

III. RESEARCH METHOD

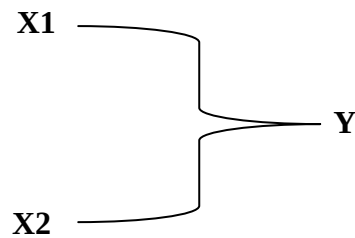
This chapter describes the method that is used in conducting the data of the research such as research design, variables, population and sample of the research, data collecting technique, data collecting instruments, validity and reliability, research procedure, data analysis, and hypothesis testing.

3.1 Research Design

The design of this research is ex post facto research design by using comparative study. Moreover, Hatch and Farhady (1982:26) states that ex post facto design was used when the researcher does not have control over the selection and manipulation of the independent variable (the researcher do not give treatment in the research). This research attempts to get the empirical data as a quantitative research that intended to investigate whether there is a significant difference between the students who have high and low critical thinking in speaking participation.

In doing this research, the data were taken by giving a critical thinking skill questionnaire (X) and observing students participation in speaking activity (Y).

The design is described as follows:



- X1** : Students with high critical thinking skill
- X2** : Students with low high critical thinking skill
- Y** : Students' speaking participation

3.2 Variables

In this research, there are two variables: dependent variables and independent variables. Dependent variable is a product from all interaction that involve in the research. In other hand, independent variables is a variables in the research that determining the effect of the dependent variable. There are the variables follow:

- a. Students' critical thinking skill as independent variable, so that it can be assumed that students' critical thinking skill influences the students' speaking participation. Students' critical thinking skill divides into 2 levels: high and low.
- b. Students' speaking participation as dependent variable, so that it can be assumed that it is a result of students' critical thinking skill.

3.3 Population and Sample

The research was conducted at SMAN 9 Bandar Lampung and the population was the second semester students in first year. There are eleven classes of the first year. In this research, the sample was X IPS 2. The researcher used simple random probability sampling by a lottery (Setiyadi, 2006 : 39), the researcher chose one class as the sample by random sampling. Random sampling enables every individual of the population has the same opportunity to be chosen as the sample. The procedures are: nine classes written in rolled paper are put into a glass. Then the glass was shaken two times and one class that came out was selected as sample.

3.4 Data Collecting Technique

3.4.1 Questionnaire

The researcher used questionnaire as first technique for collecting the data. Questionnaire is data collection technique by giving a set of questions or written statements to the respondents to be answered (Sugiyono, 2009: 199). While according to Johnson & Christensen (2000: 127), questionnaire is a self-report data-collection instrument that each research participant fills out as part of research study. The questions are regarding the facts and opinions of respondents and it is a closed questionnaire, where respondents were asked to answer the question by selecting an answer from a number of alternatives. The advantages of closed form are easily solved, easily analyzed, and able to provide the range of answers.

3.4.2 Observation

The researcher used observation as second technique for collecting the data. Observation means watching the behavioral patterns of people in certain situations to obtain information about the phenomenon of interest (MacMillan & Schumacher, 2010: 211). Based on the definition, the activity of observation used only to observe a pattern of human behavior on a particular situation to gain information about an interesting phenomenon. The researcher used participant observation, in which the researcher as observer engages directly in students' activities.

3.4.2.1 Speaking Through Discussion as Observed Activity

The researcher applied discussion with informal debate technique as observed activity by giving students some topics relate to their life such as The Pros and Cons of Giving Students Homework, The Pros and Cons of School Uniform, and National Exam : Pro and Contra. The researcher divided students into three groups that consist of ten students in each group. Each group got a text with different topic as said before and it was completed by some questions. The text let them to be pro or contra with what the writer's opinion in the text. All member of group worked and discussed for the answer of the questions, determined their position (pro or contra) and prepared some arguments to strengthen their view. After 20 minutes each group presented the result discussion in front of the class and the students from other groups gave three questions and they were allowed to give argument to reject the presenters' opinion.

For debate, the students were led through a six stage process (Rear, 2010), translated from the six categories of critical thinker defined by Facione, as follows:

1. Identify and clarify the issue (Interpretation)
2. Gather and organize information about the issue (Analysis)
3. Evaluate that information for accuracy and applicability (Evaluation)
4. Draw conclusions from the evidence (Inference)
5. Explain conclusions logically in the form of a debate (Explanation)
6. Critically appraise and examine one's performance (Self regulation)

In the first stage of preparation, the students would be divided into three groups that consist of ten students and given a text (**see appendix 4**) for each group with different topics that were close to their life as students and it was completed by some questions in a worksheet (**appendix 5**).

The second stage would begin with the students discussed in their group what kind of information or data they wished to gather, answering a series of questions in their worksheet.

In the third stage, they should learn how to evaluate that data for trustworthiness and strength. They were given practice in appraising certain items of information provided by the teacher, deciding if they felt each one was credible and why.

The fourth stage involved planning the debate itself. They should have determined to be pro or contra towards writer's opinion in the text. Before it, the students

were required to analyze the information they had gathered in order to create two or three strong arguments supported by reliable data.

The main focus for the fifth stage was on presentation skills and language. In terms of presentation, it would show their participation in speaking activity. It focused on students' encouragement/ spirit, fluency, clarity/ word choice, problem mastery, and opinion.

The sixth and final stage: the critical self-appraisal of the students' performances. During the debate, three types of appraisal were carried out: by the teacher, by the audience, and by the participants themselves.

3.5 Data Collecting Instruments

The data of this research is taken from students' score of the questionnaire and observation of their participation in speaking activity. The instruments of this research are questionnaire of critical thinking skill and observation sheet of students participation in speaking activity.

3.5.1 Critical Thinking Questionnaire

The first instrument used in getting the data is questionnaire. Data collection was carried out by using a questionnaire which is modified from the Critical Thinking Students Assessment that is developed based on extensive research and the work of the Critical Thinking Pilot Group at Central Piedmont Community College to

measure students' critical thinking skill level retrieved from <https://surveys.cpcc.edu/27234/27234.asp>

There are 40 questions and the researcher applied Likert Scale for the questionnaire where each item has mainly four alternative answers. The students were expected to give their answers as factual and real information about themselves by this questionnaire as provided in the four alternative answers. The lowest score is; $1 \times 40 = 40$ while the highest score is; $4 \times 40 = 160$. While, scoring criteria is; 40-79 means low critical thinking skill; 80-119 means medium critical thinking skill; 120-160 means high critical thinking skill.

In addition to the indicator of critical thinking skill, the researcher took from Critical Thinking Students Assessment which is the work of the Critical Thinking Pilot Group at Central Piedmont Community College as reference, the indicators are as follows :

1. Thinks critically and creatively e.g, I know several strategies for learning, problem solving, and decision making.
2. Formulates and re-evaluates position based on available evidence e.g, I gather evidence and opinions on both sides of an issue before making an opinion.
3. Asks appropriate questions that challenge assumptions and conventional wisdom e.g, I verify any rumors that I hear before repeating them.
4. Integrates ideas and values from different disciplines and contexts e.g, I seek different sources of information when doing research.

5. Uses reflection as a way to monitor and adjust thinking e.g, I review my major points following an in-depth discussion or argument.
6. Understands and applies principles of learning and learning styles to own education e.g, I know what the three different types of learning styles are.
7. Applies knowledge in practical ways e.g, I have used knowledge that I gained in my last week.
8. Analyzes and evaluates data, ideas, patterns, principles, and perspectives e.g, I occasionally think about why things are the way they are.
9. Recognizes own biases and suspends judgmental thinking e.g, I actively seek to gain information on topics I know little about.
10. Uses problem solving strategies in a wide variety of professional situations e.g, I know the basic problem solving strategies.
11. Employs values and standards of judgments from different disciplines e.g, I can use processes from one field to solve problems in another field.

Identitas responden Nama : _____ Tanggal : _____ Kelas : _____ Sekolah : _____				
Silakan menconteng pada angka yang sesuai dengan diri Anda !				
Pernyataan	Kriteria			
1. Saya mengetahui beberapa strategi dalam pemecahan masalah, belajar, dan pengambilan keputusan.	1 ☐	2 ☐	3 ☐	4 ☐

Figure 1. Critical Thinking Questionnaire

3.5.2 Observation Sheet of Student's Participation

In this research, for speaking activity the researcher used observation sheet as instrument. The researcher observed students' participation in panel discussion activity with several topics such as The Pros and Cons of Giving Students Homework, The Pros and Cons of School Uniform, and National Exam : Pro and Contra.

While observing, the most effective way is by completing it with an instrument of observation sheet, as consideration instrument, which contains items about the incident or behavior. In doing observation, we need to make a consideration then match it to the scale assessment in order to get what is wanted (Arikunto, 2006 : 229).

The researcher used some indicators refer to Arsjad (2005) while observing student's participation in discussion activity such as their encouragement/ spirit, fluency, clarity/ word choice, problem mastery and revealing opinions.

Nama : _____						
NO	ASPECT	NILAI				KET
		4	3	2	1	
1	Keberanian/ semangat					
2	Kelancaran bicara					
3	Kejelasan ucapan/ pilihan kata					
4	Penguasaan masalah					
5	Pendapat					

Figure 2. Observation Sheet for Students' Speaking Participation

Each aspect consists of four alternatives score; 1 means 5 point; 2 means 10 point; 3 means 15 point; 4 means 20 point so that if we calculate all aspect, we will gain the highest score is $20 \times 5 = 100$ while the lowest is $5 \times 5 = 25$.

Encouragement/ spirit related to students' braveness to express ideas and response to the problem, whether or not he or she give respond the problem quickly. score 4 is for students who are very brave to express ideas, respond to the problem very quickly, and has very quiet and reasonable attitude while, score 3 for students who are brave to express ideas, respond to the problem quickly, and has quiet and reasonable attitude. Then, score 2 is aimed to students who brave to express ideas, spends long time while thinking to respond to the problem, and has less quiet and less reasonable attitude. Last, score 1 is for students who dare not to express ideas, has no response to the problem, and has unquiet and unreasonable attitude.

Then, fluency measures if they speak fluently or have some difficulties when speak and sometimes stop speaking to think. Each score has interpretation, score 4 if students speak very fluent, without difficulties. Score 3 if students speak fluent, occasionally stop to think. Score 2 is for students who speak less fluent, sometimes stop and stalled. While, score 1 is for them who speak not fluent, often stop and stalled.

Then, clarity/ word choice, it shows whether they vocal is clear, speak in right sentence structure, and have good word choice. For students who have vocals are very clear, proper sentence structure, have so many vocabulary and standard word choice, they get score 4. Then, if students' vocals are very clear, have proper sentence structure, many vocabulary and standard word choice, the score is 3.

Next, score 2 is for students who have vocals are less clear, less proper sentence structure, have less vocabulary, and less standard word choice. While, score 1 if students' vocals are unclear, have inaccurate sentence structure, have less vocabulary, have no standard word choice.

Next is problem mastery. It describes students' understanding about the topic, we can see it from their desire to give argumentations in discussion. Score 4 is for students' who understand the topic very well, have so many and logical argumentations, talking direction is very clear. Score 3 is for students' who understand the topic, have many and logical argumentations, talking direction is clear. Then, score 2 if students understand the topic just little, have limited and less logical argumentations, talking direction is less clear. While, score 1 is for students who do not understand the topic, nothing to say.

The last is opinion and it relates to whether or not they propose a logical argument and it is completed by proper reasons. Score 4 is for students who have opinions are very logical and reasons are very proper, score 3 is for students who have opinions are logical and reasons are proper, score 2 is for students who have opinions are less logical and reasons are not proper while, score 1 is for them who have opinions are not logical, have no reasons.

The interpretation of scoring criteria is as follows:

75 – 100 : high

50 – 74 : medium

25 – 49 : low

3.6 Validity and Reliability

Setiyadi (2006) says that in order to make the research valid and reliable, quantitative research is focused on the instrument of the test while qualitative research is focused on the collected data. In term of validity, the researcher analyzed the test based on the content and construct validity in order to know whether the test has good validity.

3.6.1 Validity of The Instruments

Validity refers to the extent to which an instrument really measures the objective to be measured and suitable with the criteria (Hatch and Farhady, 1982: 250). A test can be considered to be valid if it can precisely measure the quality of the test. There are four types of validity: (1) face validity, (2) content validity, (3) construct validity, and (4) criterion-related validity.

To measure whether or not the test had a good validity, the researcher used content and construct validity since the other two were considered to be less needed. Face validity only concerns with the lay out of the test. Criterion-related validity is concerned with measuring the success in the future, as in replacement test (Hatch and Farhady, 1982: 251).

a. Content validity

According to Hatch and Farhady (1982: 251), content validity is the extent to which the test measures a representative sample of the subject matter content. Good test is the test which is appropriate with all indicators and researcher has to

analyze whether that instrument overall has represented what will be measured (Setiyadi, 2006: 22). The first instrument is critical thinking questionnaire that was designed to measure students' critical thinking skill and it is adopted from Critical Thinking Students Assessment that was developed based on extensive research and the work of Critical Thinking Pilot Group at Central Piedmont Community College. They focus on serving students some courses to improve four core competencies which one of them is critical thinking. It is qualified for the researcher who aims to measure students' critical thinking skill. The questionnaire has positive value means that the higher number chosen will give higher score of questionnaire.

Then the second instrument is adopted from Arsjad (2005) and has been modified by Tika Risti Mulawati (2011). Arsjad says that there are some aspects for discussion assessment. He divides the aspects into literary and non-literary aspect. Each aspect has range score from 1 until 4 and it has different point. 1 means 5 point; 2 means 10 point; 3 means 15 point; and 4 means 20 point. So if we calculate all aspect, the highest score is $20 \times 5 = 100$ while the lowest is $5 \times 5 = 25$. The researcher considers it is suitable to see students' speaking participation in which discussion as its activity. All those consideration above makes the two instruments qualified and have content validity because they represent what will be measured.

b. Construct validity

Regarding the construct validity, it measures whether the construction had already referred to the theory (Hatch & Farhady, 1982 : 251). Construct validity is

necessary for instrument that has several indicators in measuring one aspect or construct. If that instrument has some aspects and every aspect measured by several indicators, similar indicators have to associate positively each other (Setiyadi, 2006: 25). Basically, the construct and content validity are overlap. Here, both instruments have several indicators to describe one aspect.

Table 3.1. Specification of critical thinking skill questionnaire

No	Categories	Number of items	Total Items
1.	Thinks critically and creatively.	1, 2, 3, 4	4
2.	Formulates and re-evaluates position based on available evidence.	5, 6, 7, 8	4
3.	Asks appropriate questions that challenge assumptions and conventional wisdom.	9, 10	2
4.	Integrates ideas and values from different disciplines and contexts.	11, 12	2
5.	Uses reflection as a way to monitor and adjust thinking.	13, 14, 15	3
6.	Understands and applies principles of learning and learning styles to own education.	16, 17, 18, 19	4
7.	Applies knowledge in practical ways.	20, 21, 22, 23	4
8.	Analyzes and evaluates data, ideas, patterns, principles, and perspectives.	24, 25, 26, 27	4
9.	Recognizes own biases and suspends judgmental thinking.	28, 29, 30, 31, 32	5

10.	Uses problem solving strategies in a wide variety of professional situations.	33, 34, 35, 36	4
11.	Employs values and standards of judgments from different disciplines.	37, 38, 39, 40	4

To evaluate students' participation the researcher use some aspects of discussion according to Arsjad (2005: 87-89) that consists of literary and non literary aspects as indicator. The aspects are (1) encouragement/ spirit; (2) fluency; (3) clarity/ word choice; (4) problem mastery; (5) opinion.

Encouragement/ spirit related to students' braveness to express ideas and response to the problem, whether or not he or she give respond the problem quickly. While, fluency measures if they speak fluently or have some difficulties when speak and sometimes stop speaking to think. Then, clarity/ word choice, it shows whether they vocal is clear, speak in right sentence structure, and have good word choice. Next is problem mastery. It describes students' understanding about the topic, we can see it from their desire to give argumentations in discussion. The last is opinion and it relates to whether or not they propose a logical argument and it is completed by proper reasons.

Tabel 3.2. Specification on Data Collecting Instrument for Students' Participation

Aspects	Explanation	Score
1.Encouragement/ spirit	Very brave to express ideas, respond to the problem very quickly, and has very quiet and reasonable attitude.	4

	Brave to express ideas, respond to the problem quickly, and has quiet and reasonable attitude.	3
	Less brave to express ideas, spends long time while thinking to respond to the problem, and has less quiet and less reasonable attitude.	2
	Dare not to express ideas, has no response to the problem, and has unquiet and unreasonable attitude.	1
2. Fluency	Speak very fluent, without difficulties.	4
	Speak fluent; occasionally stop to think.	3
	Speak less fluently, sometimes stop and stalled.	2
	Speak not fluent, often stop and stalled.	1
3. Clarity and word choice	Vocals are very clear, proper sentence structure, have so many vocabulary and have standard word choice.	4
	Vocals are very clear, proper sentence structure, have many vocabulary and have standard word choice.	3
	Vocals are less clear, less proper sentence structure, have less vocabulary, and have less standard word choice.	2
	Vocals are unclear, inaccurate sentence structure, have less vocabulary, have no standard word choice.	1
4. Problem mastery	Understand the topic very well, have so many and logical argumentations, talking direction is very clear.	4
	Understand the topic, have many and logical argumentations, talking direction is clear.	3
	Understand the topic just little, have limited and less logical argumentations, talking direction is less clear.	2
	Not understand the topic, nothing to say.	1
5. Revealing opinion	Opinions are very logical and reasons are very proper.	4
	Opinions are logical and reasons are proper.	3

	Opinions are less logical and reasons are not proper.	2
	Opinions are not logical, have no reasons	1

Tika Risti Mulawati (2011)

3.6.2 Reliability of The Raters/ Inter-Rater Reliability

In order to assess students' speaking participation, the researcher employed two raters in scoring their performance. It is important to know reliability of the raters; the first rater was the researcher and the second one was her friend, also known as inter-rater reliability, to determine how well an implementation of some coding or measurement system works. Thus, the researcher applied a statistical measure of inter-rater reliability that is Cohen's Kappa which ranges generally from 0 to 1.0 (although negative numbers are possible) where large numbers mean better reliability, values near or less than zero suggest that agreement is attributable to chance alone.

Table 3.3. Inter-Rater Reliability Test Result

Symmetric Measures					
		Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.
Measure of Agreement	Kappa	.504	.101	7.780	.000
N of Valid Cases		30			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

The results of the inter-rater reliability for the raters was found to be Kappa = 0.504 with $p < 0.001$. it is considered moderate. As a rule of thumb values of Kappa from 0.40 to 0.59 are considered moderate, 0.60 to 0.79 substantial, and 0.80 outstanding (Landis & Koch, 1977).

3.7 Research Procedure

The procedure of the research is as follows:

1. Determining research objectives

The objectives of the research is to investigate whether there is a significant correlation between students' critical thinking skill and their participation in speaking activity and what aspect does critical thinking skill influence in students' participation.

2. Deciding the research sample

The sample of this research is the first year students of SMAN 9 Bandar Lampung in second semester. There are eleven classes of grade one. However, the researcher chose only one class for sample of this research.

3. Planning research instrument

The questionnaire to measure students' critical thinking skill consists of forty items (**see appendix 2**) with four points scale to answer. While the researcher implemented some indicators from an observation sheet to score students' participation in speaking activity.

4. Administrating the critical thinking skill test

The researcher gave the questionnaire to the students. The questionnaire is named the Critical Thinking Students Assessment questionnaire that was developed based on extensive research and work of the Critical Thinking

Pilot Group at Central Piedmont Community College which have been modified in order to make it appropriate to use in this research.

5. Administering the speaking activity to see students' participation.

The researcher gave a speaking activity to the students through informal debate as a kind of discussion activity according to the topic given. The researcher asked her friend as second rater and also co-researcher for observing students' participation in order to collect an accurate data. The researcher chose to use different topics to make the discussion be more excited because here each group would be the expert of what they discussed. They were asked to think to defend their opinions.

For debate, the students were led through a six stage process, which echoed six cognitive competencies (Rear: 2010), they are:

1. Identify and clarify the issue (Interpretation)
2. Gather and organize information about the issue (Analysis)
3. Evaluate that information for accuracy and applicability (Evaluation)
4. Draw conclusions from the evidence (Inference)
5. Explain conclusions logically in the form of a debate (Explanation)
6. Critically appraise and examine one's performance (Self regulation)

The steps are as follows:

- 1) The researcher divides students into three groups that consist of ten students in each group.

- 2) Each group gets a text with different topic that relates to their life completed with some questions and the text let them to be pro or contra with what the writer's opinion in the text.
- 3) All members of group work and discuss for the answer of the questions, determine their position (pro or contra) and prepare some arguments to strengthen their view.
- 4) After 20 minutes each group present the result discussion in front of the class and the students from other groups give three questions and they are allowed to give argument to reject what the presenter said.

The topics for discussion are as the following:

- 1) The Pros and Cons of Giving Students Homework
- 2) The Pros and Cons of School Uniform
- 3) National Exam : Pro and Contra ?

6. Collecting the data

After administrating the test and activity, the data will be collected by the researcher.

7. Analyzing the data

The data will be analyzed by using One Way Anova which will be computed by SPSS 20 to investigate whether there is a difference of participation in speaking between high and low critical thinking skill students.

8. Discussing and reporting the result of the data analysis.

3.8 Data Analysis

In running one way ANOVA, there are five data assumptions that should not violate in order to support the result of the ANOVA calculation (Setiyadi, 2006).

They are:

1. There is only one dependent variable and one independent variable with three or more level. In this research, the dependent variable is the students' speaking participation scores and the independent variable is the critical thinking score.
2. The dependent variable should be measured at the interval/ratio level. In this study, the dependent variable is continuous variable, that is the scores awarded by raters, and it is ranged from 25-100. Therefore the second assumption is met.
3. It is a between group comparison. In this research the independent variables are the subjects to compare. So, the third assumption is not failed.
4. The dependent variable should be approximately normally distributed for each category of the independent variable. In this research, the researcher employed *Shapiro-Wilk test of normality* which is available on SPSS and because this type of normality test is the most appropriate one for a research with sample size less than 50; however it can handle sample sizes as large as 2000.

Table 3.4. Normality Test Result

Tests of Normality							
	Critical Thinking	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Score	Statistic	df	Sig.	Statistic	df	Sig.
Speaking Participation	Low	.229	5	.200*	.867	5	.254
	Medium	.192	18	.078	.902	18	.063
	High	.345	7	.012	.775	7	.023

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

The table above explained the result of *Shapiro-Wilk test of normality*. We can see from the table that for the "Low", "Medium", and "High" group, the dependent variable "speaking participation" was deviated. It was shown by the significance value of more than 0.05 (only two categories met this assumption), so the data has non-normal distribution. Fortunately ANOVA only requiring **approximately** normal data meaning that assumption can be a little violated and still provide valid results.

3.9 Hypothesis Testing

After collecting the data, the researcher records and analyzes them in order to find out whether there is a significant effect of critical thinking with students' participation in speaking activity. The hypothesis of this research is "there is a difference speaking participation between high and low critical thinking skill students" and "students with high critical thinking skill gain the highest score on problem mastery aspect".

The hypothesis 1 was statistically analyzed using Comparative Study (One Way Anova) that draws the conclusion in significant level if $P > 0.05$, H_0 accepted, and $P < 0.05$, H_1 accepted. Then, for hypothesis 2 it was determined by comparing all scores of each participation aspect.

Hypothesis 1

H_{01} there is no difference in speaking participation between high and low critical thinking skill students.

H_1 there is a difference in speaking participation between high and low critical thinking skill students.

Hypothesis 2

H_{02} students with high critical thinking skill do not gain the highest score on problem mastery aspect.

H_2 students with high critical thinking skill gain the highest score on problem mastery aspect.