instrument was conducted to the eleventh grade students of SMK N 4 Bandung class XI B consisting of 31 students. The reason for choosing this class was because this class had almost similar characteristics with the control and experimental classes.

The try-out instrument was administered on 11th of September 2008. In conducting this try out, it was only 30 students involved, because there was 1 student who absent at that day.

Table 3.3: The framework of the try-out instrument

No	Indicators	+/-	Item numbers	Total
1	Motivational intensity	+	1, 2, 3, 4, 5, 6, 7, 8	8
		-	9, 10, 11, 12, 13, 14, 15, 16	8
2	Desire to learn English	+	17, 18, 19, 20, 21, 22, 23, 24	8
		-	25, 26, 27, 28, 29, 30, 31	7
3	Attitudes toward learning English	+	32, 33, 34, 35, 36, 37, 38, 39	8
		-	40, 41, 42, 43, 44, 45, 46	7
Total				46

3.5.2 Administering AMTB questionnaire

After finding out the validity and reliability of the AMTB questionnaire, the researcher only used 36 items of the questionnaire, which were valid and reliable items.

The AMTB questionnaire was used to measure students' motivation in learning English, as the dependent variable of this study. The AMTB questionnaire was used twice in this research. It was used as questionnaire before the treatment and questionnaire after the treatment.

The researcher administered questionnaire before the treatment and questionnaire after the treatment to both of the experimental and the control groups. Questionnaire before the treatment was administered in the beginning of the treatment in order to measure students' initial motivation index in learning English. Moreover, questionnaire before the treatment was intended to see whether the two groups were equal or there was no significant difference between them in their motivation in learning English.

Meanwhile, questionnaire after the treatment was given after the experimental group had their puzzle treatments. Questionnaire after the treatment were given to both the experimental and the control group. Questionnaire after the treatment was aimed to measure the influence of the treatments. The form and number of questionnaire after the treatment items were similar with questionnaire before the treatment. However, there were some changes in the arrangement of the items.

Following are indicators used to measure students' motivation toward learning English as a foreign language.

Table 3.4: The indicator of AMTB questionnaire

No	Indicators	Item Numbers		
		+/-	Pre	Post
1	Motivational intensity	+	1, 2, 3, 4, 5, 6	25, 26, 27, 28, 29, 30
		-	7, 8, 9, 10, 11, 12	31, 32, 33, 34, 35, 36
2	Desire to learn English	+	13, 14, 15, 16, 17, 18	1, 2, 3, 4, 5, 6
		-	19, 20, 21, 22, 23, 24	7, 8, 9, 10, 11, 12
3	Attitudes toward learning English	+	25, 26, 27, 28, 29, 30	13, 14, 15, 16, 17, 18
		-	31, 32, 33, 34, 35, 36	19, 20, 21, 22, 23, 24
Total			36	36

The AMTB questionnaire was assessed using Likert scale (modified 6 point to 1 scale point) ranging from "strongly agree" to "strongly disagree".

The following tables show the categorizing and scoring of the students' responses.

Table 3.5: The categorizing and scoring for positive statements

Category of responses	strongly agree	agree	partly agree	slightly agree	disagree	strongly disagree
Score	6	5	4	3	2	1

Table 3.6: The categorizing and scoring for negative statements

Category of responses	strongly agree	agree	partly agree	slightly agree	disagree	strongly disagree
Score	1	2	3	4	5	6

The achieved scores were then classified into motivation criteria. In complete, the criteria are presented below:

Table 3.7: Motivation criteria

Motivation Score	Interpretation
36—71	Very Low
72—107	Low
108—143	Moderate
144—179	High
180—216	Very High

3.5.3 Conducting treatment

The puzzle treatments were only given to the experimental group and they had been conducted for four weeks. There was one meeting per week. Every meeting was lasted in 180 minutes.

Puzzle treatments were given in line with curriculum held in the experimental class at that time. The students in this class were taught by using

puzzle as media. Meanwhile, the control group was taught by using conventional model of teaching.

3.5.4 Carrying out puzzle questionnaire

The puzzle questionnaire was an open-close ended questionnaire. It was employed to identify the advantages and disadvantages of using puzzles in English classroom. The questionnaire was distributed only to the experimental group after they finish completing the questionnaire after the treatment. In this open-close questionnaire, the students expressed what they thought about puzzles treatment. The questionnaire consisted of two indicators. The indicators were the use of puzzles in language teaching and attitude toward puzzles in English class activities.

Table 3.8: The indicators of puzzle questionnaire

No.	Indicators	Item number	Total
1.	The use of puzzle in language teaching	1 – 8	8
2.	Attitudes toward puzzles in English class activities	9 - 12	4

Since the questionnaire was an open-close ended questionnaire which consisted of “yes-no statements”, so for scoring this questionnaire, the researcher gave 0 point for the students who answered NO, whereas the students who answered YES were given 1 point.

3.5.5 Conducting interview

The interview was given to the experimental group and to the teacher in order to get additional information which missed in questionnaire. Besides, interview was used as a way in finding out their attitudes and perceptions towards puzzle in the real English class activities.

In interviewing both the students and the teacher, the researcher used Indonesian because she did not want them to have difficulty in answering the questions, expressing their feelings and transferring the language. The interview was carried out after the experimental group had their questionnaire after the treatment. The questions of the interview were based on the following aspects:

- Students' interest in English subject
- Teacher's method
- Students' opinion toward teacher's method
- Students' opinion toward puzzle method
- Teacher's opinion toward puzzle method
- The advantages of puzzle method
- The disadvantages of puzzle method

3.6 DATA ANALYSIS

After the data from questionnaires and interview were gained, they were calculated and analyzed by certain steps. The data analysis was conducted separately from each instrument.

3.6.1 Data analysis of the try out instrument

In order to achieve a good instrument, the result of try-out score was analyzed. The analysis of the try-out included measuring validity and reliability of each item.

3.6.1.1 The analysis of validity instrument

The instruments of the research must be tested then analyzed to make sure that it can be used for research instrument. This is intended to see the

validity of the instrument. As said by Brown (1990: 101) “test validity is defined as the degree to which a test measures what it claims to be measuring.” A valid instrument will have a high validity. The researcher used Pearson Product Moment formula in testing the validity, by the assistance of Microsoft Office Excel 2003 program for Windows.

Further, interpreting the index validity of each item uses the following criteria:

0.00 – 0.20	bad
0.20 – 0.40	enough
0.40 – 0.70	good
0.70 – 1.00	very good

(Kartono, cited in Susi 2006:33)

For the questionnaire, it was analyzed not only to find its item validity but also its factor validity. For example, based on the computation of Pearson Product Moment formula, the researcher can get the validity result for the item no. 10 is 0.705 and derived from Kartono’s criterion the item no.1 is in a very good category of validity. In a complete calculation, the researcher concludes that the entire questionnaire’s items are valid. The items are in the range of enough, good and very good criterion of validity. The item that has a lowest validity is the item of number 8. It gets 0.259 correlation coefficient of Pearson Product Moment; it is in the enough category of Kartono’s validity criterion. Meanwhile, for the highest validity is the item number 9. It has 0.706 correlation coefficient of Pearson Product Moment; it is in very good category of Kartono’s validity criterion.

In the factor's validity calculation, the researcher gets the lowest score of validity is in the factor 2 that correlates with factor 3. It gets 0.670 of validity score, puts in good category of Kartono's validity criteria. And for the highest factor validity is factor 1 that correlates with factor 2, it gets 0.738 of validity score; it is in a very good category of Kartono's validity criteria.

Meanwhile, the researcher also finds out the calculation of each factor correlates with the total score, and it is clear that all the factors have very good correlation coefficient of Pearson Product Moment. So it can be said that all the questionnaire factors are valid. The researcher takes 36 of the valid items, which are belong to the very good and good category of Kartono's validity, as the instrument of the research.

The absolute results of the validity test for the questionnaire are listed in the tables of validity that can be seen in the appendix-C.

3.6.1.2 Reliability analysis of the instrument

Brown (1990: 98) considers "the reliability of an instrument is defined as the extent to which the result can be considered consistent or stable." It means that an instrument cannot measure anything well unless it measures consistently.

The reliability of the instrument was analyzed by Split-half method from Spearman-Brown. The material was forty-six items of questionnaire.

The reliability was found with the formula:

$$r_i = \frac{2[r_{xy}]}{1 + [r_{xy}]}$$

(Sugiono, 2003:278)

Note:

r_i = internal reliability of the instrument

r_{xy} = the correlation of product moment between first half and second half.

Table 3.9: The calculation of questionnaire's reliability

N	X (odd)	Y (even)	X ²	Y ²	XY
30	2941	2823	293113	272195	281731

Here is the result of questionnaire's reliability:

$$r_{xy} = \frac{30 \times 281731 - (2941)(2823)}{\sqrt{\{30 \times 293113 - (2941)^2\} \{30 \times 272195 - (2823)^2\}}} = 0.889$$

$$r_i = \frac{2 \times 0.889}{1 + 0.889} = 0.941$$

The coefficient of questionnaire is 0.941 and it is positive. Consequently, the instrument used is then stated reliable since it has a positive value. In addition, the coefficient 0.941 indicates the very high reliability of the instrument.

In conclusion, the instruments are good to measure students' motivation in learning English, since the instruments are valid and reliable.

3.6.2 Data analysis of the questionnaire before the treatment

There are several conditions that need to be fulfilled in analyzing the result of the research. Those are calculating the normality of data distribution, analyzing the homogeneity of the data and identifying the t-test and also analyzing its percentage based on the frequency.

3.6.2.1 Normality of data distribution

Scores can be examined by t-test only if they are normally distributed. Kolmogorov Smirnov test in SPSS 15.0 for windows program was used to test the normality of data distribution. The following steps were taken to test the normality of distribution.

- Stating the hypothesis.

Null hypothesis (H_0): “the distribution of scores in the group is normally distributed.”

- Analyzing the normality distribution using Kolmogorov-Smirnov test in SPSS 15 for Windows.

- Looking at the alpha level $p = 0.05$

If the probability (asyp.sig 2 tailed) > 0.05 , accept the H_0

If the probability (asyp.sig 2 tailed) < 0.05 , reject the H_0

- Calculating degree of freedom with formula:

$df = (k-3)$, where $k =$ class interval.

- Comparing the Asymp sig (probability) with the level of significance for testing the hypothesis. If the Asymp sig is more than the level of significance the null Hypothesis (H_0) is accepted, the scores are normally distributed.

3.6.2.2 Homogeneity of variances test

Scores can be examined by t-test only if variances of the scores in the population are equal. In testing the homogeneity of variance, Levene’s test for equality of variance in SPSS 15.0 for Windows program was used. The steps taken in testing the homogeneity of variance were:

- Stating the hypothesis

Null hypothesis (H_0): the variances of the experimental and control group are the same.

- Setting the alpha level at 0.05

If the probability (asyp.sig 2 tailed) > 0.05, accept the H_0

If the probability (asyp.sig 2 tailed) < 0.05, reject the H_0

➤ Determining the degree of freedom

$$df1 = n1 - 1$$

$$df2 = n2 - 1$$

Note:

df1 = degree of freedom for numeration

df2 = degree of freedom for denominator

n1 = number of samples with higher variance

n2 = number of samples with lower variance

➤ Testing the hypothesis

Compare the Asymp sig (probability) with the level of significance for testing the hypothesis. If the Asymp sig is more than the level of significance the null Hypothesis (H_0) is accepted or it can be said that the scores are homogenous.

3.6.2.3 The calculation of t-test

t-test is used to find out the difference mean between two groups. The computation used SPSS 15.0 for Windows program. Steps in calculating the t-test are followed:

➤ Stating the hypothesis

Null hypothesis (H_0): "There is no significant difference in students' motivation improvement in learning English between control group compared with experimental group, which have been given puzzles treatments in their English language classroom." ($H_0: X_e = X_c$)

➤ Setting the alpha level at 0.05 directional decisions.

experimental group one more questionnaire, namely puzzle questionnaire. It was an open-close ended questionnaire.

The data of this questionnaire was calculated and analyzed by using Guttman scale. Firstly, the researcher counted the number of respondents choosing the option 'YES' and 'No' in each statement. For the option 'YES' was symbolized '1' while the option 'NO' was symbolized '0'. After the result of the calculation was found, it was changed into percentage by using formula:

$$R = \frac{fo}{n} \times 100\%$$

Note:

R : Respondent's percentage

fo : total respondents answering certain item

n : total subjects

To read the analysis of questionnaire easily, the researcher used the criteria written by Kuntjaraningrat (Susi, 2006:38) as presented below:

0%	none
1% -- 25%	a few of
26% -- 49%	nearly half of
50%	a half of
51% -- 75%	more than a half of
76% -- 99%	nearly all of
100%	all of