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Students' Mathematical Reasoning Skills in Solving PISA Model Problems: An Analysis According to Levels of Adversity Quotient (AQ)

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Abstract:
Mathematical reasoning skills and the ability to withstand difficulties, known as the Adversity Quotient (AQ), are important aspects in preparing students to face academic demands and daily life challenges. This study aims to describe students' mathematical reasoning skills and AQ by emphasizing appropriate decision-making in everyday life. AQ reflects an individual's ability to face and overcome challenges, which is essential for academic success. This study used a qualitative descriptive approach involving 36 seventh-grade students at SMP Negeri 2 Mandiraja. Data collection included an Adversity Response Profile (ARP) questionnaire, a written test of mathematical reasoning skills, and interviews with the participants. The analysis was conducted by systematically examining the results of the written tests and interviews, followed by the presentation of findings and formulation of conclusions. The findings reveal that a high level of AQ positively influences mathematical reasoning skills. Students categorized as "climbers" and "campers" demonstrated strong reasoning abilities, successfully submitting conjectures, performing mathematical manipulations, and drawing logical conclusions, although "camper" type students occasionally misinterpreted the available information. In contrast, "quitter" type students demonstrated relatively low reasoning skills, often misunderstanding critical details that hinder problem-solving. These findings emphasize the importance of enhancing AQ to support students' mathematical reasoning abilities. This study highlights the need for educational strategies that promote resilience and effective reasoning, and suggests integrating AQ development into the curriculum and teaching practices to significantly improve learning outcomes.

Abstrak:
Keterampilan penalaran matematis dan ketahanan menghadapi kesulitan Adversity Quotient (AQ) merupakan aspek penting dalam mempersiapkan peserta didik menghadapi tuntutan akademik dan kehidupan sehari-hari. Penelitian ini bertujuan untuk mendeskripsikan keterampilan penalaran matematis dan AQ peserta didik dengan menekankan pada pengambilan keputusan yang tepat dalam kehidupan sehari-hari. AQ mencerminkan kemampuan individu untuk menghadapi dan mengatasi tantangan, yang sangat penting untuk keberhasilan akademis. Penelitian

ini menggunakan deskriptif kualitatif, melibatkan 36 peserta didik kelas tujuh di SMP Negeri 2 Mandiraja. Pengumpulan data meliputi kuesioner Adversity Response Profile (ARP), tes tertulis keterampilan penalaran matematis, dan wawancara dengan peserta didik. Analisis dilakukan dengan menganalisis secara sistematis hasil tes tertulis dan wawancara kemudian dilanjutkan dengan penyajian hasil dan penarikan kesimpulan. Hasil penelitian menunjukan bahwa tingkat Adversity Quotient yang tinggi berpengaruh positif terhadap keterampilan penalaran matematis. Peserta didik dengan kategori "climbers" dan "campers" menunjukkan kemampuan penalaran yang kuat, mampu mengajukan dugaan, melakukan manipulasi matematis, dan menarik kesimpulan logis, meskipun peserta didik tipe "camper" kadang-kadang salah menginterpretasikan informasi yang ada. Sebaliknya, tipe "quitter" memiliki keterampilan penalaran relatif rendah, sering salah memahami detail penting yang menghambat pemecahan masalah. Temuan ini menegaskan pentingnya meningkatkan AQ untuk mendukung kemampuan penalaran matematis peserta didik. Penelitian ini menyoroti perlunya strategi pendidikan yang mendorong ketahanan dan penalaran efektif, serta menyarankan integrasi pengembangan AQ ke dalam kurikulum dan praktik pengajaran untuk meningkatkan hasil belajar secara signifikan.

Keyword:
Adversity Quotient, Mathematical Reasoning, PISA

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INTRODUCTION

Mathematics originates from human thought related to ideas, processes, and reasoning (Faradillah, Hadi, & Tsurayya, 2018). Along with technological advancements and the rapid growth of information, modern society is constantly faced with a variety of information. To distinguish between true and misleading information, individuals need reasoning skills to make accurate decisions. Good reasoning skills allows a person to think logically in the decision-making process regarding a particular issue. This is because reasoning skills encompass logical thinking and systematic thinking (Lestari, 2019).

Reasoning skills is crucial for understanding mathematical concepts and solving mathematical problems for student. Students' reasoning skills is described as the mental process that associates facts or concepts to draw conclusions (Saleh, Prahmana, & Isa, 2018). Akuba, Purnamasari, and Firdaus (2020) explain that reasoning skills reflects a person's capacity to connect statements or premises that have been established as true in order to draw conclusions. In other words, reasoning can be understood as a thinking process aimed at obtaining conclusions or formulating statements based on known truths (Agustyaningrum, Hanggara, Husna, Abadi, & Mahmudii, 2019). Students with good reasoning skills tend to master mathematical concepts better than those who only memorize or study mathematical facts in isolation (Mukuka, Mutarutinya, & Balimuttajjo, 2021).

Nurazizah and Zulkardi (2022) mention that the indicators of mathematical reasoning are submitting a conjecture, mathematical manipulation, and drawing logical conclusions. Submitting a conjecture refers to the students' skills to record the information known about the problem presented. Mathematical manipulation involves how students convert the information from the problem into a mathematical format and solve it using the given data. Meanwhile, drawing logical conclusions is the skills of students to make inferences based on the outcomes of the steps they have completed. Reasoning skills are an important part of mathematical literacy assessed by the Programme for International Student Assessment (PISA) (OECD, 2024). The PISA model evaluates 15 year old students' ability to apply math to real-world problems, focusing on not just what they know, but also how they use math in different contexts (Beccuti, 2024).

Success in PISA math relates to grade level and family background, while programs that use real life tasks and teamwork boost student engagement and achievement (Tashtoush, Qasimi, Sheerawi, & AL-Shannaq, 2024). However, PISA 2022 results show that Indonesian students have low reasoning skills, scoring 366 in math, down from 379 in 2018 (OECD, 2024). This decline is linked to their unfamiliarity with PISA style problems and routine, non-contextual questions given by teachers (Nusantara, Zulkardi, & Putri, 2020). Overall, while PISA provides a useful measure of math literacy, its results are sensitive to educational and methodological factors.

In the process of learning mathematics, various factors beyond cognitive abilities are crucial for helping students navigate challenges and difficulties. One significant factor is the Adversity Quotient (AQ), which reflects an individual's response to problems and challenges in life (Stoltz, 1997). Hidayat, Wahyudin, and Prabawanto (2018) state that the Adversity

Quotient (AQ) influences the enhancement of students' reasoning skills in mathematics. AQ can be understood as the ability to persevere when facing challenges (Juwita, Roemintoyo, & Usodo, 2020) and has a significant impact on students' learning behaviors (Singh & Parveen, 2018). For instance, students may confront challenges directly, strive to solve problems to the best of their abilities, or avoid them altogether (Muhatrom, Sholihah, & Sutrisno, 2023).

AQ is classified into three categories: climbers, campers, and quitters (Stoltz, 1997). Climber type students demonstrate high perseverance and motivation, effectively tackling challenges. Campers, on the other hand, often lack motivation and may not reach their full potential, while quitters are more likely to give up when faced with difficulties (Ahmar, Rahman, & Mulbar, 2018; Saregar, Latifah, & Sari, 2016). In educational contexts, AQ can be instrumental in helping students achieve their goals and strengthen their academic skills (Astuti & Aripin, 2022).

Many studies have examined students' mathematical reasoning abilities. For example, research conducted by Dewi and Setianingsih (2025) shows that climber and camper type students are capable of comprehending the information presented in a problem and recognizing mathematical patterns during the problem solving process, allowing them to draw conclusions. In contrast, quitter type students make calculation errors, preventing them from recognizing patterns and failing to draw conclusions. This aligns with research conducted by Nilasari and Anggreini (2019), which states that the reasoning abilities of climber and camper type students outperform quitter type students. Given this context, the theoretical link between AQ and mathematical reasoning suggests that enhancing a student's AQ could foster greater resilience and improve their reasoning capabilities. By developing a stronger AQ, students may be better equipped to approach mathematical problems with confidence and perseverance. This improvement can lead to not only better problem-solving outcomes but also a deeper understanding of mathematical concepts, ultimately resulting in enhanced academic success. Thus, investing in strategies to boost AQ in students is essential for promoting effective learning in mathematics.

However, despite the indicated relationship between Adversity Quotient and mathematical reasoning skills, there is still a lack of research specifically exploring this dynamic among climber, camper, and quitter type students. The gap in existing research shows that while some studies have included students' Adversity Quotient, many have not conducted in depth analyses of students' abilities to solve PISA style problems within the context of mathematics learning that encompasses mathematical reasoning skills. Therefore, the aim of this research is to analyze the relationship between mathematical reasoning skills and Adversity Quotient among students based on their levels of adversity quotient, as well as how these characteristics affect their learning outcomes. By addressing this gap, it is hoped that the research can provide new insights into the dynamics of learning and also contribute to the development of more effective teaching methods.

This research encompasses how Adversity Quotient influences mathematical reasoning skills among students and utilizes a theoretical framework that focuses regarding the connection between Adversity Quotient and mathematical reasoning. The importance of this research stems from its potential impact on educational practices, learning policies, and curriculum development. The findings are expected to provide valuable insights for educators in planning inclusive and responsive teaching strategies that meet the needs of students. This research also aims to contribute to the development of educational theories related to Adversity Quotient and mathematical reasoning.

METHODS

A qualitative approach is used in this research to analyze mathematical reasoning skills and Adversity Quotient (AQ) among students. A qualitative design was chosen to gain deeper insights into how these two variables interact in the context of learning.

The type of method in this study is qualitative descriptive. 36 students in grade VII G SMP Negeri 2 Mandiraja in the 2024/2025 school year are the subjects of this study, grouped based on the level of adversity quotient as the type of climbers, campers and quitters. Each category was taken by one student as a respondent with the purposive sampling technique. Respondents of the climbers, campers and quitter types were given the initials P1 (climbers), P2 (campers) and P3 (quitters) respectively.

To collect data using the results of the Adversity Response Profile (ARP), written questions about mathematical reasoning skills using PISA model questions and interviews were conducted with the selected subjects. The ARP consists of 20 questions with 5 answer choices scored between 1 to 5 containing adversity quotient indicators, namely control, origin and ownership, reach and endurance. The results of the ARP are then classified as follows.

Table 1. Adversity Quotient Criteria

ARP Score	Adversity Quotient Criteria
0 – 59	Quitter
60 – 134	Camper
135 - 200	Climber

Gaining a deeper understanding of students' mathematical reasoning abilities, the researcher conducted interviews with the research subjects based on the results of reasoning ability tests. The interview questions were formulated based on indicators of mathematical reasoning, and the researcher explored the characteristics of each indicator in depth. The materials and instruments used in this study consist of an Adversity Quotient questionnaire and a mathematical reasoning test. The Adversity Quotient questionnaire is designed to measure students' skills to face challenges and overcome difficulties, while mathematical reasoning tests function to determine understanding and measure students' reasoning skills in applying mathematical concepts in real situations. Both instruments have gone through a validation process to ensure their reliability and relevance in the context of research. The validation of the instruments in this study was conducted by involving evaluation experts who have research experience in the field of evaluation and mathematics education. The results indicate that the instruments used in this study are deemed valid and reliable

The following mathematical reasoning questions are presented to students, including a problem related to the PISA question model set in a personal context. While the questions align with the PISA framework, they also encompass broader indicators of mathematical understanding, such as data interpretation and logical reasoning. For example, the accompanying bar chart illustrates car production over the first four months of 2024, providing a practical scenario for students to apply their reasoning skills. This approach not only addresses the PISA context but also emphasizes the importance of various indicators in developing students' overall mathematical competence. The following data shows the number of cars produced in a factory over a period of 4 months.

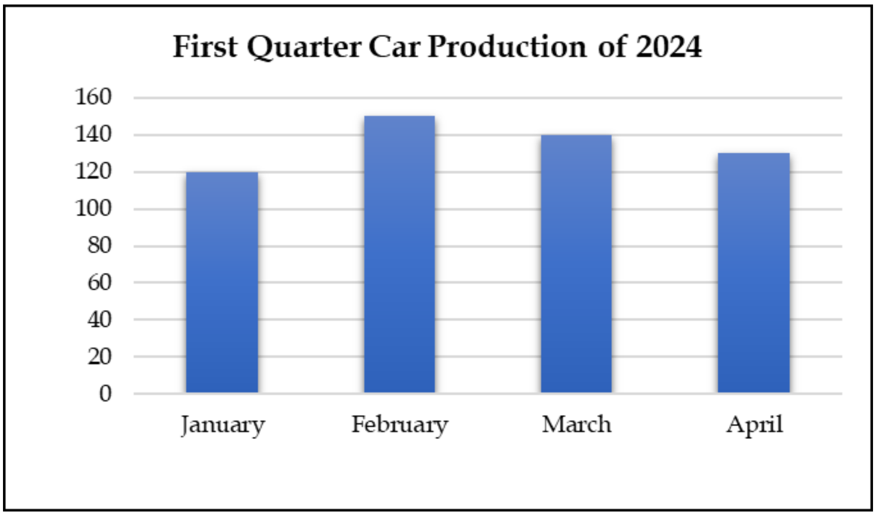


Figure 1. Car Production for the First Quarter

Based on the data above, please answer the questions below.

a. Write in detail what information you can gather from the bar chart above. (Submit a conjecture).
b. In which month did car production increase? Please specify the amount of the increase in production (mathematical manipulation).
c. If the production target for cars in the first semester of 2024 is 870 cars, how many cars need to be produced in May and June? (drawing logical conclusion).
d. Provide a conclusion regarding answer c (drawing logical conclusion).

The data analysis of this research consists of three stages: data reduction, data presentation, and drawing conclusions. In the data reduction stage, the researcher selects respondents as representatives of each type of adversity quotient and prepares relevant data so that it becomes more structured. In the data presentation stage, the researcher organizes and presents the reduced data and then describes it so that the research findings are easily understood by the readers. After the data is presented, the researcher then draws conclusions based on the existing findings.

The process in mathematical reasoning involves submitting a conjecture, performing mathematical manipulation, and drawing logical conclusions, as shown in table 2 (Nurazizah & Zulkardi, 2022).

Table 2. Indicators of Mathematical Reasoning

The Process of Mathematical Reasoning	Indicators
Submit a conjecture	Able to record what is known and what is inquired based on the given images and questions.
Mathematical manipulation	Can change existing problems into mathematical form. Can solve problems based on assumptions.
Drawing logical conclusion	Capable of formulating logical conclusions that align with the problem at hand.

RESULTS AND DISCUSSION

After 36 subjects worked on written test questions regarding mathematical reasoning and filled out the Adversity Quotient questionnaire, data was obtained that in class VII G SMP Negeri 2 Mandiraja there were 6 students in the quitter category, 20 students in the camper category and 10 students in the climber category. Then from these results, the researcher selected 3 students to evaluate the results of their answers regarding mathematical reasoning skills as representatives of each type of adversity quotient that exists. The selection of the three students is based on their levels of adversity quotient, which will then be analyzed in terms of their mathematical reasoning abilities. Next, the three selected students are designated as P1, representing the climber type; P2, representing the camper type; and P3, representing the quitter type. The results of data analysis regarding mathematical reasoning skills are presented below.

Students with Climber Type (P1)

Here are the results of the interview with P1, along with the answers to the written test regarding P1's mathematical reasoning abilities.

Q : What information can you gather based on the presented bar chart?
P1 : The chart shows data regarding car production from January to April 2024.
Q : Are there any difficulties or obstacles in understanding the chart?
P1 : No, ma'am.
Q : How do you answer question b?
P1 : Question b is related to the increase in production. What I do is

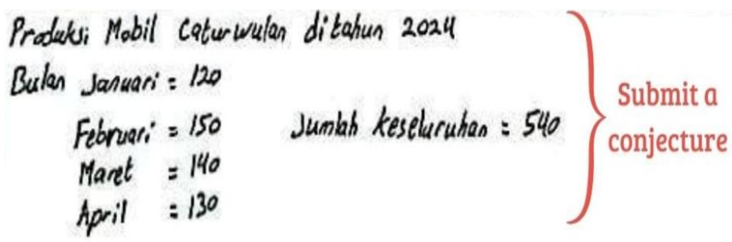
look at the bar chart and observe the changes in the height of the bars from lower to higher, and then I calculate the amount of increase that occurred.

Q : Are there any difficulties in answering question d?

P1 : No, ma'am

Q : What conclusion can you provide regarding question d?

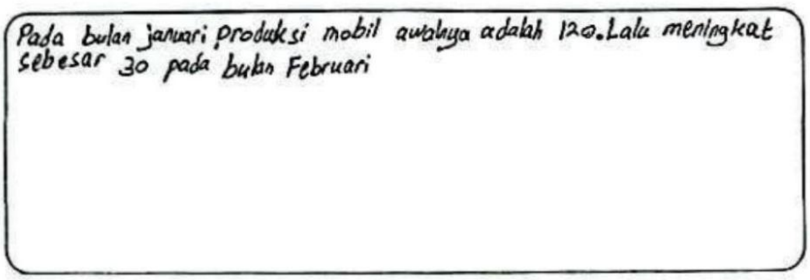
P1 : Question d asks for a conclusion related to question c. I concluded that the company should produce 330 units in May and June to meet the target



Translated into English:
Car Production for the first quarter of 2024
January: 120
February: 150
March: 140
April: 130
Total Overall: 540

Figure 2. The Results of P1's Work for The Indicator Submit a Conjecture

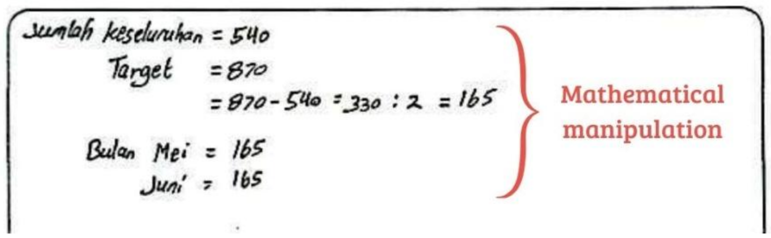
Along with the climber type, students have been able to submit a conjecture. This is evident from figure 2, where P1 have documented the information derived from the presented diagram and added the total amount of production from January to April. The results indicate that P1 has clearly and accurately met the indicator for submitting a conjecture.



Translated into English:
The initial number of cars produced in January was 120 units. Production then increased by 30 units in February.

Figure 3. The Results of P1's Work for The Indicator of Mathematical Manipulation

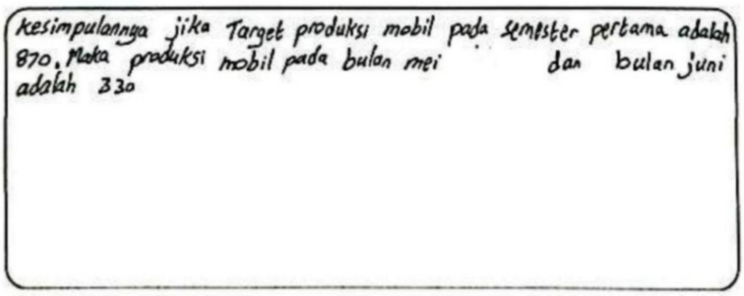
P1 have also been able to perform mathematical manipulation. This can be observed from figure 3, where students successfully solved problems related to mathematical calculations, even though the calculation process is not included.



Translated into English:
Total overall= 540
Target: 870
:870-540=330÷2=165
May: 165
June: 166

Figure 4. The Results of P1's Work for The Indicator of Mathematical Manipulation

Based on figure 4, it is noticeable that P1 are capable of carrying out mathematical manipulation by converting existing information into mathematical forms to solve the given problems. P1 have also written their opinions on the amount of production in May and June.



Translated into English:
The conclusion is if the car production target for the first semester is 870 units, then the production for May and June is 330 units.

Figure 5. The Results of P1's Work for The Indicator of Drawing Conclusions

Based on the answers shown in figure 5, it is clear that P1 have successfully written conclusions based on the given problems. Additionally, the analysis of answer sheets and interviews with P1 revealed that these students are capable of recording information derived from images and problems, which serves as material in the problem-solving process. This indicates that P1 has been able to submit a conjecture in a problem to be used as a consideration for finding a solution to a problem. P1 has also demonstrated the ability to transform existing problems into mathematical forms, as evidenced by the answer sheet. This shows that P1 can apply facts and concepts and solve problems according to the procedure to obtain solutions, indicating that they have met the mathematical manipulation criteria. Additionally, P1 has successfully engaged in logical decision-making relevant to the given problem (drawing logical conclusions). In line with this, Budiyanti, Moeller, and Thit (2022) stated that the climber type is capable of inferring problems mathematically, utilizing existing data and procedures to find solutions, and interpreting, applying, and assessing the results of calculations to draw conclusions.

This success can be attributed to the perspective of climber type students on challenges, which they view as opportunities to enhance their skills. According to the study, these students exhibit high levels of perseverance and motivation (Stoltz, 1997), enabling them to confront difficulties head on. This mindset allows them to engage deeply with mathematical concepts, transforming obstacles into valuable learning experiences. By perceiving problems as avenues for growth, climbers are more likely to invest effort in understanding and solving complex mathematical situations. Therefore, integrating strategies that foster this climber mentality into educational practices can significantly enhance students' mathematical reasoning abilities.

Students with Camper Type (P2)

Here are the results of the interview with P2, along with the answers to the written test regarding P2's mathematical reasoning abilities.

Q : What information can you gather based on the presented bar chart?

P2 : The chart shows data regarding car production from January to April 2024. In January, the production was 120; in February, it was 150; in March, it was 140; and in April, it was 130.

Q : Are there any difficulties or obstacles in understanding the chart?

P2 : No, ma'am.

Q : How do you answer question b?

P2 : I notice that the bar representing February is the tallest, with a value of 150.

Q : Do you think your answer to question b is correct?

P2 : I have a little doubt, ma'am.

Q : What do you think the correct answer should be?

P2 : I don't know, ma'am

Q : Is there a change in the number from the previous month to February?

P2 : Yes, there is.

Q : What is the change?

P2 : It increased from 120 to 150, which means an increase of 30.

Q : The answer should focus on the change in increase, rather than the production amount during the increase. Are there any difficulties in answering question c?

P2 : No, ma'am

Q : Could you explain your answer to question c?

P2 : First, I subtracted the production target of 870 from the total production from January to April, which is 550. Then, I divided the result by 2.

Q : Are you sure about your answer?

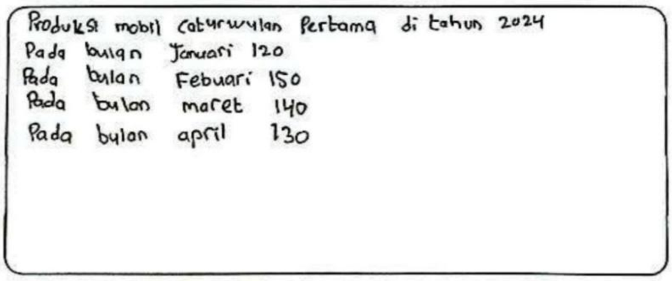
P2 : Yes, I am sure of my answer.

Q : What is the result of 30 divided by 2?

P2 : 165, ma'am

Q : In your answer to question d, do you consider 870 to be the amount that has been produced or the amount that needs to be produced?

P2 : It is the target that must be produced, ma'am.



Translated into English:
Car Production for the first quarter of 2024
January: 120
February: 150
March: 140
April: 130
The initial number

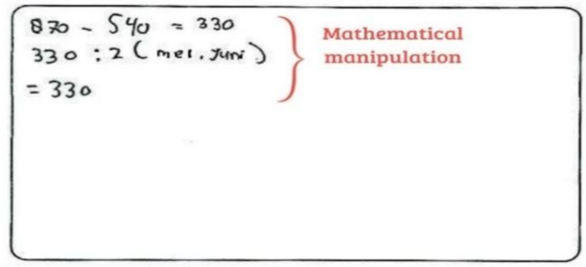
Figure 6. The Results of P2 Work for The Submit a Conjecture Indicator

Figure 6 shows that P2 have been able to submit a conjecture, as evidenced by their skills in noting the information presented in the bar diagram.

Translated into English:
February with an increase of 150 units.

Figure 7. The Results of P2 Work for The Mathematical Manipulation Indicator

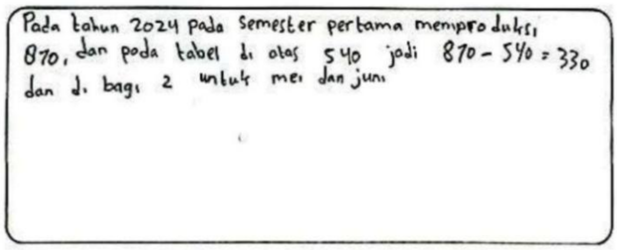
In figure 7, It is apparent that the P2 has successfully understand the information that the increase in production occurred in February, but when mentioning the amount of increase, the student experienced a misconception Where the student wrote down the amount of production in February, when the increase should have occurred in March.



Translated into English:
870 – 540 = 330
330 ÷ 2 (May, June) = 330

Figure 8. The Results of P2 Work for The Mathematical Manipulation Indicator

Figure 8 shows that P2 have successfully performed mathematical manipulation. They have been able to convert existing information into mathematical forms and use this information to solve the given problems.



Translated into English:
In 2024, in the first semester, the production was 870 units, and in the table above was 540, so 870 – 540 = 330, and divide it by 2 for May and June.

Figure 9. The Results of P2 Work for The Drawing Logical Conclusion Indicator

In figure 9, it can be seen that P2 have successfully drawn conclusions based on the given problems and provided additional insights, noting that the shortage of production is divided into two parts to meet the production targets for May and June.

Based on the analysis of answer sheets and interview results with P2, it was found that these students demonstrated the ability to follow mathematical reasoning steps. They successfully submitted a conjecture by extracting information from the bar diagram. Specifically, the calculation error occurred when dividing 330 by 2, which should have resulted in 165 for each month;

instead, P2 incorrectly wrote 330. Additionally, P2 made a mistake in reading the amount of increase, stating it as 25 instead of the correct 30. These mistakes reflected a misunderstanding of the problem rather than the inherent difficulty of the PISA questions. The errors made by these students were due to misinterpretation of the information in the table and a lack of correction of their answers. However, in the end, P2 managed to draw relevant conclusions and provide additional information about the allocation of production shortages to meet the target for the following month. Ultimately, P2 was able to conclude that the total production needed for May and June was indeed 330.

This finding aligns with previous research conducted by Lailiyah, Kurlillah, and Kusaeri (2023), which describes camper type students as eager to tackle various problems and challenges but often quit when they feel satisfied with their current situation. While P2 showed potential in their mathematical reasoning, similar to campers, they encountered obstacles that prevented them from fully realizing their capabilities. However, unlike the camper students in (Lailiyah , Kurlillah, & Kusaeri, 2023) who might give up prematurely, P2 demonstrated resilience by eventually reaching a conclusion and addressing the production targets despite initial errors. This suggests that while both groups exhibit a willingness to engage with challenges, the ability to persevere and correct mistakes may vary, highlighting the need for targeted support to enhance students' problem-solving skills.

Students with Quitter type (P3)

Here are the results of the interview with P3, along with the answers to the written test regarding P3's mathematical reasoning abilities.

Q : What information can you gather based on the presented bar chart?

P3 : The diagram shows the production volume for each month from January to April.

Q : Please mention the data that is presented in the diagram.

P3 : Based on the data provided, the production volume for January is 120, for February is 145, for March is 140, and for April is 125.

Q : Was there any difficulty in answering that question?

P3 : es, I was confused about determining the production volume for February and April.

Q : Why did that happen?

P3 : Because the endpoints of the bars in the diagram do not align with the numerical scale.

Q : Then what did you do to resolve the issue?

P3 : To answer the question, I fabricated the response by adding 5 to the value indicated by the line that the bar crossed.

Q : Are you sure about your answer?

P3 : I am not confident in my answer, ma'am.

Q : Do you know the midpoint between 14 and 16?

P3 : I know, ma'am, the midpoint is 15.

Q : Then, do you know the midpoint between 140 and 160?

P3 : Yes, I know, ma'am. The midpoint is 150.

Q : How do you answer question b?

P3 : I subtracted the production amount of February from January, ma'am, because February has the highest bar.

Q : Are you sure about your answer to question c?

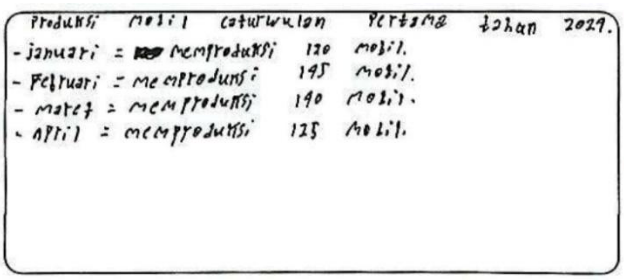
P3 : Yes, I am sure, ma'am.

Q : How do you answer that question?

P3 : I added the production from January to April, then subtracted that result from 870. After that, I divided the result by 2 for the total production in May and June.

Q : Explain the meaning of your answer to question d?

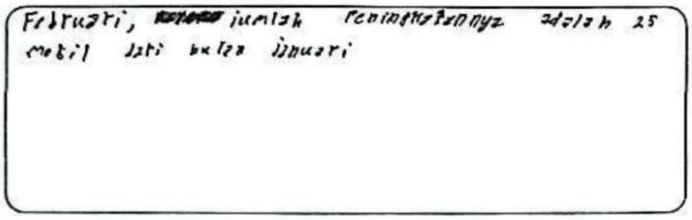
P3 : So, we need to produce a total of 430 in May and June to reach the production target of 870.



Translated into English:
Car Production for the first quarter of 2024
January: 120 cars was produced.
February: 145 cars was produced.
March: 140 cars was produced.
April: 125 cars was produced.

Figure 10. The Results of P3 Work for The Submit a Conjecture Indicator

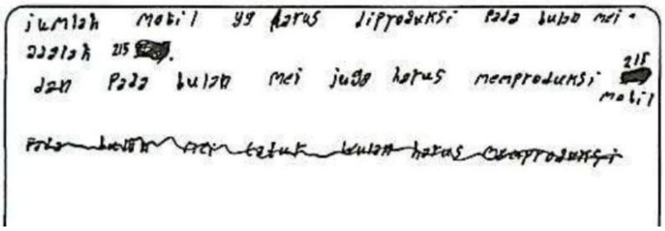
P3 have not been able to submit a conjecture. From figure 10, it can be seen that while students understood the existing problems, they made mistakes in reading the data. An error occurred in the February data, which was supposed to be 150, but the student misinterpreted it as 145. Additionally, there was a data error in April, where the correct value should have been 130, but the subject wrote it as 125.



Translated into English:
In February, the number of the increase is 25 cars compared to January.

Figure 11. The Results of P3 Work for The Mathematical Manipulation Indicator

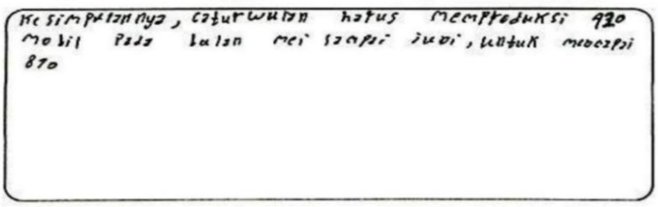
P3 has demonstrated the ability to perform mathematical manipulation, as seen in figure 11. Although P3 did not document the calculation process, they correctly identified the increase in February as 25. Based on the answer in figure 9, this calculation is accurate. However, due to errors in reading the data, the subject encountered difficulties in solving the second problem.



Translated into English:
The number of cars that must be produced in May is 215 units.
And in May, 215 cars must also be produced.

Figure 12. The Results of P3 Work for The Mathematical Manipulation Indicator

In figure 12, it can be seen that P3 has successfully understood the existing question. However, P3 has not been able to convert the presented problem into a mathematical form and still makes calculation errors in the solution.



Translated into English:
In conclusion, the quarter must produce 420 cars from May to June, to reach 870.

Figure 13. The Results of P3 Work for Drawing Logical Conclusion Indicator

From figure 13, it can be observed that P3 understands that the question is asking for the amount of production in May and June. However, P3 makes a mistake in drawing conclusions by mistakenly assuming that the data requested is a calendar, leading to an incorrect conclusion. This indicates that P3 has not yet been able to draw logical conclusions.

Based on the results of the analysis and interviews with P3, their difficulties in following mathematical reasoning steps can be closely linked to their classification as quitter type students due to their low Adversity Quotient (AQ). Students with a low AQ tend to give up when faced with challenges, which is evident in P3's problem-solving approach. While they can recognize existing problems, their inability to accurately read and interpret data, particularly regarding production figures, reflects a lack of perseverance and confidence in their reasoning abilities.

For instance, although P3 identified the increase in production for February, they failed to document the calculation process clearly, indicating a disengagement from the problem. This lack of documentation is typical of quitter-type students who may feel overwhelmed and resort to superficial processing. Their errors in reading data not only hindered their ability to solve immediate problems but also contributed to a broader pattern of misunderstanding, leading to incorrect conclusions about the production needs for May and June. Furthermore, P3's struggles to draw logical conclusions highlight how a low AQ impacts educational outcomes; when faced with difficulties, quitter-type students often lack the resilience to persist, affecting their overall academic performance and reasoning skills.

These results indicate that students with a strong Adversity Quotient are generally better equipped to face challenges in mathematics learning, which positively affects their academic performance. This suggests that the Adversity Quotient is not merely a psychological measure but also plays a direct role in learning outcomes. Therefore, an educational approach that simultaneously emphasizes the development of mathematical reasoning and the Adversity Quotient is essential. The researcher recommends that teachers and educators integrate learning experiences that encourage students to overcome challenges and foster a supportive environment for developing the Adversity Quotient, enabling students to learn from difficulties and enhance their resilience.

CONCLUSION

The results of this study indicate that a high level of Adversity Quotient has a positive influence on mathematical reasoning skills. Climber type students show good mathematical reasoning skills, as seen from the skills to write relevant information from pictures and problems, perform a conjecture and carry out mathematical manipulation. Climber type students have also been able to use facts and concepts to solve problems according to procedures and drawing logical conclusions. Camper type students have been able to submit a conjecture and mathematical manipulation. Although in the process there were errors in understanding the information, the camper type students ultimately succeeded in carrying out a drawing logical conclusion. This shows that they have a desire to try and face challenges, but are often satisfied with the results achieved so they do not re-evaluate the problem-solving process taken. Unlike climber and camper type students, quitter type students have difficulty in carrying out mathematical reasoning steps. Although they can understand the problem, quitter-type students make mistakes in the existing information so that it has an impact on the problem-solving process.

While this study provides valuable insights into the relationship between Adversity Quotient and mathematical reasoning, there are limitations Regarding the number of subjects and the context of the study. Therefore, further research is needed to involve more subjects from various backgrounds and explore other factors that may affect mathematical reasoning and Adversity Quotient, such as social environment and family support as well as the development of learning media to facilitate learners. Furthermore, it is hoped that this research can make a meaningful contribution to the development of more effective teaching methods, as well as provide a better interpretation of the dynamics of the learning process in students.

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