

## CHAPTER III

### RESEARCH METHODOLOGY

This chapter discusses about research design, research hypothesis, research setting, population and sample, source of the data, research procedure, research instrument, data collection techniques, and data analysis technique.

#### A. Research Design

The type of research used in this study was quantitative research. Quantitative research defined as a way to test a hypothesis through the use of objective instruments and appropriate statistical analyses.<sup>1</sup> In this case, the writer used quantitative research to test the hypothesis concerned on the use of Cuisenaire rods in students' speaking ability.

Hypothesis was a powerful tool in scientific inquiry. Ary et al explained that "research hypotheses are the hypotheses developed from observation, the related literature, and/or the theory described in the study".<sup>2</sup> This study consisted of two research hypotheses, those were:

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<sup>1</sup> Diane3. Larsen and Michael H. Long, *An Introduction to Second Language Acquisition Research* (London: 4.Longman Inc,1991), 11

<sup>2</sup> Donald Ary, et.al., *Introduction to Research in Education*. Eighth Edition (Canada: Nelson Education Ltd, 2010), 91

$H_o$  = There is no significant difference between the improvements of students speaking ability of eleventh grade of SMA Bina Bangsa Surabaya before and after retelling story by using Cuisenaire Rods.

$H_a$  = There is a significant difference between the improvement of students speaking of eleventh grade of SMA Bina Bangsa Surabaya before and after retelling story by using Cuisenaire Rods

The researcher used pre-experimental approach “one group pre-test and post-test design” that was primarily aimed to determine cause and effect of phenomena.<sup>3</sup> In this study, the use of experimental approach was to know the improvement of dependent variable after treating by independent variable. By doing so, the researcher tried to find out whether independent variable affects the dependent variable.

According to Ary, variable is a construct or a characteristic that can take on different values or scores.<sup>4</sup> This research consisted of two variables; independent and dependent variable. Independent variables are hypothesized to influence the dependent variable, while the dependent variables are the consequence of another variable.<sup>5</sup> In this case, the use of Cuisenaire Rods was the independent variable and student’s speaking ability in retelling story was the

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<sup>3</sup> Irwin P. Levin, *Relating Statistics And Experimental Design An Introductiona* (California: Sage Publication, Inc. 1999), 5

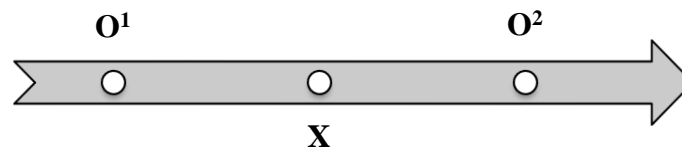
<sup>4</sup> Donald Ary, et.al., *Introduction to Research in Education* ....., 37

<sup>5</sup> Ibid.,

dependent variable. Thus, the purpose of this experimental study was to find out whether Cuisenaire Rods can improve students' speaking ability in retelling story or not.

In addition, the illustration of "one group pre-test and post-test design" can be described as figure 1 below:

**Figure 1**  
**The Illustration of One Group Pre-Test and Post-Test Design**



**Note:**

$O^1$  : The result of the first process of measurement (pre-test)

$X$  : Treatment

$O^2$  : The result of the second process of measurement (post-test)

From figure 1 above, it can be described that in "one group pre-test and post-test design" the sample at first received pre-test ( $O1$ ). So data about students' speaking score can be obtained before giving treatment. Then, they were given treatment of teaching by Cuisenaire Rods ( $X$ ) with three different topics. Finally, post-test ( $O2$ ) was given to obtain students' speaking score after

giving treatment. Later, the result of  $O^1$  and  $O^2$  was compared by calculating post-test minus pre-test score to determine how significant the differences were shown before and after using Cuisenaire rods in teaching speaking focus on retelling story activity.

## **B. Research Setting**

The research was conducted at SMA Bina Bangsa Surabaya which is located at street Siwalankerto Utara II/7 Surabaya. It was one of the school under Bina Bangsa Surabaya foundation which had not implement Cuisenaire rods yet. Furthermore, the research was accomplished from June 14, 2013 until June 24, 2013 with three stages. First, researcher did pre test on June 14, 2013. Second, researcher treated the sample by a treatment. In this case, the treatment was teaching retelling story using Cuisenaire rods. In order to make students get treatment well, this stage was done three times, there are on June 17, 19 and 21, 2013. The last stage was post test that is held on June 24, 2013.

## **C. Population and Sample**

The data of this study was gained from eleventh grade students of Bina Bangsa School Surabaya which is located at street Siwalankerto Utara II/7 Surabaya. It was one of the schools which had not implemented Cuisenaire rods yet. Therefore the population and sample were as presented below:

## 1. Population

Population is defined by Sugiyono as object or subject chosen by the researcher that has special quality and characteristics to be learned and made conclusion.<sup>6</sup> In this study, the population was the students of SMA Bina Bangsa Surabaya in 2012-2013 academic years.

## 2. Sample

According to Arikunto, sample is a part that can represent all the population observed.<sup>7</sup> So, the sample consisted of the students from the population who were chosen to participate in the study. In this case, the writer chose students of eleventh grade from Science class of Bina Bangsa School Surabaya with 14 students. In choosing the sample, the researcher was suggested by the English teacher of the school based on the students' achievement in English lesson. So the researcher took only eleventh graders of the school as suggested by the English teacher. The selection is also caused by this research used one group pre-test and post-test design which has no control variable,<sup>8</sup> the sampling technique used in this study was not chosen randomly. Thus, the sample of the study was easier to organize.

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<sup>6</sup> Sugiyono, *Statistika Untuk Penelitian* (Bandung : Alfabeta, 2010), 61

<sup>7</sup> Suharsmi Arikunto, *Prosedur Penelitian: Suatu Pendekatan Praktis* (Jakarta: PT.Melton Putra, 2002), 109

<sup>8</sup> Sugiyono, *Metode Penelitian Kuantitatif Kualitatif dan R&D*, (Bandung: Alfabeta, 2008), 74

#### **D. Source of Data**

Source of the data was the place where the researcher gets the data needed to the research. In this study, the data obtained was collected from:

1. The result of Test

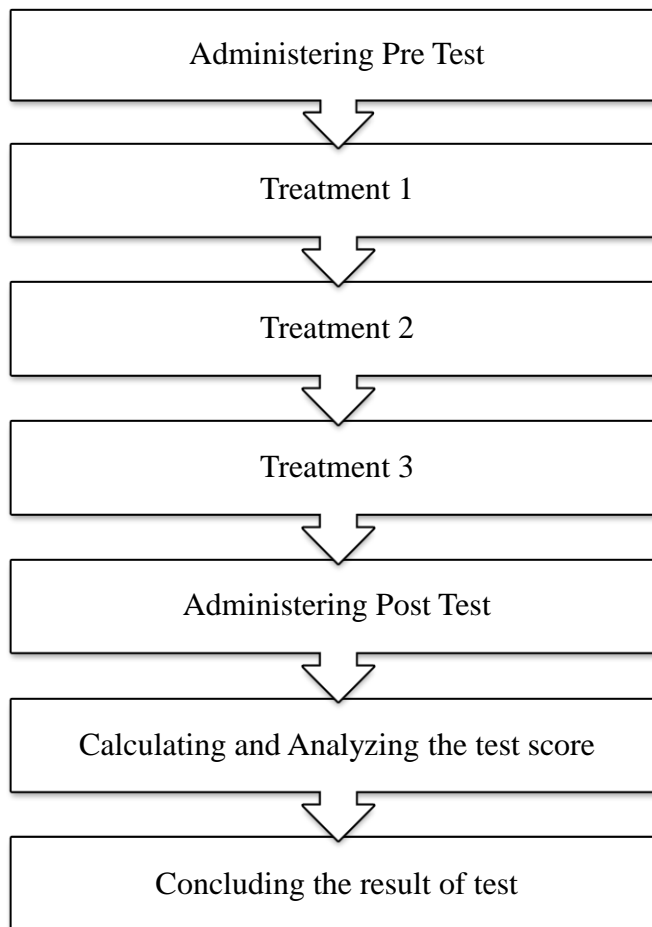
The result of test was gained from both score of pre-test and post-test of the sample. Later, the result was presented in the form of tabulation. In this case, this data was used to answer the research question of the study.

2. Speaking Score

In this study, speaking score was gained from recording and transcript. The instrument used to score students speaking was the rubrics of speaking assessment which consists of five elements; Pronunciation, Fluency, Comprehension, Grammar and Vocabulary.

#### **E. Research Procedures**

The researcher had designed a research procedure as a guide in implementing this study. Below was the figure of the research procedure:

**Figure 2****The Research Procedure**

From the figure above, it can be describe that the research procedures of the study were:

1. Administering pre test

Pre-test was held in the first meeting, in this study, the sample was given an oral test in the form of live monologue.

## 2. Treatment 1

The first treatment was carried for 45 minutes. In this first section of treatment, students were taught using Cuisenaire rods in retelling “Cinderella” story. The procedures of treatment are as follows:

- a) Students were divided into four groups in which each of them consist of three to four members.
- b) Each group was being responsible of a paragraph of the text.
- c) Then, group started to divide everyone of the group being a particular role: one constructed rods that represent the situation and object of the story, one told the story, one pointed to the rods and one moved the rods around depending on what was happening.
- d) They started reading and discussing with each other how to work on telling their paragraphs and manipulating with the rods.
- e) Finally, each group presented their paragraph and used Cuisenaire rods to tell the class about the paragraph of they were responsible on.

## 3. Treatment 2

The second treatment was carried for 45 minutes. In this second section of treatment, students were taught using Cuisenaire rods in retelling “Snow White” story.



#### 4. Treatment 3

The third treatment was carried for 45 minutes. In this third section of treatment, students were taught using Cuisenaire rods in retelling “Pinocchio” story.

#### 5. Administering post test

Post-test was held in the fourth meeting. The same as pre test, the sample was also given an oral test in the post-test in the form of live monologue. Through post test, students’ speaking achievement after learning by Cuisenaire rods was shown.

#### 6. Calculating analysing the test score.

After gaining score from both pre-test and post test, the researcher calculated the mean of difference score ( $\overline{D}$ ) between the pre test and post test of each student. Then, the researcher calculated standard deviation of  $\overline{D}$  ( $S\overline{D}$ ). Later on, the researcher analyzed the score through t-test to find out whether the difference of the scores between them was significant or not.

#### 7. Concluding the result of the test

After doing those above research procedures, the researcher concluded the result of the research through testing hypothesis to formulate the answer of the statement of research problem.

## **F. Data Collection Techniques**

The researcher conducted the test and treatment to get the data about the students speaking score. In accordance with it, the writer designed the items for speaking test. The writer used “live monologue” type of speaking assessment because the researcher assesses the students when they were asked to speak. The researcher also recorded the students’ speaking to support the data about students’ speaking. After the students’ speaking had been recorded, it was transcribed.

The descriptions of each technique (pre test, post test, recording and transcript) used in this research to collect data were as follows:

### **1. Administering pre test**

Pre-test was conducted to know the mean of student’s competency in speaking before being taught by Cuisenaire rods, by retelling story. After administering pre-test, treatment was given to the score of the study. The treatment was held three times with three meetings.

### **2. Administering post test**

Meanwhile, post test was held after giving a treatment to the score of the study three times. It was aimed to measure the effect of Cuisenaire Rods after the implementation of treatment. The result of the test was presented in the form of tabulation.

### 3. Recording and transcribing student's speaking

Because the pre and post test was about students' speaking ability, recording was used to record the students' speaking condition for both pre-test and post-test. After being recorded, it was transcribed. The recording was conducted by using tape recorder. In this case, recording was used to score students' speaking in three elements; pronunciation, fluency and comprehension. Meanwhile, transcript was used to score two elements involve grammar and vocabulary.

## **G. Research Instruments**

In collecting the data, the researcher used some instruments, they were: tests, tape recording and transcription and scoring rubric of speaking assessment.

### 1. Tests

In this study, the test was used to determine students' speaking ability before and after learning to retell a story by Cuisenaire rods. To construct the test, this researcher used content validity. Furthermore, the tests were divided into two tests, pre-test and post-test. To support the test, the researcher used a scoring rubric of speaking assessment. Therefore, the supported instruments of tests were: validity of the test, pre test, post test and scoring rubric of speaking assessment.

## a. Validity and Reliability of the Test

### 1) Validity of the Test

A test should have validity to know whether the test was valid or not. As Hughes said that “A test is valid if it measures accurately what it is intended to measure”.<sup>9</sup> To fulfil the content validity, the content of the test was developed based on standard curriculum of Indonesia. According to English basic competence no. 10.1, the eleventh graders are supposed to be able to express meaning of monologue text by any kind of oral language accurately, fluently and acceptable in daily life context in the form of: *narrative*, *spoof* and *analytical exposition* text.<sup>10</sup> Thus the topic chosen by the researcher was appropriate to the curriculum of eleventh grades’ speaking ability of narrative text.

The test item (see appendix 6) was also consulted to the expert. In this case, the instrument was validated by the expert of speaking lecture and the English teacher of the school. The form of the instrument validation can be seen on appendix 3. Finally, the test can be said as a valid one after the lecture and English teacher agreed that the test represented the curriculum.

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<sup>9</sup> Arthur Hughes, *Testing for Language Teacher second edition* (United Kingdom: Cambridge University Press. 2003), 26

<sup>10</sup> BNSP, *Standar Isi Standar Kompetensi Lulusan Mata Pelajaran Bahasa Inggris Sekolah Menengah Atas, Madrasah Aliyah, dan Sekolah Menengah Kejuruan*, (Jakarta: Depdiknas, 2006), 325

## 2) Reliability of the Test

Reliability was an instrument which is believable enough to use as data collection technique because the instrument is good.<sup>11</sup> The Reliable instrument can be used many times to measure the same object and produce the same result of data.<sup>12</sup> Thus, if the instrument of the test was reliable, the test can be used for another sample.

In this research, the computation formula of reliability test used by the researcher was the 21<sup>st</sup> formula of Kuder and Richardson which was stated as KR-21<sup>13</sup> below:

$$r = \frac{k}{(k-1)} \left\{ 1 - \frac{m(m/k)}{s_x^2} \right\}$$

$k$  = Number of test items  
 $m$  = Mean of test ( $\sum D/n$ )  
 $s_x^2$  = Varian Score of test  
 $(\sum(D - \bar{D})^2/n - 1)$

$$r = \frac{4}{(4-1)} \left\{ 1 - \frac{5.4 (5.4/4)}{16.3} \right\} =$$

$$r = \frac{4}{3} \left\{ 1 - \frac{5.4 \times 1.35}{16.3} \right\}$$

$$r = 1.33 \{1 - 0.447\}$$

$$r = 1.33 \times 0.553$$

$$r = 0.735$$

<sup>11</sup> Suharsmi Arikunto, *Prosedur Penelitian: Suatu.....*, 170

<sup>12</sup> Sugiyono, *Metode Penelitian Kuantitatif Kualitatif dan R & D .....*, 173

<sup>13</sup> Drs. Saifuddin Azwar, MA, *Reliabilitas dan Validitas*, (Yogyakarta: Pustaka Pelajar, 2008), 84

After gaining r-value, it was compared to r-table with  $n=14$  on  $\alpha = 0.05$  and two tailed. Based on Pearson product moment table or r-table, r-table of  $n = 14$  on  $\alpha = 0.05$  and two tailed (14, 0.05) is 0.532.

The result showed that 0.735 is bigger than 0.532. Therefore, when r-value was bigger than r-table ( $r\text{-value} > r\text{-table}$ ) it can be said that the test instrument was reliable.

#### b. Paired test

Paired test was the way to know whether any effect or not from the experiment.<sup>14</sup> In this study, the paired test consisted of pre-test and post test.

##### 1) Pre test

In this case the researcher conducted pre-test to the students from Science class of eleventh grade of SMA Bina Bangsa as the sample of the study to measure the degree of the dependent variable before the treatment. In this research pre test was used to know the student's ability in speaking, especially in retelling story.

After doing pre test, treatment was given to the sample of the study for three times. The treatment was the implementation of Cuisenaire rods in learning to retell a story.

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<sup>14</sup> Sugiyono, *Statistika Untuk Pendidikan* (Bandung: Alfabeta, 2007), 122

## 2) Post test

The post test conducted at the end of the research to measure the degree of change on the dependent variable. In this study, post test was used to measure the improvement of students speaking ability after learning by Cuisenaire rods.

## 2. Tape Recording and Transcription

Tape recording was used to record students' speaking. It was used to get more detailed and accurate data. In this case, the students were not informed that their speaking is recorded, because students are often uncomfortable when they know that the tape was used to capture what was being said. Furthermore, after the students' speaking was recorded, it was transcribed. Later, it was used to describe students speaking ability before and after being taught by Cuisenaire rods.

## 3. Scoring Rubric of Speaking Assessment

The result of students' speaking recording and transcription was assessed by the rubrics of speaking assessment. The scoring rubric of speaking assessment that was used in this study was adopted from oral rating scale which was proposed by Harris.<sup>15</sup> (See appendix 4). The elements of speaking assessment which were proposed by Harris were pronunciation, fluency, comprehension, grammar and vocabulary. Students' speaking recording result

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<sup>15</sup> David P Harris, *Testing English as A* ....., 81-82

was used to score three of five elements; pronunciation, fluency and comprehension. The rest two elements: grammar and vocabulary were scored from their transcription.

## **H. Data Analysis Techniques**

The data from student's speaking records was used to analyze students' speaking ability in the three components; pronunciation, fluency and comprehension. Meanwhile, to analyze student's ability in term of grammar and vocabulary components, the students' record was transcribed. The result of students' transcription was described in narrative manner to describe the students' speaking ability before and after given Cuisenaire Rods in teaching learning process.

In analyzing the data from paired test, the writer firstly calculated the total and mean from overall pre-test and post test score. Then the writer used statistical calculation of t-test. T-test was used in order to find out the influences of independent variable (X) to dependent variable (Y) and to test hypothesis concerning to the two variables. The data at first calculated in the table of t test that consisted of:

- Respondent Code (See appendix 7)
- Score from pre test and post-test
- Difference score between the pre test and post test of each respondent ( $\bar{D}$ )



- Difference score minus the mean of the difference score  $(D - \bar{D})$
- Quadratic equation of  $(D - \bar{D}) / (D - \bar{D})^2$

Due to the sample was paired double sample, the t-test formula used was t-test with paired double sample, the procedures were:

- 1) Calculating standard deviation of  $\bar{D}$  ( $S\bar{D}$ ) by the formula<sup>16</sup>:

$$S\bar{D} = \sqrt{\frac{\sum(D - \bar{D})^2}{N - 1}}$$

$\sum(D - \bar{D})^2$  = The sum of the quadratic equation of deviation minus the mean of the deviation

N = The amount of sample

- 2) Calculating t-value by t test formula to find out whether the difference of the scores between them was improve or not by formula<sup>17</sup>:

$$t = \frac{\bar{D} - 0}{\frac{S\bar{D}}{\sqrt{N}}}$$

$\bar{D}$  = The mean of difference score between the pre test and post test

$S\bar{D}$  = Standard deviation of  $\bar{D}$

- 3) Calculating degree of freedom (df) by the formula:

$$df = N - 1$$

- 4) Checking critical value of t-table at  $\alpha = 0,05$  (5 %), It meant that the researcher checks t-table of df value with the level of significance ( $\alpha$ ) 0.05.

<sup>16</sup> Sugiyono, *Metode Penelitian Kuantitatif Kualitatif dan R&D* ....., 57

<sup>17</sup> Ibid., 96

- 5) Comparing the value of t-value to t-table and hypothesis testing where:
  - a) If t-value is lower than t-table,  $H_0$  (There is no significance difference) is accepted
  - b) If t-value is bigger than t-table,  $H_a$  (There is significance difference) is accepted
- 6) Making decision of hypothesis testing whether  $H_0$  (null hypothesis) or  $H_a$  (alternative hypothesis that is accepted)

In this case, if the result of t-value was bigger than t-table at 0.05 level of significance of t-test, it meant that there was a significant difference between the improvement of students speaking skill before and after retelling story by using Cuisenaire Rods. Thus, Cuisenaire rods can be stated as a media which can improve student's speaking skill.

On the other hand, if the result of t-value was lower than t-table at 0.05 level of significance of t-test, it meant that there was no significant difference between the improvement of students speaking ability before and after retelling story by using Cuisenaire Rods. Therefore, Cuisenaire rods cannot be stated as a media which can improve student's speaking skill.

Later, the researcher gave her interpretation of the result of the conclusion of the test in narrative manner. It was adjusted to the writer opinion and the evidence of the result of the test by reviewing several related literature in order to have an appropriate and relevant conclusion.