CHAPTER III
RESEARCH METHODOLOGY

In this chapter, the researcher ilustrates how this research is conducted with the subject of research design. It consist of research design, place and time of the research, population and sampling, research variables, research instrument, technique of data collection and technique of analysis data.

3.1 Research Design

"Research method can be described a process of steps to collecting, analysis about information, topic or issue to get valid data".

Based on the the purpose of the study in previous chapter, the researcher used Mix Method. According to Ary et al (2006:561) Mix Method is a mixing of qualitative and quantitative approaches occurs in all stages of a study. (formulation of the research question, data collection procedures and research method, interpretation of the result, use in single and multiphased study). Then, Research design is the spesific procedures to explain for each step in the process such as: data collection, data analysis and report writing Cresswell (2002:20). The design used of this research is *Explanatory Sequential Design.* The Mixed Method Sequantial Explanatory Model is ilustrated in figure 5. That ilustrate the application of this model.
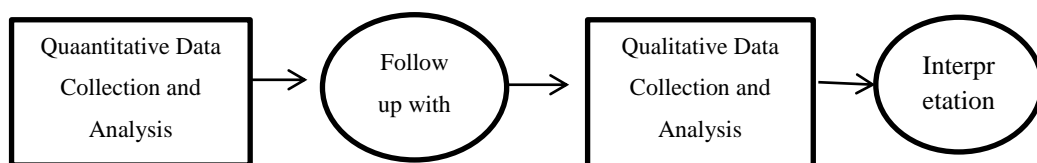

Figure 3.1 Explanatory Sequantial Design Model

The ilustrate figure 5 above, Explanatory Sequantial design use Quantitative then follow up with qualitative data collection which fuction to help in explaining, and interpreting the findings of quantitive research. However, the

design conducted in 2 collecting data which is the most priority for the research is quantitative. It supported by Cresswell (2002:542) Explanatory Sequantial Mixed Method Design also called (two-phases model), consist of first collecting quantitative data then qualitative data to help explain or elaborate on the quantitative results. The researcher use Explanatory Sequantial design to measure and explore the Effectiveness Paul's Wheel Strategy to Increase Students Critical Thinking in Reading Explanation Text by using Quantitative Data Collection then follow up with Qualitative Data Collection. It can seen from the figure below:
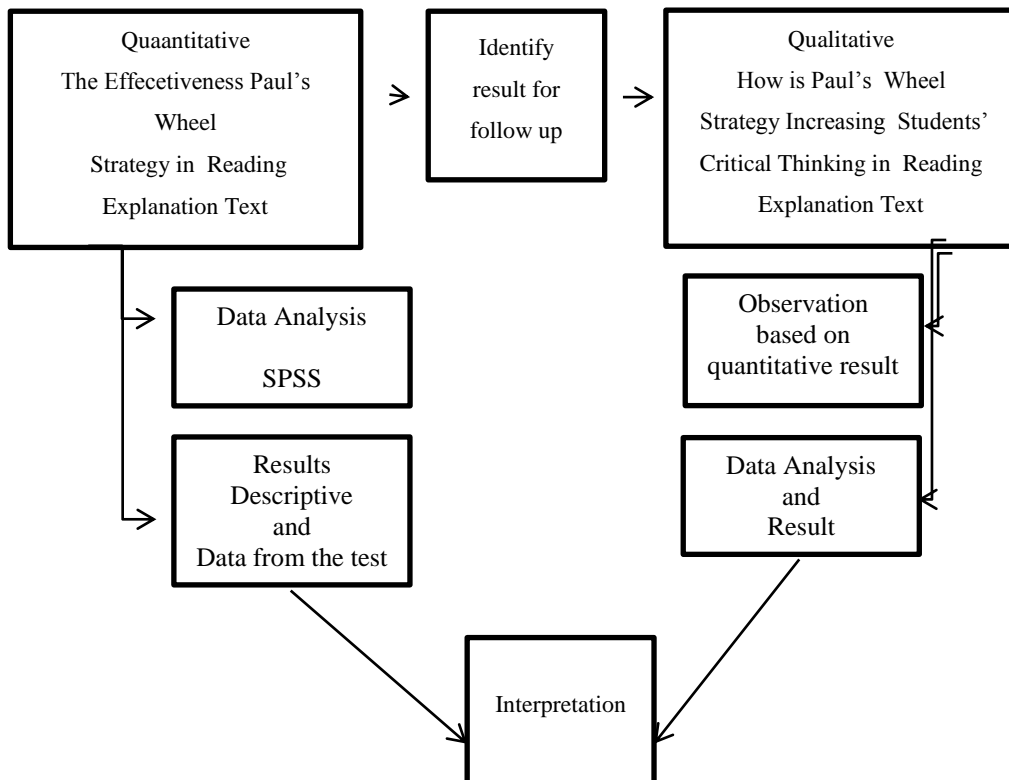

Figure 3.2 A Mixed Method Sequantial Explanatory to measure and explore The Effectiveness
Paul's Wheel Strategy to Increase Students Critical Thinking in
Reading Explanation Text

Based on schema figure 6 above, This design it called a two-phase model, here in the first phase the researcher collecting quantitative data and then second phase the researcher collecting qualitative data to help explain, elaborate and strengthen the result.

First phase, the researcher use quantitative to collecting the data to know The Effectiveness Paul's Wheel Strategy in Reading Explanation Text, the researcher use SPSS verse 20,0 for collecting the data has taken from the test, then give the result and analysis from the test. Then, identify the result and follow up with qualitative data as a second phase. The researcher use interview, observation checklist and the document of test that contain critical thinking skill based on Paul and Elder (2008) to collect and identify the data.

3.2 Population and Sampling

3.2.1 Population

In this research, the population is tenth grader of SMA Muhammadiyah 2 Surabaya in the academic year 2016/2017. There are 276 students from 11 classess.

3.2.2 Sampling

According John and James (2006:13) Sampling means a sample in a small population that use for the researcher selected for observation or analysis, by using it, the researcher know the characteristic from the population and also sample has drawn. Based on the population above, the researcher used selected sampling because the researcher choosed the subject those who are most appropriate based on the research. This research need two classess for doing this research, they are Mipa 1 and Mipa 2. The reason for the researcher choose both classess because the students have the same ability in learning english and the environment of the class to support the research. This research design used to see

the effectiveness of Paul's Wheel Strategy both of the class. The aim of this research is to know the effectiveness of Paul's Wheel Strategy result between both of class in different treatment.

3.3 Research Variables

There are three variables in this research. The first, dependent variable in this research is students'reading ability in explanation text. While, The second is independent variable is Paul's Wheel Strategy that is influence in students' reading strategy. Third, the reseacher give additional variables because wants to know more how the effected of Paul's Wheel in student's critical thinking .

3.4 Research Instruments

In this research, the researcher use some instrument to support the research, they are :

3.4.1 Interview

The first technique the used to collect the data was interview. In John and James (2006:264) interview it is important for the researcher to provide information and perspective of the interviewer, mostly researcher only done with the teacher before taught in the class as a sample of this research, Interview was used to explore information from the teacher, The researcher used this technique to know how the teacher in teaching reading, so the researcher can conclude how the problem and student's responses about English, especially in reading lesson in the class. (See Appendix 18)

3.4.2 Observation

The second technique the used to collect the data, the researcher supported the qualitative phase by observation. This technique to get the process, open-

ended and first hands information by the people or place in process. Creswell (2002:214) In here researcher used checklist to got information concerning of process in the classroom especially when the teacher taught reading lesson. By doing so, the researcher could see the real condition in the classes and observe the teacher stimulus.

From the describtion above, it can conclude that the observation is get the target. To get the data by coming to the classroom to see the real class situation diractly by using the sense of perception. (See Appendix 19)

3.4.3 Pre - Test

Pre-Test also given by the researcher before the students receive the material that combined the treatment from the researcher, the content of the test is reading explanation material, the researcher use multiple choice which are suitable to increase students' critical thinking skill. This test did earlier to know the ability of students and use researcher to choosed control and experimental class .According Cresswell (2002:297) Pre-Test is a measure on some attribute or characteristic for the participant before they receive the treatment. The Pre-test will be given to th X Mipa 1 and X Mipa 2 class with the same material.

3.4.4 Post - Test

The researcher also use post-test. The post -test will give after the researcher did the treatment in the experimental class. For treatment, the researcher implementing Paul's Wheel Strategy. The post-test here to know the student's reading skill increasing students' critical thinking after got treatment, The kind of this posttest, the researcher use multiple choice which are accomodir of critical thinking question. It supported by Cresswell (2002:297) Posttest is a measure on some atribute or characteristic that is assessed for participants in an experiment after a treatment.

3.4.5 Paul's Wheel of Reasoning Rubric

The student's scores by using the Paul's Wheel reasoning rubric. It is to know how the Paul's Wheel strategy to increase student's critical thinking skill (Paul and Elder, 2008) . In the scores the researcher has eight catagories such as : Purpose, Question at Issue, Information, Inferences and Interpretation, Concept, Assumption, Implication and Cosequences and Point of View.

3.5 Research Procedure
3.5.1 The Procedure of Collecting Data

This research uses test (Pre-test and Post-test) to collect the data. This research is carried out through the following steps :

Table 3.1 The conducting data schedule

No.	Time	Schedule	
1.	Monday, 22nd February 2017	Send permission letter at SMA 2 Muhammadiyah Surabaya	
		Control Class	Experimental Class
		Pre -Research	
		a. Interview the teacher	
		b. Observe both of class	
		c. Selected Group d. Determining material about explanation text and the topic for learn activities of the research. e. Arranging and making lesson plan during learning the activities of the research f. Determining the instrument of the research g. Analyzing the instrument of the research h. Giving Try-out in other classes i. Giving Pre-Test	c. Selected Group d. Determining material about explanation text and the topic for learn activities of the research. e. Arranging and making lesson plan during the activities of the research f. Determining the instrument of the research. g. Analyzing the instrument of the research. h. Giving Try-out in other classes i. Giving Pre-Test
		Research Process	
		a. Introducing and Explaining about	a.Introducing and Explaining about

		material whether that will use in learning activities of the research. b. Introducing and Explaining about material whether that will use in learning activities of the research. c. The researcher ask the students to analyze the passages of explanation text d. The students practice in the class	material whether taht will use in learning activities of the research b.Introducing and Explaining about material whether that will use in learning activities of the research c.Giving students treatment by using Paul's Wheel of Reasoning Strategy d.The researcher ask the students to analyze the passages bu using Paul's Wheel Strategy. e. The teacher observe the class by using Paul's Wheel of Reasoning Rubric to know Critical Thinking process. f.The students practice in the class.
		Research Closing	
		a. Giving Post-Test to measure control class b. The researcher analyze the data of Post-Test c. The researcher will count the data and compare between control and experimental group to know the effectiveness of this method.	a.Giving Post-Test to measure experimental class. b.The researcher analyze the data of Post-Test between control and experimental group . c.the researcher will count the data and compare between control and experimental class to know the effectiveness of this method .

3.6 Data Colection Technique

Data collection technique is the important for the researcher because it is main step of researcher get the data. Data is needed for the researcher to observed and studied without the data, the researcher will not get standarized. Therefore the researcher use Test for data collection technique. The function of the test to get the result both Pretest and Posttest.

As the steps done in data collection technique as below :

1. Preparation

    a. Analyzing topic materials

    b. Arrange lesson plan

    c. Preparing instrument, assessment and test

    d. Revision about instrument

    e. Making test

To do the preparation the researcher consulting all above to the english teacher in SMAM 2 Surabaya.

2. Realization

    a. Giving Pre-Test both of groups experimental and control group

    b. Implementation of the treatment about Paul's Wheel method in teaching reading explanation text at experimental group

    c. Giving Post test for both of group

3. Ending of Action

    a. Collecting Data

    b. Observing Data

    c. Analyzing Data

3.7 Quantitative Data Analysis Technique

The researcher analyzing the data after have been collected. John and James (2006:351) state that analyzing the data using statistical procedure and enough information to the reader by using calculate of the data with hand or aim of computer. This activities of data collection technique by grouping data based on variable to aswer of the researcher's statement of the problem as well to examine the hypothesis.

3.7.1 Normality Test

The purpose of normality test is to know that the data normal or not. Normality test is done by using SPSS verse 20.0 to check the data normal or not, the criteria of testing normality is if $\mathbf{P_{value}} < \boldsymbol{\sigma}$ so that H_0 is refused.

H_0 = Sample of data is normal distribution

H_1 = Sample of data is not normal distribution

The criteria of the test based on *P*- value as below :

H$_0$ push away, if P ($_{value) <}$ $\boldsymbol{\sigma}$, so data is normal distribution.

H$_1$ push away, if P ($_{value) >}$ $\boldsymbol{\sigma}$, so data is more normal distribution.

3.7.2 Homogenity Test

To measure both classes have similiarity, the researcher used to test homogenity by using Levane test of homogenity of variences. Homogenity test is done by using SPSS verse 20.0 to check both of classes are homogen or not.
The criteria of testing Homogenity:

The criteria of the test as below :

H$_0$: SIG < ALPA 0.05, so data is not homogen

H$_1$: SIG > ALPA 0.05, so data is homogen

3.7.3 Computing mean

Computing the mean use to calculate both of pre-test and post-test in each group. The mean of a distribution commonly understood as the arithmetic average John and James (2006:359)

$$\bar{x} = \frac{\Sigma x}{N}$$

$\bar{x}$ = mean
Σx = The sum of the x scores
N = The number of the subject

3.7.4 Computing Standard Deviation

Determining the Standard Deviation used for the scores pretest and post test for both groups from raw scores .

$$S = \sqrt{\frac{\Sigma x^2}{N} - x^{-2}}$$

S   = Standard Deviation

$\Sigma\times^2$ = The sum of the x squared scores

$\boldsymbol{x}^{-2}$ = The mean of distribution

N   = The number of students

3.7.5 T-Test

After testing homogenity, researcher will continued with T-test. T-Test to know is there significance or not in implementation of the treatment. On standarization 0.05 with formula hypothesis :

H_0 = Paul's Wheel Strategy is not effective in reading explanation text to increase students' critical thinking skill.

H_1 = Paul's Wheel Strategy is effective in reading explanation text to increase students' critical thinking skill.

The criteria of the test based on P value as below :

H_0 Push away, if $P_{(value) < \sigma}$, so there is no effective

H_1 Push away, if $P_{(value) > \sigma}$, so there is effective

The researcher also counts T-test using manual way with calculating T_{count} and T_{table} . If $T_{count > T_{table}}$, So H_0 push away, but it if $T_{count < T_{table}}$ so that H_1 push away.

3.7.6 Validity and Reliability

Validity and reliability are important measuring instrument that use for the researcher. The relationship between these concept use for the researcher is given post-test for the students. In ths test the researcher given reading of explanation text to know the students reading ability which are effected in theirs' critical

thinking skill. The purpose of this test was conducted are the first determine whether the instrument of the test are valid and reliable or not. Second, to determine whether the instrument of the test are appropriate and suitable for level of student's ability or not. (According to) Ary et all (2010:239).

"A measuring instrument can be reliable without being valid, but it cannot be valid unless it is first reliable "when te researcher given the test for the students it's not only valid is also reliable for the researcher to gathering data procedure and instrument.

3.7.6.1 Validity

Cohen(2007:133) said that validity is an important to do research, in here there a problem if the research invalid an influence of the instrument. It uses both of quantitative and qualitative research. The validity will get by the researcher to demonstration and showing the instrument in fact. The data validity was measured from the valid instrument. In here the researcer make the instrument became valid in reading explanation text for ten grader, the researcher use standard competency and basic competence in Indonesia curriculum that was related with those instruments

Table 3.2 The Result of Validity

Class	Main Competency	Basic Competency	Competence Indicators
Tenth Grade 2013 Curriculum	**KI 1:** Comprehence and practice the teachings of their religion . **KI 2 :** Comprehence and practice honest behavior, discipline, responsibility, caring (gotong royong, cooperation, tolerance, peace), polite, responsive and pro active and to be part of the solution to many problems in interacting effectively with the social environment and the nature and position ourselves as a reflection of the social world	**1.1** Thanks to the ocassion can learn english language as a international language as a motivation in learning **1.2**Showing good manner and caring attitude to do interpersonal communication with teachers and friends	
	KI 3 : Understand, apply, analyze factual knowledge, conceptual, procedural, based on curiosity about science, technology, art, culture, and humanities with a vision of humanity, national, state, and civilization related causes of phenomenon and events, as well as applying procedural knowledge on specific fields of study according to their talents and interests to solve the problem.	**3.11** Analyzing social function , text structure and language element from the text to explain and ask about explanation text of natural phenomenon and other sources in the tenth grades as appropriate with the context.	**3.11.1** Explain the social function of the paragraph which have unity from explanation text. **3.11.2**Identification the generic structure of topic sentences and supporting sentences from explanation text **3.11.3**Identification the generic structure of topic sentences and supporting sentences from explanation text.
	KI 4: Processing, reasoning, and all present in the real of the concrete and the abstract reality associated with the development of the learned in school independently, and they able to use the method according to the rules of science.	**4.6** Founding the meaning about explanation text in spoken and writen	**4.6.1** Identify the difference spesific information which contain in explanation text. **4.6.2** Describe the implicit information which contain in explanation text

Based on the table above. that show the data is suitable with main competency and basic competence, and the Indicator is also related of the main and basic competence. The researcher held consultation to ask the validity with the expert judgement. They were Gusti Nur Hafifah, S.Pd,M.pd as supervisior, Ari Setyorini, S.S.M,A as a reading lecturer and Rimba Ayu S,Hum as english teacher of SMAM 2 Surabaya.

Table 3.3 List of Validators

No.	Name	Validity of the test		Date of Validation
		Yes	No	
1.	Gusti NurHafifah,M.Pd	✓		14th April 2017
2.	Ari Setyorini,S.S M.A	✓		13th April 2017
3.	Rimba Ayu, S.Hum	✓		19th April 2017

3.7.6.1.1 Validity Point

Validity point is used to validate the points which will be tested to students. Validation point has been validated that help spss verse 20.0 to count validation of points, the researcher uses formulates:

$$r_{xy} = \frac{N\Sigma \times Y - (\Sigma\times)(\Sigma Y)}{\sqrt{(N\Sigma\times^2 - (\Sigma\times)^2(N\Sigma Y^2 - (Y)^2}}$$

Explanations :

r_{xy} = correlations coeffesient

$\Sigma \times Y$ = total results times value X and Y

$\Sigma \times$ = total value X

ΣY = total value Y

$\Sigma \times^2$ = total quadrate value X

ΣY^2 = total quadrate value Y

N = number of students

(Arikunto, 2009 : 78)

Between 0.800 until 1.00   = very high

Between 0.600 until 0.800   = high

Between 0.400 until 0.600   = enough

Between 0.200 until 0.400   = low

Between 0.00   until 0.200   = very low

If the correlation coeffesient (r_{count}) is more than (r_{table}) so the points is valid

3.7.6.2 Reliability

The researcher use standard competency and basic competency of curriculum to know whether the instrument are valid, after the instrument was adapted, the researcher must measure the realibility of the instruments. Reliabilty used to measure the instrument if it reliable and appropriate to use in this research. It is supported from Ary et all (2010:236), they said that realibility is to show how is essential in any kind of measurement. Reliability of a measuring instrument is the degree consistenly. According to Creswell (2002:161) 'The observers record their scores of the behavior and then compare scores to see if their scores are similiar or different ".

According to Surapranata (2004:99) commonly uses in measuring reability . The formula is as follow :

$$r_{x1x2} = \frac{N\Sigma\times^1\times^2 - (\Sigma\times^1)(\Sigma\times^2)}{\sqrt{(N\Sigma\times_1^2 - (\Sigma\times_1)^2(N\times_2^2 - (\Sigma\times_2)^2}}$$

$X_1 =$ Test 1 (Pre Test)

$X_2 =$ Test 2 (Post Test)

 n = Member of test

3.8 Qualitative Data Analysis Technique

After collecting the data use quantitative, the researcher support by collecting qualitative as a second phase. Creswell (2002:13) states, qualitative is to develop in depth exploration of a central phenomenon. In here, the phenomenon of the researcher built is student's critical thinking. However, the purpose of qualitative is use to build and explain in depth quantitative result.

In here the researcher analyze the data using theory of Paul and Elder (2008) to analyze students' critical thinking skill by Paul's Wheel Strategy.The researcher analyze the level of students' critical thinking based on elements of thought which have saveral reasoning, they are Purpose, Question at Issue, Information, Interpretation and Inference, Concepts, Assumption, Implication and Cosequences, Point of View. (See chapter 2)