CHAPTER III

RESEARCH METHODOLOGY

Chapter three presents the methodology in conducting this study. This chapter provides four main parts of the investigation: research design, data collection technique, research procedures, and data analysis technique.

3.1 Research Design

Quantitative method in the form of quasi-experimental design was employed in this study. The quasi experimental design is aimed at discovering the influence of particular treatments (Sugiyono, 2009, p.77). In addition, the design allows for attempts to fulfill standards of the true experimental design as closely as possible (Hatch and Farhady, 1982). Schematically, the quasi-experimental design can be depicted as follows:

Table 3. 1.

The Schematic of The Quasi experimental Design

Group	Pre-test	Treatment	Post-test
Experimental	O_1	X	O_2
Control	O_3	-	O_4

Note:

- X represents the exposure of a group to an experimental variable
- O refers to the process of observation or measurement

(Campbell and Stanley, 1963, as cited in Cohen and Manion, 1994:169)

A variable can be defined as an attribute of a person or of an object which varies from person to person or from object to object (Hatch and Farhady, 1982). In research, variables can be classified as dependent and independent variables. The independent variable is the variable which is selected, manipulated, and measured by the researcher, while the dependent variable is the variable which a researcher observes to determine the effect of the independent variable (Hatch and Farhady, 1982). The independent variable of the present research is Constructivist Approach and the dependent variable is the reading scores.

3.1.1 Hypothesis

Hypothesis is defined as a formal affirmative statement predicting a single research outcome, a tentative explanation of the relationship between two or more variables. It also limits the focus of the investigation to a definite target and determines what observations are to be made (Best, 1981). However, the most common hypothesis is the null hypothesis which states that there is no difference between the outcome of experimental and control group (Hatch and Farhady, 1982). Meanwhile, the alternative hypothesis is the opposite of the hypothesis null (Hatch and Farhady, 1982). Therefore, the hypotheses of this study are as follow:

- H_0 = There is no significance difference between students' post-test scores in the experimental group and students' post-test scores in the control group.
- H_A = There is a significance difference between students' post-test scores in the experimental group and students' post-test scores in the control group.

Acceptance of null hypothesis is based on the result of independent t-test and dependent test that is gained from the scores of pre-test and post-test in experimental and control group. If the result from each test is similar or higher than critical value of $\propto = 0.05$, thus the null hypothesis is rejected which means that the use of Constructivist Approach enhances students' reading

comprehension. On the other hand, if the result is less than critical value of $\propto = 0.05$, the null hypothesis is accepted which means that the use of Constructivist Approach does not enhance students' reading comprehension significantly.

3.2 Data Collection

3.2.1 Population and Sample

Population is defined as any group or individuals that have one or more characteristics in common that are of interest of the researcher, while samples are a small proportion of a population selected for observation and analysis (Best & Khan, 1995, p.13). Since quasi-experimental design does not include random selection of subjects, the sample of this study was chosen purposively, based on the same number of students and absence of significant difference between scores of the two groups. The difference was determined by the independent t-test.

In this research, the population was tenth grade students of one senior high school in Cimahi, whereas the samples were only two classes, namely X-2 as the control group and X-4 as the experimental group.

3.2.2 Research Instruments

Research instruments are media used by researcher in order to obtain relevant data to research's project and there are many alternatives from which to choose (Wilkinson & Birmingham, 2003, p. 3). The data were collected to answer research questions of the study. There were four kinds of research instruments utilized in this study, namely pilot test, pre-test, post-test, and interview. Based on those instruments, the data collections were analyzed to determine whether Constructivist Approach enhance students' reading comprehension.

The pilot-test was employed in the class which was not selected for the control and experimental groups. The test was intended to examine the validity,

reliability, and difficulty of the items that would be administered in experimental and control group.

The pre-test and post-test were conducted to generate scores that were analyzed to find out whether or not Constructivist Approach is effective to enhance students' comprehension in reading procedure texts. The pre-test was conducted to both experimental and control group before the treatment, in order to measure students' initial ability of reading procedure texts. On the other side, the post-test was conducted to both groups after the treatments, in order to see whether or not there is an enhancement on students' comprehension of reading procedure texts.

After the post-test, interview was also conducted to six students in experimental group. The interview aims to find out the students' perceptions toward the implementation of Constructivist Approach. It was utilized as the supporting data for this study. The open-ended questions in the interview allowed for an element of structure without compromising the interviewee's freedom to elaborate on topics of interest to him/her. Besides, the open-ended interview also allows for spontaneous questions to be asked that come out of the interviewee's comments (Bryman, 2004). Thus, interview was chosen as one of the research instrument.

3.3 Research Procedure

Generally, the research procedures are:

1. Organizing the Teaching Procedures

   In organizing teaching procedure, the researcher served as the teacher and facilitator for both experimental and control groups. The teaching procedure was organized into two steps. The first step was preparing appropriate materials for the teaching and learning processes during the treatment. The second step was organizing teaching procedure in experimental and control group. The teaching procedure in experimental group employed

Constructivist Approach and in control group employed the Teacher-centered Approach in which learners mostly only listen to the teacher's explanation and do the exercise.

2. Organizing the Research Instrument

   Organizing the research instruments included creating the test item for both pre-test and post-test and constructing open-ended questions for the interviews.

3. Testing the Validity and Reliability of the Pre-test and Post-test through the Pilot Test

   The pre-test and post-test were tested to find out whether or not the items had possessed the validity and reliability. Moreover, it was intended to see the difficulty index of items. The pilot-test items were tested to students in seventh grader at the same school. The students who got the pilot test were students who did not participate in control and experimental group. They were students from other classes.

4. Administering Pre-test to Experimental and Control Group

   Administering pre-test to experimental and control group was conducted before conducting the treatment in order to portray the initial ability of reading procedure texts.

5. Conducting the Treatment

   The Constructivist Approach was conducted in the experimental group, on the other hand the teacher-centered was carried out in the control group. It was aimed at finding out whether or not there was a significant difference between students' scores which were given Constructivist Approach and students' scores which were not. Hence, the effectiveness of the

Constructivist Approach could be measured. Further information related to example of the process in conducting the treatment of both groups is elaborated below:

a. Treatment 1

In the experimetal group, the first treatment applied the use of students' prior knowledge. In learning through Constructivist Approach, there is an important role of students' prior experience in the learning process in order to build their understanding (Hoover, 1996 in Mvududu and Burgess, 2012). In this stage, the researcher who also acted as the teacher showed pictures of two famous chefs in Indonesia. Teacher asked some questions in relation to the chefs that will guide students to the procedure text, such as: "Who are they?", "What do they do?", "What will you read if you want to cook delicious food like the chefs?". After the interactive interaction that would remind them to recipes that they have ever read, students were asked to play a game using food recipes, namely "Fly and Arrange Me" (detail procedure of this game can be seen in the Appendix E). Therefore, teacher divided the learners into six groups in which there was one high achiever in each group. When students played the game, teacher took the role as the guide on side to control the students' participation. As suggested by Educational Broadcasting Corporation (2004), the roles of constructivist teachers are to control the situation during the learning activity, and to guide the learners to use their experiences and prior knowledge. After each group finished arranging the recipe of a food, then they discuss their result in front of the class. The discussion included the structure of the recipe, the ingredients, and also the taste of the food. In this stage, teacher gave further information or correction about the group results to all students. This step is supported by Vygotsky (1978, in Forman & Cazden, 2004, p. 181) that scaffolding or the assistance from adult is needed in order to create an effective learning process.

In the control group, the Teacher-centered Approach was applied. At the beginning of the lesson, teacher read procedure text of food recipe from a textbook, "Developing English Competencies for Senior High School Grade X". Then, teacher asked three students to read loudly three food recipes in turn. After that, teacher translated to them the difficult vocabulary and explained the generic structure of procedure text while students listened and took note. In teacher-centered Approach, students put their focus on the teacher, so that the activity asks the students to be quiet and exclusively listen to the teacher's talk (Concordia University Online, 2013). Next, students were asked to answer questions individually from the text book about the food recipes that they had read. Then, the teacher gave the answer on the board and asked the students to checked their answer. This in line with Thirteen Ed (2004) that Teacher-centered Approach uses textbook as the primary source and lets the students work individually.

b. Treatment 2

The topic of the second treatment was about drink recipes. In the experimental group, firstly, students and teacher discussed what they had learned in the previous meeting.After that, the teacher showed some sacks of instant coffee and milk. The conversation about the pictures revealed that they had taught procedure text of drink recipes in Junior High School. It means that the use of students' learning history which is one of the CA principles existed. Moreover, the social history of the learners is important in the implementation of CA because the process when the past meets the new experience makes students easier to remember the material (Clarkson and Brook, 2004). Then, students were asked to play a group game, namely "Run for Your Life". In this activity, the teacher read the definition of key word for the drink recipes, then, the students in each group discussed the answer and chose one key word card provided on their table then ran to the front and stuck it. This game involved students' interaction which is important in CA. As suggested by Piaget (Concept of Classroom, 2004) that

the logic of learners and their modes of thinking are initially different from adult. Thus, group work is necessary to be implemented. After students and teacher checked the works, students were asked to complete a procedure text using the key words that they had got in 'Run for Your Life' game. Meanwhile, teacher checked the discussion of each group to ensure that all members of the group studied. It showed the role of constructivist teacher as the guide and facilitator (Jonassen, 1997). At the end, all groups discussed the answer together with the assistance of the teacher.

The topic for the second meeting in the control group was similar with the experimental group, which was about drink recipe. At the beginning of the lesson, teacher explained again what they had studied previously. After that, teacher asked the students to open a page of a textbook and asked two students to read the texts loudly. Next, teacher translated the unknown vocabulary for the students and asked them to take note. Then, teacher asked the students to do the exercises about the drink recipes and filled the gap of the text. Finally, teacher checked their answers. These activities are supported by Concordia University Online (2013) that during activities, students work alone and collaboration is prohibited in Teacher-centered Approach. Moreover, teacher in this approach does not allow students to express themselves and ask questions because teacher takes full control of the classroom (Concordia University Online, 2013).

c. Treatment 3

The third treatment applied Social Media as the topic. In learning through CA, the researcher who also acted as the teacher showed four symbols of famous social medias, such as Friendster, Instagram, Twitter, and Path. Teacher asked some questions in relation to the social media, such as: "Do you know what logo it is?", "Do you have account of those social media?", "Can you create an account of social media?". After the interactive interaction that would remind them to social media that they had

had, teacher told to them that they were going to learn creating account of social media. First, they had to predict the key words in creating social media using "Hang Man" game. As suggested by Halliday (2004, p. 13) that it is necessary to encourage language learners to be more interactive with the other learners, and the teacher. He stated that this activity in CA provides chances for learners to get new information and share understanding which will help all learners in the classroom to construct their comprehension. Thus, group work was also utilized in every meeting of the experimental group. In the implementation, the students in every group were asked to discuss and write down about how to create a facebook account but at the first they watched a video in making a facebook account. The use of problem-solving technique is one of the principles of CA (Christie, 2005). Moreover, procedure text has steps that should be in correct order to accomplish the goal. Therefore, students were asked to solve the problem in which how to create a Facebook account. In addition, constructivist teacher must engage students in learning by the activity and the interaction because students must apply their current understandings in new situation in order to construct new knowledge (Hoover, 1996, cited in Mvududu & Burgess, 2012). As the consequence, at the end of every meeting in, teacher role existed to brought more information or correction.

Meanwhile, in control group, the classroom remained orderly. The students could not talk or discuss with other friends. In other words, they had to be quiet and did what the teacher asked them to do by themselves. The aim of those principles in Teacher-centered Approach is to avoid students missing an important information in the learning process (Concordia University of Portland, 2013). As the consequence, the activities included students listened to teacher explanation about procedure text, three students read aloud of the social media text while the other read it silently, wrote note of new vocabulary, and did the exercise alone in their workbook. It was supported by Sunandar (2006) that the teaching activities involved in

Teacher-centered Approach are listening teacher's explanations, making lists of difficult words, translating English text into first language, asking learners to read loudly or silently, and getting students answer question which relates to the text. Therefore, in the end of the lesson, teacher gave score to students' work and gave conclusion of the meeting.

Table 3. 2

The Schematic of Teaching Schedule

Day/ Date	Activities	
	Experimental Group	**Control Group**
20 August 2013 (*Pilot test*)	-	
August 27, 2013	Pre-test	-
August 28, 2013	-	Pre-test
September 3, 2013	Recipes (Food)	-
September 4, 2013	-	Recipes(Food)
September 6, 2013	Recipes (Drink)	Recipes (Drink)
September 10, 2013	Social media	-
September 11, 2013	-	Social media
September 13, 2013	Operating Machine	Operating Machine
September 17, 2013	Installing Software	-
September 18, 2013	-	Installing Software
September 20, 2013	Review	Review
September 24, 2013	Post-test	-
September 25, 2013	-	Post-test
October 1, 2013	Interview	-

6. Administering Post-test to Experimental and Control Group

After the treatment was given, post-test was administered to both experimental and control groups at the end of the program in order to investigate the effectiveness of Constructivist Approach in teaching reading in procedure texts.

7. Conducting Interview

In order to find out the students' perception toward the implementation of Constructivist Approach, five open-ended questions were posed to several students in experimental group in the interview sessions. The students were chosen based on their achievement in the post-test and their performances throughout the learning. Therefore, three high achiever students and three low achiever students were chosen. The interview questions are shown below:

Table 3. 3
The Interview Questions

No	Interview Questions
1.	What is your opinion about reading activity?
2.	Which text type is considered difficult for you? How about procedure text?
3.	How is your feeling in learning with Constructivist Approach? Explain your opinion.
4.	Does Constructivist Approach help you to understand the procedure text? How?
5.	Does Constructivist Approach bring good influence to other language skills, like writing, speaking, and listening? Why?

3.4 Data Analysis on the Pilot Test

3.4.1 Scoring Technique

There are two types of formula in processing the score for multiple choice test, those are with minus system and without minus system (Arikunto, 2012, p. 187). The research only used the formula without minus system in order to avoid the negative score. The formula was proposed as follow:

Table 3. 4

The Scoring Technique of Multiple Choice Tests

S = R

S = Obtain score

R = Right answer

3. 4. 2 The Validity Tests of the Pilot test

The research employed content validity for validity testing. Content validity can be made by comparing the contents of the draft with the instruments that have been set (Sugiyono, 2009, p. 129-134). The data was calculated manually using Microsoft Excel and SPSS 20.

3.4.3 The Reliability Test of the Pilot test

This study employed reliability test in the pilot test. Reliability test was used to see the consistency of the result in a test when it is administered under similar conditions (Hatch and Farhady, 1982, p. 244). Split-half method was employed in the research for testing the reliability which used Spearman-Brown formula. The research used Microsoft Excell and SPSS 20 to process this test. After that, it was interpreted based on the following categorization:

Table 3. 5

Category of Coefficient Correlation of Reliability

Coefficient Correlation	Interpretation
0.0 – 0.20	Low
0.20 – 0.40	Moderate
0.40 – 0.70	High
0.70 – 1.00	Very High

3.4.4 The Difficulty Index

The difficulty index is an assumption that a good item should not be too difficult or too easy (Arikunto, 2012, pp. 222-225). To measure the degree of difficulty, the study used Microsoft Excell and SPSS 20 to process the test.

3.4.5 Data Analysis on the Pre-test and the Post-Test

3.4.5.1 The Normal Distribution Test

In order to test the distribution normality of the set of a data, the Kolmogorov-Smirnov test was used in this study. The test compares the scores in the sample to a normally distributed set of scores with the same mean and standard deviation (Field, 2009, p. 144). The test was employed through SPSS 20 for Windows.

There were three steps in conducting the Komogorov-Smirnov test: they are stating the hypotheses and setting the alpha level; analyzing the groups' scores using the Kolmogorov-Smirnov formula through SPSS 20; and interpreting the

output data. For the first step, the alpha level set is at 0.05 (two-tailed test) and the hypotheses are as follow:

- H_0 = the score of the experimental and the control group are normally distributed
- H_A = the score of the experimental and the control group are not normally distributed

Then the data were analyzed by using the Kolmogorov-Smirnov formula through SPSS 20. Finally, the output data were interpreted by this way: if the result is non-significant ($p < 0.05$) it means that the distribution of the sample is significantly different from normal distribution and the null hypothesis is rejected. If the result is significant ($p > 0.05$) then the distribution is approaching the normal distribution and the null hypothesis is accepted (Field, 2009, p. 139).

3.4.5.2 The Homogeneity of Variance Test

In order to analyze the homogeneity of variance of the scores, Levene's test was employed in this study. The Levene's test checks the null hypothesis that the variances in the groups are equal. It means that the difference between the variances is zero (Field, 2009, p. 150). The test was employed through SPSS 20 for Windows.

There were three steps in conducting the Levene's test. They are stating the hypothesis and setting the alpha level; analyzing the scores using Levene's test through SPSS 20; and interpreting the output data.

The first step, the alpha level set is at 0.05 ($\alpha = .05$). This is the maximum error points that can be tolerated. The hypotheses are as follow:

- H_0 = the variances of the control and experimental group are homogenous.
- H_A = the variances of the control and experimental groups are not homogenous.

Secondly, the data were analyzed by using Levene's test through SPSS 20. Thirdly, the output data were interpreted by this way: If the result of the test is interpreted to be significant at $p \leq .05$ and it means that the null hypothesis is rejected and the variances are significantly difference. On the other hand, the result is interpreted to be non-significant if $p > .05$ and it means that the null hypothesis is accepted and the variances are approximately equal (Field, 2009, p. 150).

3.4.5.3 The Independent *t*-test

The independent group *t*-test is used to analyze a causative relationship between the independent variable (treatment) and the dependent variable (response) that is measured on experimental and control group. This test focuses on determining whether or not there is a significant difference between the experimental and control groups' means on dependent variable (Coolidge, 2000, p. 141). There were three steps in conducting the independent group t-test: first is stating the hypothesis and setting the alpha level; second, analyzing the groups' scores using the independent group *t*-test in SPSS 20 for Windows which results in the *t* value or t_{obt} ; and third, comparing the t_{obt} with the level of significance for testing the hypothesis. For the first step, the alpha level set is at 0.05 (two-tailed test) and the hypotheses are as follow:

- H_0 = the two samples are from the same population; there is no significant difference between the two samples.
- H_A = the two samples are from the same population; there is a significant difference between the two samples.

Then, the data were analyzed by using the independent group t-test formula through SPSS 20 for Windows. The third is comparing the result with the significance level. If the result ≥ 0.05 , the null hypothesis (H_0) is rejected which

means that there is a significant difference of mean between experimental and control group. In contrast, if the result ≤ 0.05 , the null hypothesis is accepted which means that there is no significant difference of mean between experimental and control group.

3.3.3.4 The Dependent T-test

Dependent *t*-test (paired sample t-test) is used to analyze and compare the difference of means between the scores of pre-test and post-test of each group(Kranzel&Moursund, 1999). In the study, the dependent t-test was used to the control and the experimental group. It was aimed at finding out whether or not there was a significant difference between the scores of pre-test and post-test of both groups. The test was calculated by the computation of SPSS Statistics 20 for Windows.

There were three steps to use the dependent t-test. The first was stating the hypothesis (H_0= there is no significant difference between the scores of pre-test and post-test of the group) and setting the alpha level of significance at 0.05. The second was analyzing the scores of pre-test and post-test of the group. The lastwas comparing the $t_{obt}$with the level of significance for testing the hypothesis(t_{crit}). If the t-obtained > t-critical, it means that the null hypothesis is rejectedbecause there is a significant difference between the scores of pre-test andpost-test of the group(Field, 2005).

3.4. 6 Data Analysis on The Interview

In order to analyze the data from the interview, the interview was transcribed. The transcription was coded based on the respondents' answers, and then the answers were classified into smaller group of answers. At the end, the transcription was used as the source in answering the second reseach question which asks about the students' perception toward the implementation of constructivist approach. The transcription of the interview can be found in appendix D.

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