CHAPTER IV

FINDINGS AND DISCUSSION

This chapter discusses The Finding of the Research and Discussion

4.1 The Effectiveness of Paul's Wheel Strategy in Incresing Students' Critical Thinking in Reading Explanation Text

In this chapter, the researcher analyzed the data based on the result of quantitative phase. In this research the researcher used mix method design to mix of quantitative and qualitative data. In quantitative phase the researcher ensured that the strategy is influenced the achievement of students. The researcher used two classes of tenth grade, they are Mipa 1 and Mipa 2, one class gave a treatment and the other class are not. This treatment has a purpose to increased critical thinking skill in reading ability. This chapter showed up the results in table: the table assessment from all student's ability. The results indicated the percentage of the students' achievement.

Process of research had done at about one month from 3th March - 19th April 2017. Before starting the lesson, the researcher gave the pre-test. After that, all of the materials which were given to the class to get the achievement in reading skill. The quantitative data got from pre-test and post-test, the researcher got the test towards 50 students who had been selected, Mipa 1 gave the strategy, then mipa 2 is not. They gave 10 question about explanation text by the tittle "Earthquake: Movement of the Earth's Crust "that will done in duration of 45 minutes. After giving the test, the researcher analyzed the result as the data. to count the quantitative data, by using Microsoft Excel 2010 and SPSS Verse 20,0. The result of the quantitative test showed the Paul's Wheel Startegy is Effective in Students' Critical Thinking in Reading Explanation Text from the counting of result of formula that has been explained below:

4.1.1 The Pretest Score of both classes

The researcher inputs the list of students. At present, the researcher has been prepared the data of pre-test and post test which took from eleventh grade of the students from Mipa 1 and Mipa 2 in Muhammadiyah 2 Senior High School of Surabaya as seen in the table belows:

Table 4.1 Pretest's score of Experimental class and Controlled class

No.	Passing	Score o	f Pre-test
	Grade	Exp*	Cntrl*
1.	70	70	50
2.	70	70	70
3.	70	70	70
4.	70	70	70
5.	70	30	60
6.	70	80	80
7.	70	50	50
8.	70	30	40
9.	70	50	50
10.	70	70	60
11.	70	60	60
12.	70	50	60
13.	70	50	50
14.	70	70	40
15.	70	50	60
16.	70	70	40
17.	70	40	40
18.	70	60	60
19.	70	80	40
20.	70	80	50
21.	70	50	50
22.	70	60	60
23.	70	70	40
24.	70	60	60
25.	70	50	50
Ave	rage Score	59,6	54,4

Explanation : Exp* = Experimental class

Cntrl* = **Controlled class**

The table 4.1 showed that, 10 pretest questions were given to the students both in the experimental group and controlled group before researcher explained about the material. The pretest score are showned in table 5. Based on researcher after counting the real score result of pretest both experimental class and controlled class, shows that the minimum score of experimental class is 30 and the

maximum score of experimental class is 80. Meanwhile, in controlled class is minimum score is 40 and the maximum score is 80, wheareas, the mximum score in the test must reach 100 score.

4.1.2 The Post-test Score of both classes

After doing the learning teaching process of experimental and controlled class, the students were given posttest to measure the student's achievement. At present, in this table below showed the post-test score, especially at X Muhammadiyah 2 Senior High School of Surabaya.

Table 4.2 Post-test's Score of Experimental class and Controlled Class

No.	Passing	Score o	of Post-test
	Grade	Exp*	Cntrl*
1.	70	70	60
2.	70	80	70
3.	70	90	60
4.	70	70	60
5.	70	70	60
6.	70	80	80
7.	70	80	80
8.	70	60	60
9.	70	70	60
10.	70	60	60
11.	70	70	60
12.	70	70	50
13.	70	60	60
14.	70	90	40
15.	70	80	60
16.	70	70	50
17.	70	50	50
18.	70	70	50
19.	70	90	40
20.	70	90	70
21.	70	70	70
22.	70	80	70
23.	70	80	50
24.	70	80	70
25.	70	80	80
Ave	erage Score	74,4	60,8

Explanation: Exp* = Experimental class

Cntrl* = **Controlled class**

The table 4.2 shout showed, that 10 post-test questions were given students to the experimental and controlled classes after the researcher explained the material. The scores both of the classes are showed. From the counting, the result of the score which are gt in post-test, is it showed that the minimum score of experimental class is 50 and the maximum score is 90. Meanwhile, in controlled class the minimum score is 40 and the maximum score is 80.

Based on both of class, the result it is showed from 10 pre-test and posttest questions were given to the students in experimental and controlled class before and after giving the explanation material. The scores showed the minimum and maximum of both classes.

4.1.3 The precentage student's score improvement of passing grade.

Next, the researcher discussed about the percentage of pretest and posttest value. The data are shown below:

Table 4.3 The numbers of student excedding of passing grade

In pre-test and post-test (experimetal class)

Passing Grade	Students of experimental class		Precentage of test	
	Pre-test	Post-test	Pre-test	Post-test
Complete (Grade ≥ 70)	3	12	12 %	48 %

Based on the precentage in table 7, it show the result of comparison of pre-test and post-test of the students which exceed the passing grade of pre-test 12% and post-test 48% so the increasing is 36%.

Table 4.4 The numbers of student exceeding of passing grade

In pre-test and post-test (controlled class)

Passing Grade	Students of controlled class		Precentage of test	
	Pre-test	Post-test	Pre-test	Post-test
Complete (Grade ≥ 70)	1	3	4%	12%

Based on the precentage in table 8, it show the result of comparison of pretest and post-test of the students which exceed the passing grade of pre-test 1% and post-test 12% so the increasing is 11%

Table 4.5 The comparison percentage of Post-test for controlled and experimental class

Passing Grade	Both of classes		Precentage of test	
	Controlled	Experimental	Controlled	Experimental
Complete (Grade ≥ 70)	3	12	12%	48%

Based on the precentage in table 9, the result of the compariosn of posttest shows that the students' precentage which exceed the passing grade of cotrolled class is 12% and experimental class is 48% so the comparison of both classes is 36%.

4.1.4 Test of normality distribution

4.1.4.1 Test of normality distribution of both classes (pre-test)

Test of normality distribution is to measure whether there is significant or not both of classes. The researcher gave pre-test to the students to measure it. Test of normality distribution of both classes in pre-test is used statistics with hypothesis formulate as below:

 H_{0} = The data is normality distribution

 H_1 = The data is not normality distribution

The researcher uses softwere SPSS 20.0 of Kolmogrov-Smirnov test to test the normality distribution. It is used terminology P -value that means significant (sig.) the standard of significant is called alpha (α) 0.05 In the other hand, H_0 push away if P -value < α . That means this research is not normality distribution. The result as below:

Table 4.6 Result of Kolmogorov and Smirnov (K-S)

One-Sample Kolmogorov-Smirnov Test

		Experimental	Control
N		25	25
,	Mean	59,6000	54,4000
Normal Parameters ^{a,b}	Std. Deviation	14,28286	11,21011
	Absolute	,207	,173
Most Extreme Differences	Positive Negative	,149 -,207	,173 -,171
Kolmogorov-Smirnov Z		1,034	,863
Asymp. Sig. (2-tailed)		,236	,445

- a. Test distribution is Normal.
- b. Calculated from data.
- a. Test distribution is Normal.

Based on the table 10, it can be seen that the result of Kolmogorov-Smirnov is significant because the value of experimental class and controlled class are 0,236 and 0,445. The significance of both classes is more than significant value (0,05). So, H_0 is accepted and the data is normality distribution.

4.1.4.2 Test of normality distribution of both classes (post-test)

The reseracher got post-test score after the students following the material, this test will to know whether there is difference of normality distribution or not. It same the previous normality distribution the data post-test will be tasted by using Kolmogorov-Smirnov with the standard is 0,05. The hypothesis formulate as below:

 H_0 = The data is normality distribution

 H_1 = The data is not normality distribution

The normalitas distribution tets by using softwere SPSS 20.0 of Kolmogorov-Smirnov test. It is used terminology P -value that means significant (sig.) the standard of significant is called alpha (α) 0.05. In the other hand, H₀ is pushed away if P -value < α . That means this research is not normality distribution. The result it can seen below:

Tbale 4.7 Result of Kolmogorov and Smirnov (K-S)

One-Sample Kolmogorov-Smirnov Test

		Experimental	Control
N		25	25
	Mean	74,4000	60,8000
Normal Parameters ^{a,b}	Std. Deviation	10,44031	11,15049
	Absolute	,184	,209
Most Extreme Differences	Positive	,183	,209
	Negative	-,184	-,191
Kolmogorov-Smirnov Z		,921	1,043
Asymp. Sig. (2-tailed)		,365	,227

a. Test distribution is Normal.

Based on the table 11, it can seen that the result of Kolmogorov-Smirnov is significant, it can seen from the value of experimental and controlled class are 0,365 and 0,227. The significance of both classes is more than the significant value (0,05). So, H_0 is accepted and the data is normality distribution.

4.1.5 Homogenity Test

To know that both classes have similarity, the researcher the score by using Levene test of homogenity of variences, the result can seen below:

Table 4.8 Test of Homogeneity of Variances

VAR00001

Levene Statistic	df1	df2	Sig.
1,197	4	20	,343

b. Calculated from data.

Based on the result above, p value (significant value) is higher than α value. $p > \alpha / 0.05 < 0.34$. So, from the hypothesis H_0 is accepted if $p > \alpha$. It can conclude both of classess are homogen.

4.1.6 T- Test

The researcher measure the effectiveness of Paul's Wheel Strategy is used in reading explanation text by using T-test with software SPSS verse 20.0. The hypothesis is formulates as below:

- H_0 = Paul's Wheel Strategy is not effective in reading explanation text to increase students' critical thinking skill.
- H_1 = Paul's Wheel Strategy is effective in reading explanation text to increase students' critical thinking skill.

 H_0 is pushed away if the significant standard in T -test which is done by using SPSS 20.0, if $P_{(value)} > \sigma$ It means this strategy is effective using Paul's Wheel Strategy in reading explanation text to increase students' critical thinking skill at tenth grader of experimental class.

Table 4.9 T -test Group Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Experimental	25	74,4000	10,44031	2,08806
Control	25	60,8000	11,15049	2,23010

Independent Sample Test

	Test Value = 0					
	t	Df	Sig. (2- tailed)	Mean Difference	95% Confidence Intervente Difference	
					Lower	Upper
Expe rime ntal	35,631	24	,000,	74,40000	70,0905	78,7095
Cont rol	27,263	24	,000	60,80000	56,1973	65,4027

Based on the table 12, the significant (sig) uses T -test to get the variences test of the value post-test both classes are, 0.000, from the value it get that significant less than 0,05 or P -value $< \sigma$, so H_0 is pushed away. In other hand, The reseracher use T -test for equality of means got the same significant is 0,000, the value significant less than 0,05 or P -value $> \sigma$, it means H_0 is pushed away. The ability of both classes are same. So, the researcher can conclude that Paul's Wheel Strategy is more effective than without using the strategy because there are differences in result.

4.2 How the Paul's Wheel Strategy in Enhances Students' Critical Thinking in Reading Explanation Text

In this phase the researcher answer the research question. How does Paul's Wheel enhance student's critical thinking in reading explanation text. The result of this research was obtained through the process of the Implementation of Paul's Wheel Strategy and The Criteria Critical Thinking Test that conducted using Paul's Wheel Strategy is affected in students' critical thinking skill based on theory Paul and Elder (2008).

4.2.1 The Implementation of Paul's Wheel Strategy

This research to explain teaching reading explanation text using Paul's Wheel Strategy in tenth grade at Muhammadiyah 2 Senior High School of Surabaya, The researcher want to know the effect of using Paul's Wheel Strategy in Students' Critical Thinking. The researcher conducted the strategy on 18th and 19th April 2017 of tenth grade Mipa 1.

To know the effect of Paul's Wheel Strategy in students' Critical Thinking in teaching reading explanation text, the researcher show the step the learning processes in the classroom. Firstly, the researcher prepared lesson plan before, discussion with the teacher what the material and step of teaching processes in the classroom, then introduced about the researchers' purpose that handled of the class and greeted to all the students. (See Appendix 21).

In main activity, before the researcher introduced the material, the class divided into group of four, the purpose of this process help the students to discuss and gained the information gathered with theirs friends that effected in students' critical thinking that supported reading material in passage about the Effect of Global Warming for each group (See Lesson Plan). Then asked the students to read the passage in ten minutes to understood of the material before learned, After the students got the information, the researcher ask the students and guide the material with saveral question to stimulate the students collected the information based on the passage(See Appendix 21 and Lesson Plan), The researcher asked and chose the students based on attendence list to help read for each paragraph then discussed the information that contained in each paragraph (See Appendix 21) in this seasion the researcher stimulate the students to guide information about the material based on the each of paragraph (See Appendix.21.). By the end of discussed the students are founded the information and know what the material that they learned, Meanwhile the researcher explained more about the material reading explanation text to strengthen students' understanding, Such as: The generic structure of explanation text are general statement, explanation statement smd conclusion, the researcher explained of each generic structure based on the Passage, Language element like present passive voice, in this seasion the students and the teacher shared the information about the present passive voice to stimulate by gave example of the passive voice, then the students collected the information and mention the pattern of passive voice based on passage for each group (See Appendix 21) After each group mention the passive voice, the researcher continuou to explain action verb and the cause and effect more detail. To strengthen of the material the researcher conclude the material and purpose. Furthemore, the students get the input about the material then the researcher used Paul's Wheel Strategy to stimulate the student's critical thinking.

Paul's Wheel that strategy supported by Paul and Elder (2008) is explained eight elements of productive thinking which involved of logical reasoning that combines both creative and critical thinking skill. The strategy guide the students to read and analyzed passage and article for each element in a meaningful way, the elements such as Purpose, Questions, Point of View,

Information, Inferences, Concept, Implication and Assumption (See Chapter II). Before, the implementation of Paul's Wheel the researcher create the media who help the students felt there in a wheel that incude saveral question which stimulate students' critical thinking and used Paul's Wheel of Reasoning Rubric to explore how is critical thinking aspect occured in learning process. Firstly, the researcher introduced of Paul's Wheel and the elements to students, and give the information for each elements that connected to the reading passage. Secondly, the researcher asked and discussed each element based on information in passage and observing the process by using Paul's Wheel of Reasonig Rubric to observed the critical thinking aspect based on Paul and Elder (2008).(See Appendix 21). Third, after explaines one by one of Paul's Wheel Element the researcher ask to answer in the worksheet (See Appendix 21). Last, the researcher concluded the meeting and gave feed back to the students.

4.2.2 Aspect of Critical Thinking in Paul's Wheel Strategy

This research explained teaching reading explanation text using Paul's Wheel Strategy in tenth grade at Muhammadiyah 2 Senior High School of Surabaya, what are the effected of using Paul's Wheel Strategy in students' Critical Thinking. The researcher conducted the strategy on 18th and 19th April 2017 at tenth grade Mipa 1.

To answer the effect of students' Critical Thinking Skill in teaching reading explanation text, the researcher gave the test before and after the implementation of Paul's Wheel to got the different result, the test included 10 question that applied based on Paul and Elder (2008). (See Chapter 2).

The researcher analyzed that Students' Critical Thinking are incresingly, it conclude that the Paul's Wheel Enhance Students' Critical Thinking Skill by supported the question those are stimulate. It can seen from the chart below:

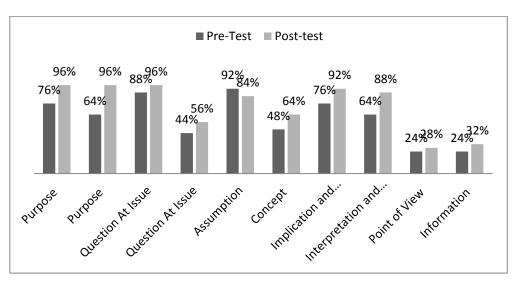


Chart 4.1 The Impact of Critical Thinking Aspect Show in the Test Improvement

The chart above showed that there are question which are significantly improve after gave the treatment of Paul's Wheel Strategy, the researcher gave the students 10 question in pre-test and post-test. The form of question were accomodired of Critical Thinking (See Chapter II). In here the researcher want to analyzed each number 1 - 10 that counducted based on theory Paul and Elder (2008) to stimulate students critical thinking in 8 aspect, they are Purpose, Question at Issue, Information, Interpretation and Inference, Concept, Assumption, Implication and Sequences, Point of View that contain for each quaestion. It can seen from the following step below:

The question of number 1, "What is the type of the text?" from the question about "type" in element of thought, the researcher want to stimulated studets of the target of the passage in explanation before. The result in pre-test the students answer 76% but in post-test increase until 96%.

The question number 2, "What is the purpose of the text?". The "Purpose" help the reader to stimulate the goals of the passage, and to guide the students understood what the writer write the passage for the reader. in pre-test the students answer correctly in 36% and in post-test increase until 96%.

The question number 3, "What is the main issue of the text?". "Issue", is stimulate the students about saveral problem that occur in reading passage, they were able to solved the problem and undrstood to break the paragraph to get the

information in saveral ways. In pre-test the students answer correctly 88% and in post-test increase 96%.

The question number 5, "Major earthquake is populated areas can cause large huge destruction. The closest meaning with underline word is?". The underlined word above, helped the students assumption which included in paragraph, to get the meaning related to the passage in appropriate. The students answer in number 5 correctly was 92% but decrease 84% in post-test.

The question number 6, "Which of the following best expresses the organization of the information in the passage?". This type of the question guide the students to identified the concept how the passege was organized and explain based on the writer, This aspect help the students able to comprehend for each paragraph and purpose that connected each other to got the information that contained in each paragraph that follow of writer's concept. In pre-test the students' answer correctly 48% and increase 64%.

The question number 7, "Which of the following best describes the organization of the passage?". This question was related the aspect that conducted the Implication and Cosequences. The students comprehend and understood of the passage than follow with negative and positive reasoning in each paragraph to know how to best describes organization of the passage. Students answer correctly is 76% and increase in 92%.

The question number 8, "What type of information is included in the first paragraph?". The question guide the readers to indicate the interpretation and inference based on the information in the first paragraph. In this question the students answer correctly is 64% and increase in post-test 88%.

The question number 9 is, "How does the information in the second paragrah differ from that in the third paragraph?". This question is stimulate

and guide the students to found the differences information in both of paragraph, identify which one was strengthened and weakness to evaluating of point of view, so the students get the differences the gap in second and third paragraph. From the percentage above the result students' answer correctly in pre-test is 24% and post-test increase 28%.

The question number 10, "What does not have the potential to generate tsunami?". this question is stimulate the students to found the information based on passage, but in here the researcher give the question that opposite from the information in passage, to guide the students found the fact, data about the correct answer. The precetage students correct answer is 24% and increase in 32%.

Based on the analyze test number 1 - 10 contained 8 aspect element of thought such as: Purpose, Question at Issue, Information, Interpretation and Inference, Concept, Assumption, Implication and Sequences, Point of View those are stimulate students' crtical thinking skill by Paul's Wheel Strategy, It showed from the chart between pre-test and post-test different in result, Mostly after the researcher applied Paul's Wheel Strategy the students answer were increasing. Furthemore, the strategy were able to stimulate the student's critical thinking in eight aspect. This question stimulate the students to use theirs elements of thought to analyze the passage of explanation text.

4.2.3 The Analysis of Paul's Wheel Strategy Enhances Student's Critical Thinking in Reading Explanation Text

The researcher answer the question how the Paul's Wheel Strategy Enhances Student's Critical Thinking in Reading Explanation Text. Paul's Wheel is a strategy can be applied in secondary until university level that like a wheel, for each wheel has a part and question called eight elements of productive thinking which involves of logical reasoning that combines both creative and crtical thinking skill, Paul and Elder (2008). While, the teacher applied this strategy to guide and stimulate students reading activity in meaningful way. So the students of the benefecial and challenging in reading process, it can seen from

the implementation Paul's Wheel Strategy by the researcher above, that showed how the researcher guide the students to work in group and analyze the explanation passage and sharing with each other. Based on observation in class, the researcher used Paul's Wheel of Reasoning Rubric that help to know whether the strategy enhances in student's critical thinking. It can found that the students were able to fill the aspect based on Paul's Wheel of Reasoning Rubric. To supported the strategy in learning process, the researcher conducted the test which were included the aspect of Paul's Wheel Strategy. The test has done before and after the implementation of Paul's Wheel Strategy to know the effect of Paul's Wheel Strategy in Student's Critical Thinking. It can seen from the chart below:

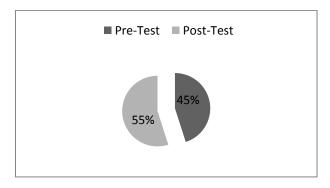


Chart 4.2 The Impact of Critical Thinking Aspect Show in the Test Improvement

The chart above was showned increasing both Pre-test and Post-test in 10%, there is an improvement both of test, it supported for each number between pre-test and post test are increasing, (See Chart 1). The question for each number has accomodired the aspect of Paul's Wheel Strategy that contained elements of thought that gave effect of student's critical thinking. The student's need to master in order to learn how to upgrade their thinking. They need to be able to identify the "Parts" of their thinking and they need to be able to assess their use of these parts of thinking, to found some aspect from Paul's Wheel that's impact student's critical thinking, as follows:

All reasoning has a purpose, article and reading passages has a purpose from the writer to the reader. All reasoning has a purpose to connect between

writer and reader to get the goals. The students were able to found the goals and objectives in reading passages, they try to found what's the writer purpose from the passage, in learning processes this stimulate the students to state the purpose of the passage in oral and written clearly and stiil on target.

Issue is the important thing that the writer's messege to the reader, from this issue the reader try to solve and settle the problem. Paul's Wheel stimulate the reader to breaks into sub question to analyze the issue based on the passages. *All reasoning is an attempt to figure something out, to settle some question and solve the problem*. So, Question at issue helpt the reader especially the students to know what the problem and issue occur on the passages and have the ability to analyze and solve the problem and issue, in habitual they can express the question in saveral ways to clarify the meaning and scope of the issue or problem.

Information is the main point from the article or reading passages that the reader need, they need a source that supported if the data valid or not. They need the information to build the knowledge to process into theirs brain that produce the useful new information as a reader to get the beneficial for theirself. As a critical reader they able to know that *All reasoning based on Data, Facts, Observation and Experiences* related the topic that discuss on the passages. It's the important to explore and found what one of them in the passages, to give accurate and relavant to the issue or problem. This strategy stimulate the readers especially for the students that everything information must be supported by data you have, not only from one source but gathered to sufficient information to proved that is appropriate to receive as an information.

Inferences or Interpretation is help the reader to draw the Conclusion from the passage, In here the reader was able to know what the conclusin of the passage or article by understand the paragraph that guide the reader to identify the assumption that lead to inferences, *All reasoning contains Inferences or Interpretation by which draw the conclusion and give meaning to the data*, the readers must be check the inference for their consistency with each other. Conclusion is the important for the writer and reader to connect and build the Inferences or Interpretation that give the meaning of the text.

All reasoning is expressed through, and shaped by, concept and ideas.

Concept and ideas is need for the students to evaluate theirs thinking, Paul's Wheel guide the students to identify for each paragraph has an main idea and supporting the idea, when the mind makes a generalization such as a concept of this paragraph, it extract similirites and understood that idea contain in each paragraph then guide the students and reader mention the idea in each paragraph, to stimulate theirs mind to explain them clearly.

All reasoning is based on assumption. Assumption is how the writer accepted as a true thats happen. To guide and stimulate the students to draw and give theirs assumption of the issue that's occur based on the passages, they try to found the writer belief about the issue that support about the fact, or experince to help the readers or students get the assumption by theirs own thinking. As a reader, they make that situation that benefecial as a reader.

All reasoning leads somewhere or has Implications and Cosequences

Implication as the writer's purpose to the reader, it's sometimes show the background of the passage to give the knowladge to the readers, this implication that connected to the sentences that support the consequences of the aim, for the example: if the writer's purposes that explained about the effect of global warming, furthemore, the readers get the consequences based the infomation had they read and try to explored negative as well as positive implications thats contains in the passages, then stimulate their thinking to analyze

All reasoning from some Point of View. The information is benefit or not from the writers based on some point of view, they supported the information from some perspective which related from the issue or problem to strengthen the information, it was useful for the writer to gave the orientation to the readers and give background knowledge. The students had a reasoning to identify for each strengths as well as weakness to use theirs thinking in evaluating of point of view that show from the writer, they use their thinking to identify where's the writer's orientation.

Based on explanation above, there are some aspect in Paul's Wheel Strategy that impact student's critical thinking, it can seen from the chart below:

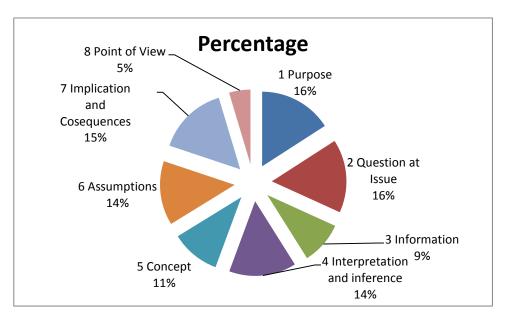


Chart 4.3 The Improvement of Paul's Wheel Aspect

From the chart seen, the percentage of improvement aspect of critical thinking, There are 8 aspect that effect in students; critical thinking, they are: This aspect get the reasoning in the thinking that has a purpose, attempt to figure something out, to settle some question, and solve the problem, based on data, information and evidence, contains inferences or interpretation by which draw conclusion and give meaning to data, expresse through and shaped by concept and ideas, based on assumption, leads somewhere or has implication and cosequences and the last all reasoning from some point of view.

Finally, the eight aspect of Paul's Wheel Strategy is improving in students' critical thinking skill, If the teacher in reading activity stimulate and analyze by using this strategy it helps upgrade students thinking in analyze passage, while if apply continuously in daily life the student's thinking quality is improving to be Intellectual Standard.