

CHAPTER III

METHODOLOGY

A. Research Method and Design

1. Research Method

This research is aimed to investigate current situation of students' creativity and concept understanding in science mini-project activity, not including its impact or effectiveness toward students' achievement. Based on this, descriptive research method is used to investigate problems and explain why something is occurs. There's no given treatment or manipulation on object of research. Instead, natural setting condition is captured as a report (Arikunto, 2010).

2. Research Design

Non-experimental with natural descriptive design is used in this research as purposed to provide a description of phenomena. Current situation of research variables are elaborated descriptively and classified based on its types, characteristics, or condition, then draw into conclusion (Arikunto, 2010).

B. Subject of Research

Subject of this research is students of science class in 7th grade in one of the school at Padalarang with number of participant is 19.

This subject of research is chosen under purposed of the responsible teacher of subjects which used to implement science mini-project activity in order to equip high achiever students with supported learning activity and experience meaningful learning to develop their skills and understanding.

C. Operational Definition

To avoid the differences in perception, there are explanations about the terms that used in this research, as follows:

1. Students' Creativity

Creativity is the ability to think about something in novel and unusual ways and come up with unique solutions to problems. Students' creativity in this research is investigated from the product that created by subject on science mini-project. Students' creativity is measured by Creative Product Analysis Matrix (CPAM) that developed by Besemer and Treffiger in 1981 under three dimensions: novelty, resolution, and elaboration and synthesis. This creativity scoring is measured on three different conditions; plan as individual, product design as a group, and group presentation by using the development of CPAM rubric scoring as an instrument.

2. Students' Concept Understanding

Concept understanding in this research is represented as knowledge related to concept that students need in cognitive process which leads to their ability in solving problem on creative product. Concept understanding is analyzed from students' elaboration in individual plan, product design, presentation, and communication book. Students' concept understanding explains how students answer the problem under concept related in creative product ideas making and assessed through rubric scoring.

3. Science Mini-Project Activity

Science mini-project is a learning activity including short practical problem in limited scope. By this mini-project, students will create

product in as the outcomes of giving solution. Students will be given a problem to solve in individual and elaborate it in group on next session. The implementation of science mini-project is assessed through observation based on its steps to project-based learning; (1) start with the essential question, (2) design a plan for the project, (3) create schedule, (4) monitor students and project progress, (5) assess the outcome, and (6) evaluate the process.

D. Research Instruments

In order to investigate some points in this research, several research instruments that used are;

1. Rubric Scoring of Students' Creativity

Students' creativity is assessed through rubric scoring on three conditions (individual plan, group product design, and product presentation). Rubric scoring of students' creativity is structured under Creative Product Analysis Matrix (CPAM) from Besemer and Treffiger in 1981 based on its three dimensions; novelty, resolution, and elaboration and synthesis.

2. Rubric Scoring of Students' Concept Understanding

Students' concept understanding is assessed from students' creative product ideas (individual planning, product design, and presentation) through rubric scoring. rubric scoring of students' concept understanding measured relevancy between students' creative ideas with concept covered.

3. Communication Book

Communication book is the development of project module which focuses on guidance acts from facilitator (teacher) to students during mini-project activity. Communication book consisted of essential problems, statement

of problem and purposes, group product design, and mission tracking. Communication book is purposed to track students' work under project making by ensuring their experience and as one of the source for analyzing students' concept understanding (Appendix B.3).

4. Questionnaire

Questionnaire form with gradation range of alternative answers is used to investigate students' response and impression in facilitation of creativity and support their understanding in energy conservation through science mini-project activity.

E. Data Collection

There are several techniques to collect the data needed in this research. Those data are purposed to fulfill the assessment process of students' creativity, concept understanding, and investigate students' response toward science mini-project activity. By this, data collection technique is described below:

1. Data of Students' Creativity

In order to assess students' creativity based on their product, this research used rubric scoring to assess data from students' product on science mini-project activity. Rubric scoring is 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 are gained from three sources; as individual in planning, as group in product designing, and in group presentation. Blueprint of students' creativity rubric scoring based on the dimension of CPAM is explained by the table below:

Table 3.1 - Blueprint of Creativity Scoring based on its Dimensions

Creativity Dimension	Definition	Indicator
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 a 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 the concept
		Useful, applicable
Elaboration and Synthesis	How far is the product adjust all of the criteria in general	Organist, clearance of main objective
		Elegant, more values than how it appears
		Complex, adjustment from several aspects
		Understandable, clear performance
		Artistic, neat

(Adopted from Besemer and Treffiger, 1981 in Munandar , 2009)

2. Data of Students' Concept Understanding

Data of students' concept understanding is gained by analyze students' product in mini-project that involved the present of cognitive present, which are; elaboration from individual planning, product design, product presentation, and communication book. Data of students' concept understanding is represented how students give solution on problems

Adinda Gladya Puspasari , 2014

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under concept related in creating creative product ideas. From given problem about energy crisis, path of students' learning on mini-project is expressed by the following blueprint table of students' concept understanding:

Table 3.2 – Blueprint of Students' Concept Understanding

Problem	Causes of Problem	Proposed Solutions
Energy Crisis	High energy consumption	Decrease the energy usage through efficiency energy method
	Limited energy source from the non-renewable one	Find the alternative energy sources

3. Data of Students' Response towards Science Mini-Project Activity

Students' response which investigated by using questionnaire are; students' respond toward science mini-project activity implementation, students' respond toward understanding of role in giving contribution on energy conservation issue, students' respond toward facilitation of creativity on science mini-project activity.

The result of questionnaire will be used as supported condition feels by the students during science mini-project activity is supporting their creativity and concept comprehension. Blueprint of students' response questionnaire form is explained by the following table:

Table 3.3 - Blueprint of Questionnaire Form

No	Indicator	Statement Number	
		Positive	Negative
1	Students' respond toward science mini-project activity implementation	1, 3, 5, 7, 9, 11	2, 4, 6, 8, 10, 12
2	Students' respond toward understanding of role in giving contribution on energy conservation issue	13, 15, 17	14, 16, 18
3	Students' respond toward facilitation of creativity on science mini-project activity	19, 20, 22, 24	21, 23

F. Data Analysis Technique

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

1. Analysis of Students' Creativity Data

Students' creativity is investigated based on their product results from science mini-project activity. It is measured on three conditions; individual planning, group product, and group presentation. Each part of students' creativity indicators are assessed by using rubric scoring under creativity dimension from Besemer and Treffiger, and converted into percentage form through formula as follows:

$$Score = \frac{Raw\ score}{Maximum\ score} \times 100\%$$

(Adopted from Purwanto, 2012)

In order to categorize the students' creativity, score that gained in percentage form is than classified into 5 types; very high, high, enough, low, and very low as explain in following table:

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)

Three different datas of students' creativity are analyzed one by one to investigate the condition a group, and personal to represent class condition. Students' achievement in creativity is analyzed based on the three factors that influence creativity; knowledge (from concept understanding), creative thinking based on their working style (from students' multiple intelligences profile), and motivation (from students' response).

2. Analysis of Students' Concept Understanding

Data collected from students' elaboration in individual planning, product design, product presentation, and communication book are structured to analyze the solution that proposed by students toward issue based on concept related in making creative product ideas. Students' result of solution in creative product is scored by the following formula:

$$Final\ Score = Total\ fill - in\ of\ Right\ Answer$$

(Adopted from Purwanto, 2012)

Students' result then interprets into percentage with previous formula for students' creativity scoring percentage and analyzed along with the categorization as the creativity scoring.

3. Analysis of Students' Response from Questionnaire

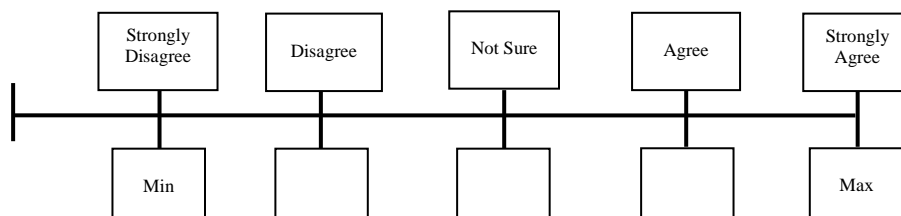
The data from questionnaire is used to investigate students' response toward the implementation of science mini-project activity, support students' understanding in energy conservation, and toward facilitation of creativity. Result from Likert Scale type is score from scale one to five (from strongly disagree to strongly agree), than interpret as the table below:

Table 3.5 – Scoring Guideline of Students' Response

	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
Positive statement	1	2	3	4	5
Negative statement	5	4	3	2	1

(Adopted from Arikunto, 2010)

After that, each indicator is analyzed based on scoring per items from respondent. Data collected is then scaled per indicator based on the following scale:



(Adopted from Sugiyono, 2013)

Figure 3.1 – Scaling Guideline of Students' Response

G. Research Scheme

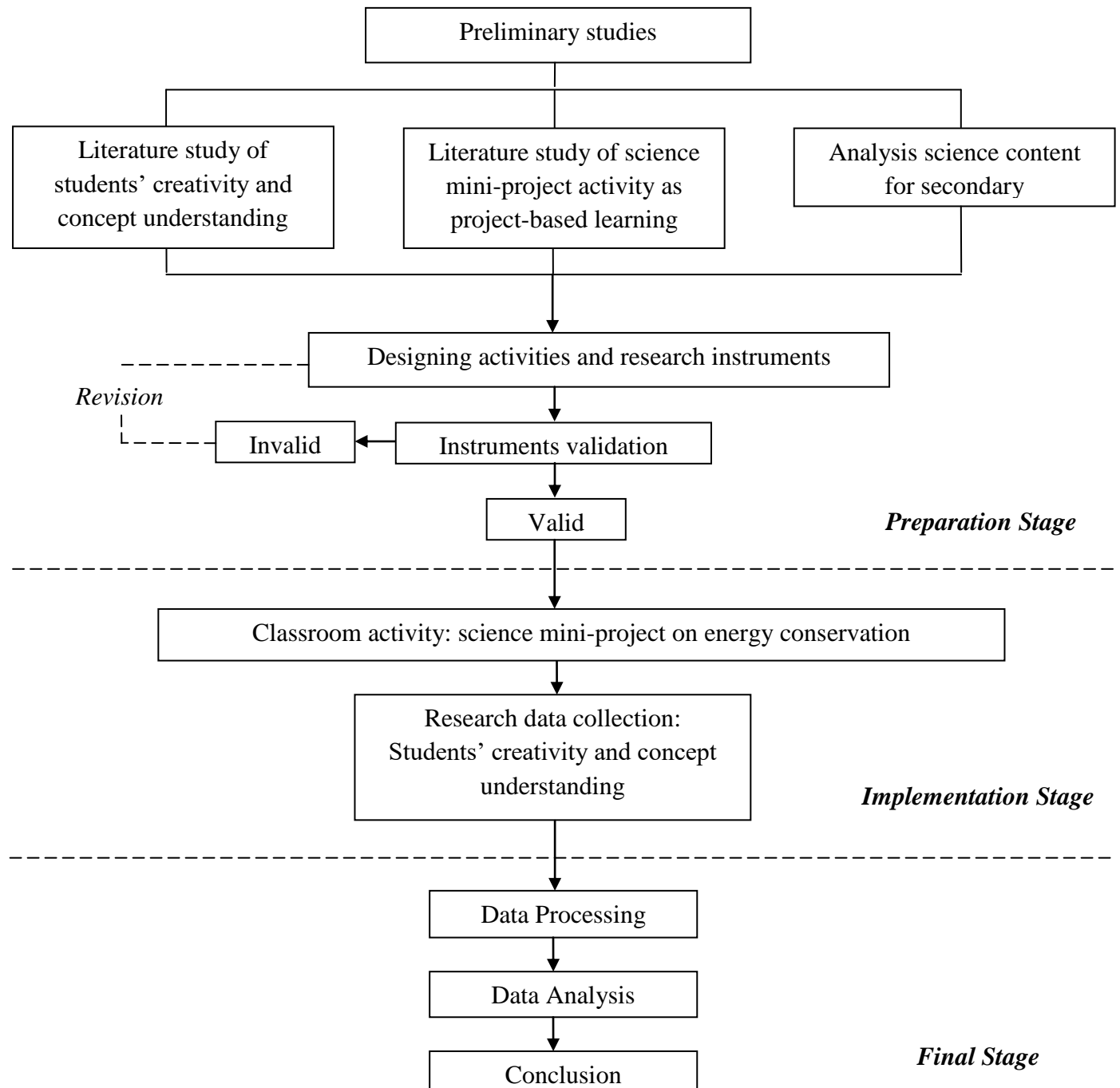


Figure 3.2 – Research Scheme