CHAPTER III
RESEARCH METHODOLOGY

A. Research Method and Research Design

1. Research Method

The method is used for this research is Quasi Experiments. Creswell (2012) stated that quasi experiments include assignment, but not random assignment of participants to groups. This is because the experimenter cannot artificially create groups for the experiment. This method is appropriate with the purpose of the research which is to investigate the effect of the lesson towards creative disposition, creativity product and understanding in learning Heat Transfer. In this research, the objects of the research are given any treatment. The experiment class is taught by teacher using experimental method while the control class is using demonstration method of teaching. The method of teaching depends on the teacher in the school as long as it can triggered the creative disposition of the students.

2. Research Design

The design of research is used pre-test and post-test design (Creswell, 2012). The researcher assigns intact group the experimental and controls treatment, administers a pre-test to both groups, conducts experimental treatment activities with the experimental group only, and then administers a post-test to assess the differences between the two groups.

Table 3.1 Pre-test and Post-test Design

Select Control Group	Pre-test	No Treatment	Post-test
Select Experimental Group	Pre-test	Experimental or Practical Method	Post-test

(Creswell, 2012)

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B. Population and Sample

The location of this research is International Junior High School "X" in Bandung. The population of this research will be all 7th grade students at International Junior High School "X" Bandung. The samples are 7th grade students from two classes in International Junior High School "X" in Bandung.

The sample was taken by cluster random sampling technique in experimental class (n=19 students) and control class (n=21 students) with the population of 7th grade students at Junior High School in Bandung. Fraenkel and Wallen (2007) stated that Cluster Random Sampling is one in which each and every member of population has an equal and independent change of being selected. The subject of this research is defined under purposed of the responsible science teacher that is used to implement this research which is Heat Transfer topic.

C. Assumption

Assumption as the foundation of this study as follow :

1. Experiment or practical method can more affect the creative disposition based on creative disposition model from Lucas, Claxton and Spencer (2014) can comes out rather than demonstration method.

2. Practical method can more enhance students' understanding rather than demonstration method.

3. Experiment or practical method will more affect students' creativity product rather than demonstration method.

4. The more creative students will have higher understanding.

D. Hypothesis

Hypothesis that is tested in this study are as follow:

H_0: there is no difference in creative disposition, students' creativity and understanding in learning heat transfer between taught using experimental method and demonstration method .

H_1: there is difference in creative disposition, students' creativity and understanding in learning heat transfer between taught using experimental method and demonstration method.

E. 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. Experimental or practical method is a form of learning that involves students to working with objects, materials and laboratory equipment either individually or in groups. The experimental or practical method is used in the learning process of experiment class to doing practical works in laboratory about heat transfer which are convection, conduction and radiation.

2. Creative disposition is the creative characteristic of person. The five creative dispositions that measured in this research involves five creative dispositions model, those are inquisitive, persistent, imaginative, collaborative and discipline (Lucas, Claxton and Spencer, 2014). The inquisitiveness, persistent, imaginativeness, collaborative and disciplines based on Lucas, Claxton and Spencer of the student will be measured using observation sheet. The observation sheet that containing indicator from the expert judgments are used to measure the treatment of teacher in the lesson in different teaching method to know how much experiment or practical method and demonstration method can impacted the creative disposition based on creative disposition model from Lucas, Claxton and Spencer comes out, students' creative product and students' understanding.

3. The students' creativity product in this research is measured the drinking bottle that can prevent heat transfer or thermos that made by students that will be use Rubric of Creative Product Analysis Matrix (CPAM) which is proposed by Basemer and Treffinger (1981) as the instrument.

4. Students' understanding that is measured in this research is the competence of students that covers the cognitive process dimension of the revised taxonomy

which is remembering (C1), understanding (C2), applying (C3), analyzing (C4).

F. Research Instrument

In this research, instrument is necessary to be used for gaining data. There were three types instrument that were used in this research which are objective test, observation sheet and students creativity rubric. Those instruments are described below:

1. Objective Test

Objective test is an instrument to get the quantitative data that was gained in this research. The data was collected through pre-test and post-test in form of multiple choice and pre-test will be conducted before treated using creative disposition model-based lesson and post-test will be conducted after treated using creative disposition model-based lesson in learning thermal physics. The objective test consist of 42 questions before validation and become 24 multiple choice questions after validation. with the cognitive dimension of remembering (C1), understanding (C2), applying (C3) and analyzing (C4). The instrument questions were be analyzed with the following requirements

a. Validity

According to Fraenkel (2011), There are some things that must be considered before choosing and preparing an instrument before doing research and the one of important idea to consider is validity. Validity has a point to the appropriateness, meaningfulness, correctness, and usefulness of the conclusions a researcher makes. Therefore, the data that is resulted from the test will valid with the variable that want to be measured and interpreted by using this validity test. The software ANATES will be used to determine the validity of the instrument in this study.

The validity of each test item will be measured by using formula of correlation which has stated by Pearson (in Kaplan and Saccuzzo, 2012), which is called as product moment correlation formula as follows:

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

Note:

r : correlation coefficient between x and y

N : amount of student

X : total score in test item

Y : total score of student

Minium et al (1993) describes that the correlation coefficient between x and y interpretation is divided into some distinct categories as shown on the following table:

Table 3.2 Interpretation of validity

Value r	Interpretation
$0.80 < r \leq 1.00$	Very high
$0.60 < r \leq 0.80$	High
$0.40 \leq r \leq 0.60$	Enough
$0.20 < r \leq 0.40$	Low
$0.00 < r \leq 0.20$	Very low

(Minium et al., 1993)

b. Reliability

According to Crocker and Algina (2006), the test users want some assurance that the results can be replicated if the same individual each time the test is given and tested again under the same conditions. The desired

consistency (or reproducibility) of the value of such tests can be called reliability. .

According to Kaplan and Saccuzzo (2012), the standard deviation of the scores was observed and the reliability of the test is used to estimate the standard error of measurement. The task of researchers in reliability analysis is to estimate how many of researcher make the mistake of using a score from short test as an estimate of a person's true ability.The formula for calculating the reliability of a test in which the items are dichotomous, scored 0 or 1 (usually for right or wrong), is known as the Kuder-Richardson 20,or KR20 or KR20. The formula came to be labeled this way because it was the 20th formula presented in the famous article by Kuder and Richardson (in Kaplan and Saccuzzo, 2012), as follows:

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

Notes :

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 separately for each item)

q : the proportion of people getting each item incorrect. For each item, q equals 1−p.

$\sum pq$: sum of the products of p times q for each item on the test

Table 3.3 Reliability Interpretation

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$0.20 < r \leq 0.40$	Very low

(Minium et al, 1993)

c. Difficulty level

For a test that measures achievement or ability, The difficulty of test items determined by the number of people who get certain stuff right. The test items should have different levels of difficulty for a good test discriminates at various levels. (Kaplan and Saccuzzo, 2012).

Boopathiraj and Chellamani (2013) stated that item difficulty may be defined as the proportion of the examinees that marked the item correctly. Item difficulty is the percentage of students that correctly answered the item. The range is from 0% to 100%, the higher the value, the easier the item. P values above 0.90 are very easy items and might be a concept not worth testing. P-values below 0.20 indicate difficult items and should be reviewed for possible confusing language or the contents needs re-instruction. Optimum difficulty level is 0.50 for maximum discrimination between high and low achievers. Generally, items of moderate difficulty are to be preferred to those which are much easier or much harder. The following formula is used to find difficulty level based on Boopathiraj and Chellamani (2013):

$$DL = \frac{R_u + R_l}{N_u + N_l}$$

Where,

Ru : the number students in the upper group who responded correctly

Rl : the number students in the lower group who responded correctly

Nu : Number of students in the upper group

Nl : Number of students in the lower group

Arikunto (2013) stated that index of difficulty is how easy certain questions is and the amount that indicates a difficulty. The range that owned by difficulty index is ranging from 0.00 to 1.00. The criteria of the difficulty index are shown in the table 3.3 below:

Table 3.4 Difficulty Index

Value	Criteria
0,00– 0,30	Difficult
0,00– 0,30	Middle
0,71 - 1,00	Easy

(Arikunto, 2013)

d. Distractor

Distractor meaning based on Kaplan and Saccuzzo (2012) is alternatives exist on multiple choice exams that are not true or that no credit is given. which is required to determine the number of alternatives is "true" when taking a multiple choice examination. the wrong choice is called a distractors.

Arikunto (2013) stated that the scheme of the choice answer can be determined whether the distractor works well or not. He also stated that distractor is not good or bad is the distractors that are not be chosen at all. According to Arikunto (2013), the distractor can be threated using following methods:

1) accepted, because it's good

2) rejected, because it's bad

3) rewritten, because it's not really good.

2. Creative Disposition Observation Sheet for The Lesson

The students' creative disposition will be measured using The Five Creative Dispositions Observation Sheet which is proposed by Lucas, Claxton and Spencer (2014). Some criteria that exist in the observation sheet will assess the students' creative characteristic whether how much the teacher can encourage the students' thinking by triggered them using certain treatment so their creative disposition can be showed during the lesson. This kind of observation sheet that use to assess the students in the lesson can be measured by giving checklist in the observation sheet if there's sub indicator that appears. The observation sheet of Five Creative Dispositions blueprint is shown in Table 3.4 as follows:

Table 3.5 Blue Print of The Five Creative Dispositions Observation Sheet

No.	Creativity Dimension	Indicators	Yes	No	Notes
1.	Inquisitive	Wondering			
		Questioning			
		Exploring			
		Investigating			
		Challenging Assumption			
2.	Persistent	Sticking with difficulty			
		Daring to be different			
		Tolerating uncertainty			
3.	Imaginative	Playing with possibilities			
		Making connections			
		Using intuition			

No.	Creativity Dimension	Indicators	Yes	No	Notes
4.	Collaborative	Sharing the product			
		Giving and receive feedback			
		Cooperating appropriately			
5.	Disciplined	Developing techniques			
		Reflecting critically			
		Crafting			
		Improving			

(Adapted By Lucas, Claxton and Spencer, 2014)

3. Students Creativity Product Rubric

The creativity of students can be seen by their result of their product which is the drinking bottle that can prevent heat transfer using vacuum flask principle. The students' creativity of making product can be measured using Rubric of Creative Product Analysis Matrix (CPAM) which is proposed by Basemer and Treffinger (1981). The product of simple thermometer is assessed into some criteria which was available in the rubrics. The students' creativity can be measured based on the result of drinking bottle. This kind of creativity test can be assessed by giving checklist on the rubric if there is sub indicator that appears in students' creative product. The rubric of Creative product Analysis Matrix (CPAM) blueprint is shown in following table 3.5 below :

Table 3.6 Blue print of Students' Creativity Rubric

Creativity Dimension	Indicators	Measured Aspects	score			note
			1	2	3	
Novelty	Original: Being rare and out of the usual product	Theme				
		Product Design				

Creativity Dimension	Indicators	Measured Aspects	score			note
			1	2	3	
	that ever made					
	Surprising:	Theme				
	Gives surprise as a general in first impression	Product Design				
	Germinal: Trigger ideas for further original product	Product Design				
	Score					
Resolution	Valuable: Solving problem that stated at project mission	Product Design				
	Logic: Solution on design is answering the purposes logically	Product Design				
	Useful, applicable	Product Design				
	Score					
Elaboration and Synthesis	Organist: Clearance of how the product is made	Product Design				
	Elegant: More values than how it appears	Product Design				
	Complex: Adjustment from several aspects; - Features reasoning - Eco-friendly materials - Art and colors look - Motivation through effort in	Product Design				

Creativity Dimension	Indicators	Measured Aspects	score			note
			1	2	3	
	make it beautiful					
	Understandable: Clear procedure	Product Design				
	Artistic	Product Design				
	Score					
	Total Score					

(Adapted by Basemer and Treffinger, 1981)

G. Research Procedures

In order to have a good sequence systematically of the research, the research procedure is arranged in three stages that have been done. Those of three stages are preparation stage, implementation stage, and completion 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 problems to be investigated.

b. Determine the focus of variable research.

c. Conduct literature review of Creative Disposition Model , conceptual understanding, interaction of organisms and its environment topic, and constructed response test item.

d. Conduct literature review of students' Creativity.

e. Conduct literature review of conceptual understanding.

f. Conduct literature review of heat transfer topic.

g. Arrange the research proposal which is including chapter I, chapter II and chapter III which is presented in proposal seminar.

h. Revise of research proposal after having suggestions and critics from the lecturers.

i. Design the blueprint to create the instrument.

j. Construct research instrument in the form of objective test items that is composed of 42 questions of students' conceptual understanding on heat transfer topic.

k. Test the validity, reliability, difficulty level, and discriminating power.

l. Report and make the validation of the research instruments.

m. Revise the instrument after having validated.

n. Prepare research license to schools.

o. Determine research subject which are determined by science teacher which the participants are from 7th grade or Secondary 1 students in Al-irsyad Satya Islamic School.

2. Implementation Stage

This is the process of data collecting in the school, when the treatments to students' are implemented

a. Determination of control class and experimental class

b. Pretest was given to the students in control class and experimental class to know the students prior knowledge and students' initial condition.

c. Processing pretest result

d. Conduct research activity by observing the creative disposition in the lesson which the teacher is implementing the treatment by teaching the students using experimental method in experiment class and record the lesson using camcorder.

e. Conduct research activity by observing the students creative disposition in the lesson which the teacher is implementing demonstration method to the students in control class and record the lesson using camcorder.

f. Assessing students' creativity product in making drinking bottle that prevent the heat transfer.

g. Posttest was given to the students in control class and experimental class to know the improvement of students' understanding.

3. Completion Stage

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

    a. The whole data of the research were analyzed.

    b. Discuss and conclude the data analysis result.

    c. Arrange the research report.
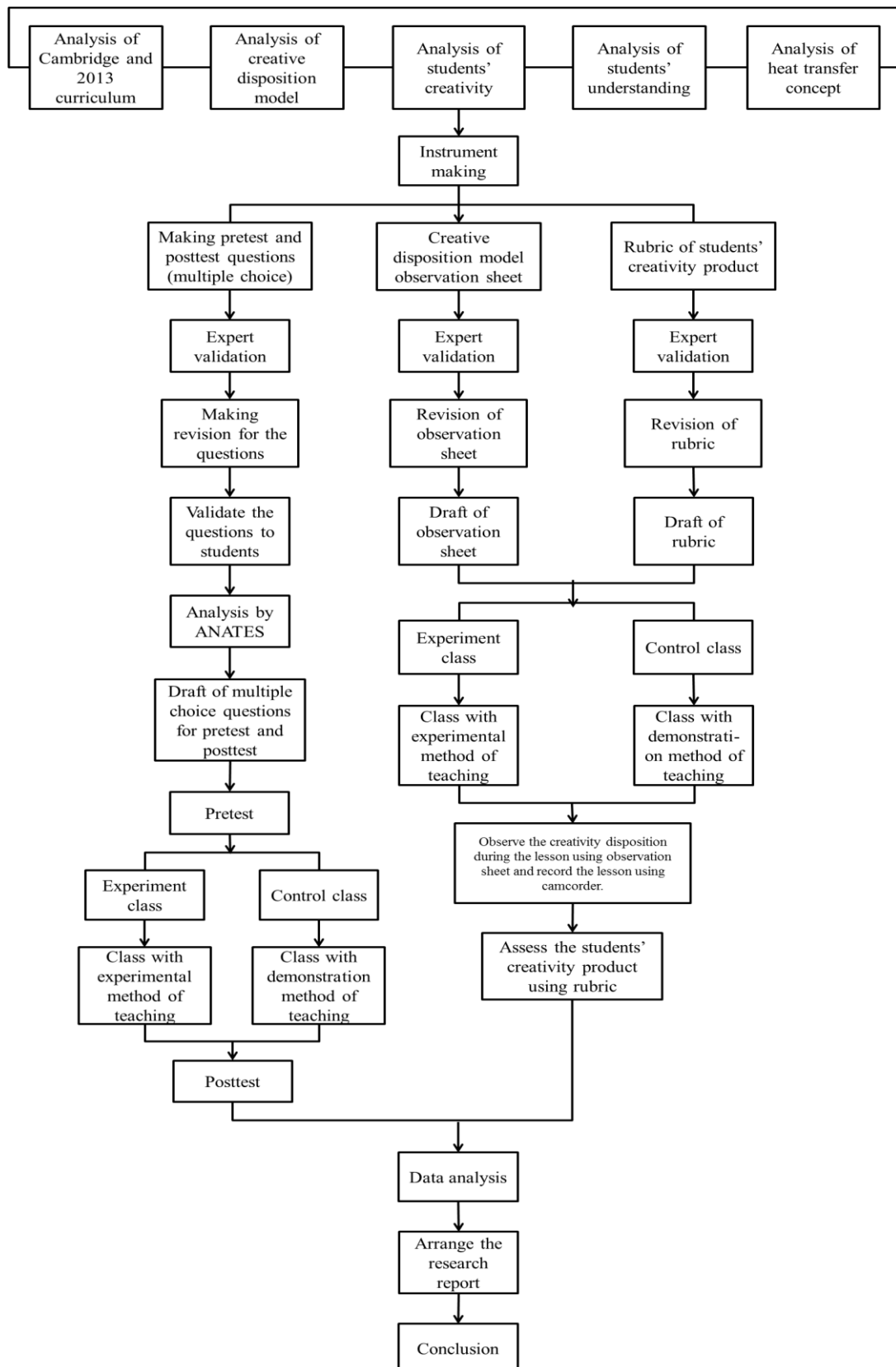
Figure 3.1 Research Procedure

H. **Instrument Analysis Result**

1. **Recapitulation of Students' Understanding Instrument**

   The objective test in form of 42 questions as the instrument is given to the students for measuring students' understanding. The validity, reliability, discriminating power, and difficulty level of the instruments was tested. The test was given to 20 students which have learned about the chapter or the topic that is learned in the research. This following table is shown the recapitulation of the test item analysis.

   Test item recapitulation:

   Reliability Test   : 0.72 (High degree)

Table 3.7 Recapitulation of Test Item for Students' Understanding

Question Number	Discriminating Power	Validity	Difficulty Level	Status
1	Poor	Invalid	Easy	Rejected
2	Excellent	Enough	Medium	Accepted
3	Poor	Very low	Easy	Rejected
4	Mediocre	Very low	Hard	Rejected
5	Poor	Invalid	Hard	Rejected
6	Poor	Very low	Hard	Rejected
7	Excellent	High	Medium	Accepted
8	Mediocre	Low	Easy	Revised
9	Poor	Very low	Medium	Rejected
10	Excellent	Enough	Medium	Accepted
11	Excellent	Low	Medium	Revised
12	Excellent	Enough	Easy	Accepted
13	Excellent	Enough	Medium	Accepted
14	Mediocre	Low	Medium	Rejected
15	Excellent	High	Medium	Accepted

Question Number	Discriminating Power	Validity	Difficulty Level	Status
16	Excellent	Low	Very hard	Revised
17	Worst	Invalid	Medium	Rejected
18	Poor	Invalid	Hard	Rejected
19	Excellent	Enough	Medium	Accepted
20	Excellent	Low	Medium	Accepted
21	Poor	Low	Easy	Revised
22	Poor	Very low	Medium	Rejected
23	Excellent	Very low	Medium	Rejected
24	Excellent	Enough	Easy	Accepted
25	Excellent	Enough	Medium	Accepted
26	Poor	Invalid	Easy	Rejected
27	Excellent	High	Easy	Accepted
28	Worst	Invalid	Medium	Rejected
29	Excellent	Enough	Medium	Accepted
30	Poor	Very low	Very hard	Rejected
31	Poor	Very low	Easy	Rejected
32	Excellent	Enough	Medium	Accepted
33	Worst	Invalid	Medium	Rejected
34	Mediocre	Low	Hard	Revised
35	Excellent	Very low	Hard	Rejected
36	Excellent	High	Hard	Accepted
37	Worst	Invalid	Medium	Rejected
38	Excellent	Low	Medium	Revised
39	Excellent	Low	Medium	Revised
40	Excellent	Enough	Medium	Accepted
41	Excellent	Enough	Medium	Accepted
42	Excellent	Enough	Medium	Accepted

The test item has been tested in term of validity, reliability, discriminating power, and difficulty level also judged by some experts then revised so that it is adequate to be used as research instrument to obtain the data of students' understanding. The following table is the blueprint of objective test as the research instrument to determine students' understanding and the data of experiment and control class which is based on cognitive domain that include in the item test after doing validation.

Table 3.8 Objective Test (Pretest and Posttest) Item Specification and Recapitulation.

Indicator	Cognitive domain				
	C1	C2	C3	C4	Amount (s)
Explain the definition, meaning and phenomena of heat transfer by convection, conduction and radiation.	1	16			2
Determine the good conductor of heat materials and bad conductor of heat materials		10, 11		2, 12,` 13	5
Identify good isolator of heat materials and bad isolator of heat materials		15	6		2
explain the current of fluids when convection happen when it is heated and to density changes		5, 20, 21	3, 7, 14, 22		7
Describe experiments to compare the thermal conduction of different materials.			8		1

Indicator	Cognitive domain				Amount (s)
	C1	C2	C3	C4	
Describe the experiments and phenomena which show the properties of good emitters and absorber of radiation.				9, 17, 18, 19	4
Determine the materials use to make a drinking place that can reduce the heat transfer				23	1
Explain the main methods of reducing heat transfer		4		24	2
Total	**1**	**8**	**6**	**9**	**24**

2. Instrument Non-Test Requirements

In this research, there are two kinds of instrument that is not in form of test in order to get qualitative data. Rubric and observation sheet are used. The students' creativity of making drinking bottle to prevent heat transfer or thermos is assessed using Rubric of Creative Product Analysis Matrix. Several criteria that available are existing in the rubric. The way of observer to measure the students' creativity product are by fulfilled the rubric. The observer gave the checklist on the rubric if there is sub indicator that appears in students' creative product.

Meanwhile, the creative disposition model observation sheet was used to know the creativity disposition on the lesson based on Lucas, Claxton and Spencer (2014). There are some criteria in the observation sheet that can measure the creative disposition that comes out during the lesson. This data was obtained from the beginning until the end of the lesson by observing the lesson and giving checklist in the criteria that exist in the observation sheet.

I. Data Processing

There are three different data which are obtained from both quantitative data and qualitative in this research. Quantitative data is obtained from the pre-test and post-test of students' understanding. The qualitative data is obtained from the Rubric of Creative Product Analysis Matrix (CPAM) and The Five Creative Dispositions Observation Sheet. Explanation of data processing techniques are obtained as follows:

1. Quantitative Data Processing

The quantitative data was process using Microsoft Excel calculation to determine the score of pre-test and post-test. The value of quantitative data is gained by the result of normalized gain. The calculating process of data is explained as follow:

a. Score of Test Item

In this research, the improvement of students' understanding is measured using the data of test scores. The 24 test items is used in this research to test the students' understanding. Each multiple choice correct answers are given 1 score and each incorrect answer was given a 0 score.

b. Calculation of Gain Score and Normalized Gain

The data of the test item score after its' obtained are needed to be processed by calculating the gain score and normalize score. Gain is needed to be calculate to determine the differences between pre-test and post-test score to know the improvement of learning and it can be seen clearly. It could be assumed as the effect of the treatment. After the actual Gain is gotten, then Normalized Gain (N-Gain) can be gotten. Normalized gain calculations are supposed to determine the categories of the achievement of students' improvement.

According to Hake (1999), Gain can be calculated by the following formula.

$$G = S_{f} - S_{i}$$

Description:

G : Gain score

S_f : Post test score

S_i : Pre test score

(Hake, 1999)

The effectiveness of the treatment by the teacher in teach heat transfer to increase students' understanding in heat transfer can be seen from the result of the normalized gain that achieved by students during the learning process. The meaningful improvement can be shown from Normalized Gain rather than actual Gain because the improvement of higher and lower achiever students can be shown clearly. The formula of N-Gain is shown as follow.

$$<g> = \frac{Spost - Spre}{Smax - Spre}$$

Description:

$<g>$: Normalized Gain

Spost : Post-test score

Spre : Pre-test score

Smax : Maximum score

(Hake, 1999)

Then, the Normalized Gain value is determined based on criteria below:

Table 3.9 Criteria of Normalized Gain Value

Value $\langle g \rangle$	Classification
$\langle g \rangle \geq 0.7$	High
$0,7 > \langle g \rangle \geq 0.3$	Medium
$\langle g \rangle < 0.3$	Low

(Hake, 1999)

c. **Normality Test**

The use of parametric statistic has a deal with assumption that each analyzed variable in this is a normal distribution. The homogeneity variant test cannot be done if the data is abnormal or the parametric technique cannot be applied. Meanwhile if the data is normal and homogenous, the parametric technique can be used. Normality test aims to know the sample which comes from population has normal distribution or not. In this research, Normality statistic test is done by using SPSS 23,

Kolmogorov-Smirnov with significance level (α) is 0.05. The statistic criteria as if significance value more than 0.05, hence H_0 is accepted and if significance value less than 0.05, then H_0 is rejected or denied. The hypotheses are:

H_0 : Sample comes from population that has normal distribution.

H_1 : Sample comes from population that has not normal distributio.

d. **Homogeneity test**

A sample from population that is originated from two classes that homogenous can be determining using homogeneity test. In this research, the homogeneity test is also uses statistic test from SPSS 23, with significance level (α) is 0.05. Sudjana (2005) stated that the data is homogenous when significance value ≥ 0.05.

The difference of both means can be done by using T test if two

samples of which are taken have homogeny variance. But, if the taken samples have non homogeny variance, the two means difference can be done by using t' test.

e.   Independent T-Test and Mann-Whitney Test

Both experimental and control class have the same mean or not the independent t-test will be done after the implementation of the experiment method and demonstration method. T-test requires data which is normal and homogenous. This test is represented by the result of pretest and posttest score in experiment and control class. The test is using *Independent T-Test* in SPSS 23.

Sudjana (2005) stated that H_0 is rejected if the level of significance (*sig)* ≤ 0.05. While H_0 is retained if the level of significance (*sig)* > 0.05. Meanwhile, Mann-Whitney test includes as non-parametric analysis test which is used when the data show that the distribution from one or all data is not distributed normally. H_1 is retained If the level of significance (Assymp. *sig)* > 0.05.

The hypothesis of the difference of a average pretest result in experiment class and control class is determined as follow.

H_0: there is no difference in creative disposition, students' creativity and understanding in learning heat transfer between taught using experimental method and demonstration method .

H_1: there is difference in creative disposition, students' creativity and understanding in learning heat transfer between taught using experimental method and demonstration method.

2.   Qualitative Data Processing

The qualitative data is gained from creativity rubrics of students' drinking bottle that can prevent heat transfer and observation sheet. The analysis of rubrics is done by converting the raw score into form of

percentage. The technique of converting score into percentage is used formula as follows:

$$P = \frac{R}{MS} \times 100\%$$

Noted:

P : percentage

R : raw score

MS : maximum score

(Arikunto, 2010)

The percentage of students' creativity can be interpreted and categorized into certain criteria according to Arikunto (2013) as shown in Table 3.10 as follows:

Table 3.10 Percentage Interpretation

Percentage (%)	Criteria
80-100	Very Good
66-79	Good
56-65	Enough
40-55	Lack
<40	Very lack/ Failed

(Arikunto, 2013)

The other instrument besides from the rubric, the data that is analyzed qualitatively is from observation sheet result result. The qualitative analysis describes the real situation of the research result because the researcher also take a video in whole lesson and also the result of students' observation sheet in learning heat transfer by observing the creative disposition in the lesson when taught by teacher.

The process of transcription and analysis the video is done by using a special software to analyze video called "Videograph" (Rimmele, 2002). In this study each lesson video is analyzed from five aspects which is inquisitive, persistent, imaginative, collaborative and discipline based on Lucas, Claxton and Spencer (2014). The researchers were able to use Videograph to observe the images and read the transcripts of conversations that occurred on the scene. This software can help the researcher to be able analyze the video carefully. If the researcher are not yet clear what happened or think that something is missed, Videograph also can replay that section. Researchers can then perform the coding by clicking on the column of coding area based on the observation. the researchers can determine the unit of analysis according to the type and purpose of the study. By Videograph, researchers can analyze the video in a varies span of time based on researcher's want.

In this research, the scene analysis unit is ten seconds. This means that the lesson lasted for 2400 seconds which is 40 minutes for first meeting and 3000 seconds which is 50 munutes for second meeting for each class so it can be divided into 540 units of analysis.

In the implementation of coding, the researchers observe each scene with duration of 10 seconds nd then do the coding of events observed. The analytical framework that used to analyze the creative disposition in this study is the creative disposition that involves the five creative disposition models which are inquisitive, persistent, imaginative, collaborative and disciplined that stated by Lucas, Claxton and Spencer (2014). Because of the aspects analyzed is not much, in the implementation of the coding investigators conducted an analysis together but if the researcher thinks there's something missed, it will be replayed. When the researcher analyze the video using Videograph, if the researcher thinks that the one of indicator of creative disposition comes out, then click one of coding that fit.

The result of coding will be export in order to conduct the analysis using *SPSS.23* until obtained statistic result in form of the appearing frequency of the indicators of creative disposition model in the lesson. Those data will be

analyzed to know the appearing time of the indicators of creative disposition model in the lesson. The technique of converting the total appearing frequency for each indicator in each meeting into appearing time for each indicator in each meeting is used formula as follows:

$$t\ appearing\ time = \Sigma\ frequency\ \times \frac{analysis\ unit}{conversion\ time}$$

(Widodo & Ramdhaningsih, 2006)

Notes :

t appearing time   : the appearing duration in minutes

$\sum$ frequency   : appearing frequency

Analysis unit   : 10 seconds

Conversion time   : 60 seconds