

CHAPTER III

METHODOLOGY

3.1 Formulation of Problems

The difficulty of young learners in mastering vocabulary becomes the major problem for those who learn foreign language. Because of that, young learners need a tool to help them learn vocabulary. Vanvlodorp (2007) stated that why difficulty occurs in mastering vocabulary is mainly because of missing motivation of most students in learning vocabularies. It shows that a certain tool that provides comprehensive words and gives them motivation to use the words.

Some experts believed that the use of technology on the learning process can help to construct a tool in learning language, especially vocabulary learning process. Brown (2001) stated that Computer Assisted Language Learning (CALL) can serve constructive tool of language learning. Computer-based game which is served as one of a feature CALL has been applied as a tool for learning language. This way of learning language is applied in Elementary School Students by giving them an example of computer-based paparazzi game to be played. After all, the study is used to seek:

1. Can digital console game-based vocabulary game help to improve students' vocabulary mastery in the fourth grade students of elementary school?
2. What are students' responses toward the use of digital console game-based vocabulary game series in the teaching of English vocabulary?

3.2 Research Methods

In this study, the experimental research design was used to find out the influence of the certain treatment in the controlled condition (Sugiyono, 2008:107). There would be some statistic computation in order to analyze the data of the research because this method is a part of the quantitative method.

3.2.1 Research Design

There are various types of experimental design. The one group pretest-posttest of pre-experimental design was used in this study (Arikunto, 2008:78). This kind of design tries to compare the condition of students before and after the treatments through the pre-test and post-test results. As proposed by Arikunto (2008:78) the scheme of the design is as follow:



O1 = Observation of pretest score result (Before treatment)

O2 = Observation of posttest score result (After treatment)

Moreover, Sukmadinata (2007:59) stated that a single subject experimental design is the type of research designs that only uses one experimental subject (or sample).

3.2.2 Research Variable

Kerlinger (1973) in Sugiyono (2008:61) stated that “*variable adalah konstruk atau sifat yang akan dipelajari...yang diambil dari suatu nilai yang berbeda*”. It means that the variable is the variation. Moreover, Kidder (1981) in

Sugiyono (2008:61) gave definition that the quality or value of people, object, and activity which has certain variety in order to be learnt and generalized can be also called as a variable.

In fact, there are two measured variables in this study. They are digital console game treatment as the independent variable and the students' vocabulary achievement which can be seen from the test result as the dependent variable.

3.3 Population and Samples

The main criterion of population and sample for this study was the subjects should know how to operate computer and engage with them continually. Because of that, Students of one of elementary school in Bandung was chosen as sample for this study. The school provided 20 computers for students and they are already familiar with computer programs.

3.3.1 Population

Arikunto (2002:108) described population as the whole subject in the study field. Based on that definition, the population of this study is the 4th grade students in one of elementary school in Bandung.

3.3.2 Samples

According to Sugiyono (2008:118), the sample is the representative part of the population. In this study, 32 students of the 4thA grade were taken as the sample. The ages of the students are around 9-10 years old.

The reason for choosing the students of the 4th grade in this study was because they had learned Basic English on the stage before. Besides, based on the

preliminary survey conducted before the treatments, it could be observed that the English vocabulary of the 4th grade students in that school was still taught by using the traditional method, which was the repetition of the words. Considering the situation, the writer tried to implement a better way in teaching English vocabularies to the 4th grade students by using digital console game.

Moreover, the sample in this study was selected through the purposive sampling. It was based on the certain purpose in order to get the maximum data considering the limited time, fund and energy (Arikunto, 2002:117).

3.4 Hypothesis

Sugiyono (2008:220) defined hypothesis as, "...the tentative answer to the formula of the problem." Moreover, he said hypothesis is the theoretical answer to the research problem (Sugiyono, 2008:96). Because this study used the quantitative method, the hypothesis must be formulated.

This study is begun with Null Hypothesis (H_0). Emory (1985) in Sugiyono (2008:224) said, "The null hypothesis is used for testing. It states that no difference exists between the parameter and statistic being compared."

The formulation of the null hypothesis for this study is as follows:

$$H_0: \mu \text{ pretest} = \mu \text{ posttest}$$

It means that there is no difference of students' vocabulary mastery before and after the digital console game treatments by using null hypothesis, every possibility of the research can be shown. If the hypothesis is rejected, it can be concluded that experiment works. While if the hypothesis is accepted, the experiment does not work.

So, the null hypothesis of this study is playing digital console game has no influence in the students' achievement in vocabulary mastery.

3.5 Research Instruments

Sugiyono (2008:133) stated that research instrument is a measurement tool of research. It is used to collect the data and to measure the value of the research variables in the research that uses the quantitative and qualitative methods. The research instruments in this study are the pilot-test, pre- and post-tests, and questionnaire.

3.5.1 Pilot Test

Pilot test is important in order to find out the validity and reliability of the test before collecting the data of research. The standardized of the pilot test was taken from the English book for 4th grade students. The topics are "Things in the Classroom" and "Things around School".

The type of the test is multiple choice forms which contain four options. The pilot test which consists of 30 items was conducted on 25th of March 2011 to 32 of the 4A class' students.

3.5.2 Pre-test and Post-test

The purpose of giving the pre- and post-test is to find out the difference of students' achievement in vocabulary mastery before and after the digital console game treatments were given. In this study, the pre- and post-test were actually in the same form of multiple choices which consists of four options. Both of the tests contain 13 items of the valid pilot test items that have been measured before.

3.5.3 Questionnaire

The questionnaire consists of 19 questions about the students' response in using digital console game as a teaching and learning media in vocabulary learning. It was made to support the result of vocabulary test in pre- and post-tests. The 19 questions from the questionnaire are divided into 17 closed statements, which are made to lead the answers that are needed in the study, and 2 open ended questions to find out the deeper understanding of the subjects' opinion.

3.6 Data Collection Procedures

The data of the research were gathered and collected through some steps. First, the pilot test referring to the material from English for grade 4 school books that consists of 30 items. Further, the pilot test was conducted on 25th March 2011. There were 32 of the 4th A grade students who did the pilot test at that time.

After conducted the pilot test, the writer did the calculation of the difficulty power, discriminating power, validity, and reliability in order to find out the valid items for pre- and post-tests. From 30 items of pilot test, there were 15 valid items for the pre- and post-tests.

Further, the pre-and post-tests were respectively administered on 26th March 2011 and 30th April 2011 in order to gain the raw data of the research. The time allocation of the research schedule is shown in the following table:

Table 3.1
Research Agenda

Stages	Date	Events
1.	24th March 2011	Asking permission to the Pussenkav Foundation and the Headmaster of SD Kartika X-1, and survey for conducting the research
2	25th March 2011	Pilot test
3.	26th March 2011	Pre-test
4.	29th March 2011	Treatment 1
5.	5th April 2011	Treatment 2
6.	12th April 2011	Treatment 3
7.	26th April 2011	Treatment 4
8.	30th April 2011	Post-test and conducting the questionnaire

Moreover, the treatments were conducted on 29th March 2011 until 26th April 2011 before the post-test were given to the subjects. The game treatments were held in four instructional processes which were lasted for 70 minutes per meeting. The lesson plans were also made based on the School Based Curriculum or *Kurikulum Tingkat Satuan Pendidikan (KTSP)*, and *Standar Kompetensi dan Kompetensi Dasar (SK-KD)* or Standard and the Basic Competency Concepts. The following table is the outline of the lesson plans of the treatments by using digital console game Paparazzi game.

Table 3.2
Lesson Plans

Treatments	Pre- Activities	Main Activities	Post- Activities	Vocabulary Focus
1	Teacher invites students to do brainstorming related to things	Students play digital console game	Students do exercise related to the vocabulary	Baseball, Headphone, Computer, Computer Mouse, Book

	around school	Paparazzi game	focus	
2	Teacher invites students to do brainstorming things around school	Students play digital console game Paparazzi game	Students do exercise related to the vocabulary focus	Report Cards, Mineral Water, Measuring Tape, Glasses, Sneakers
3	Teacher invites students to do brainstorming things in the classroom	Students play digital console game Paparazzi game	Do exercise related to the vocabulary focus	Blackboard, Table, Chair, Chalk, Cupboard
4	Teacher invites students to review all things around school and things in the classroom	Students play digital console game Paparazzi game	Students do exercise related to the vocabulary focus	Blackboard, Table, Chair, Chalk, Cupboard, Report Cards, Mineral Water, Measuring Tape, Glasses, Sneakers, Baseball, Headphone, Computer, Computer Mouse, Book, Pen, Pencil, Bag

3.7 Data Analysis

3.7.1 Analysis Data of Pilot Test

3.7.1.1 Difficulty Index

Arikunto (2008:207) stated that difficulty index is an assumption that a good item should not be too difficult or too easy. The formula is as follows:

$$P = \frac{B}{JS}$$

P = Difficulty Index

B = Number of subjects who answer the item correctly

JS = Number of all subjects

Table 3.3
Criteria of Difficulty Index

Difficulty Index	Interpretation
0.00 – 0.30	Difficult
0.30 – 0.70	Moderate
0.70 – 1.00	Easy

(Arikunto, 2008:210)

From the criteria and calculation above, the results are as follows:

Table 3.4
The Difficulty Index

Items Number	Difficulty Index	Category
6, 13	0.00 – 0.30	Difficult
8, 11, 12, 16, 18, 19, 22, 23, 26, 28, 30	0.30 – 0.70	Moderate
1, 2, 3, 4, 5, 7, 9, 10, 14, 15, 17, 20, 21, 24, 25, 27, 29	0.70 – 1.00	Easy

From the Table 3.4, it can be seen that in general the difficulty index of the test is classified as three categories i.e. Easy (17 items), Moderate (11 items), and Difficult (2 items).

3.7.1.2 Discriminating Power

Arikunto (2008:211) said that a good item must be able to differentiate higher achiever from the lower achiever subjects as well. It deals with the discriminating power that has the following formula:

$D = \frac{BA - BB}{\frac{1}{2} JS}$	D	= Discriminating Index
	BA	= Number of right answer from upper group
	BB	= Number of right answer from lower group

JS = Number of all subjects

Table 3.5
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

(Arikunto, 2008:210)

Based on criteria and calculation above, the index of discrimination of each item was gained. The result of the discrimination index of each item is as follows.

Table 3.6
The Discrimination Index of Each Item

Items Number	Difficulty Index	Category
1, 4, 6, 9, 14, 18, 20	0.00 – 0.20	Poor
2, 10, 17, 19, 21, 22, 24, 25, 27, 28, 29, 30	0.20 – 0.40	Satisfactory
5, 7, 8, 11, 12, 16, 26	0.40 – 0.70	Good

From the table 3.6, it shows that the discrimination index of the test is classified as three categories i.e. poor (7 items), satisfactory (12 items), and good (7 items).

3.7.1.3 Validity

A good test instrument must be valid. According to Sugiyono (2008:173), valid means that the instrument can be used to measure what should be measured.

In other words, the instrument should correspond with the material that will be given to the subjects as part of the research implementation.

In this study, the Pearson Product Moment Formula was used in calculating the validity of coefficient correlation of each test item. The formula is as follows:

$$r_{XY} = \frac{N \sum XY - (\sum X)(\sum Y)}{\sqrt{\{N \sum X^2 - (\sum X)^2\} \{N \sum Y^2 - (\sum Y)^2\}}}$$

r_{XY} = coefficient correlation between X and Y

N = the number of subjects (or samples)

$\sum X$ = the sum of score of each test item

$\sum Y$ = the sum of score of all test items

$\sum XY$ = the sum of the XY cross products

$\sum X^2$ = the sum of the squared X scores

$\sum Y^2$ = the sum of the squared Y scores

Table 3.7
Category of Coefficient Correlation of Validity

r value	Interpretation
0.80 – 1.00	Very high
0.60 – 0.80	High
0.40 – 0.60	Satisfactory
0.20 – 0.40	Low
0.00 – 0.20	Very low

(Arikunto, 2008:75)

After calculating the validity of each try out test item by using the formula above, the result reveals that 15 items are valid. It means that those items can be used in the pre- and post- tests. The complete data can be seen in Appendix IV.

3.7.1.4 Reliability

A good test instrument must also be reliable. It means that the instrument will produce the same data if it is used to measure the same object (Sugiyono, 2008:174). Reliability deals with the consistency and stability.

Moreover, Sugiyono (2008:174) said that since reliability is an important thing in testing the validity of the instrument, the reliability testing of the instrument must be employed. Some steps in calculating the reliability of the test are as follows.

1. Dividing the test item numbers into halves of the odd (X) and the even (Y) numbers.
2. Calculating the correlation of the half-reliability of the test by using Pearson

Product Moment Formula:

$$r_{\frac{1}{2} \frac{1}{2}} = \frac{N \sum XY - (\sum X)(\sum Y)}{\sqrt{\{N \sum X^2 - (\sum X)^2\} \{N \sum Y^2 - (\sum Y)^2\}}}$$

The computation on the half-part reliability of the pilot test is as follows:

$$r_{\frac{1}{2} \frac{1}{2}} = \frac{(32)(3390) - (339)(312)}{\sqrt{\{(32)(3767) - 114921\} \{(32)(3188) - 97344\}}}$$

$$r_{\frac{1}{2}\frac{1}{2}} = \frac{108480 - 105768}{\sqrt{\{129544 - 114921\}\{102016 - 97344\}}}$$

$$r_{\frac{1}{2}\frac{1}{2}} = \frac{2712}{\sqrt{\{14623\}\{4672\}}} = \frac{2712}{\sqrt{68318656}}$$

$$r_{\frac{1}{2}\frac{1}{2}} = \frac{2712}{8265.51} = 0.32$$

3. Finding out the reliability of the whole test by using The Spearman-Brown

Formula as follow:

$$r_{XY} = \frac{2 \left(r_{\frac{1}{2}\frac{1}{2}} \right)}{1 + r_{\frac{1}{2}\frac{1}{2}}}$$

The computation of the reliability of whole test as follow:

$$r_{XY} = \frac{(2)(0.32)}{1 + 0.32} = \frac{0.64}{1.32} = 0.48$$

4. Interpreting the result of the coefficient correlation by using this following categorization table.

Table 3.8

Category of Coefficient Correlation of Reliability

Coefficient Correlation	Interpretation
0.00 – 0.20	Low
0.21 – 0.40	Moderate
0.41 – 0.70	High
Above 0.70	Very High

(Arikunto, 2008:34)

Based on the computation above, the result shows that the coefficient correlation of the test is 0.48. It means that the tested items are considered to have high reliability for the subject of research. The complete data can be seen on Appendix A.

3.7.2 Analyzing Data of Pre- and Post- tests

The result of the pre- and post-tests data would be analyzed by using the dependent paired samples *t*-test formula in order to compare the significant mean difference between the two tests. The *t*-test result of pre- and post-tests would also be significantly used to answer the proposed hypothesis and research question.

There were some procedures in analyzing the pre- and post-tests data. Firstly, the results of the pre- and post-test scores were calculated by using “without punishment formula” proposed by Arikunto (2008:172). The formula is as follows.

$$S = R$$

S = Obtained score (Raw Score)

R = The right answer

Then, the raw data scores were transformed into scale 1-100. Secondly, the data of pre- and post-tests were categorized by using Harris’ categorization.

Thirdly, the pre- and post-tests data were statistically analyzed by using the paired-sample *t*-test on Microsoft Excel 2007 with level of significance (*p*) = 0.05 and the *t* critical with *df* = *N*-1. Finally, the writer determined whether the null hypothesis should be rejected or retained by comparing the obtained *t* with the critical *t* (if $t_{obt} \geq t_{crit}$, H_0 can be rejected but if $t_{obt} \leq t_{crit}$, H_0 cannot be rejected).