CHAPTER III
RESEARCH METHODOLOGY

3.1 Research Method and Research Design

3.1.1 Research Method

This research has a purpose to describe the current condition of students' concept mastery and scientific argumentation skill in oral and written in learning global warming. According to this purpose, descriptive correlational method was used to fulfill the aim of research itself. This method is appropiate since the main purpose of this study are to describe or capture secondary students' concept mastery and scientific argumentation skill profile. Thus, in this research, the object of research is not given any treatment and natural condition is set without any manipulation. It will provide reasonable answer why something is occured (Arikunto, 2011). Descriptive studies describe a given state of affairs as fully and carefully as possible (Fraenkel, 2011).

3.1.2 Research Design

Non-experimental with descriptive correlational design was used in this research. All of students came from two classes of seventh grade were given concept mastery test in learning global warming topic. Those score were captured as the data of students' concept mastery in cogitive aspect of students from C1 to C5. Moreover, to identify students' scientific argumentation skill by using a video audio transcript during the discussion for oral argumentation test and essay writing test for written argumentation test were used rubric from Toulmin Argumentation Pattern. Based on those results, the profile of students' concept mastery and scientific argumentation skill could be identified.

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3.2 Population and Sample

The location of this research was Sekolah Indonesia Kuala Lumpur (SIKL) Malaysia which uses National Curriculum of 2013. The instruction in classes is mainly conducted in Bahasa Indonesia. The population of this research was all

students in SIKL with the sample was 7-1 and 7-2 class. All of the students in both classes experienced discussion as teaching learning activities.The sampling technique used convenience sampling,A convenience sample is a group of individuals who conveniently are available for study(Fraenkel, 2011).

3.3 Operational Definition

In order for getting the expected goals and also to avoid misunderstandings in the interpretation of existing terms in this study. Opertional definition describes or defines a variables in term of operations or techniques used to make it happen or measure it (Leech, Barrett, Morgan, 2005). Operational definition is described every definition have indicator that can be measured from every variable in this research that included:

1) Students' Concept Mastery in this research focused on cognitive aspect refers to Bloom's Taxonomy revise. The level of cognitive aspect consist of C1 (remembering), C2 (understanding), C3 (applying), C4 (analyzing), and C5 (evaluating). The cognitive aspect, in this research measured from C1 to C5. Concept Masterywas measured using an objective test,consist of 25 questions in the form of multiple choice. The indicator is based on global warming indicator which consist of the effect, cause and solution for global warming.
2) Scientific argumentation is the ability to construct reasoned opinions, idea and thus to deal with the increasing complexity of knowledge and problems. It is as an important scientific practice that is used to solve problems and advance knowledge (Sampson, 2012). In this study, Students' scientific argumentation consist of oral and written argumentation. Both of them were analyzed based on the rubric from Toulmin Argumentation Pattern and Argumentation level based on Erduran et al., (2004).
3) Oral scientific argumentation is argument expressed by students during discussion. data was done by audio-video recording during discussion. One ideas or student expression during discussion is considered as one argument. Quality arguments are analyzed using a quality analysis framework presented by Erduran et al., (2004)

4) Written scientific argumentation is arguments based on students' answer in essay writing test., which consist of five questions. The data was analyzed based on the rubric from Toulmin Argumentation Pattern and Argumentation level based on Erduran et al., (2004).
5) Students' perspective in this research is students' statement which reveal description regarding their scientific argumentation ability both in oral and written argumentation. The data was gained through questionnaire and Interview sheet.

3.4 Research Instrument

There are two types instruments used in this research to measure Students' Concept mastery and Scientific Argumentation Skill:

3.4.1 Cognitive paper test

Cognitive paper test is conducted to describe cognitive ability of students in mastering the concept. The test in the form of multiplechoice questions based on Bloom Taxonomy revised is used to measure students'concept mastery in cognitive aspects. The cognitive aspect is measured from C1 to C5 which is about knowledge, comprehension, application, analysis, and evaluation (Anderson et al., 2001).

The research instrument in order to measure secondary students' cognitive had already consulted by the lecture and some experts in related field in order to modify or revise test items that was not appropiate with the content, distractor, or question statement. The Objective test was tested to the group of studets that had already given the topic of Global Warming. It was tested to 8 grade of secondary school students which was the shame with the experimental school. The instrument analysis of objective test requires validity, reliability, levels of difficulty, discriminating power.

1) Validity

Validity is defined as an agreement between the test scores or the size and quality, it is believed to measure (Kaplan, 2009).Validity refers to the correctness, meaningfulness, and usefulness makes by researcher. Researcher want the information by the use of an instrument to serve their

purposes. Validation is the process of analyzing and collecting evidence to support the inference (Fraenkel, 2011). The validity of the instrument in this study is by using software ANATES. The formula is described:

$$r = \frac{N\sum XY - (\sum X)(\sum Y)}{\sqrt{[N\sum X^2 - (\sum X)^2][N\sum Y^2 - (XY)^2]}}$$

r = Correlation coeficient between x and y variable

N = Amount of students

X = total score in test item

Y = total score of student

(Fraenkel, 2011)

Table 3.1 Validity Interpretation

Correlation Coeficient	Validity Criteria
0,80 < r ≤ 1,00	Very high
0,60 < r ≤ 0,80	High
0,40 < r ≤ 0,60	Enough
0,20 < r ≤ 0,40	Low
0,00 ≤ r ≤ 0,20	Very low

(Source: Minium et al., 1993)

2) Reliability

Reliability refers to the consistency of scores or answers from one administration of an instrument to another, and from one set of items to another (Fraenkel, 2011). Reliable means a test must rely and fit on several aspects in conducting the test item. The formula is described:

$$KR_{20} = r = \frac{N}{N-1}\left(\frac{S^2 \sum pq}{S^2}\right)$$

KR_{20} = the reliability estimate (r)

N = the number of items on the test

S^2 = the variance of the total test score

P = the proportion of the people getting each item correct (this is found separateky for each item)

Q = the proportion of people getting each item incorrect. For each item, q equals 1 – p

$\sum pq$ = the sum of the products of p times q for each item

(Source: Kaplan, 2009)

The reliability of test item can be calculated by using ANATES. The value of it can be interpreted in Table 3.2.

Table 3.2 Reability Interpretation

Correlation Coefficient	Realiability Criteria
0,80 < r ≤ 1,00	Very high
0,60 < r ≤ 0,80	High
0,40 < r ≤ 0,60	Enough
0,20 < r ≤ 0,40	Low
0,00 ≤ r ≤ 0,20	Very low

(Source: Minium et al., 1993)

3) Difficulty Level

The mean item score correspond to the porpotion of examines who answer the item correctly is called difficulty. It describes a test's proficiency in

$$P = \frac{Number\ \ of\ student\ \ who\ answered\ \ the\ item\ correctly\ \ (A)}{Total\ \ number\ \ of\ students\ \ who\ attempted\ \ the\ item\ \ (N)} \text{ X } 100$$

termsof the achievement. The formula is described:

(Source: Cohen, 2007)

The difficulty level can be calculated by using ANATES software. The value can be interpreted in Table 3.3.

Table 3.3 Difficulity Interpretation

Value	Criteria
0 – 0,29	Difficult
0,30- 0,69	Middle
0,70 - 1,00	Easy

(Source: Arikunto, 2012)

4) Discriminating Power

Discriminating power is the ability of a test item to differenciate of discrimination between weak and strong groups (Jandaghi, 2010)

$$D = \frac{B_A}{J_A} - \frac{B_B}{J_B}$$

(Source: Arikunto, 2013)

D = Discriminating power

B_A = Number of high achieving group that have correct aswer

B_B = Number of low achieving group that have correct aswer

J_A = Total Paticipant of high achieving test-takers

J_B = Total Paticipant of bottom achieving test-takers

Table 3.4 Classification of Discriminating Power

Discriminant Index Coefficient	Discriminant Index Criteria
$0,00 < D \leq 0,20$	Poor
$0,20 < D \leq 0,40$	Satisfactory
$0,40 < D \leq 0,70$	Good
$0,70 < D \leq 1,00$	Excellent
D = Negative	Question is deleted

(Source: Arikunto, 2013)

5) Distractor

Distractor is the option of multiple-choice item, where it offers alternatives one, and studets must choose the correct alternative answer. If students select many times it was working effectively; if rarely or never been then it does not work effectively (Cohen, 2007).

6) Recapitulation of Students' Cognitive Outcomes Instrument

Based on Analysis of ANATES, The result of objectve test, the reliability of test is 0,86 (Very high). The number of question which was used directly in this research was 18 and the number of question which was revised and dropped is 7. The recapitulationn of objective test as well as specification for each question item is represented on Table 3.5.

Table 3.5 Recapitulation of Test Item for Students' Cognitive Outcomes Analysis Result by ANATES

Number of Question	Discriminating Power	Level of Difficulty	Validity	Correlation Significant	Note
1	Good	Easy	High	Very Significant	Used
2	Excellent	Easy	High	Very Significant	Used
3	Satisfactory	Difficult	Low	-	Dropped
4	Poor	Medium	Very Low	-	Dropped
5	Good	Easy	Enough	Significant	Used
6	Satisfactory	Medium	Enough	Significant	Used
7	Satisfactory	Difficult	Enough	Very Significant	Used
8	Good	Medium	Enough	Very Significant	Used
9	Good	Medium	Enough	Very Significant	Used
10	Satisfactory	Difficult	Enough	Significant	Used
11	Good	Medium	Enough	Very Significant	Used
12	Satisfactory	Easy	Enough	Significant	Used
13	Poor	Medium	Very Low	-	Dropped
14	Good	Easy	Enough	Significant	Used
15	Satisfactory	Medium	Low	-	Revised
16	Satisfactory	Easy	Enough	Significant	Used
17	Excellent	Easy	Enough	Very Significant	Used
18	Excellent	Medium	Enough	Very Significant	Used
19	Poor	Medium	Very Low	-	Dropped
20	Poor	Difficult	Enough	Significant	Used
21	Excellent	Medium	Enough	Very Significant	Used
22	Excellent	Medium	High	Very Significant	Used
23	Poor	Medium	Low	-	Revised
24	Excellent	Medium	High	Very Significant	Used
25	Poor	Medium	Low	-	Revised

3.4.2 Essay Argumentation Writing Test

Essay test is used for determining the quality of students' written argumentation skill in answering the questions provide by the teacher. The questions consist of five questions regarding the topic of Global Warming and it will be assesed based on the indicator of Toulmin Argumentation Pattern which are data, claim, warrants, qualifiers, backing, rebuttals.The Essay Test had already consulted and validated by the lecture and some experts in related field in order to modify or revise essay test that was not appropiate with the content, or argumentation component Based on Toulmin.

3.4.2.1 Guideline for determine argumentation components

Guideline for determine argumentation components contain a indicator on Toulmin Argumentation Pattern (TAP) which are claim, data, warrant, backing, qualifier and rebuttal. This instrument will emerge the argumentation component for both oral and written argumentation. Rubric components arguments used in determining students' arguments.

Table 3.6 Rubric for Components Arguments Determination

Meaning	Description	Expression
Claim/ Counter claim	*Bila siswa mengembangkan claimnya berdasarkan pernyataan yang disajikan atau berdasarkan pernyataan siswa lain. Claim berupa pernyataan setuju.*	*Saya setuju dengan… Saya mendukung…. Menurut saya …..sudah tepat…… Atau Saya tidak setuju…. Saya tidak sependapat dengan…. Menurut saya……tidak sesuai…*
Warrant	*Bila anggota membuat jaminan sebagai pembenaran claim yang dibuatnya atau menuliskan hubungan dari informasi yang*	*Saya setuju dengan …karena……. Mengapa saya mendukung….. karena.. Hal yang membuat saya tidak setuju adalah…..*

Meaning	Description	Expression
	diketahui dengan menuliskan bentuk pernyataan lain agar lebih kuat lagi bentuk pernyataannya.	
Backing	*Bila anggota menyajikan data-data atau fakta untuk mendukung warrant yang dibuatnya atau pernyataan yang dibuat oleh siswa berdasarkan informasi yang diketahuinya itu akurat atau benar secara teori.*	*Berdasarkan yang pernah saya alami…* *Menurut apa yang terdapat di buku….* *Bila kita lihat fakta-fakta tentang….* *Dari teori yang saya baca…* *Saya pernah mendengar tentang…* *Fenomena/data/ fakta berikut ini membuktikan…….*
Qualifier	*Bila siswa memberikan kekuatan dari data kepada warrants dan dapat membatasi claim universal*	*Kebanyakan…* *Biasanya…* *Selalu…* *Kadang-kadang…*
Rebuttal	*Bila anggota melakukan penyanggahan terhadap pernyataan anggota lainnya*	*Saya tidak setuju….* *Saya tidak sependapat dengan….* *Menurut saya……tidak sesuai.* *Pernyataan anda nampaknya kurang tepat……*

(Source: Roshayanti & Rustaman, 2013)

Students' argument who do not contain linguistic features from Table 3.6, the further consideration was based on description of the components of arguments and argumentation patterns expressed by students.

3.4.2.2 Guideline for Level Arguments determination

Guideline forLevel Arguments determination aims to analyze the quality of student's argument. Guidelines for determination of this level is used after the process of determining the components of the argument. The guidelines sheet for determining the level of argumentation is analyzed based on framework format analysis of the arguments developed by Erduran et al., (2004). Data from This instrument is the number of arguments spread across various levels. The levels of quality argument based onErduran et al., are shown on Table 2.2.

3.4.3 Questionnaire

Questionnaire constitute the basis of every survey-based statistical measurement which is systematically tested prior to the data collection Brancato et al., (2004). Questionnaire is an instrument which is distributed to the students to analyze and describe the students' perspective during discussion and students' interest, ans self confidence to express argumentation for both oral and written argumentations. This questionnairehad already consulted and validated by the lecture and some experts in related field in order to modify or revise the questionnaire that was not appropiate with the content.

Tabel 3.7 Blueprint of questionnaire regarding students' perspective towards scientific argumentation skill

No.	Aspect	Statement	Question Clasification
1.	Self Confidence to express the argument	I have self confidence to speak in front of the class	Positive
		I never feel nervous when someone ask me to express my opinions in a forum.	Positive
2.	Interest in Discussion	I like to discuss in group	Positive
		I will be easier to express my argumentation during the discussion	Positive
		I always want to argue or give opinion during the discussion in group	Positive
		Discussion can stimulate me to express my argumentation	Positive
3.	Ability to express the	I can convince other person with my arguments.	Positive

	Argumentation	I can express my arguments related with science concept.	Positive
		I can express my arguments based on the real data, fact, or example.	Positive
		I can express my arguments based on the expeience.	Positive
		I can retain my argument if someone denied my arguments	Positive
		I can express my argument well organized and understanable	Positive
4.	Ability to Accept and Rebut other arguments	I can accept other opinion although it's different with mine.	Positive
		I can rebut the arguments of other if I do not agree with the other arguments..	Positive
5.	Abilty in Oral Argumentation	I prefer oral argumentation to writting argumentation	Positive
		I can be easier to expressed my opinion / argument in oral argumentation.	Positive
6.	Ability in Writing Argumentation	I prefer writing argumentation to oral argumentattion	Positive
		I can be easier to expressed my opinion / argument in written argumentation	Positive

3.4.5 Interview Sheet

Interview sheet is an instrument which is used to investigate students' statement and respond regarding their scientific argumentation skill. This interview is given to students after they finish whole activites starting. Interview sheet consists of students statement regarding their reason to express their argument for both oral and written argumentation and their difficulities. This interview sheet had already consulted and validated by the lecture and some experts in related field in order to modify or revise the question that was not appropiate with the content. The blueprint of interview sheet is shown on Table 3.8.

Tabel 3.8 Blueprint of Interview sheet

No.	Aspect	Question
1.	Oral and written	Which one do you prefer between oral

No.	Aspect	Question
	Argumentation ability	and written argumentation? Explain the reason!
2.	Factor and difficulities in expressing argumentation	What are the factors that influence your ability to express your argumentation? Explain the reason!
		What is your difficulities in expressing argumentation?
3.	Argumentation skill	What is your difficulities in expressing argumentation?
4.	Argumentation in discussion	Do the discussion triggering you to express your argumentation? Explain the reason!
5.	Ability to accept the othe argument	Do you like to accept the contradiction argument with your argument? Explain!

3.5 Data Analysis Technique

3.5.1 Students' Concept Mastery

The concept mastery test in the form of multiple choice question in cognitive paper test was analyzed by using Anates after objective test. Data analysis was done by calculating the score of cognitive in post test only. The percentage of the correct answer in each level of cognitive level was analyzed to describe the profile of students' concept mastery.

Since there is an unequal allocation of items for each cognitive level, the raw score for each cognitive level needs to be converted into proper scale score by taking the average. The average score count with the total number divided total of questions (Arikunto, 2011).

In an effort to build the concept mastery in cognitive aspect profile, the main data analysis procedure involved was the descriptive analysis, which focused on the mean value. In this case, the mean and standard deviations were computed for each of the cognitive domain and the overall score to provide the cognitive aspect in concept mastery skill profile. Based on the mean of each cognitive domain and overall score, each students' attainments can be categorized as Very Poor, Poor, Satisfactory, Good, Excellent according to these following definition.

Table 3.9 Interpretation of Students' Attainments

Interval	Category
$X \leq \bar{x}$ - 1,5 SD	VeryPoor
$\bar{x}$ - 1,5 SD $\leq X \leq \bar{x}$ - 0,5 SD	Poor
$\bar{x}$ - 0,5 SD $\leq X \leq \bar{x}$ + 0,5 SD	Satisfactory
$\bar{x}$ + 0,5 SD $\leq X \leq \bar{x}$ + 1,5 SD	Good
$\bar{x}$ + 1,5 SD $\leq X \leq$100	Excellent

Where,

X = Students' Score

$\bar{x}$ = Overall students' mean score

SD = Standard Deviation

(Source: Arikunto, 2013)

Based on te category interpretation on Table 3.10, the students' concept mastery in cognitive aspects can be categorized in five following levels based on the Mean and Standard Deviation; very poor (Score < 44,96), poor (44,96 ≤ score ≤ 59,6), satisfactory (59,6 ≤ score ≤ 74,22) , good (74,22 ≤ score ≤ 88,8), and excellent (score ≥ 88,8).

3.5.2 The Students' Scientific Argumentation skill

The data analysis technique for scientific argumentation skill was done by audio-video recording. Results of the audio-video recording was transcribed before analyzing using guidelines for determination of argumentation component and level to know the students' argumentation quality. The transcription process was done only during the discussion session in learning activities.Audiovideo transcription did not clearly contain student identity. If on the audio-video recording students mention the name clearly, the name was disguised or replaced. Students' identities were replaced by sequence of students' numbers in their own group. For example in the transcript listed S1G2, it meaned students who express argumentation was students1 from group 2.

3.5.2.1 Determination of Scientific Argumentation Components

Based on Toulmin argumentation component that is claim, data, warrant, backing, qualifier, and rebuttal. Identification of students' argumentation was based on the linguistic feature or the main sentence the student expressed as contained in the guidelines for the determination of argument components. For example if Students declared linguistic features "I agree with ...", that sentence was classified as claim components. Meanwhile if in the analysis process, the sentence was unidentified based on the linguistic feature, then the sentence was considered by analyzing at the description or characteristics of each argumentation component and argumentation pattern based on Toulmin Argumentation Pattern.

3.5.2.2 Determination of Scientific Argumentation Level

The scientific argumentation level was determined after the determination process of argumentation component. Students' argumentation during the class discussion were analyzed. Transcript form was obtained from current audio-video recordings. The transcripts was analyzed using the argumentation analysis based on the analytical argumentation framework developed by Erduran et al., (2004) contained in Table 2.1. Level 1 shows the students' argumentation who are only able to make choices or decision towards the topic without having a reason for their choice or decision. Students only able to express aggreement or disagreement towards something. The argumentation in level 2 consist of claim which is followed with the data, warrant, backing or qualifier. In this level argumentation doesn't contain rebuttal.

The argumentation in level 3 to level 5 already contains a rebuttal. In Level 3, the argumentation contains a weak rebuttal and its argumentation structure couldn't be identified clearly. Level 4 is argumentation that contains one proper rebuttal and clearly identified. The highest level is level 5 that shows the argumentation with more than onerebuttal. Thus, the good quality of students' argumentation is determined by the presence of rebuttal in the argumentation..

3.5.3 Data Analysis of Questionnaire

The questionnaire interpreted to know how students' response toward learning global warming by using discussion method, and their respond in expressing oral and written argumentation. The data was processed from the raw score to the percentage. Analysis of students' questionnaire is used by classifying data based on alternative answers given. In the time of data analysis, the process uses Likert scale by calculating the following value:

$$P = \frac{f}{n} \; x \; 100 \; \%$$

Where,

P : Percentage

f : frequence of the answer

n : total of the respond.

(Source: Sugiyono, 2008)

Item question consist of positive statements. The positive question contains statements with five options: strongly agree (5), agree (4), hesitate (3), disagree (2), strongly disagree (1). Questionnaire data were tabulated for every student and every item statement. Then, the calculated average number score each statement with the following formula:

Questionnaire used in this research consist of 18 questions n positive statement. The questionnaire average score show the tendency of students' respond towards their oral and written argumentation skill through discussion and essay written argumentation test.

3.5.4 Data Analysis of Interview

Data collecton is in the form of qualitative data which is described students' perspective collected through interview and then analyzed. Interview was conducted towards students representative from the higher, middle and low group of students in cognitive concept mastery and argumentation skill. The result of interview is used to strengthen data analysis of students cognive and argumentation skill or the association for both of them.

3.5.5 Examine the Correlation

Correlation is conducted to analyze the correlation and effects of one variables to another. In this study correlation was applied to find out the relationship between concept mastery towarsd argumentation skill, either in oral or written argumentation. Correlationalresearch is done to determine relationships among two or more variables and to explore theirimplications for cause and effect (Fraenkel, 2011). The result of argumetation result analysis is in ordinal data type. Data measured at the ordinal level are often called ranked data because the categories of such variables measures the amount (a quality or quantity) of whatever of being observed (Cunningham &Aldrich, 2012)

Since the score for Argumentation skill is in ordinal type of data, the Spearman's rank Correlation was applied. Spearman's correlation coefficient is statistic that shows the strength of the relationship between two variables measured at the ordinal number, and also be used as the nonparametric data (Cunningham & Aldrich, 2012). The Correlation coefficient is the degree of relationship determined how closely variables and quantifies the stength and specifies the direction (Cunningham &Aldrich, 2012). The closer the positive or negative correlation coefficient is to +1 or -1, the stronger the relationship. A correlation coefficient is zero indicates that there is no relationship between the two variables.

Table 3.10 Interpretation of Correlation Coefficient

Correlation Coefficient	Interpretation
$0{,}80 < r \leq 1{,}00$	Very Strong
$0{,}60 < r \leq 0{,}80$	Stron
$0{,}40 < r \leq 0{,}60$	Medium
$0{,}20 < r \leq 0{,}40$	Low
$0{,}00 \leq r \leq 0{,}20$	Very low

(Source: Sugiyono, 2008)

3.6 Research Procedure

In this research general procedure will describe with several stages:

3.6.1 Preparation Stage

1) Preliminary study on the students' problem, and characteristics.

2) Conducting Literature study from various resources such as book, journals, articles, and etc.
3) Analyze the science content of secondary school, Literature review is conducted to support the concept.
4) Formulate research problem and question.
5) Design the implementation, including designing the lesson plan, teaching sequences.
6) Designing the instruments as tools to collect data which consist of Objective test, Writing Argumentation essay test, interview sheet, and Questionnaire.
7) Judging the instrument such as Objective test, Writing Argumentation essay test,interview sheet, and Questionnaire.
8) Revising the instruments based on experts' suggestion.
9) Conducting test for multiple choice question and analyze the result test by ANATES.

3.6.2 Implementation stage

1) Conducting research using discussion method.

Students conducted discussion to decide an effective way to solve and reduce the effect of global warming. The discussion process consist of two group who argue to convince other, that their solution was aneffective way to solve or reduce the effect of global warming. Each group consist of four to five students in a group.The discussion consist of three stages.

First stage was, when students argued their argumenation regarding their topic. They had to explain as much as possible reasons or informations to strengthen their argument, to convince the other that their argument was the effective way to solve the global warming. Students had to show the data or evidence to convince other people. Then the other group was given opportunity to express their idea or opinion towards the previous group's argument. The second stage was given to second group to express their arguments and give alot of reasons from any kind of source. Meanwhile the other group gave respond or idea towards the previous groups' arguments.

Students' argumentation from the audio transcript was identified based on argumentation component which consist of claim/counter claim, data, warrant, backing, qualifier, and rebuttal which is shown in Table 4.3. After the identification of argumentation component, Each quality of argumentation was analyzed into five levels argumentation by using the framework to analysis argumentation developed by Eduran et al., (2004).

2) Analyze the students' Argumentation skill in video audio transcript.
3) Conducting objective test in the form of multiple choice to describe students' concept mastery.
4) Conducting Students' Scientific Argumentation writing test.
5) Students conduct interview and fill the questionnaire.

3.6.3 Completion Stage

1) Collecting data as result discussion in video audio transcript.
2) All of data are calculated.
3) The result of data calculation are analyzed.
4) Constructing the Discussion to elaborate the result of analysis related to theoritical foundation.
5) Consulting the research result with the lecture
6) Drawing the Conclusion based on result analysis.
7) Recommendation that conduct after finishing the implementation that what should be avoid in this research to next research with same research focus.

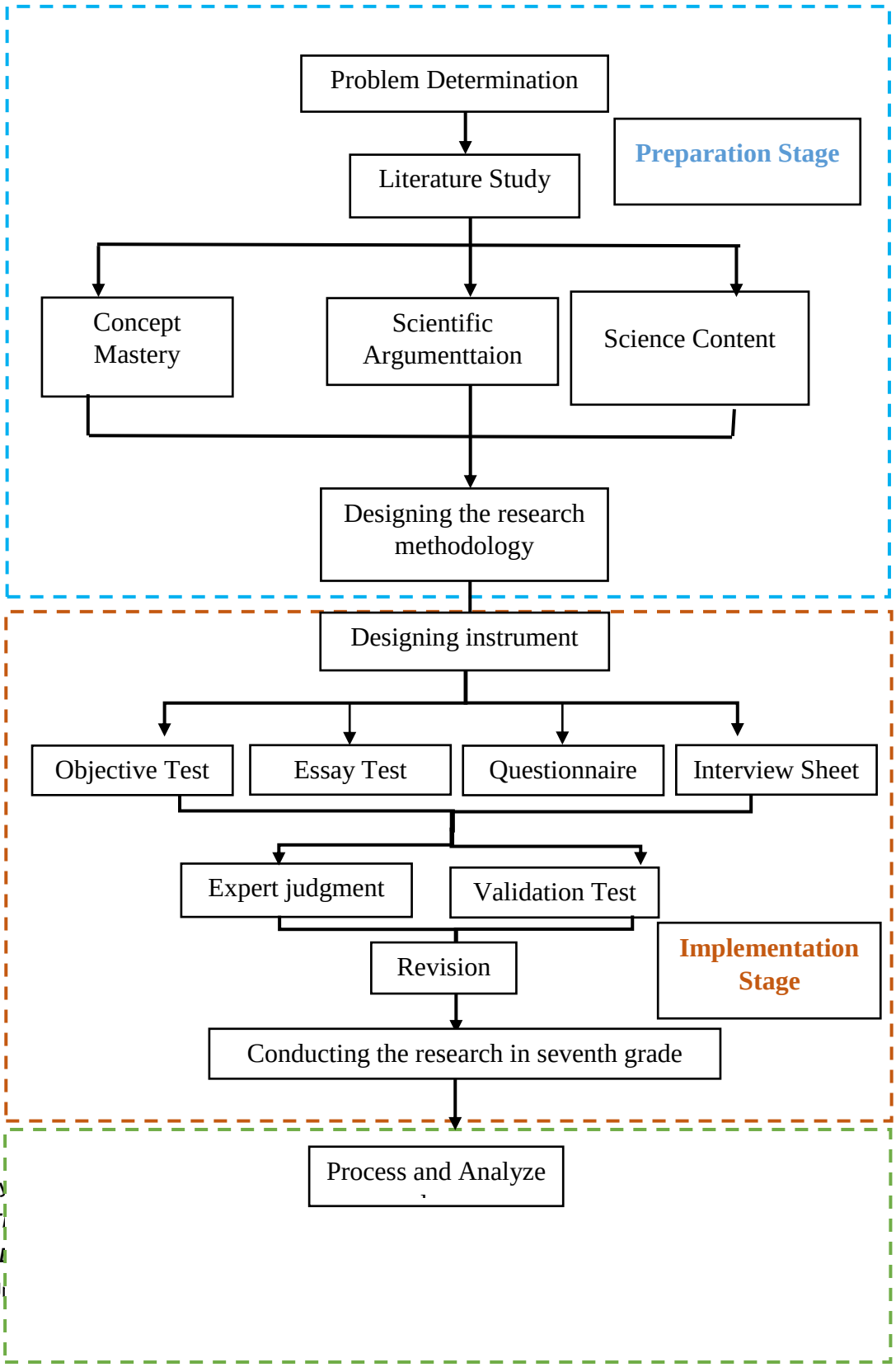
Problem Determination
Literature Study
Preparation Stage
Concept Mastery
Scientific Argumenttaion
Science Content
Designing the research methodology
Designing instrument
Objective Test
Essay Test
Questionnaire
Interview Sheet
Expert judgment
Validation Test
Revision
Implementation Stage
Conducting the research in seventh grade
Process and Analyze

Figure 3.1 Flowchart of Research Procedure