

CHAPTER III

RESEARCH METHODOLOGY

3.1 Research Method and Research Design

3.1.1 Research Method

The study applied descriptive research method to the use of profiling students' science process skills in human muscle tissue experiment. According to Cohen et al (2007), descriptive research is concerned with how what is or what exists is related to some preceding event that has influenced or affected a present condition or event. The aspect that will be research is to analyze students' science process skills in learning human muscle tissue experiment through direct observation.

3.2 Subject of Research

3.2.1 Research Location and Period

The location of this research is a private Junior High School in Tangerang in the academic year 2016/2017. This school uses bilingual languages English and *Bahasa* Indonesia in teaching learning activity and applies National Curriculum 2013.

3.2.2 Research Subject

The subject of the research was 8th grade students. The students who participated in this research were 78 students. The students consist of 39 male students and 39 female students.

3.3 Operational Definition

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

- 1) Students' basic science process skill ability, in observing, communicating, classifying, and measuring. In order to determine the basic science process

skills of the students, the observers assess to what extent the students' basic science process skills based on observation sheet.

- 2) Students' integrated science process skill ability, designing investigations and experimenting. Same as basic science process skills the indicator of students' integrated science process skills based on observation sheet and performance assessment.
- 3) Gender differences of students' with the characteristics that can be observed.

3.4 Research Instrument

- 1) Observation sheet, observation is the process of gathering firsthand information by observing people and places at a research site (Creswell, 2012). The observation sheet used to measure each student through the laboratory experiment where the process skills will be observed by the observer. Observation of the students starts from the beginning of teaching-learning activity to experiment activity. In this research, researcher used observation sheet in the form of rating scale. Rating gives a numerical value to some kind of judgment (Arikunto, 2003). The observation format that be used is in five category 0, 1, 2, 3, and 4. The scale as follow:
 - a. Scale 4 with the statement of very high
 - b. Scale 3 with the statement of high
 - c. Scale 2 with the statement of sufficient
 - d. Scale 1 with the statement of low, and
 - e. Scale 0 with the statement of very low.

The form of rating scale, the observer can be aware how extent students' science process skill.

Table 3.1
Observation Sheet of Students' Science Process Skills Layout

No	Indicator	Assessment Aspects	Score				
			0	1	2	3	4
	Basic Science Process Skills						

No	Indicator	Assessment Aspects	Score				
			0	1	2	3	4
1	Observing	Observing the specimen by using microscope					
2	Communicating	Make description of the skeletal muscle, smooth muscle, and cardiac muscle as it is shown under the microscope					
		Discussing the results of observation within a group					
		Make a conclusion at the end of experiment					
3	Classifying	Taking notes about the comparison the skeletal muscle, smooth muscle, and cardiac muscle					
		Classifying the slide of muscle based on characteristic of muscles that shows under the microscope					
4	Measuring	Magnify the image of slides with different magnifications from low to high magnifications that suitable specific dimension					
Integrated Science Process Skills							
5	Designing Investigations	Designing the type of muscle that will be investigated in "Muscle Investigation"					
6	Experimenting	Experiment by following the instruction given					

- 2) Performance assessment, used to assess how the students in handling and using microscope, is it poor, moderate, or good.

Table 3.2
Performance Assessment Layout

No	Aspects	Criteria		
		Poor	Moderate	Good
1	Holds the microscope	Hold it by the arm, using one hand	Hold it by the arm and base, using two hands	Hold it by the arm and base, using two hands, carrying with good attitude

Shofwa Widdina, 2017

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No	Aspects	Criteria		
		Poor	Moderate	Good
2	Set the microscope	Set it carelessly	Set it on a sturdy surface	Set it on a sturdy surface, put it in a place where the light source come in
3	Adjusting the mirror for adequate light, ocular lens, and objectives lens.	Not able to adjust the mirror	Able to adjust the mirror for adequate light, make sure ocular lens work	Able to adjust the mirror for adequate light, make sure the ocular and objective lens work
4	After using the microscope, raises the body tube and places it on the lowest objective, remove the slide from stage clips, and clean the microscope.	Remove the slide from stage clips	Raises the body tube, remove the slide from stage clips	Raises the body tube, put the magnification on the lowest, remove the slide from stage clips, and clean the microscope

- 3) Rubric, as the guidance for the observer to give desirable score of students' process skills in observation sheet through experiment activity. Rubric that used in the research customized with students' worksheet.

3.5 Validity of Research Instrument

In every research, research instrument must be tested, whether the instrument has validity or not to measure what is supposed to be measured. Validity is defined as the extent to which the instrument measures what is designated to measure that emphasize on not on the test itself, but on the result (Arikunto, 2003). The validity that will be used is content validity. According to Creswell (2012) content validity is the extent to which the questions on the instrument and the scores from these questions are representative of all the possible questions that could be asked about the content or skills.

The research instrument was checked by three experts; two lecturers and a teacher. The validity of worksheet was checked by the experts with some suggestions. Previously the experiment includes in preparing wet slide, with the suggestion from the experts preparing wet slide was changed to prepared slide. Observation sheet and rubric was separated from the initial layout, the rubric is made by using scale to see the level skill of students.

3.6 Data analysis

3.6.1 Observation Sheet

Acquired data from the observation sheet will be analyzed:

- 1) Every activity that students did in experimenting, students get a score for every activity. By The score for each aspect to assess attitudes toward a topic by presenting a statement about the topic and asking respondents to indicate for each whether they strongly agree, agree, are undecided, disagree, or strongly-disagree (Ary et al., 2010). This statement also called as Likert scales or method of summated ratings. By adopting Likert scales, the various agree-disagree assigned to a numeric value, the total scale score is found by summing the numeric responses given to each item (Ary et al., 2010).
- 2) Assorting students' scores they got through activity for each scores and change them into percentage:

Table 3.3
Score Indicator Category

Score	Category
4	Very High
3	High
2	Sufficient
1	Low
0	Very Low

Then find the percentage each student's scores based on equation below:

$$\text{Percentage (\%)} = \frac{\text{subject research category}}{\text{total subject of research}} \times 100$$

After acquired data of percentage, the data will be interpreted as the descriptive data for each aspects student's science process skills.

- 3) Interpreting the category of students' science process skills category based on the score.

Table 3.4
Science Process Skills Category

Index	Category
80% – 100%	Very High
60% – 80%	High
40% – 60%	Sufficient
20% – 40%	Low
0% – 20%	Very Low

To get the interpretation results,

$$X = \text{maximum score} \times \text{total respondents}$$

$$Y = \text{minimum score} \times \text{total respondents}$$

Then,

$$\text{Index} = \frac{\text{total score}}{X} \times 100\%$$

3.7 Research Procedure

There are three stages of procedure consist of preparation stage, implementation stage, and completion stage. Those three stages will be explained as follow:

3.7.1 Preparation Stage

In this stage researcher prepare everything that will be needed for the implementation of this research. This stage, the researcher conduct several stages that support the research, the steps will be explained as follow:

- 1) Formulating problem to be investigated.
- 2) Organizing research layout of The Profile of Students' Science Process Skill in Learning Human Muscle Tissue at Secondary School.
- 3) Specifying research objectives.
- 4) Determining sample and population of the research.
- 5) Conducting literature study about science process skill, gender, and muscle tissue topics.
- 6) Constructing and revising research layout that has been presented with supervisors' agreement.
- 7) Constructing and organizing research instruments; worksheet, observation sheets, performance test, and rubric based on science process skill.
- 8) Conducting instrument validation by experts.
- 9) Revising research instruments based on suggestions by experts and supervisors.
- 10) Conducting limited class test.
- 11) Ask permission letter to the faculty and give it to the desired school for the research.

3.7.2 Implementation Stage

- 1) Administration the instrument.
- 2) Implementation observation research of students' science process skill.

3.7.3 Completion Stage

- 1) Processing gained data.
- 2) Analysis data research of observation sheets, worksheet, and performance assessment.
- 3) Discussing the data of the research.
- 4) Draw conclusion.

In order to make the process easier to read, outline research process illustrated in Figure 3.1.

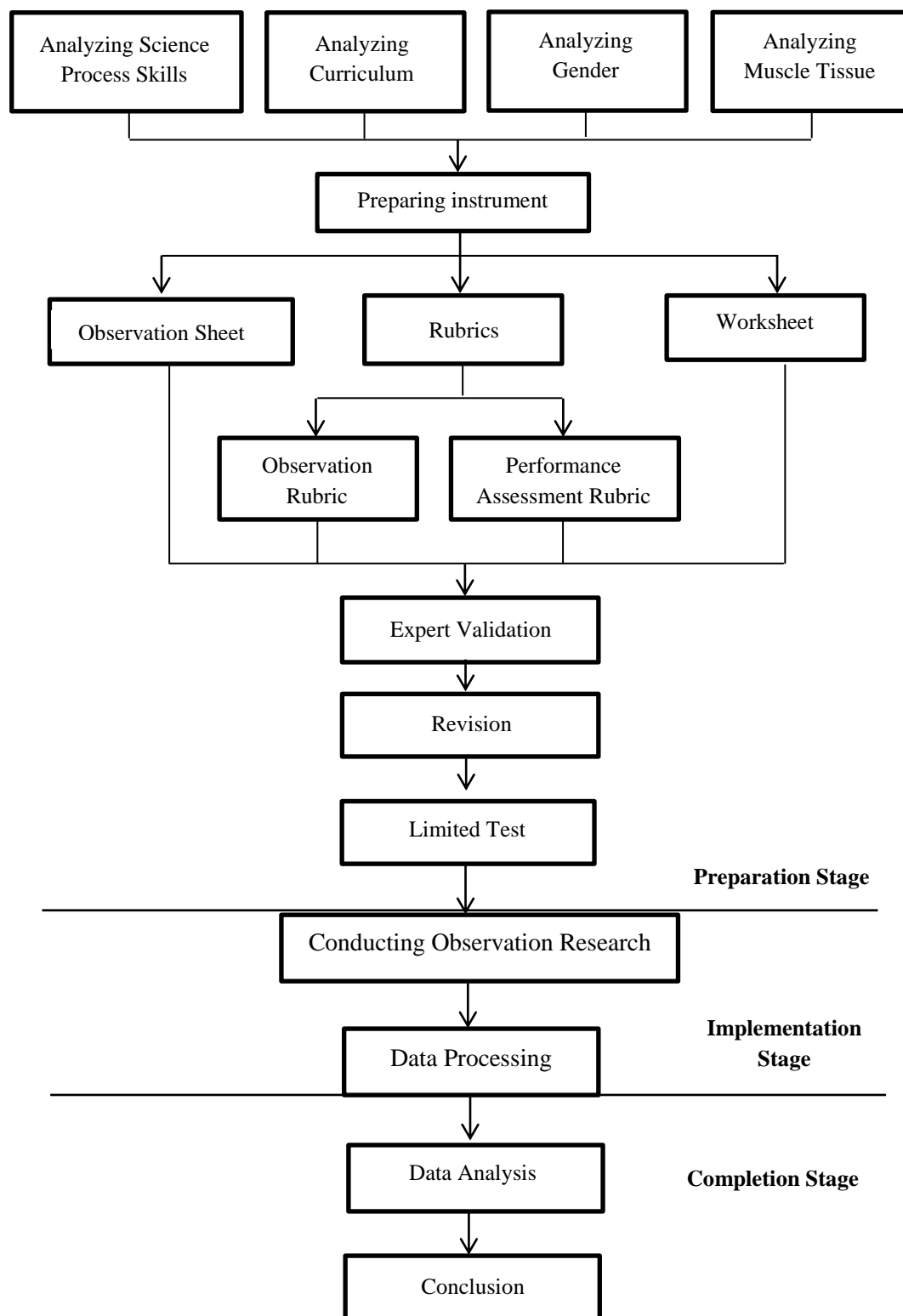


Figure 3.1 Research Procedure