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IMPROVING STUDENTS' CREATIVE THINKING SKILLS ON INTEGER TOPICS IN TERMS OF ADVERSITY QUOTIENT (AQ)

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ABSTRACT

The study conducted at SMP Negeri 16 Malang class VII F revealed that students were unable to solve problems accurately and often resorted to alternative solutions. This indicates a lack of optimal creative thinking abilities among students. The purpose of this research is to examine the level of students' Creative Thinking Ability (TKBK) in solving problems in terms of the Adversity Quotient (AQ) based on gender. A qualitative approach with descriptive research was utilized, and data was collected through creative thinking ability tests, interviews, and documentation. Research subjects were selected based on their AQ type, which was determined through an Adversity Response Profile (ARP) questionnaire, and then analyzed with grouping based on gender. Students with the AQ Climbers type were able to provide multiple solutions with the correct final answer, while those with the female AQ Climbers type demonstrated very creative TKBK abilities by fulfilling all indicators of creative thinking. The male AQ Climbers type also demonstrated creative thinking abilities but was less thorough in the flexibility indicators. This research is important for educators to design questions with varying levels of difficulty to encourage students' creative thinking abilities, considering their AQ type.

Keywords: creative thinking ability; adversity quotient (AQ); gender

1. Introduction

Mathematics is a branch of education that has an important role in the development of science and technology. In line with the opinion of Eviliasani (2018) who states that mathematics is a science that is the basis of other sciences, is the basis for the development of science, and is very useful for life. According to Yanti et al. (2019), mathematics can be a strong, short, and clear means of communication and a means of solving problems in everyday life.

Regulation of the Minister of National Education of the Republic of Indonesia Number 22 of 2006 explains that the aim of learning mathematics in schools is so that students can understand and apply mathematical concepts and use reasoning in solving problems. Mathematics education involves processes, teaching and learning, and creative thinking that can turn students into people who can think logically, critically, and rationally. Riskawati (2018) believes that the current orientation of mathematics learning is on improving students' creative thinking. In creative thinking, students are required to be able to explore more than one way to solve a problem, because by thinking creatively, students can develop their potential by looking at a problem from various perspectives.

Based on the results of interviews conducted with mathematics teachers at SMP Negeri 16 Malang class VIIF, it was revealed that the level of students' creative thinking abilities in recent years has been quite low. One factor that influences this is the shift from online learning to offline learning due to the Covid-19 pandemic.

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Apart from that, in daily learning the dominant learning method uses conventional learning as a teaching paradigm. Less varied learning makes students bored, which impacts their creativity in learning and problem-solving (Hariyani and Kamunggul, 2019).

Creativity grows through a combination of personality traits and personal intelligence, making each individual different from one another. Hudojo (1990) explains that of course a person's creative thinking ability is influenced by their level of intelligence. Furthermore, Zheng Zhu (2007) revealed that differences in mathematical solutions are influenced by gender differences, differences in experience, and differences in education. Problem-solving is a process that must penetrate all the concepts and skills that can be learned. Every individual has different problem-solving abilities.

Therefore, it is important to conduct this research to determine the level of creative thinking between men and women in terms of the Adversity Quotient (AQ). Stoltz (2000) defines Adversity Quotient as an individual's intelligence in overcoming difficulties so that they can survive. An individual's ability to think creatively can be assessed by how the individual is faced with a problem and how to solve or find a solution to the problem. This research is important to determine the ability to solve mathematical problems by differentiating between the intelligence levels of men and women. This can be a reference for research on creative thinking.

Based on the description above, this research aims to analyze the creative thinking abilities of class VII students in solving mathematical problems on integer material in terms of the Adversity Quotient (AQ) based on gender. The benefit of this research is as input information for teachers to design mathematics problems with different levels of difficulty according to students' intelligence levels.

2. Research Methods

The research approach used in this research is qualitative. The research paradigm in the qualitative approach is a natural paradigm that originates from a phenomenological view (Purwanto, 2008). The type of research used in this research is description research or qualitative descriptive research. Meanwhile, Ary (2007) explains that the descriptive research method is designed to find appropriate and sufficient descriptions to obtain information about the nature of a situation when the research is carried out. The research location is at SMP Negeri 16 Malang. The subjects in this research were class VIIF students at SMP Negeri 16 Malang. The following are the procedures for collecting data in this research, namely:

1. *Adversity Response Profile (ARP) Questionnaire*
   Adversity Response Profile (ARP) is a formal analysis whose instrument expresses benchmarks for how a person responds to a difficulty or challenge. The *Adversity Response Profile (ARP)* questionnaire in written form will be filled out by students according to how students deal with or respond to the circumstances of the incident. The *Adversity Response Profile (ARP)* questionnaire procedure aims to divide class VIIF students at SMP Negeri 16 Malang based on their *Adversity Quotient (AQ)* type categories.

Table 1. Types of Adversity Quotient (AQ)

Score Range	***Adversity Quotient (AQ)* Types**
$165 < AQ \leq 200$	*Climbers*
$134 < AQ \leq 165$	*Campers to Climbers*
$94 < AQ \leq 134$	*Campers*
$59 < AQ \leq 94$	*Quitters to Campers*
$0 < AQ \leq 59$	*Quitters*

(Stoltz, 2009)

2. Creative Thinking Ability Test
   This creative thinking ability test was carried out by 15 selected subjects with the highest AQ scores for each type, consisting of 5 Climbers-type subjects, 5 Campers-type subjects, and 5 Quitters-type subjects. The creative thinking ability test questions were validated by two validators, namely the mathematics lecturer at PGRI Kanjuruhan University Malang with a validation score of 23 with the "Valid" criteria and the mathematics subject teacher at SMP Negeri 16 Malang with a validation score of 23 with the "Valid" criteria. Students will answer 3 questions regarding the description of class VII integer material. This creative thinking ability test procedure aims to determine a student's creative thinking ability level by solving the questions given.

Table 2. Result Criteria Percentage of Creative Thinking Score

Percentage of Achievement of Creative Thinking Aspects	Creative Thinking Level Category
$85\% \leq q < 100\%$	Very Creative (SK)
$70\% \leq q < 85\%$	Creative (K)
$55\% \leq q < 70\%$	Quite Creative (CK)
$40\% \leq q < 55\%$	Less Creative (KK)
$0\% \leq q < 40\%$	Not Creative (TK)

(Riduwan, 2007)

3. Interview
   With the structured interview guide that had been prepared, the researcher conducted interviews with 2 selected students in the AQ category of female Climbers and AQ type of male Climbers to test accountability for the results of the creative thinking ability tests that the students had completed. By the structured interview guidelines, the types of questions used in this research are structured questions by the interview guidelines that have been prepared previously.

3. Results And Discussion

Based on the results of the Adversity Response Profile (ARP) questionnaire of 33 class VIIF students, there were 7 students of the AQ Climbers type, 4 students of the AQ type transitioning from Campers to Climbers, 15 students of the AQ Campers type, 2 students of the AQ type transitioning from Quitters to Campers, and 5 AQ Quitters type students. This research is only limited to the AQ Climbers, Campers, and Quitters types.

Of the 33 students who have taken the Adversity Response Profile (ARP) test, they will then be analyzed using creative thinking ability test questions with a total of 15 subjects selected from each of the 5 AQ type categories Climbers, Campers, and Quitters. However, in the discussion of this article only 2 selected subjects are presented, namely 1 female subject of the Climbers type and 1 male subject of the Climbers type.

Table 3. Creative Thinking Ability Test Results

No	Subject Code	Creative Thinking Ability Test Results Score				Total	Creative Thinking Score Percentage	Creative Thinking Level Category
		Question	*fluency*	Flexibility	Novelty			
1	SES (Climbers Female)	1 2 3	3 3 3	3 3 3	3 3 3	27	100%	Very Creative
2	MER (Climbers Male)	1 2 3	3 3 3	3 2 3	3 3 3	26	96,30%	Very Creative

WRITTEN TEST RESULTS

Subject SES type AQ Climbers Female

The following is a presentation of the SES Subject test results

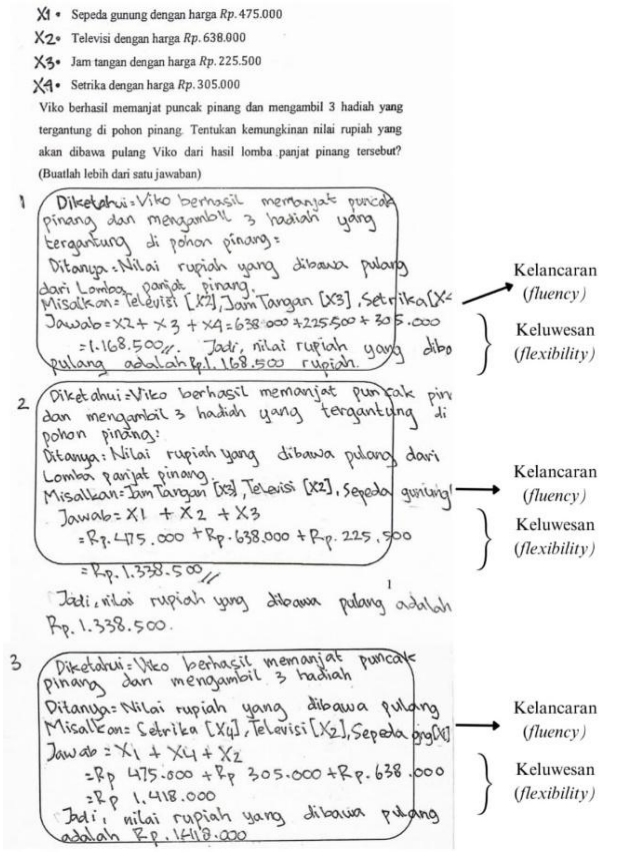

Figure 1. SES Subject Test Results Number 1

The results of the SES subject interview for solving question number 1 are as follows:

Researcher: Do you understand the purpose of the question?
Subject SES: Understand ma'am.
Researcher: What steps did you take to solve this problem?
SES Subject: I first wrote down what I knew about the question, then took each of the three items taken from the areca climbing competition and looked for every possible answer by adding up the prices of the three items, ma'am.
Researcher: Can you solve the problem with more than one alternative solution?
Subject SES: Yes, ma'am, I answered 3 possible total rupiahs from the prize taken, ma'am.
Researcher: Did you experience difficulty in working on this question?
Subject SES: No ma'am.
Researcher: After finding the answer, did you re-examine the steps you took in solving the problem?
SES Subject: Yes ma'am, I re-examined each answer.

Analysis of SES Subject Test and Interview Results on Question Number 1

SES subjects can understand question number 1 and can provide three alternative solutions, namely by making the first possible answer from the total price of a television, watch, and iron which is IDR 1,168,500. The second possible answer is the total price of watches, televisions, and mountain bikes which is IDR 1,338,500. The third possible answer is the total price of an iron, television, and mountain bike which is IDR 1,418,000. All alternative solutions for the SES subject have correct results, so it can be said that the SES subject is capable of working on question number 1 according to the indicators of fluency, flexibility, and novelty.

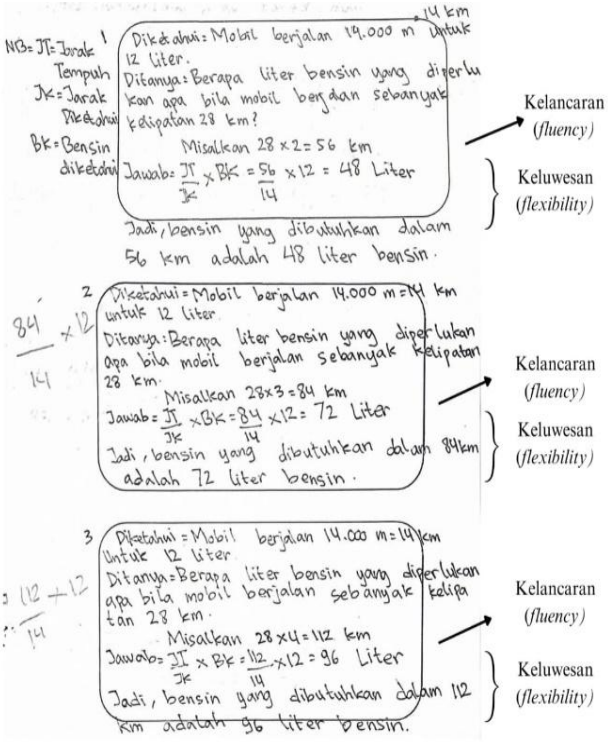

Figure 2. SES Subject Test Results Number 2

The results of the SES subject interview for solving question number 2 are as follows:

Researcher: Do you understand the purpose of the question?
Subject SES: Understand ma'am.
Researcher: What steps did you take to solve this problem?
Subject SES: It is known that a car traveling 14,000 m is the same as 14 km consuming 12 liters of petrol. Then they were asked how many liters of petrol would be needed if the car traveled a multiple of 28 km. For example, with a distance of 56 km, 84 km, and 112 km ma'am. Then find by dividing by the known distance and then multiplying by the known gasoline, ma'am. For example, by a distance of 56 km, $\frac{56}{14} \times 12 = 48$ *liters of petrol needed to cover a distance of 56 km ma'am. Likewise for other possible distances.*
Researcher: Can you solve the problem with more than one alternative solution?
Subject SES: Yes ma'am, I can take the distances of 56km, 84 km, and 112km for example.
Researcher: Did you experience difficulty in working on this question?
Subject SES: No ma'am.
Researcher: After finding the answer, did you re-examine the steps you took in solving the problem?

SES Subject: Yes ma'am, I re-examined each answer.

Analysis of SES Subject Test and Interview Results on Question Number 2

SES subjects can understand question number 2 given and can provide three alternative solutions, namely by making the first possible answer if the car's distance is 56 km, by $\frac{mileage}{distance\ is\ known} \times gasoline\ is\ known = \frac{56}{14} \times 12 = 48\ liter$. The second possible answer is if the car's distance is 84 km, by $\frac{mileage}{distance\ is\ known} \times gasoline\ is\ known = \frac{84}{14} \times 12 = 72\ liter$. The third possible answer is if the car's distance is 112 km, by $\frac{mileage}{distance\ is\ known} \times gasoline\ is\ known = \frac{112}{14} \times 12 = 96\ liter$. All alternative solutions from the SES subject have correct results, so it can be said that the SES subject can work on question number 2 according to the indicators of fluency, flexibility, and novelty.

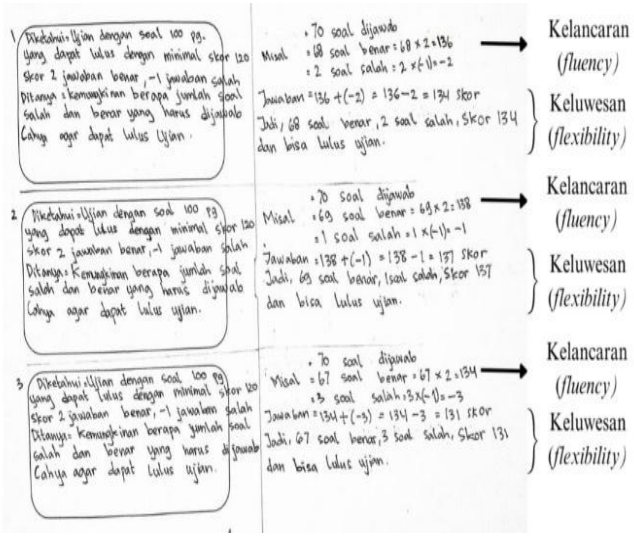

Figure 3. SES Subject Test Results Number 3

The results of the SES subject interview for solving question number 3 are as follows:
Researcher: Do you understand the purpose of the question?
SES Subject: Understanding ma'am, asked about the number of correct and incorrect questions to pass the exam.
Researcher: What steps did you take to solve this problem?
Subject SES: In this question, it is known that Cahya answered 70 questions out of 100 questions, ma'am. Then I looked for the possible correct answers and wrong answers and looked for the total score by multiplying the score 2 for the possible correct answer and the score -1 for the possible wrong answer then added them up and had to get a score above 120 to pass.
Researcher: Can you solve the problem with more than one alternative solution?
SES Subject: Yes, ma'am, I can imagine several possible correct and incorrect answers.
Researcher: Did you experience difficulty in working on this question?
Subject SES: No ma'am.
Researcher: After finding the answer, did you re-examine the steps you took in solving the problem?
SES Subject: Yes ma'am, I re-examined each answer.

Analysis of SES Subject Test and Interview Results on Question Number 3

SES subjects can understand question number 3 given and can provide three alternative solutions, namely by making the first possible answer. If they answer 68 questions correctly and 2 questions incorrectly, they will get a score of 134 and Cahya can pass. The second possible answer is if you answer 69 questions correctly and 1 question incorrectly you will get a score of 137 and Cahya can pass. The third possible answer is if you answer 67 questions correctly and 3 questions incorrectly you will get a score of 131 and Cahya can pass. All alternative solutions for the SES subject have correct results, so it can be said that the SES subject is capable of working on question number 3 according to the indicators of fluency, flexibility, and novelty.

Subject MER type AQ Climbers Male
The following is a presentation of the MER Subject test results

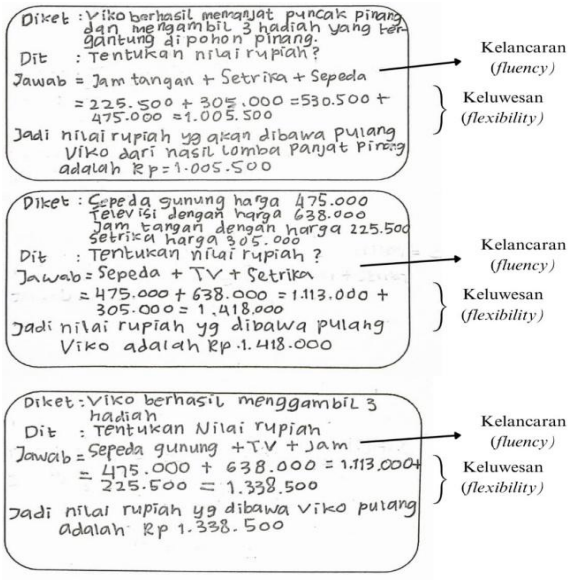

Figure 4. MER Subject Test Results Number 1

The results of the MER subject interview for solving question number 1 are as follows:

Researcher: Do you understand the purpose of the question?
MER Subject: I understand ma'am.
Researcher: What steps did you take to solve this problem?
MER Subject: I wrote down information on the prices of each of the 3 items brought from the competition and then added them up to find out the total price of the items, ma'am...
Researcher: Can you solve the problem with more than one alternative solution?
MER Subject: Yes ma'am, I will answer 3 solutions.
Researcher: Did you experience difficulty in working on this question?
MER Subject: No ma'am.
Researcher: After finding the answer, did you re-examine the steps you took in solving the problem?
Subject MER: Yes ma'am, I'll check again ma'am because I'm afraid I'm wrong.

Analysis of MER Subject Test and Interview Results on Question Number 1

MER subjects were able to understand question number 1 given and were able to provide three alternative solutions, namely by making the first possible answer from the total price of a bicycle, watch, and iron which was Rp. 1,005,500. The second possible answer is the total price of watches, televisions, and mountain bikes which is IDR 1,338,500. The third possible answer is the total price of an iron, television, and mountain bike which is IDR 1,418,000. All alternative solutions for the MER subject have correct results, so it can be said that the MER subject is capable of working on question number 1 according to the indicators of fluency, flexibility, and novelty.

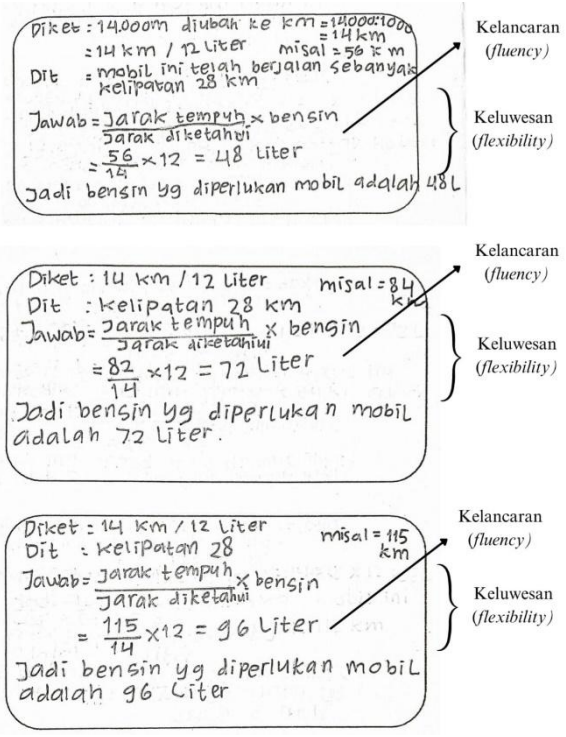

Figure 5. MER Subject Test Results Number 2

The results of the MER subject interview for solving question number 2 are as follows:

Researcher: Do you understand the purpose of the question?
MER Subject: Understand ma'am, asking about how many liters of petrol are needed if you cover a distance of multiples of 28km.
Researcher: What steps did you take to solve this problem?
Subject MER: I converted 14,000 m into km using 14,000/1,000 so in 14 km this car consumes 12 liters of petrol. I gave the example as a multiple of 28. I solved it by dividing the distance by the known distance and then multiplying by the known petrol, ma'am.
Researcher: Can you solve the problem with more than one alternative solution?
MER Subject: Yes ma'am, I got 3 answers.
Researcher: Did you experience difficulty in working on this question?

MER Subject: Experiencing bu when dividing the distance traveled and the known distance.
Researcher: After finding the answer, did you re-examine the steps you took in solving the problem?
Subject MER: I'll check again, ma'am.

Analysis of MER Subject Test and Interview Results on Question Number 2

MER subjects were able to understand question number 2 given and were able to provide three alternative solutions, namely by making the first possible answer if the car's distance was 56 km, by $\frac{mileage}{distance\ is\ known} \times gasoline\ is\ known = \frac{56}{14} \times 12 = 48\ liter$. The second possible answer is if the car's distance is 84 km, by $\frac{mileage}{distance\ is\ known} \times gasoline\ is\ known = \frac{84}{14} \times 12 = 72\ liter$. The third possible answer is if the car's distance is 112 km, by $\frac{mileage}{distance\ is\ known} \times gasoline\ is\ known = \frac{112}{14} \times 12 = 96\ liter$. The MER subject provided 3 alternative solutions, but in the two alternative solutions used, the MER subject was less precise in determining how far he had traveled, so it can be said that the MER subject was not precise in working on question number 2 according to the flexibility indicator.

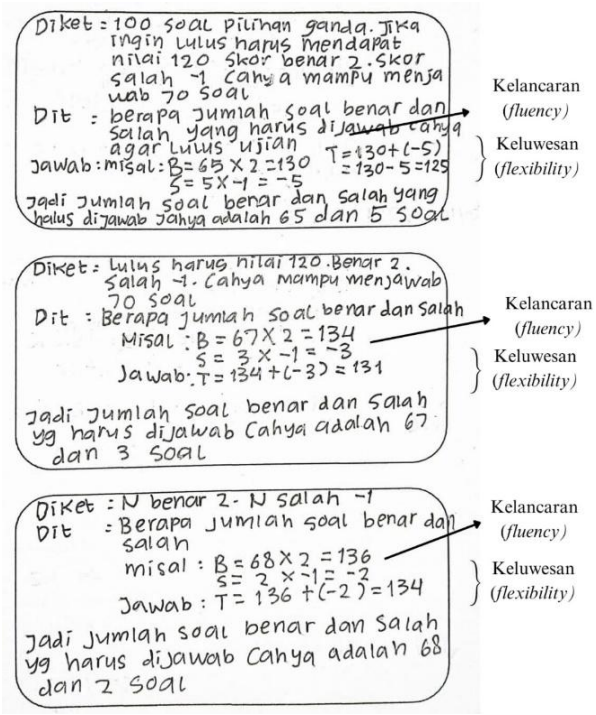

Figure 6. MER Subject Test Results Number 3

The results of the MER subject interview for solving question number 3 are as follows:
Researcher: Do you understand the purpose of the question?
MER Subject: Understand ma'am, to determine the right and wrong questions to answer to pass the exam.
Researcher: What steps did you take to solve this problem?
MER Subject: First, I'm looking for known information, ma'am. It is known that Cahya answered 70 questions, and then I calculated how many questions were correct and how many questions were incorrect. Then multiply the correct and incorrect scores and total them to get a score above 120 so you can pass, ma'am.
Researcher: Can you solve the problem with more than one alternative solution?
MER Subject: Yes ma'am, I will give 3 answers.
Researcher: Did you experience difficulty in working on this question?
MER Subject: Slightly experienced but when calculating the total.
Researcher: After finding the answer, did you re-examine the steps you took in solving the problem?
MER Subject: Yes ma'am, I re-examined each answer.

Analysis of MER Subject Test and Interview Results on Question Number 3

MER subjects can understand question number 3 given and can provide three alternative solutions, namely by making the first possible answer. If they answer 65 questions correctly and 5 questions incorrectly, they will get a score of 125 and Cahya can pass. The second possible answer is if you answer 67 questions correctly and 3 questions incorrectly you will get a score of 131 and Cahya will pass. The third possible answer is if you answer 68 questions correctly and 2 questions incorrectly you will get a score of 134 and Cahya can pass. All alternative solutions for the MER subject have correct results, so it can be said that the MER subject is capable of working on question number 3 according to the indicators of fluency, flexibility, and novelty.

a. Level of Creative Thinking Ability Type AQ Female Climbers

Based on data obtained from the Adversity Response Profile (ARP) questionnaire, female subjects with the AQ Climbers type received a score of 172. Stoltz's

theory in Ningrum (2017) reveals that the AQ Climbers type is the type who does not give up easily in facing a challenge and will continue to try to find a solution to the problem.

This can be seen from the results of written tests and interviews of female AQ Climbers-type subjects who can fulfill the creative thinking indicators of fluency, flexibility, and novelty well. The subject received a total score from the analysis of 27, where the subject was able to answer all the questions by fulfilling the creative thinking indicators. On the fluency indicator, the subject gets a score of 3 on each question, which means the subject can give more than one correct final answer. On the flexibility indicator, the subject gets a score of 3 on each question, which means the subject can give more than one answer using alternative solutions that have the correct value. According to Simanjuntak (2019), female subjects can make a solution plan by detailing the correct answer which can be seen clearly. On the novelty indicator, the subject got a score of 3 on each question, which means the subject was able to answer more than one answer by correctly bringing out the element of novelty. This research is in line with research by Maryanti (2023), namely that female AQ Climbers-type students can fulfill all indicators of creative thinking. In the Creative Thinking Ability Level (TKBK) category with a score percentage of 100%, the female AQ Climbers type is included in the "Very Creative" category.

b. Level of Creative Thinking Ability Type AQ Male Climbers

Based on data obtained from the Adversity Response Profile (ARP) questionnaire, male subjects with the AQ Climbers type received a score of 167. Stoltz's theory in Septianingtyas (2018) revealed that the AQ Climbers type are those who have courage in facing problems and are brave enough to take risks to solve the problem.

This can be seen from the results of written tests and interviews of male AQ Climbers-type subjects who can meet the creative thinking indicators of fluency, flexibility, and novelty. The subject received a total score from the analysis of 26, where the subject was able to answer all the questions by fulfilling the creative thinking indicators. On the fluency indicator, the subject gets a score of 3 on each question, which means the subject can give more than one correct final answer. On the flexibility indicator, the subject got a score of 3 in questions number 1 and 3, which means the subject was able to give more than one answer using alternative solutions that had the correct value, but in question number 2 the subject was only able to use one alternative solution that had the correct value because in the other two alternative solutions were that the subject was less careful in writing down the solution steps so the subject got a score of 2. This incident is in line with research by Agnesti (2020) where the male subject was able to write what he knew and asked according to the question, but it was a shame that the student was not careful enough. in working on questions so that the subject becomes less focused. On the novelty indicator, the subject got a score of 3 on each question, which means the subject was able to answer more than one answer by correctly bringing out the element of novelty. According to Maryanto (2021), female subjects can provide detailed answers and have better accuracy than male subjects. In the Creative Thinking Ability Level (TKBK) category with a score percentage of 96.30%, the male AQ Climbers type is included in the "Very Creative" category.

4. Conclusion

Based on the results of the analysis and discussion carried out by researchers, conclusions were obtained with the following results:

1. Students with the female AQ Climbers type obtained an Adversity Quotient (AQ) questionnaire score of 172 and were included in the Creative Thinking Ability Level category of "Very Creative" with a percentage of achieving creative thinking aspects of 100%. Students can fulfill all indicators of creative thinking, namely indicators of fluency, flexibility, and novelty well.
2. Students with the male AQ Climbers type obtained an Adversity Quotient (AQ) questionnaire score of 167 and were included in the Creative Thinking Ability Level category of "Very Creative" with a percentage of achieving creative thinking aspects of 96.30%. Students can fulfill all indicators of creative thinking, namely indicators of fluency, flexibility, and novelty. However, in the flexibility indicator, students are less careful in writing alternative solutions.

5. Acknowledgement

I would like to express my gratitude to Mr. Sukarno (math teacher SMP Negeri 16 Malang) for their guidance, academic encouragement, and friendly critique.

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