



The Critical Thinking Ability in Watson-Glaser Framework in Fourth Grade Students

Farida Puput Lestari✉, Farid Ahmadi, Rochmad Rochmad

Universitas Negeri Semarang, Semarang, Indonesia

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Abstract

This study aimed to determine the critical thinking ability of fourth-grade students at SDN Sampangan 02. It is because that critical thinking ability is one of the important ability for students to have since elementary school. The method used was descriptive qualitative. The subjects in this study were students of SDN Sampangan 02. The data collection technique used was a critical thinking ability test referring to the Watson-Glaser Critical Thinking Appraisal and documentation. Data analysis techniques used the interpretation of final scores, percentages, and averages. The results showed that students' critical thinking ability was in a low category. In the inference indicator, students' critical thinking ability was in a low category. In the indicator of assumption recognition, students' critical thinking ability was in a low category. On deduction indicators, students' critical thinking ability was in a low category. In the interpretation indicator, students' critical thinking ability was in a low category. The last, in the indicator of evaluation argument, students' critical thinking ability was also in the low category.

✉ Correspondence address:

Jalan Kelud Utara III, Semarang, Indonesia.
E-mail: faridapuputl@gmail.com

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INTRODUCTION

Critical thinking according to Ennis (1993) is reflective thinking reasoned with a focus on deciding what to believe and do. In line with Ennis (1993) and Jumaisyaroh et al. (2015) state that critical thinking is a thinking ability to make, evaluate, and make decisions about what has been done. It can be simply said that critical thinking is a thinking activity supported by several reasons and aims to decide on something.

Critical thinking is important for students to have. In order to be able to make decisions and solve problems effectively, students must be able to think critically (Setyowati et al., 2011; Peter, 2012). In line with Peter, Jumaisyaroh et al. (2015) said that critical thinking ability is important for students to be rational and choose the best choice for themselves. Furthermore, Jacob (2012) states that critical thinking ability stimulates students to be independent and solve problems they found in school as well as in everyday life. In addition, according to Nuryanti et al. (2018), the ability to think critically is one of the abilities needed to solve various problems in people's life. Thus it can be said that students' critical thinking is not only important in the education world but also the real one (the world outside of school).

Considering the importance of critical thinking, schools as educational institutions need to carry out learning that can facilitate students to sharpen and develop their critical thinking ability. The ability to think logically, rationally, critically, and creatively cannot happen by itself but requires an educational process, one of which is learning mathematics in schools (Abdullah, 2013). Mathematics learning can be used as a means to improve critical thinking ability. So, it needs to become a concern for teachers in carrying out mathematics learning activities, do not only focus on achieving mastery of mathematical learning concepts but also train students to be able to think critically (Haryani, 2012). Therefore, mathematics learning should be maximized in order to improve students' critical thinking ability.

In fact, critical thinking has not been accustomed to schools, there are very few schools that focus on teaching students to think critically (Syahbana, 2012; Danaryanti & Lestari, 2017). Based on the results of observations, the implementation of mathematics learning has not been able to make students become active in learning. Mostly the math exercises given to students are routine problems. This such mathematical learning process makes students become less capable to think critically. In addition, teachers also do not know much about their students' critical thinking ability.

Since critical thinking ability is one of the important ability possessed by students, it is also necessary to know how their critical thinking ability need to be measured. For this reason, analysis of critical thinking ability is needed for students to be able to know and understand how their critical thinking ability is. The results of these measurements can be used as a basis for developing their critical thinking ability.

There are many theories about indicators of critical thinking ability, one of which is a theory proposed by Watson and Glaser. Indicators of critical thinking according to Watson and Glaser (2002) are as follows; (1) inference, able to distinguish between the truth and error of a conclusion drawn from the data provided; (2) recognition of assumptions, able to provide allegations or prejudices from the statements given; (3) deduction, able to determine whether certain conclusions have to follow information from the statement or premise given; (4) interpretation, able to measure the evidence and decide whether generalizations or conclusions based on the data provided are correct or not; (5) evaluation of arguments, able to distinguish strong and relevant arguments from weak or irrelevant arguments with certain problems.

Watson-Glaser Critical Thinking Appraisal (WGCTA) is one of the tests developed by Goodwin Watson and Edward Glaser. An institution that publishes tests based on the WGCTA framework is the Pearson Assessment. In this study, the researcher used

tests that refer to the WGCTA framework and be adjusted to the characteristics of students in elementary schools.

This study specifically aims to determine the level of critical thinking ability based on the Watson-Glaser Critical Thinking Appraisal in fourth-grade students of SDN Sampangan 02 in Semarang. The analysis of critical thinking ability needs to be done as input for teachers to design appropriate learning activities and improve students' critical thinking ability.

METHODS

This research was a descriptive study, which aimed to describe the situation regarding students' critical thinking ability. The results gathered were then described as quantitatively and qualitatively. This research was conducted in IVA and IV B Classes at SDN Sampangan 02 Semarang. The subjects in this study were fourth-grade students in SDN Sampangan 02, totaling 68 students. Data collection techniques were carried out by using written tests. The test of critical thinking ability refers to the Watson-Glaser Critical Thinking Appraisal (WGCTA). Before conducting data collection, the test instrument was tested first to find out its validity and reliability. Validity was calculated using product moment analysis while reliability was calculated using the alpha formula with the assistance of Microsoft Excel 2013.

There are several stages of development of the instrument, including finding the right theoretical basis, preparing instrument items, experts validation, testing instruments on the appropriate respondents, calculating validity and reliability, understanding the characteristics of instrument items, using appropriate instruments, and then compiling them into instruments that are appropriate and ready to use.

The quality of research instruments greatly influences the accuracy of the research results. Although the research design, data scale, and statistical tests applied are appropriate, the quality of research instruments is still needed to conclude. When the research instruments have low validity and reliability, the conclusions of the

research results or statistical hypothesis testing are not appropriate. An analysis of validity and reliability is very important and needs to be done in developing instruments.

The critical thinking test in this study consisted of 7 questions that had been validated by 2 validators (UNNES Postgraduate lecturers). Initially, the score on the critical thinking ability test had a score range of 0-5. Furthermore, the scores obtained were converted into a score range of 0-100. The formula used to convert the scores obtained is as follows.

$$\text{Score} = \frac{\text{Score Obtained}}{\text{Maximum Score}} \times 100$$

Final scores on the students' critical thinking ability test were then interpreted into the categories in Table 1.

Table 1. Criteria for Critical Thinking Ability

Criteria	Interval
Very High	81.25 < Score ≤ 100
High	71.5 < Score ≤ 81.25
Moderate	62.5 < Score ≤ 71.5
Low	43.75 < Score ≤ 62.5
Very Low	0 < Score ≤ 43.75

The result of the critical thinking ability test that has been obtained was then analyzed by calculating the average using the formula suggested by Sugiyono (2013).

$$\bar{x} = \frac{\sum Xi}{n}$$

Notes:

- $\sum Xi$: The sum of all data
- n : The number of data
- \bar{x} : Average

RESULTS AND DISCUSSION

The research instrument in the form of a critical thinking ability test was then tested on 38 students of IVA class at SDN Bendan Ngisor, Semarang. The test results were then analyzed in terms of its validity and reliability (Ikhsanudin &

Subali, 2018). The results of validity and reliability tests of students' critical thinking ability are presented in Table 2.

Table 2. Calculation Results of Validity and Reliability Test

Test Item	Validity		Result	Reliability
	R _{count}	R _{table}		
1	0.79		Valid	
2	0.84		Valid	Obtained
3	0.86		Valid	0.81 > 0.32
4	0.80	0.38	Valid	
5	0.85		Valid	The tests
6	0.83		Valid	are reliable
7	0.78		Valid	

Based on the calculation results in Table 2, it can be seen that the test instrument of critical thinking ability tested has been valid and reliable so it was suitable to be used as a research instrument.

After calculating the validity and reliability, the test instrument of critical thinking ability was given to students to be done. The data results of critical thinking ability tests were scored and then statistically described. The interpretation of the final results of the critical thinking ability test in fourth-grade students at SDN Sampangan 02 can be seen in Table 3.

Table 3. Interpretation of Final Score on Critical Thinking Ability Test

Criteria	Interval	n	(%)
Very High	81.25 < Score ≤ 100	2	3
High	71.5 < Score ≤ 81.25	7	10
Moderate	62.5 < Score ≤ 71,5	12	18
Low	43.75 < Score ≤ 62.5	24	35
Very Low	0 < Score ≤ 43.75	23	34
Total		68	100

Based on Table 3, it can be seen that students' critical thinking ability categorized as very high is the least amounted, which only 2

students or 3%. Students who have a high category in critical thinking ability are 7 students or 10%. Students who have a moderate category in critical thinking ability are 12 students or 18%. Students who have a low category in critical thinking ability are the most amounted 24 students or 35%. Students who have very low category in critical thinking ability are as many as 23 students or 34%. The interpretation of the final scores on the critical thinking ability test can also be seen in Figure 1.

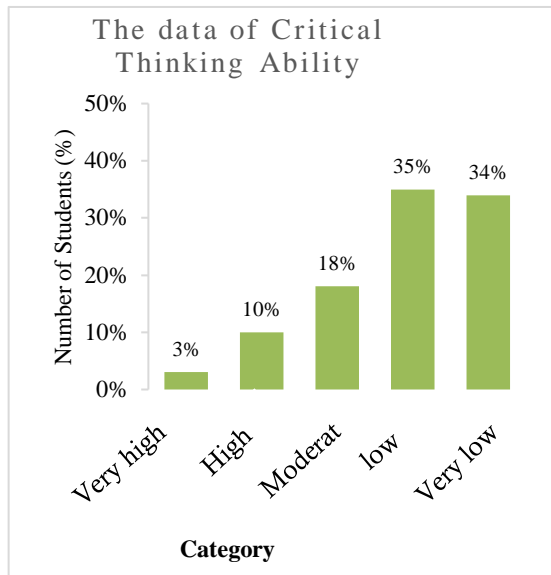


Figure 1. Bar Diagram of Students' Critical Thinking Ability Test Results

In order to see the results of each indicator, the scores were converted and averaged. The average score for each indicator of critical thinking ability namely drawing conclusions, assumptions, deductions, interpreting information, and analyzing arguments presented in Figure 2.

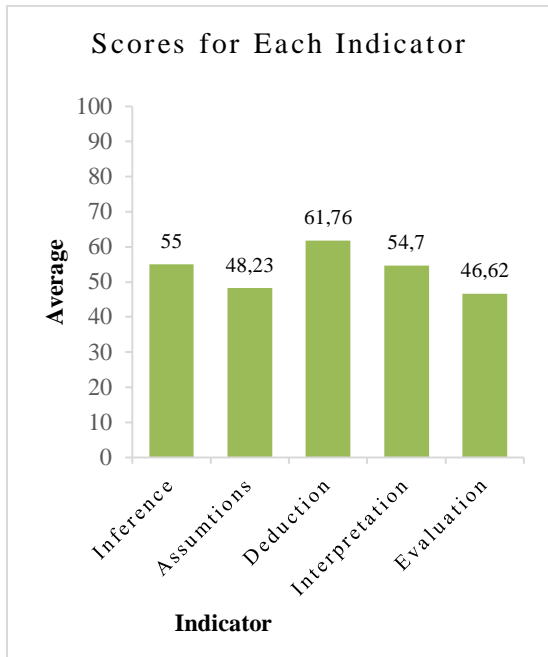


Figure 2. Bar Diagram of Each Critical Thinking Indicator Scores

Based on Figure 2, it can be seen that the average score on the conclusion drawing indicator is 55 which is included in the low category, the average score on the assumption indicator is 48.23 which is included in the low category, the average score on the deduction indicator is 61.76 which included in the low category, the average score on the indicator of interpreting information is 54.70 which is included in the low category, and the average score on the indicator of analyzing argument is 46.62 which is included in the low category. It can be concluded that the results of the analysis on the critical thinking ability test of fourth grade students at SDN Sampangan 02 are in the low category on each indicator.

The first indicator in the Watson-Glaser Critical Thinking Appraisal is inference. In this indicator, the measured ability was to determine the truth of a conclusion from the statement given. Based on the average test scores of students' critical thinking ability were in the low category. In this first indicator, some students had been able to answer correctly by determining and identifying the truth of a conclusion from the data provided and can write down the right reasons. On the other hand, there were still some

students who have not been able to give reasons precisely related to the answers written. The results of students' work on this indicator can be seen in Figure 3.

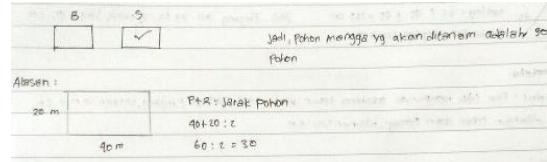


Figure 3. The Result of Student Work on the First Indicator

When students were asked to look for a circumference of a rectangle, the students only sum up the two sides together so the results are not quite right.

The second indicator is the recognition of assumptions. In this indicator, the measured ability is to determine whether the assumptions made are consistent with the statement given or not. In this indicator, some students had also been able to answer correctly by identifying the allegations given and could provide the right reasons in accordance with the data that had been given previously. But there were still some students who are wrong in identifying the allegations and giving reasons. Following are the results of students' work on this indicator.

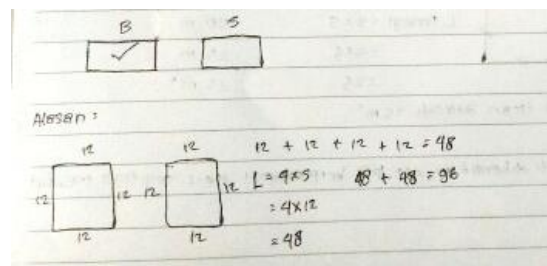


Figure 4. The Results of Student Work on Second Indicator

Students were asked to find the area of a square, despite they used the circumference formula of the square so the results did not match.

The third indicator is deduction. In this indicator, the measured ability was determining a conclusion whether the students followed the information from the statement given or not. In

this indicator, most students have been able to determine whether a conclusion was in accordance with the data given previously or not, although most of them were still incomplete in writing the reasons for the answers they chose. Among other indicators, students' scores on this indicator were the highest. But there were still some students who have not been able to determine deductive patterns, so they could not draw conclusions correctly. The following figure shows the results of student work on this indicator.

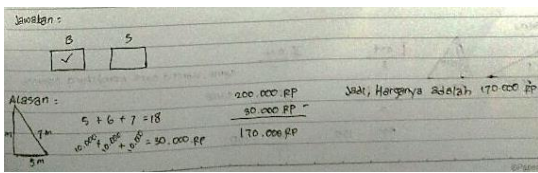


Figure 5. The result of Student Work on Third Indicator

The student was almost right in doing the work, he has searched the circumference of the triangle correctly, but he was still not right in doing price calculations.

The fourth indicator is interpreting information. In this indicator, the measured ability was giving the evidence and decided whether the conclusions submitted were in accordance with the data in the statement given or not. In this indicator, some students can interpret the information correctly so they can determine whether a conclusion was in accordance with the data provided or not. In addition, some students also have been able to write down the reasons for the answers they chose correctly. The following are the results of student work on this indicator.

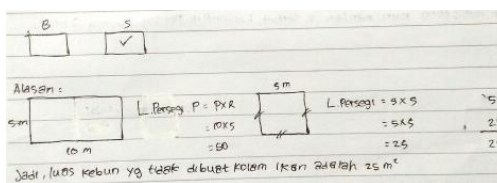


Figure 6. The Result of Student Work on Fourth Indicator

The fifth indicator is assessing an argument or opinion (evaluation argument). In

this indicator, the measured ability was determining whether the arguments/opinions are strong and relevant or weak and not relevant to the data in the statement given.

In the fifth indicator, which is analyzing arguments, some students could answer correctly. They were able to determine which arguments are in accordance with the statements and which arguments are not in accordance with the statements. They were able to give reasons that match their answers. But there were still some of them who could not answer correctly. Among other indicators, the student score on this indicator was the lowest, it might be caused by their inability to judge which arguments are relevant, and in accordance with the statements that have been given previously. So it made many of them have not been able to answer correctly.

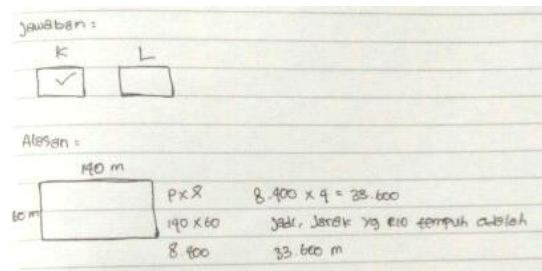


Figure 7. The Result of Student Work on Fifth Indicator

When students were supposed to use the circumference of a square to solve problems, they used other methods so the results were less precise.

From the research results, it was found that students' critical thinking ability was still low. The low critical thinking ability of students is partly due to the fact that mathematics learning in schools cannot make students become the center of learning. This is supported by the statement of Nuryanti et al. (2018) that the low ability of students' critical thinking is caused by teachers still dominating in learning activities. Then Hasratuddin (2010) states that the learning process in almost all levels of education take one-way learning where the teacher becomes the center of attention.

In addition, students are also not given non-routine questions that can practice their critical thinking ability. In order to practice their critical thinking ability in mathematics, it can be done by familiarizing them with practice questions that can make them think reflectively and reasoned in determining the right answer. According to Rusiyanti (2014), critical thinking ability can develop by doing exercises

CONCLUSION

According to the results of research that have been done, critical thinking ability in the Watson-Glaser Critical Thinking Appraisal framework in fourth-grade students of SDN Sampangan 02 Semarang can be concluded that students' critical thinking ability is in a low category. This might be caused by the learning undertaken has not been able to develop students' critical thinking ability. Therefore it is suggested that in implementing the mathematics learning process, teachers should pay attention to the development of students' critical thinking ability so that their critical thinking ability can be even better. Besides, students should also continue to practice and develop their critical thinking ability.

The results of this study can provide an overview for teachers and researchers about the real condition of the critical thinking ability of elementary school students.

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