

CHAPTER III

METHODOLOGY

A. RESEARCH METHOD

Research method that was used in this research of students' creativity in the implementation of CTL in learning Newton's third law was weak experiment only uses one group and don't have built-in controls for threats to internal validity, in addition for independent variable, there are some logical explanations for the outcomes that occur in this experiment (Fraenkel and Wallen, 2007). Instead, the researcher captures the natural setting condition as report.

B. RESEARCH DESIGN

This research design that was used in this research was the one-shot case study. It means that a single group of class is exposed to a treatment or event and dependent variable is subsequently observed (measured) in order to assess the effect of treatment (Fraenkel and Wallen, 2007).

X	O
Treatment	Observation (Dependent variable)

The symbol of X represented exposure of the group to the treatment of interest, while O refers to observation (measurement) of dependent variable (Fraenkel and Wallen, 2007).

The research was conducted at "X" International Secondary School in West Bandung. This school uses English as their formal language in teaching and learning process. The school implements two kind of curriculums, those are Cambridge IGCSE Curriculum and National Curriculum of 2006 or KTSP.

C. POPULATION AND SAMPLE

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The population in this research was 8th grade students in second semester of the year 2015/2016 at “X” International Secondary School. The sample was one class of 8th grade students with 24 number of participant.

The sampling technique of this research was convenience sampling. Convenience sampling technique is the sampling technique based on soliciting due to the possibility of sampling availability in the field (Fraenkel and Wallen, 2007).

D. OPERATIONAL DEFINITION

In order to avoid misconception about this research, some operational definitions are explained in this research. Those terminologies are explained as follow:

1. The Contextual Teaching and Learning (CTL) applied in this research was based on Crawford (2001), there are some systematically procedure that should be conducted by teacher. Crawford called it R-E-A-C-T (Relating, Experiencing, Applying, Cooperating, and Transferring) measured using observation sheet.
2. The Students' creativity applied in this research was measured by using Creative Product Analysis Matrix (CPAM) as student creativity scoring that developed by Besemer and Treffiger. It is measured from the product that created by students through making bow and arrow as implementation of CTL in Newton's third law after those two judges measured the product using CPAM rubric. It consist three dimensions namely novelty, resolution, and elaboration and synthesis (Filasaime, 2008).
3. This research only concern on Newton's third law, Newton's third law of motion explains that forces act in pairs. Whenever, one body exerts a force on a second body, the second body exerts an oppositely direction force of equal magnitude on the first body. The third law is often called action – reaction force. This law formally stated that “For every action there is an equal magnitude and opposite reaction”. The statement means that in

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every interaction, there is a pair of forces acting on the two interacting objects. The size of the forces on the first object equals the size of the force on the second object.

E. RESEARCH INSTRUMENT

In this research, these are three types of instruments that are used in this research. Those instruments are described below.

1. Rubric of student's creativity

The students' creativity measured in this research was gained by using qualitative data. It is obtained through measurement of students' product using Creative Product Analysis Matrix (CPAM) rubric from Besemer and Treffiger in Filasaime (2008) based on its three dimensions: novelty, resolution, and elaboration and synthesis. The rubric that is used to measure creativity had some indicators that show the percentage of students' creativity.

2. Observation Sheet Implementation of Contextual Teaching and Learning

Observational sheet was used by the observers to know the implementation of CTL has been implementing or not. Teacher followed the procedures of CTL from Crawford (Crawford, 2001) and it is based on five procedures: experiencing, applying, cooperating, and transferring, and the observers checked those five strategies during the teaching learning process. The observation sheet is provided in Appendix B.3.

3. Students' Response Questionnaire

Students' impression instruments are provided in the form of *Likert-scale* which used to measure how is the impression of student toward this learning model. The outline of *Likert-scale* is provided in appendix.

4. Lesson Plan of CTL Implementation

Lesson Plan of CTL implementation is used to guide the student in order to have the right sequence of the experiment. Lesson plan of CTL has been designed by author is provided in appendix.

5. Student worksheet

Student worksheet is used to guide the student to keep them more understand about the concept, yet to ensure that students conduct the right experiment. Student worksheet that has been designed by author is provided in Appendix A.2.

6. Group Worksheet and Project Design

Group worksheet and project design is used to guide the student to make bow and arrow as creative product. Student worksheet that has been designed by author is provided in Appendix A.3.

F. DATA COLLECTION

There are several techniques to collect data needed in this research. those data are purposed to fulfill the assessment process of students' creativity, students' response and investigate the implementation of CTL. Data collection techniques are described below.

1. Students' Creativity Data Instrument

In order to assess students' creativity based on their products, this research used rubric scoring in order to assess data from students' product on making bow and arrow. Rubric scoring was used to assess students' creativity in group based on their final product under three dimension of CPAM (novelty, resolution, and elaboration and synthesis). Data of students' creativity product are gain from bow and arrow product. The students' creativity rubric scoring based on the dimension of CPAM is explained by the table below:

Table 3. 1 Creativity Dimension and Indicators using CPAM

Creativity Dimension	Definition	Indicator
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Novelty	How far the product is new regarding to its creation in term of creator's history	Original, by being rare and out of the usual product that ever made
		Surprising, as general in first impression
		Germinal, trigger ideas for further original product
Resolution	How far is the product can fulfill the need to solve problems	Valuable, solving problem
		Logic, under concept
		Useful, applicable
Elaboration and Synthesis	How far is the product adjust all of the criteria in general	Organist, clearance of main object
		Elegant, more value than how it appears
		Complex, adjustment from several aspects
		Understandable, clear performance
		Artistic, neat

(Adopted from Besemer and Trefiger 1981, in Filsaime, 2008).

The CPAM blue print is shown in Table 3.2 as follows:

Table 3. 2 Rubric of Measurement of Students' Creativity

No	Creativity Dimension	Indicator	Measured Aspect	Score		
				1	2	3
1	Novelty	Original	Theme			
			Product Design			
		Surprising	Theme			
			Product Design			

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No	Creativity Dimension	Indicator	Measured Aspect	Score		
				1	2	3
		Germinal	Theme			
			Product Design			
		Valuable	Product Design			
2	Resolution	Logic	Product Design			
		Useful	Product Design			
		Organist	Product Design			
3	Elaboration and Synthesis	Elegant	Product Design			
		Complex	Product Design			
		Understandable	Product Design			
		Artistic	Presentation			

(Adopted from Besemer and Trefiger 1981, in Filsaime, 2008)

The data obtained from research instrument, the data was analyzed by converting it to percentage. The percentage is interpreted using Purwanto index to determine its creativity level.

2. Data of Students' Response

Data of students' response is gained by analyzing data of students' response through questionnaire and rubric scoring. Data of students' response represented how students respond in the implementation of CTL and emerge their creativity to solve the problems. Students' response expressed by the following blueprint table of students' response:

Table 3.3 Blueprint of Questionnaire Form of Students' Response

No	Student's Response Indicator	Statement	Number	
			Positive statement	Negative statement
1	Students' response toward CTL implementation in Newton's Third Law chapter	I can gain real experience on Newton's Third Law from this lesson	✓	
		I cannot get real experience on Newton's Third law from this lesson		✓
		I can comprehend Newton's third law phenomenon in this lesson	✓	

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No	Student's Response Indicator	Statement	Number	
			Positive statement	Negative statement
		I cannot relate to Newton's third law phenomenon in my life		✓
		I experience Newton's third law phenomenon in this lesson	✓	
		I did not realize the phenomenon/occurrence of Newton's third law		✓
		I can apply the Newton's third law in my daily life	✓	
		I do not know the implementation of Newton's third law in my daily life		✓
		I am able to present our project in front of my friends	✓	
		I feel shy presenting our project in front of the class		✓
		I enjoy learning Newton's 3 rd Law in this lesson	✓	
		I am not interested in this lesson		✓
		2	Students' respond toward team work as a group	I have big involvement in my group
I share my idea in my group	✓			
I enjoy working in group with my friends	✓			
My friends and I have good teamwork	✓			

No	Student's Response Indicator	Statement	Number	
			Positive statement	Negative statement
		My friends and I work together when we discuss the project	✓	
3	Students' response in creativity on Newton's Third Law chapter	I gave much contribution in this project	✓	
		I did not give any idea in this project		✓
		I offer some solutions to the project	✓	
		I did not give any solution in the project		✓
		My idea is implemented for this project	✓	
		My thought is not used in this project		✓
		Our group can combine the original resource with our innovations in this project	✓	
		No one in our group give the idea		✓
4	Students' response toward making a bow and arrow as final product of project	This project wastes my time		✓
		I can design the project well	✓	
		I think that making bow and arrow is suitable project for Newton's Third Law concept	✓	
Total			18	11

G. DATA ANALYSIS INSTRUMENT

Data collected in this research would be analyzed descriptively, as follows:

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1. Analysis of Students' Creativity Data

Students' creativity was investigated based on their product results (making bow and arrow) from experiencing CTL activities. Students' creativity indicators were assessed by using rubric scoring under creativity dimension from Besemer and Treffiger, and converted into percentage form through formula as follows:

$$Score = \frac{Raw\ Score}{Maximum\ Score} \times 100\% \quad \dots Equation\ 3.1$$

(Adopted from Arikunto, 2010)

The interpretation of score percentage of students' creativity is categorized into certain criteria according to Purwanto (2012) as shown in Table 3.9 as follows:

Table 3. 4 Categories of Creativity Scoring

Score	Categories
86 - 100%	Very High
76 – 85%	High
60 – 75%	Fair
55-59%	Low
≤ 54%	Very Low

(Purwanto, 2012)

The qualitative data was obtained from both creativity rubrics of final product and questionnaire. The rubrics assess the bow and arrow as the final product. The analysis of rubrics was conducted by converting the raw score into percentage form. Therefore the result of percentage can be classified into several categories.

2. Analysis of Students' Response Data

Students' response data was analyzed qualitatively from questionnaire result. The qualitative analysis describes the real situation of the research result and also the result of students' response in experiment Newton's third law by using Contextual Teaching and

Learning. The data processing was done by calculating Likert scale, it is calculated into score and then converted into percentage, the percentage of answers observer to then be evaluated for the next lesson. The scoring guideline is shown in the Table 3.5 as follows:

Table 3.5 Scoring Guideline of Students' Response

	Strongly Agree	Slightly Agree	Slightly Disagree	Strongly Disagree
Positive Statement	4	3	2	1
Negative Statement	1	2	3	4

The percentage of each *Likert-scale* in each indicator determines the students' response toward Contextual Teaching and Learning implementation.

Meanwhile the rubric of the *Likert-scale* is interpreted to know how the impression of the student toward this learning method. The score is turn to the percentage by using this following formula.

$$P = \frac{f}{n} \times 100\%$$

.....Equation 3.2

Where,

P = Percentage

f = the frequency of the answer

n = the amount of response of the answer

The percentage is used to see how many students who gives response of strongly agree, slightly agree, strongly disagree, and slightly disagree. Finally after the data has been obtained, then it was interpret by making the average of the total score of the student or of each category.

According to Suherman (2001), if the average score of the questionnaire results of more than 3, meaning that students response

positively. Meanwhile, if the average scores of students in the focus groups is smaller than 3, meaning that students responded negatively.

H. RESEARCH PROCEDURE

In order to make this research arranged systematically, there are three stages of procedure that has been conducted in this research, including preparation stage, implementation stage, and analysis and conclusion stage.

1. Preparation stage

In this stage, researcher focused on all of the preparation to conduct and support the research. Here are the steps of preparation stage:

- a. Formulate problem to be investigated
- b. Determine the focus of variable research
- c. Conduct literature review of Contextual Teaching and Learning
- d. Conduct literature review of student's creativity
- e. Conduct literature review about Newton's Third Law
- f. Arrange the research proposal which including Title, Introduction, Literature Review and Methodology which is presented in proposal seminar
- g. Revise of research proposal after having suggestions and critics from lecturers.
- h. Design teaching-learning process which will be conduct in implementation stage.
- i. Report research instrument.
- j. Instruments are judged by the expert
- k. Revise instrument after having validation.
- l. Prepare research license.
- m. Determine research subject.

2. Implementation stage

This is the process of data collecting in the school, when the treatments are implemented.

- a. Conduct research activity by implementing Contextual Teaching and Learning in Newton's third law of motion
- b. Order students to make the creative product by making bow and arrow
- c. Process the result of report
- d. Give questionnaire to know the student's response towards The Implementation of Contextual Teaching and Learning in learning Newton's third law of motion

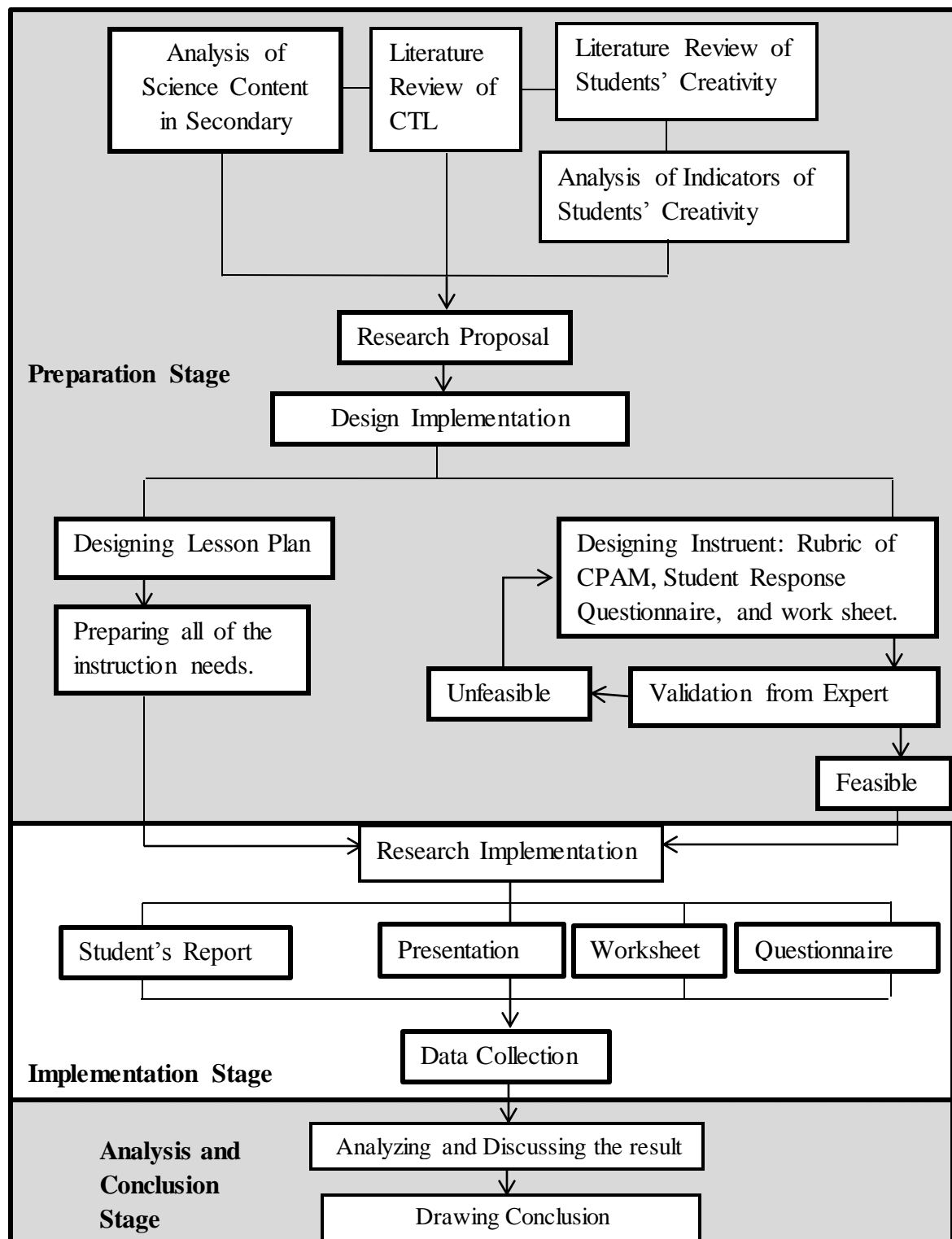
3. Analysis and Conclusion Stages

This is the final stage of research design, the step that is conducted in this stage is explained as the following steps.

- a. Analyze the result of the research implementation
- b. Discuss and concluded for the data analysis result
- c. Arrange the report of the research

I. RESEARCH SCHEME

Scheme of research is a view how is the research conducted. Start from preparation, implementation, and analysis and conclusion stages. Detailed of the research scheme will be shown as Figure 3.1



3.1 Research Scheme

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