Research Article

Elementary School Students' Literal Thinking Ability in Solving Flat Figure Problems Seen from the Adversity Question

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Abstract.
This research aims to analyze students' literal thinking ability in solving plane problems in terms of the adversity quotient (AQ). This type of research is quasi-experimental and involves 55 elementary school students in Central Maluku Regency, Maluku Province, Indonesia. The data obtained was analyzed using non-parametric statistical tests with the Kruskal Wallis test type. The results of the research show that there are differences in students' literal thinking abilities in solving flat - shape problems in terms of AQ. By using the Post-Hoc test, it was found that the literal thinking ability of AQ-Cb students was significantly different from AQ-Q and AQ-Cp, while AQ-Q and AQ-Cp level students had no significant difference. This difference is because AQ-Cb level students are more thorough and work harder in solving flat shape problems compared to AQ-Q and AQ-Cp level students. Students with high AQ are generally more skilled at understanding information, interpreting problems, and being able to make solutions correctly.

Keywords: lateral thinking, adversity quotient (AQ), mathematical problem solving

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1. INTRODUCTION

The ability to think mathematically is one of the important goals of mathematics education. because it can support sustainable mathematics learning [1], [2]. One of the thinking skills that needs to be developed for elementary school students is creative thinking, so that at the initial level they are trained to explore creative ideas through solving mathematical problems related to real life.

The ability to think creatively allows students to quickly understand mathematical concepts and learn well. [3] [4] the ability to think creatively in mathematics influences the understanding of mathematical concepts. This is because creative thinking can trigger students to solve problems with flexible and creative thinking and is not tied to what the teacher teaches.

Creative thinking is connected to literal abilities, so students need to have literal abilities when learning mathematics [5] [6]. The thinking ability related to creativity is literal thinking [7] [8] [9]. Literal thinking in solving mathematical problems is able to provide a leap for students' minds, provide various alternative answers, provide unusual answers, and trigger the use of many ideas to produce new ideas [10] [11]. Lateral thinking can be developed through reasoning when completing challenging tasks in mathematics learning [12]. This is very important because teachers can provide various opportunities for students to be involved in completing challenging tasks [13] [14] [15].

Preliminary research studies indicate that elementary school students at the research location still experience difficulties in learning mathematics, especially the concepts of plane figures and spatial figures. The difficulties experienced by students vary because they are influenced by internal and external factors, including a lack of basic mathematics skills, low motivation, minimal use of problem-based learning models, and the need for parental attention in supervising children's learning at home.

In order to overcome students' internal problems, intelligence is needed. [16] states that the intelligence a person has when facing problems is known as the adversity quotient. One of the internal factors that influences the success of learning mathematics is the adversity quotient [17].

The adversity quotient is the main key to student success in learning mathematics. If a student has a high adversity quotient, then they can easily solve mathematical problems by trying various possible answers until they are complete and correct [18]. The adversity quotient can be used to measure students' ability to face challenges and difficulties when solving challenging math problems.

Students with a high adversity quotient remain motivated and resilient in solving mathematical problems, even though they encounter difficulties, so those with a high adversity quotient will have good literal thinking skills and tend to be more successful in solving complex mathematical problems. In general, students who have a high adversity quotient enjoy challenges in learning mathematics [19].

2. RESEARCH METHODS

This research uses a quasi-experimental method with no randomization of the research sample. This research involved 55 elementary school students in Central Maluku Regency, Maluku Province, Indonesia. The research instruments used were: (1) literal thinking ability test: measuring students' mathematical problem-solving abilities, and

(2) Adversity Quotient (AQ) Scale: measuring students' AQ level in Quitters (AQ-Q), Campers (AQ-Cp) levels; and Climbers (AQ-Cb).

Data were analyzed using the one-way Anova technique, which is a statistical technique used to compare the means of two or more groups of data. In the context of one-class research, the one-way ANOVA test was used to compare the mean literal ability scores before and after the problem-based learning model was applied. Before testing is carried out, normality and homogeneity tests are first carried out. If both conditions are met, then the one-way Anova test is used, but if the conditions are not met, then a non-parametric test with the Kruskal-Wallis test type is used, and then a further test is carried out using the post-hoc test if there are differences.

3. RESULTS AND DISCUSSION

3.1. Results

3.1.1. Test of Differences in Mathematical Literal Ability in Solving Plane Figure Problems Judging from AQ

Before conducting a differentiation test between mathematical literacy ability and the ability to solve problems with flat shapes in terms of AQ (Quitter, Campers, and Climbers), the research hypothesis is first established:

H_0: There is no difference in the average AQ of students' literal thinking abilities.

H_1: There is a difference in the average AQ of students' literal thinking abilities.

After determining the research hypothesis, the next step is to carry out a difference test using one-way ANOVA. But first, the data normality and homogeneity requirements are tested. Table 1 presents the test results.

TABLE 1: Data Normality and Homogeneity Test.

Normality Test			
Kolmogorov-Smirnov	Sig. (2-tailed)	α = 5%	Decision
	0,046	0,05	Not Normally distributed
Uji Homogenitas			
Levene Statistic	0,000	0,05	different variances

Table 1 shows that the normality test using Kolmogorov-Smirnov obtained a significance value (0.046) < 0.05, so the decision was made that the data was not normally

distributed. To carry out a homogeneity test, use the statistical Levene test, where the test results show a significance value of 0.000 < 0.05 and a decision is made that the data is not homogeneous. The test requirements carried out showed that the test requirements were not met, so for data analysis, a non-parametric test with the Kruskal-Wallis test type was used. Table 2 presents the mean rank AQ, and Table 3 presents the Kruskal-Wallis test.

Table 2: Mean Rank AQ.

	AQ levels	n	Mean Rank
AQ-Combined	AQ-Q	15	18.07
	AQ-Cp	28	26.20
	AQ-Cb	12	44.63
	Total	55	

Table 2 shows that the average ranking value of AQ-Cb is 44.63, which is higher than AQ-Cp, which is 26.20, and AQ-Q, which is 18.07, while AQ-Cp is higher than AQ-Q. These results show that students with level AQ-Cb have higher mathematical abilities than students with levels AQ-Cp and AQ-Q.

Table 3: Kruskal Wallis Test.

	AQ -- Combined
Chi-square	19,409
df	2
Asymp. Sig.	0,000

Table 3 shows that the results of the Kruskal-Wallis test obtained a significant value of 0.000 < 0.005, so a decision was made to accept H_1 and reject H_0, which means that there is a difference in the average AQ for students' literal thinking abilities in solving flat-shape problems. To analyze more deeply the different types of AQ, further tests were carried out using the post-hoc test. Table 4 presents the test results.

Table 4: Test Differences In Literal Thinking Ability In Terms Of AQ.

AQ	Sig	Decision
AQ-Q vs AQ-Cp	0,057	No Different
AQ-Cb vs AQ-Cp	0,000	Different
AQ-Cb vs AQ-Q	0,002	Different

The mean difference is significant at the 0.05 level

Table 3 shows that the results of the Kruskal-Wallis test obtained a significant value of 0.000 < 0.005, so a decision was made to accept H_1 and reject H_0, which means that

there is a difference in the average AQ for students' literal thinking abilities in solving flat-shape problems. To analyze more deeply the different types of AQ, further tests were carried out using the post-hoc test. Table 4 presents the test results.

3.1.2. Analysis of Student Work Results Seen from AQ

This research was carried out in class V at SD Negeri 257 and 216 Central Maluku. The first step taken is to give students an initial test to determine their initial abilities. After that, students were categorized based on levels measured via the AQ Likert scale. The measurement results showed that 15 students were at the Quitter level, 28 students were at the Campers level, and 12 students were at the Climbers level. To analyze these three levels, students were tested with the questions in Figure 1.

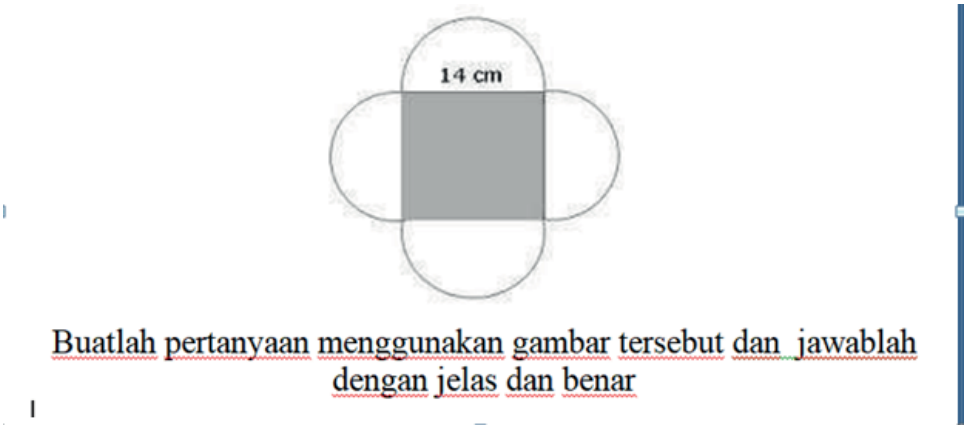

Figure 1: Flat Figure Test Questions.

Below are the results of the analysis of answers from the three AQ levels, both AQ-b, AQ-Cp, and AQ-Q level students. Figure 2 presents the results of students' work at levels AQ–Q.

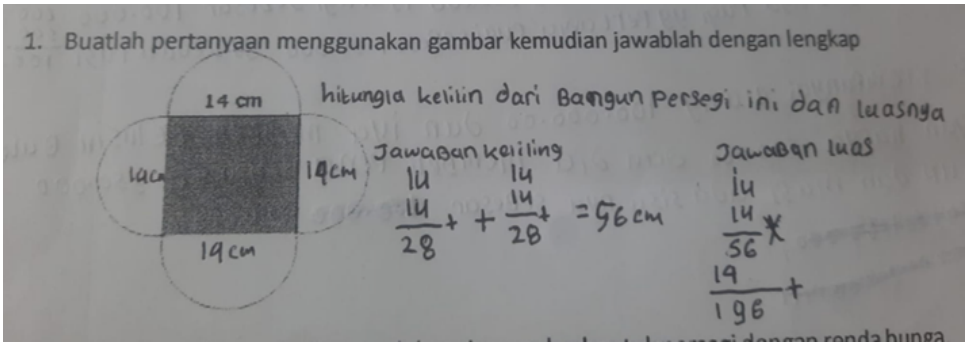

Figure 2: AQ-Cb Student Work Results.

Based on the answers given, it appears that students can identify the information in the picture relating to the area and perimeter of a square. AQ-Cb students look at the

semicircles on each side of the square shape. Students can calculate the perimeter of a square correctly, namely by adding up all the sides of the square. Students can also calculate the area of a square correctly, namely by directly multiplying the length of the side of the square. This shows that students have two ways of looking at the picture of the problem.

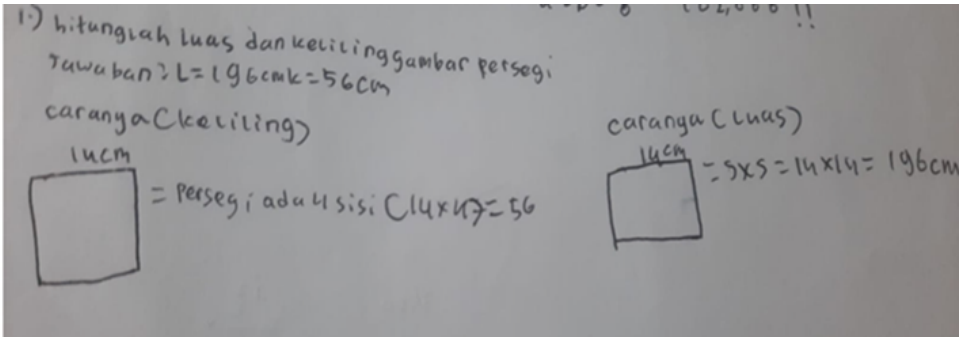

Figure 3: AQ-Cp Student Work Results.

Based on the answers in Figure , it can be seen that AQ-Cp students tried to solve the questions using several methods. Students make questions based on pictures, and the questions they make are not wrong, but they are less in-depth; that is, they do not cover all the information shown in the picture. Students ask questions about the area and perimeter of a square without seeing that there are half circles on each side of the square. However, the answer given by the student is correct, namely that the area of the square is obtained from s × s and the perimeter of the square is obtained from 4 × s. This means that students have several different ways of viewing the images presented in the problem.

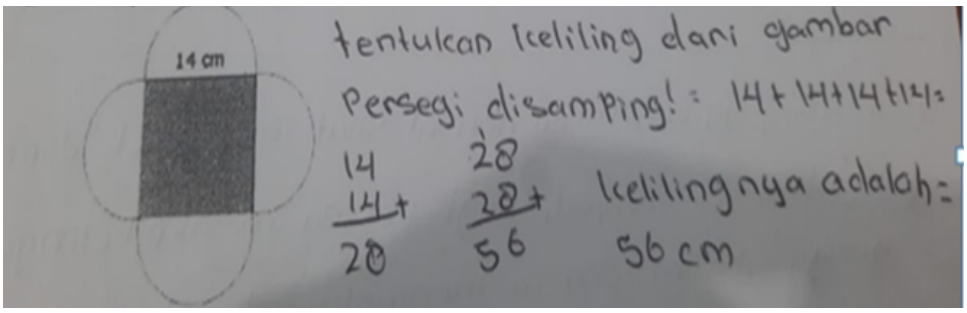

Figure 4: AQ-Q Student Work Results.

Based on students' answers to AQ-Q, it can be seen that students try to solve the problem using one method. Students make questions based on pictures, and the questions are very simple, namely, determine the perimeter of a square. Students identify the information contained in the image related to the perimeter of the rectangle. The resulting answer is correct, namely, by adding up all the sides of the square in the

image. This means that students only have one way of looking at the image presented in the problem.

3.2. DISCUSSION

The ability to think literally is one of the basic abilities that is important in solving mathematical problems. This ability allows elementary school students to understand the information provided well and be able to transform it into mathematical concepts, especially the concept of flat shapes.

Literal thinking in solving plane problems needs to be supported by high AQ, because students with high AQ enable them to find solutions in solving problems [20], students with high AQ have good abilities in responding to and overcoming the difficulties they face, have high motivation, and do not give up easily due to their inabilities or the difficulties they face.

The results of the research show that there is a difference in literal thinking abilities in solving plane problems between AQ-Cb level students and AQ-Cp and AQ-Q students, while AQ-Cp and AQ-Q level students are no different. This difference is because AQ-Cb to solve flat-shape problems compared to AQ-Cp and AQ-Q level students.

The problem-solving process shows that AQ-Qb level students can analyze the two pictures well, so from this information, students can make two questions and solve them correctly. AQ-Qb students can also analyze the relationship between the concepts of circle and square. On the other hand, AQ-Q students can understand the information from the picture, but not completely. They can design two questions and answer them correctly, but the solution process is not structured. For AQ-C, students can only design one question. However, based on the results of interviews, it was revealed that some students forgot and were lazy about writing down what they knew and were asked about the questions being tested.

Students who have high AQ are able to solve the problems or challenges they are facing, so this will encourage students' achievement motivation to always want to achieve the achievements they want to achieve; conversely, if the student's AQ is low, then their achievement motivation will also be low. Students will tend to give up easily and tend to be pessimistic, less open, and less responsible [21].

Literal thinking ability and AQ are two important factors in effective mathematical problem solving. Students with high AQ are generally more skilled at understanding information, interpreting problems, and finding creative solutions to complex math

problems. Therefore, it is important to improve AQ and literal thinking abilities in an effort to improve students' abilities to solve mathematical problems.

To improve the ability to think literally in solving plane problems and other mathematical material, it is necessary to: (1) strengthen understanding of basic mathematical concepts; (2) practice challenging math problems; and (3) use technology, in this case using learning videos. The goal is to understand mathematical concepts interactively. Students with high literal thinking abilities will be more motivated and challenged to solve challenging math problems, which can trigger an increase in their AQ.

4. CONCLUSION

Referring to the research results, it can be concluded that there are differences in literal thinking abilities in solving plane problems as seen from students' AQ. The results showed that the AQ-Cb level was significantly different from AQ-Cp and AQ-Q, while the AQ-Cp and AQ-Q levels were not different. This difference is because AQ-Cb students are more careful in analyzing images, work hard, and are not easily frustrated in solving flat-shape problems compared to AQ-Cp and AQ-Q level students.

Students with high AQ tend to have better literal thinking abilities compared to low AQ students. AQ-Cb students are better able to understand the information given correctly and can identify the images in the questions better compared to AQ-Cp and AQ-Q students. However, based on interviews, it was found that all three levels forgot to write down what was known and what was asked in the question.

5. SUGGESTION

There is a need to increase students' literal thinking abilities and improve AQ through various optimal efforts. To improve literal thinking skills, students need to strengthen basic mathematical skills, optimize creative and critical thinking skills by frequently practicing challenging math questions, and optimize the use of technology in learning.

In an effort to increase students' AQ, it is recommended to use appropriate and creative strategies. For AQ Campers and AQ Quitter level students, they need to apply creative mathematics learning models, concrete learning media, motivate them intensively, and need to receive special guidance. On the other hand, students at the AQ Climbers level need to be given opportunities for independent learning and encourage them to explore various ideas through critical and creative thinking skills.

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