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Analysis of Students' Critical Thinking Skills on the Material of Flat Shapes in the Fifth Grade of Tindoi State Elementary School

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Abstract. The ability to think critically is one of the abilities that must be mastered by students and has an important role in the mathematics learning process. Based on initial observations, it shows that the critical thinking skills of fifth graders at SD Negeri Tindoi are still low. This study aims to analyze students' critical thinking skills on the flat-shaped material. This research is qualitative research. This study uses 4 indicators of critical thinking skills according to Robert Ennis, namely providing simple explanations, making further explanations, determining strategies and tactics, and concluding. The subjects in this study were 9 students of class V SD Negeri Tindoi, consisting of 3 male students and 6 female students. Data collection was carried out by written tests, interviews, and document studies. Data analysis techniques used are data reduction, data presentation, and drawing conclusions. The technique of checking the validity of the data is using the triangulation technique. Based on the results of the study, it was shown that the critical thinking skills of the fifth-grade students of SD Negeri Tindoi belonged to the low category. This can be seen by the number of students who have low critical thinking skills as many as 4 students, 2 students with sufficient critical thinking skills, and 3 students with very low critical thinking skills out of 9 students. The students' critical thinking ability on each indicator in solving the problem of flat shape material shows different results in each category of critical thinking ability, namely: 1) Students with sufficient critical thinking ability have been able to meet three indicators of critical thinking ability, namely the indicator provides an explanation. simple, determine strategies and tactics and conclude. 2) Students with sufficient critical thinking skills have been able to meet two indicators of critical thinking skills, namely indicators of providing simple explanations, determining strategies and tactics, and 3) Students with very low critical thinking skills are only able to meet one indicator of critical thinking skills, namely indicators provide a simple explanation.

Keywords**:** analysis, critical thinking.

1 Introduction

Thoughts appear in all human mental activities, function to form or solve problems, make decisions, and find reasons. Abidin (Suryanti & Azizah, 2020: 682) explains that critical thinking is the ability used to decide logically and creatively different pieces of information, which are then used for analysis, evaluation, and making final conclusions.

A person can be said to have the ability to think critically if he has certain characteristics. There are several characteristics of someone said to have a critical thinker. Lau (Haryanti, 2017: 60) mentions a critical thinker if one is able to (1) master the logical bonds between ideas; (2) formulate ideas briefly and precisely; (3) identify, build, and evaluate reasons; (4) evaluate the pros and cons of a decision; (5) evaluate facts and hypotheses; (6) knowing inconsistencies and universal errors in reasoning; (7) analyze problems systematically; (8) recognize the relevance and significance of ideas; (9) taking into account the beliefs and values held by a person; and (10) evaluating one's thinking skills. In the world of learning, one of the disciplines that must be understood is mathematics.

Regarding the field of mathematics tested at the *Program for International Student Assessment* (PISA), Prihandoko (Muzayyanatun Munawwarah Nurul Laili & Tohir, 2020: 38) said that mathematics is a basic science that has become a tool for pursuing other sciences. So the idea that mathematics is said to be the queen of knowledge and philosophy as its king. Mathematics is a very basic provision for student participants in improving their logical, critical, practical, systematic, analytical and creative thinking skills. By learning mathematics, students are expected to be able to think critically in uncovering problems.

Tanjung (Rosmalinda et al., 2021: 485) reveals that critical thinking is a person's skill in obtaining data correctly, evaluating and processing the data into a decision. Not only that, critical thinking is also a systematic process to solve a case that involves skills such as formulating problems, giving reasons, carrying out deductions or inductions, evaluating, and making decisions. Yaumi (Yusriani et al., 2020: 11) suggests that "critical thinking is a cognitive ability to say something with confidence because it relies on logical reasons and strong empirical evidence."

Indonesian students' critical thinking skills are still weak. The 2015 TIMSS (*Trends in International Mathematical and Scientific Research*) results show that Indonesian students' mathematics scores are ranked 5th out of 50 countries. The ability of Indonesian students to solve problems related to the field of reasoning also shows that their abilities are still very low (Azizah et al., 2018: 62). From these results, the implementation of mathematics learning in elementary schools not only requires students to answer questions correctly, but also encourages students to come up with new ideas.

According to Setianingrum (Rizza, 2020: 296), learning mathematics is a process of interaction between teachers and students in understanding mathematical concepts, explaining the interrelationships between concepts and applying concepts flexibly, accurately, efficiently, and precisely in problem solving so that they can carry out learning activities effectively. and efficient.

Initial observations were made on October 23, 2021 at SD Negeri Tindoi Class V which included flat-shaped material. The researcher gave an initial test, namely 4 numbers of essay questions to 5 students. The results obtained from the initial test were still many students who answered incorrectly, did not understand the questions asked. In the student's answer sheet, it is seen that writing the name of the flat shape does not match the picture given. In addition, students immediately write down the answers to the questions given. However, it does not write down the steps for solving the problem. When given an image of a flat shape, students are not even able to distinguish between images of rectangles, circles, trapezoids, and triangles. Meanwhile, according to Sumarmo (Prihartini et al., 2021: 64) explains that critical thinking skills include the ability to analyze and evaluate arguments and evidence, make clarifications, make valuable judgments, develop explanations based on relevant and irrelevant data, and identify and evaluate assumptions.

From these problems, the researcher wants to know how the critical thinking skills of fifth graders on flat-shaped materials are. The researcher took this problem as the object to be studied with the title "Analysis of Students' Critical Thinking Ability on Flat Shapes in Class V SD Negeri Tindoi".

2 Methods

Type of research is qualitative research. The subjects of this study were the fifth-grade students of SD Negeri Tindoi, totalling 9 students consisting of 6 girls and 3 boys. The research was conducted through 3 stages, namely preparation, implementation, and data analysis. Data collection techniques using tests, interviews, and document studies. The instruments used are test and interview instruments. From the students who take the test, 3 students will be selected as student representatives to be interviewed. The data analysis technique used is *credibility*, *transferability*, *dependability* and *confirmability*. The data validation technique used triangulation technique.

3. Result

This study aims to analyze the critical thinking skills of students on the flat shape material in class V SD Negeri Tindoi, with a total of 9 students. The data analyzed is the result of the students' critical thinking ability test on the flat material in the form of student answer sheets. Each question

includes 4 indicators of critical thinking skills, namely indicator 1 providing a simple explanation (Elementary Clarification), indicator 2 making further explanations (Advance clarification), indicator 3 determining strategies and tactics (Strategies and tactics), and indicator 4 concluding (Inference).

Test was conducted on fifth grade students of SD Negeri Tindoi to determine students' critical thinking skills on flat-shaped material. The test sheet consists of 4 numbers of essay questions and is distributed to students to be done in 60 minutes. The question sheets will then be evaluated and classified into critical thinking level (TBK) according to the students' work.

The total number of fifth grade students of SD Negeri Tindoi who became the subject of this study was 9 students, then three subjects were taken to analyze the results of the critical thinking ability test, the subjects selected were PM, SND, and LR. PM subjects are students with sufficient critical thinking skills, SND subjects are students with low critical thinking skills, and LR subjects are students with very low critical thinking skills.

3.1 Description of PM Subject Answers

Based on the subject's answer sheet (PM) for question number 1, it can be seen that the indicator provides a simple explanation of the subject (PM) writing down what is known and asked about the question but it is incomplete. The PM subject only wrote down what was known and did not write down what was asked. The indicator makes further explanation visible that the subject (PM) does not write further explanations of the questions and immediately writes down the formula. The indicator determines the strategy and tactics, the subject (PM) is correct in determining the strategy and tactics by writing the formula, but it is incomplete so that in calculating the area referred to in the question an error occurs. While the indicator concludes, the subject (PM) does not write the conclusion of the problem referred to in the question.

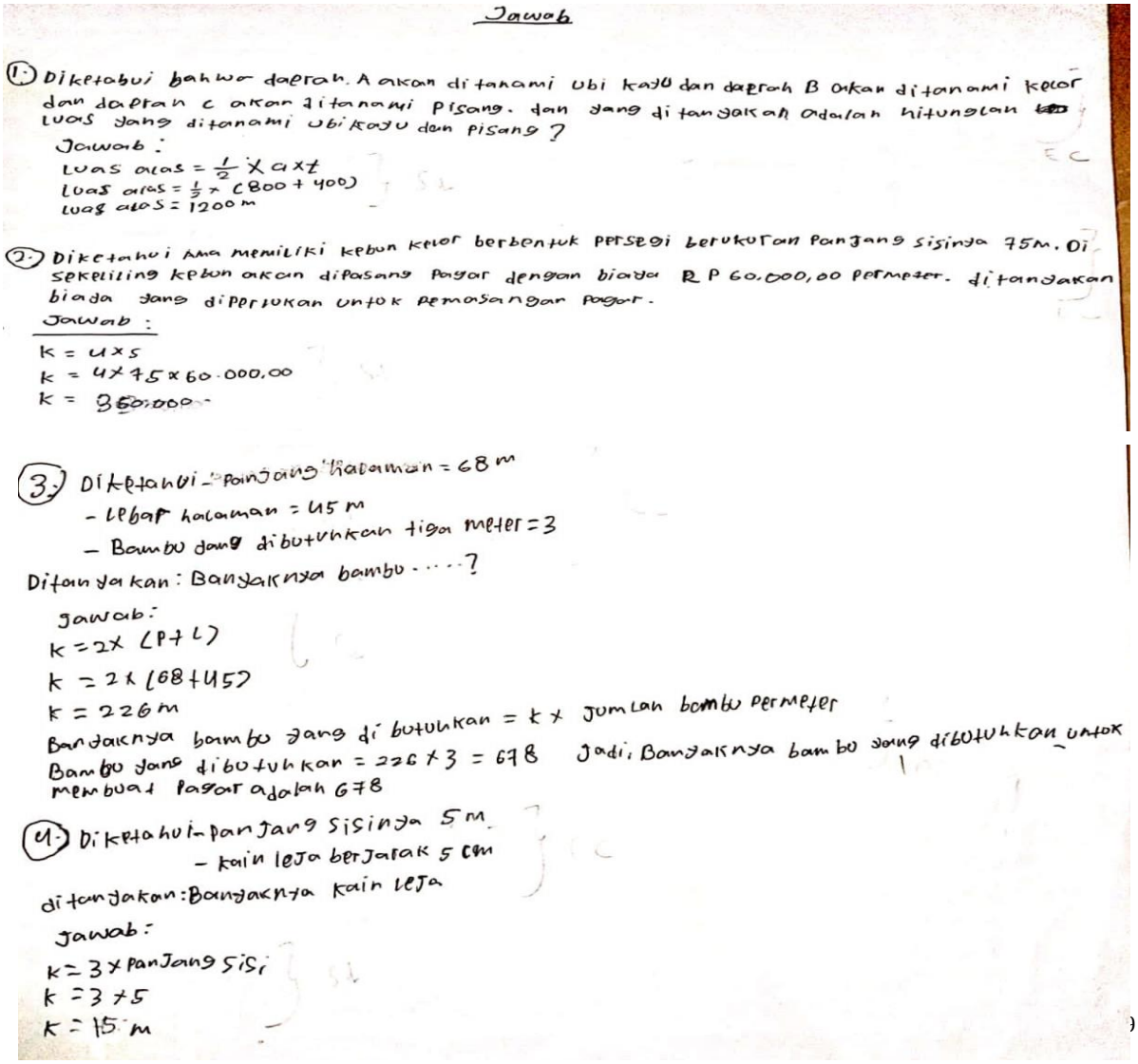


Figure 1 Subject's Answer (PM)

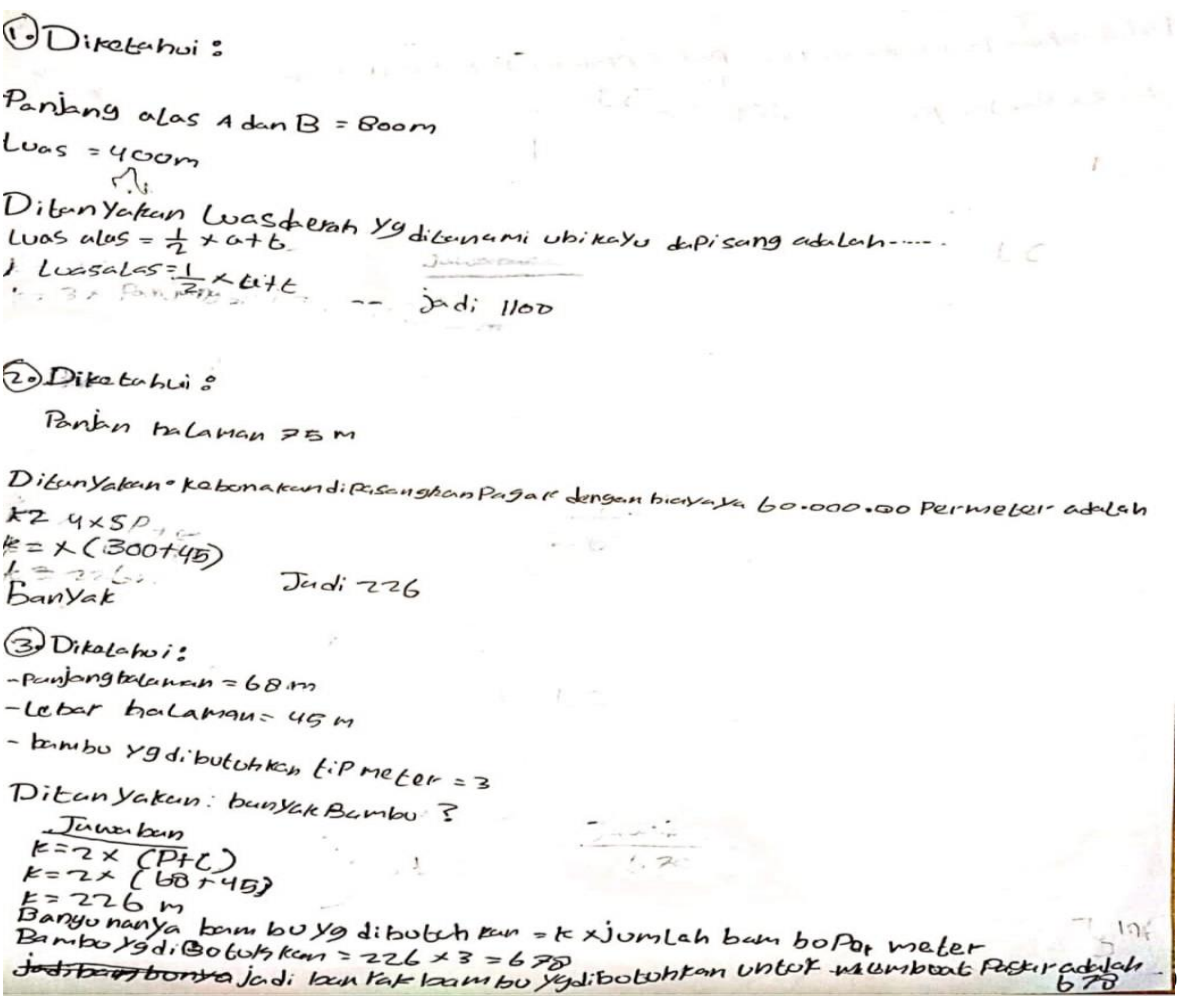
Question number 2 in Figure 1 shows that students are able to solve problems. The indicator provides a simple explanation of the subject (PM) writing down what is known and asked about the question completely. The indicator makes further explanation visible that the subject (PM) does not write further explanations of the questions and immediately writes down the formula. The indicator determines the strategy and tactics, the subject (PM) is correct in determining the strategy and tactics by writing the formula, but it is incomplete so that in calculating an error occurs. While the indicator concludes, the subject (PM) does not write the conclusion of the problem referred to in the question.

In question number 3, the answer to the subject (PM) in Figure 1 shows that the students are already able to solve the questions. Students fulfil the indicators provide simple explanations, determine strategies and tactics and conclude. However, the subject (PM) did not write a further explanation of the problem.

While in question number 4, the subject's answer (PM) for the indicator provides a simple explanation because it can write down what is known and asked but makes mistakes in writing numbers. Indicators make further explanation not written. Indicators determine strategies and tactics because they are incomplete in writing the formulas used in solving problems. While the indicators conclude, do not write conclusions from the questions.

3.2 Description of SND Subject Answer

Question number 1, the answer (SND) in Figure 2 for indicators provides a simple explanation of the subject (SND) which is not appropriate in writing what is known and asked in the question. Indicators providing further explanation are not listed. Indicators for determining strategies and tactics are incomplete in writing the formulas used in solving problems. While the indicator concludes, the subject (SND) does not write the conclusion of the question.



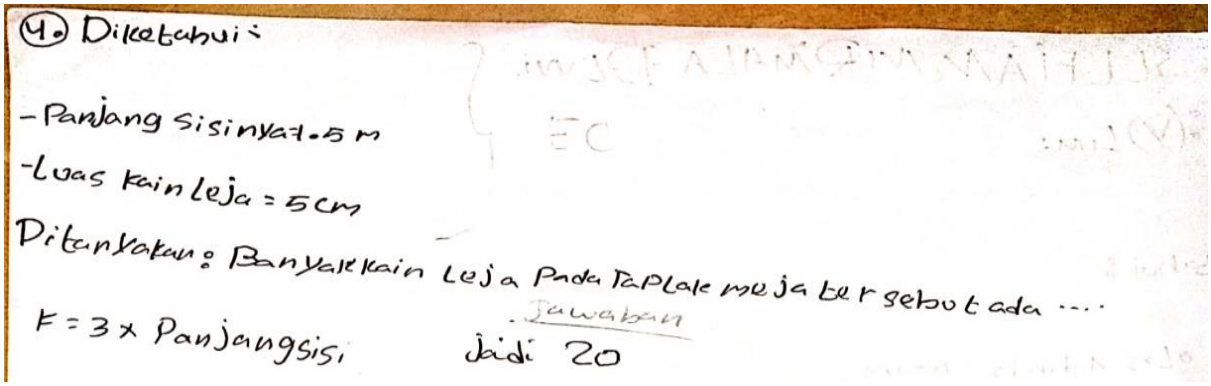


Figure 2 Subject's Answer (SND)

In question number 2, the subject's answer (SND for the indicator provides a simple explanation because it can write down what is known and asked in the question but is not complete. The indicator makes further explanation, the subject (SND) does not make further explanation. Indicator determine the incomplete strategy and tactics in writing the formula used in solving the problem. Meanwhile, in the conclusion indicator, the subject (SND) does not write the conclusion of the question.

In question number 3, the subject's answer (SND) for all indicators is to provide a simple explanation, but not make further explanations. This can be seen in the answers of students who directly write formulas to determine strategies and tactics and conclude the problems contained in the questions.

The subject's answer (SND) in question number 4 for indicators is to provide a simple explanation by writing down what is known and asked about but made a mistake. Indicator makes further explanation, the subject (SND) did not write further explanation and immediately determined the strategy by writing the formula but it was not complete. While the indicator concludes, the subject (SND) does not write a conclusion from the problem in the question.

3.3 Description of Subject Answer LR

Questions 1 and 2, the subject's answer (LR) for the indicator provides a simple explanation, the subject (LR) writes down what is known and asked in the question. LR subjects only wrote and did not analyze the statements in the questions. Making further explanations, determining strategies and tactics, and concluding are not written in the answer sheet.

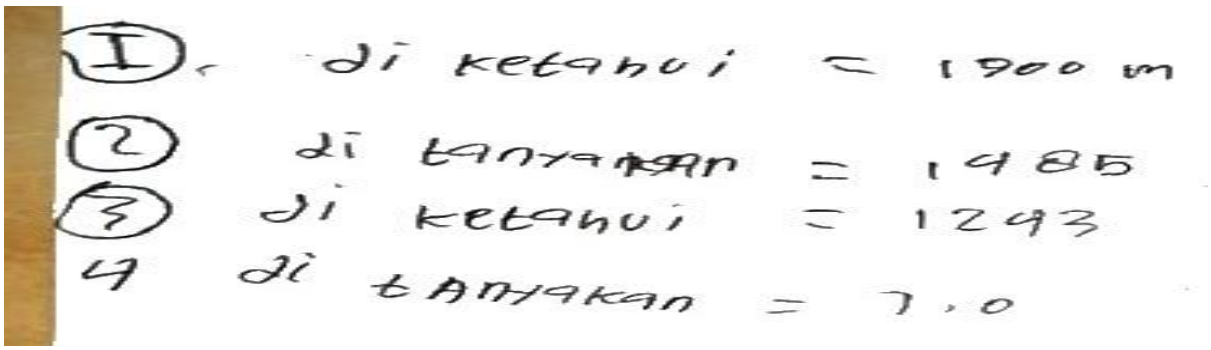


Figure 3 Subject's Answer (LR).

The same thing was done for questions number 3 and 4, subject 3's answer (LR) for the indicator provides a simple explanation because it can write down what is known and asked in the question but it is not complete. Indicators make further explanations, define strategies and tactics, and conclude not written down.

From the results of the critical thinking ability test of the fifth-grade students of SD Negeri Tindoi. The following are the categories of students' critical thinking abilities based on the results of students' critical thinking skills on flat-shaped materials.

Table 1 Grouping of Critical Thinking Ability

Category	Frequency	Percentage
Enough	2	53,13
Low	4	39,63
Very Low	3	,25
total	9	99,01

4 Discussion

Based on the results of research that has been carried out in class V SD Negeri Tindoi, there are still many students who have not been able to meet the indicators of critical thinking skills and even there are no students who achieve critical thinking skills in the high category can be seen in table 1. These results indicate that the critical thinking skills of grade students V SD Negeri Tindoi is still low. Of the 9 students of class V SD Negeri Tindoi who have the ability to think critically enough category as many as 2 students. The low category is 4 students and 3 students are in the very low category.

Critical thinking is needed in solving a problem. At every stage of solving problems, critical thinking skills are needed. Edward Glaser (Putri, 2018: 794) critical thinking is an attitude to think about the depth of problems and matters, within one's reach, knowledge of test logic and reasoning skills to apply methods.

Critical thinking ability itself is an intellectual potential that can be developed through the learning process and this ability is very important for students at every level of education. Lambertus (Setiana & Purwoko, 2020: 164) revealed that in mathematics, critical thinking skills are needed by students, where there is a relationship between mathematics and critical thinking. In mathematical research, there are stages of problem formulation, solution planning, solution testing stages, hypothesis formation when data is incomplete, which requires critical thinking skills. Students who have critical thinking skills are able to master critical thinking aspects in learning.

Students who have sufficient critical abilities are the subject of PM and MR. In this study, researchers took one of the subjects, namely PM. From the overall answers of the PM subject, it can be seen that the critical thinking ability on the indicator giving a simple explanation is correct. In this step, students are able to write down what they know or ask questions based on their knowledge, although some of them are incomplete in writing, which can be seen in Figure 1.

This is in line with the opinion of Mira Azizah and Joko Sulianto (2018) in their research which states that students who are capable of thinking Critically able to write all the facts or information in the problem. However, of the two subjects in the critical thinking ability group in the sufficient category, both subjects met the criteria for determining strategies and tactics and concluded perfectly only on question number 3.

Providing further explanations including identifying and providing definitions of the conjectures thought out. PM subject has not been able to make further explanations properly. Meanwhile, according to Robert Ennis (Apiati & Hermanto, 2020: 168) providing further explanation aims to guide students to think broadly, provide a challenge, test mathematical abilities. Indicators for determining strategies and tactics students have been able to write them down even though they are not complete in solving problems can be seen in Figure 1. So that the indicators conclude that students make inaccurate conclusions, with the context of the questions. However, in one of the answers, the PM subject has made the right conclusions according to the context of the question in question number 3.

Students who have low critical abilities are SND, RA, AI, and BI subjects. In this study, researchers took one of the subjects, namely SND. From the overall answers of SND students, it can be seen that the students' critical thinking ability on the indicator of giving a simple explanation is correct, it can be seen in Figure 2 Students have written what is known and asked about the questions correctly, for the analytical indicators have been able to identify the relationships between statements, questions, and concepts given in the problem.

Indicators determine strategies and tactics are also not right in solving problems, and make mistakes in calculations. In addition, the SND subject did not use the right formula and the indicator concluded that students were still not able to correctly conclude the results of their answers. This is in line with the results of research conducted by Nana Rosmalinda, Ali Syahbana, and Tika Dwi Nopriyanti (2021) in their research showing that students with low critical thinking skills can write correct strategies when solving problems but do not solve them. it, some wrote wrong information but solved the question completely.

SND students still make mistakes in doing calculations at the stage of determining strategies and tactics so that students make inappropriate conclusions even though they are adjusted to the context of the problem. However, in one of the answers, it can be seen in Figure 2, the SND subject has made the right conclusion according to the context of the question. However, there are answers that the SND subject cannot conclude completely, only to get the final answer on the answer sheet image 4.10.

Based on the results of the analysis of student answers, it can be seen that these students have low critical thinking skills. The results of this study agree with the research of Hamdan Muh Rizza (2020). In his research, it was found that students with low critical thinking abilities indicated that students were able to solve problems correctly but were not accompanied by conclusions.

Students with very low critical abilities are LR, RN, and SI subjects. However, in this study the researcher took one subject, namely LR as a representative of students who had very low critical thinking skills, which can be seen in table 1. From the overall answers of LR students, it can be seen that students' critical thinking skills for interpretation indicators are still very low, students write which is known from the questions but is incomplete, for indicators providing simple explanations students are not able to make explanations of the questions given.

Indicators determine strategies and tactics students do not use strategies in solving problems. This is in line with the opinion of Anike Putri (2018) in her research it was found that students with very low critical thinking skills. Students belonging to the low category mean that students are incomplete in writing facts or information and for indicators using inappropriate and incomplete strategies in solving problems and for inference stage or conclude students make inappropriate conclusions.

Subjects with very low critical thinking skills tend to solve problems only by filling in indicators, giving simple explanations and not being able to solve problems well. This is in accordance with research from Hidayah et al (Furrahmah et al, 2018: 89) which says that the stages of the thinking process of students in the low group only fulfill the clarification stage in the critical thinking process stage. The subject only knows and writes the information that is known and asked in the problem but does not try to solve the problem given.

In the conclusion stage, students who have low critical thinking skills do not make conclusions at all. Because the indicators provide simple explanations, make further explanations, and determine students' strategies and tactics are wrong so that the final answer is wrong. Based on the results of the analysis of students' answers, it can still be seen that students' critical thinking skills are very low.

5 Conclusion

Based on the results of research and discussion on students' critical thinking skills on the flat shape material in class V SD Negeri Tindoi, it can be concluded that, critical thinking skills for class V students at SD Negeri Tindoi belong to the low category. This can be seen from the number of students who have low critical thinking skills as many as 4 students, 2 students with moderate critical thinking skills, and 3 students with very low critical thinking skills.

The students' critical thinking ability on each indicator in solving the problem of flat shape material shows different results in each category of critical thinking ability, namely: 1) Students with sufficient critical thinking ability have been able to meet three indicators of critical thinking ability, namely the indicator provides an explanation. simple, determine strategies and tactics and conclude. 2) Students with sufficient critical thinking skills have been able to meet two indicators of critical thinking skills, namely indicators of providing simple explanations, determining strategies and tactics, and 3) Students with very low critical thinking skills are only able to meet one indicator of critical thinking skills, namely indicators provide a simple explanation.

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