JURNAL EDUSCIENCE (JES)
p-ISSN : 2303 - 355X | e-ISSN : 2685 - 2217
PUBLISHED BY : LPPM of UNIVERSITAS LABUHANBATU

Mathematical Problem-Solving Ability of Students in Terms of Adversity Quotient and Self-Efficacy

Suci Charolina[1*], Suhendra[2]

[1] Department of Mathematics Education, Universitas Pendidikan Indonesia, Indonesia
[2] Department of Mathematics Education, Universitas Pendidikan Indonesia, Indonesia
*sucicharolina03@upi.edu

ARTICLE INFO

Keywords:
Adversity Quotient
Problem-Solving
Self-efficacy
SPLDV

ABSTRACT

Purpose – This study aims to analyze students' mathematical problem-solving skills in SPLDV material regarding adversity quotient and self-efficacy, and provide recommendations for improving students' mathematical problem-solving skills in schools with comparable backgrounds.

Methodology – This study used a qualitative approach with a case study method. The subjects were three ninth-grade students selected based on their AQ and SE levels. The data collection technique used was triangulation. The test instrument for this study was a problem-solving ability test. The non-test instruments for this study were the AQ Questionnaire, the SE Questionnaire, and the interview guidelines. The techniques for examining data validity in qualitative research include testing credibility, transferability, dependability, and confirmability.

Findings – The study found that students with a climber adversity quotient and high self-efficacy excel in mathematical problem-solving, fulfilling all four problem-solving indicators: understanding the problem, planning a strategy, implementing a solution, and re-examining the results. Students with a camper adversity quotient and high self-efficacy have good problem-solving skills but are not optimal, fulfilling only three indicators. Students with a high adversity quotient and low self-efficacy tend to struggle, fulfilling only two indicators and often giving up.

Contribution – The results of this study are expected to contribute to mathematics education by serving as a reference for research on students' mathematical problem-solving abilities about adversity quotient and self-efficacy.

Received 5 January 2025; Received in revised form 18 January 2025; Accepted 12 June 2024
Jurnal Eduscience (JES) Volume 12 No. 3 (2025)
Available online xx June 2025

INTRODUCTION

Learning mathematics is not only about concepts, but also about the meaning of learning, including problem-solving skills. According to Polya (1957), in Cano and Lomibao (2023), problem solving is finding solutions to difficulties to achieve goals that cannot be achieved instantly. NCTM (2018) emphasizes that problem solving occurs when individuals face problems without clear resolution methods. This ability is essential because it helps students solve mathematical problems in everyday life. In mathematics learning, problem solving is very important, even said to be the heart of mathematics. Istiqomah et al (2021) add that most mathematics learning occurs through problem-solving, which helps students integrate concepts, skills, and decision-making. In other words, problem-solving is a key aspect of the mathematics curriculum that helps students integrate concepts, skills, and decision-making.

Based on the above description, it can be concluded that students should master mathematical problem-solving skills because most of the competency standards in basic mathematics require problem-solving skills. This is supported by the Regulation of the Minister of National Education No. 22 of 2016, which states that one of the mathematics learning objectives is to develop students' problem-solving skills. The view that problem-solving skills are a general objective of mathematics learning implies that mathematics can help solve problems in mathematics, other subjects, and everyday life. However, Indonesian students are still not very good at problem-solving. The PISA (Programme for International Student Assessment) survey results show that Indonesian students' mathematical problem-solving skills are still inferior. For reference, the questions in PISA are related to problem-solving. These questions are designed to measure students' ability to apply mathematical concepts to solve real-world problems, which require critical thinking, analytical skills, and the contextual application of knowledge.

PISA is an organization that measures the learning achievements of 15-year-old students in three areas of literacy: scientific, reading, and mathematical. Specifically in mathematics, the latest PISA assessment 2022 identified problem-solving skills as one of the cognitive indicators. Assessment results indicate that Indonesian students still face challenges in solving mathematics problems, particularly those requiring complex problem-solving. The 2022 PISA results also revealed that 82% of Indonesian students did not achieve Level 2 in mathematics, the minimum level needed to succeed in the 21st century. This means most Indonesian students struggle to solve simple mathematical problems and apply mathematical knowledge daily (OECD, 2022). Understanding problems is one of the most dominant difficulties in solving PISA questions compared to other difficulties (Febrianti et al., 2022). This indicates that students in Indonesia are among those who experience difficulties in mathematics, especially in learning related to problem solving.

Several studies on mathematical problem-solving ability conclude that students' problem-solving ability is still low. Research by Meika, Ramadina, Sujana, and Mauladaniyati (2021) concluded that low problem-solving ability can be seen from the data on student learning outcomes, which shows that the average student score is only 58.0. This figure is far below the minimum passing criterion (KKM) set by the school, which is 70.0. Then, research by Asok and Hasanah (2021) showed that mathematical problem-solving ability is classified as low based on the achievement of mathematical problem-solving ability indicators obtained by students because some students are unable to make plans, are not accustomed to and immediately work on questions without making plans in advance with sentences, besides that students have difficulty in making plans in entering data in the formulas that have been written. Students are not thorough in the calculations they make. Based on some of the research results above, it can be concluded that students' mathematical problem-solving skills are still low. In fact, in learning mathematics, problem-solving skills are critical. One of the contributing factors is that they lack practice in solving non-routine problems (Sriwahyuni & Maryati, 2022). The habit of students doing routine problems makes them unable to solve a problem when given non-routine problems. Non-routine problem solving tends to be more difficult than routine problem solving because non-routine problems require a higher level of originality and imagination from the problem solver (Naimnule et al, 2022). Therefore, solutions to non-routine problems are unlikely to emerge quickly or directly.

Students' success in learning and achieving learning objectives, especially in SPLDV material, can be influenced by their persistence in finding solutions to problems. Students can face various difficulties in finding solutions to these problems. Each student can likely overcome difficulties in dealing with problems

through their intelligence. Intelligence in dealing with difficulties is called the adversity quotient (AQ). AQ is an individual's intelligence in overcoming every difficulty, and is often identified with the ability to fight to overcome difficulties. The character of each student in finding solutions to the problems faced is very likely to be different. Stoltz (2000) in Verenia et al (2022) says that AQ is the ability of a person to recognize challenges and apply their intelligence to these challenges, as well as turn them into problems to be solved. This ability enables people to find solutions to problems by responding positively to difficulties. Thus, a person's intelligence in facing difficulties will vary.

Some research related to AQ shows unsatisfactory results. Among them is research conducted by Yustiana, Kusmayadi, and Fitriana (2021), which concludes that students with the quitter type can understand the problem. Students who fit the description of AQ campers can understand the problem, formulate an action plan, and implement it. Students who belong to the Climbers type can understand the problem, formulate an action plan, implement it, and then review the results. Furthermore, research conducted by Aisyah, Riyadi, and Subanti (2021) concluded that climbers' subjects experienced two difficulties in solving mathematical problems, namely difficulty in understanding the problem and difficulty in implementing the plan. Campers experience three difficulties in solving mathematical problems: understanding problems, implementing plans, and looking back. Quitters experience four difficulties in solving mathematical problems: difficulty in understanding problems, difficulty in planning, difficulty in implementing plans, difficulty in reviewing, and difficulty in revising. Several previous studies show differences in research results related to students' mathematical problem-solving abilities regarding AQ.

Apart from AQ, a person's problem-solving ability is also influenced by personality factors, including self-efficacy (SE). Adetia and Adirakasiwi (2022) state that problem-solving ability is closely related to students' confidence in solving problems because students' confidence in solving problems will affect their learning outcomes. Thus, self-efficacy significantly impacts students' mathematical thinking when solving math problems. Everyone's self-efficacy is correlated with their ability to overcome difficulties. Several previous researchers have researched students' mathematical problem-solving abilities in terms of self-efficacy. Some existing studies include research conducted by Fatmasari., Waluya., and Sugianto (2021) that students with high self-efficacy can solve problems according to the indicators of mathematical problem-solving ability compared to students with medium and low self-efficacy because students with high self-efficacy are better able to survive in facing mathematical problems and do not despair in the face of failure.

Meanwhile, students with moderate and low self-efficacy can solve all problems. However, they cannot meet the problem-solving ability indicators because they have doubts and quickly give up when solving mathematical problems. Another study conducted by Adetia and Adirakasiwi (2022) showed that students with high levels of self-efficacy tend to be able to solve problems very well; students with moderate levels of self-efficacy tend to be able to solve problems well; students with low levels of self-efficacy tend to solve problems poorly. Based on the results of the several studies above, there are differences in mathematical problem-solving ability in terms of students' self-efficacy in mathematics. Therefore, a teacher needs to be aware of and focus on developing students' self-efficacy to support them in overcoming challenges in solving mathematical problems. The problems that arise regarding self-efficacy can be overcome to support the development of student learning and make it easier for students to achieve academic success.

Furthermore, research by Ahmad and Dewi (2024) shows that Self-Efficacy and Adversity Quotient have a significant positive effect on students' mathematical problem-solving skills at the elementary school level, this study presents a novelty by focusing on the material of the Two-Variable Linear Equation System (SPLDV) at a higher level, namely at Junior High Students. Until now, no research has been found that specifically examines the relationship between AQ and SE to students' mathematical problem-solving ability on SPLDV material. Therefore, this study contributes to filling the gap in the literature by linking students' psychological aspects, namely AQ and SE, with problem-solving ability in the context of SPLDV material, which has higher complexity than material at the elementary level.

Adversity quotient (AQ) and self-efficacy (SE) have been the primary focus of many international problem-solving studies. AQ, which reflects an individual's ability to persevere, rebound, and adapt in the

face of challenges, is globally proven to play an important role in enhancing individual resilience and effectiveness when faced with complex or stressful situations (Anwar et al., 2024). Meanwhile, self-efficacy (SE), an individual's belief in his or her ability to complete a task or face a problem, also contributes significantly to problem-solving skills (Umbara et al., 2022). Cross-country studies show that individuals with high SE are more confident, actively seek solutions, and do not give up easily when faced with failure (Öztürk et al., 2024). In a global context, AQ and SE are increasingly relevant as they support adaptation, innovation, and individual and group effectiveness in facing challenges in a diverse and dynamic environment. Thus, strengthening AQ and SE is highly relevant to mathematics learning, as they support the development of skills needed to face challenges in the learning process.

Following up on the findings of several studies above, the researcher conducted a preliminary study on the need for mathematical problem-solving skills among students at a junior high school in Bandung, West Java Province, by interviewing mathematics teachers and students. Based on the interview results, teachers believed students' ability to solve mathematical problems, especially in the material on two-variable linear equation systems (SPLDV), was still inadequate. Generally, students could understand the prerequisite material well and provide appropriate solution strategies when given questions that required conceptual understanding. However, some other students could only understand when the teacher explained the material. Students assigned problems that differ from the example problems still struggle to solve them. Based on the findings of several studies and preliminary research mentioned above, this study provides an overview of mathematical problem-solving abilities categorized into climbers, campers, and quitters, and mathematical problem-solving abilities categorized into high, moderate, and low self-efficacy levels, as measured by the indicators used. To the researcher's knowledge, no research has investigated mathematical problem-solving ability by considering both adversity quotient and self-efficacy, especially in junior high school students with SPLDV material. Research on students' mathematical problem-solving ability in SPLDV material is still limited, as shown in Figure 1, which shows no direct connection between problem-solving and linear equations.

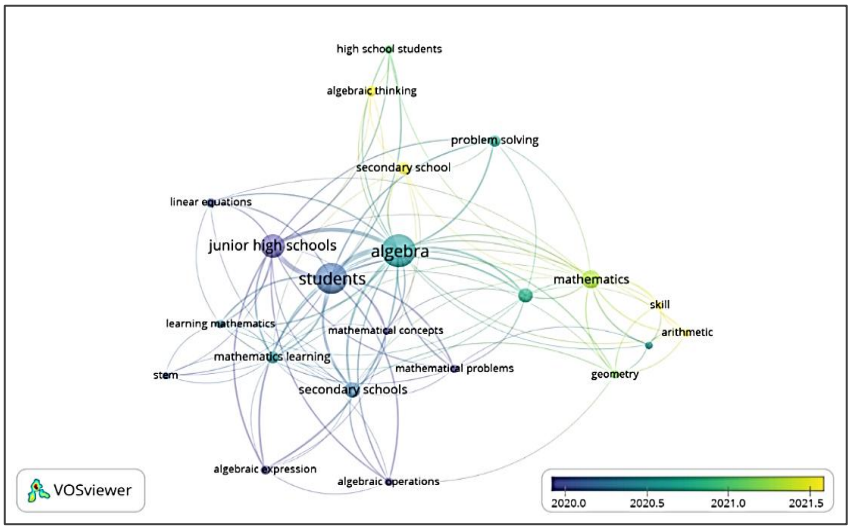


Figure 1. Development of Research on Problem-Solving Ability Based on Year of Publication

Figure 1 illustrates how research on problem-solving ability has developed over the last five years, from 2020 to 2021. With the increasing interest in this research, there is a huge opportunity to conduct more in-depth research on students' mathematical problem-solving ability. This study aims to analyze the mathematical problem-solving abilities of junior high school students on SPLDV material in terms of adversity quotient and self-efficacy.

METHODOLOGY

Research Design

This study aims to provide a comprehensive overview of students' mathematical problem-solving abilities in two-variable linear equation systems regarding adversity quotient and self-efficacy. Based on this objective, a qualitative approach with a case study method was used. Cresswell (2017) states that the qualitative approach begins with a theoretical framework that informs the research problem, which examines the meaning of an individual or group from a phenomenon or problem.

Participant

This study was conducted at a junior high school in Bandung City, West Java Province. The research subjects were selected based on the students' AQ (adversity quotient) and SE (self-efficacy) levels at the school, which were obtained after administering a questionnaire. The number of students who became respondents was 31. After receiving the questionnaire scores and test results, the researcher selected several subjects from each adversity quotient and self-efficacy group by observing the completion patterns on the students' answer sheets. The research subjects were three ninth-grade students at a junior high school in Bandung City, West Java, consisting of 1 student with high AQ climber-SE, one with high AQ camper-SE, and one with low AQ quitter-SE. The selection of only three students as research subjects in this study was based on the depth of exploration in the case study approach. Three students were chosen to provide a comprehensive and diverse perspective on how AQ and SE influence their approach to solving mathematical problems.

Data Collection

This study used triangulation as a data collection method, combining test and non-test techniques to ensure data reliability. The test used was a mathematical problem-solving test on SPLDV material. At the same time, non-test methods included questionnaires and interviews to collect data on adversity quotient (AQ) and self-efficacy (SE).

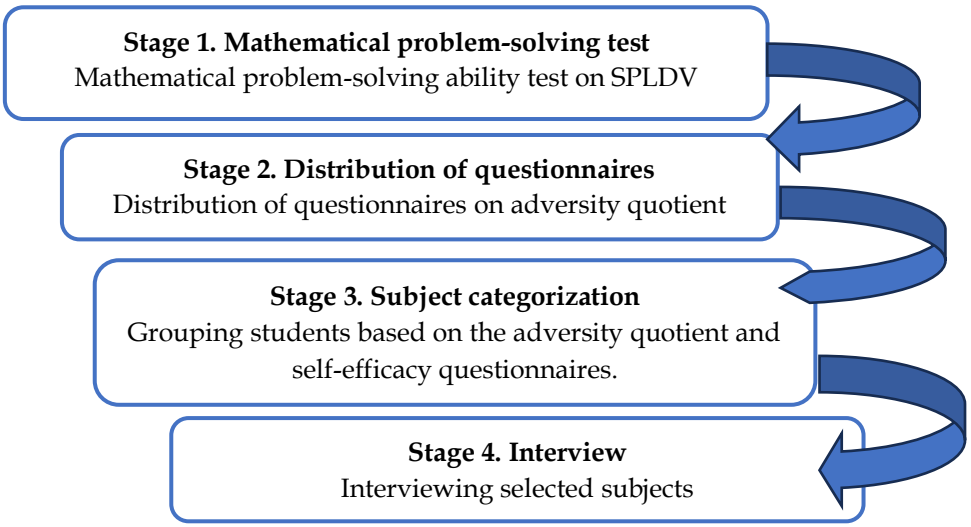


Figure 2. Data Collection Stages

Instrument

The research instrument test consists of three mathematical problem-solving questions related to two-variable linear equation systems (SPLDV). Non-test instruments in this study include the AQ and SE questionnaires and interview guidelines. The indicators used in the AQ questionnaire include control, origin, ownership, reach, and endurance. The indicators used in the self-efficacy questionnaire include magnitude, strength, and generality. The research instruments were developed beforehand and verified by several lecturers who are experts in mathematics education. The evaluation and recommendations that experienced validators provided helped refine the research instruments. After revisions based on input from several validators, the instruments were tested on students not included in the research population.

Based on the summary of the item validity calculation results, it was found that the collected data were valid, with a high reliability of 0.89. Each item's discriminating power was in the good category, and the item difficulty index showed varying levels of difficulty, ranging from easy to moderate. Thus, the items can represent the research indicators and can be used as a test to measure mathematical problem-solving ability.

Data Analysis

The data collection technique used in this study is triangulation. This study used source and technique triangulation (written tests, questionnaires, and interviews). The data analysis technique used in this study employs the data analysis methodology recommended by Miles and Huberman (2014), which was applied to the research data. The following are the steps in interactive qualitative data analysis: data reduction, which includes summarizing, selecting key points, identifying themes and patterns, and then discarding unnecessary data. This study involved data reduction from the results of mathematical problem-solving tests, AQ and SE questionnaires, and interviews. Data were collected, categorized, and aligned with the research questions and objectives, then presented as tables, diagrams, and brief narratives. Data presentation was divided into three sections according to the established formula. Finally, conclusions were drawn based on the reduced and presented data, with validity checks to avoid bias and ensure the reliability of the results.

FINDINGS

Three students were selected to analyze their mathematical problem-solving abilities based on their adversity quotient and self-efficacy types, based on the students' answer patterns on problem-solving indicators and AQ and SE questionnaire results, and they were representative of other subjects. The selected subjects are student S20, who has a climber adversity quotient and high self-efficacy; student S1, who has a camper adversity quotient and high self-efficacy; and student S2, who has a quitter adversity quotient and low self-efficacy.

Students with adversity quotient climber and high self-efficacy

Subject S20 is a selected subject whose test results will be presented by the researcher. The results of the students' mathematical problem-solving ability tests on SPLDV material are described and analyzed below based on the question number. The following are the students' answers and interviews for question number 1:

Results of student answers and interviews for question number 1

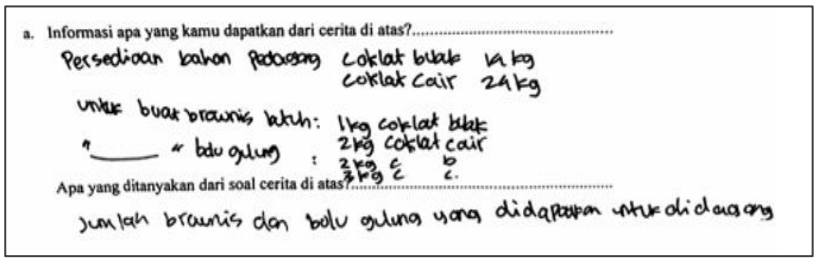
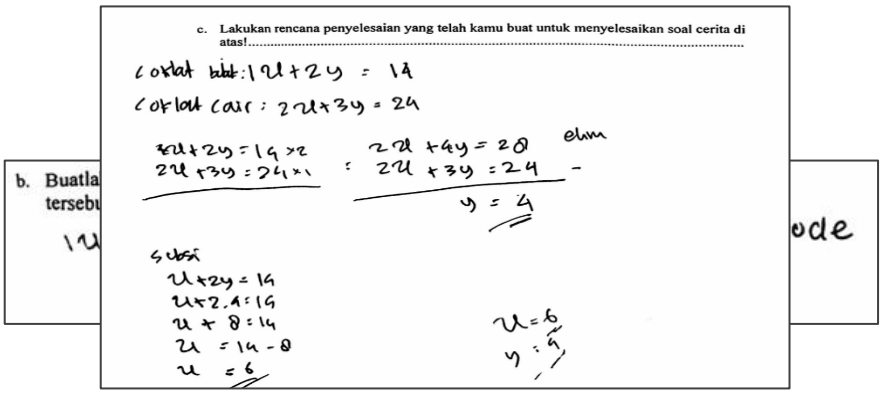


Figure 3. Answer Subject S20 Question Number 1 in the Stage of Understanding the Problem



Subject S20 conveyed the information in the question, explained the relationship between what was known and what was asked, and demonstrated a clear understanding of the problem. The following are the student's answers and the researcher's interview with subject S20 at the strategy formulation stage:

Figure 4. Subject's Answer S20 Question Number 1 In the Stage of Developing a Resolution Strategy

Based on the answers and interview results above, it was found that subject S20 was able to explain the strategies used, namely the elimination method and the substitution method, to solve the problem. The following are the results of the students' answers and the results of the researcher's interview with subject S20 at the stage of implementing the solution strategy

Figure 5. Subject's Answer S20 Question Number 1 in the Implementing the Resolution Strategy Stage

Figure 5 shows that subject S20 solved the correct process by performing elimination and substitution. The following substitution methods were rechecked.

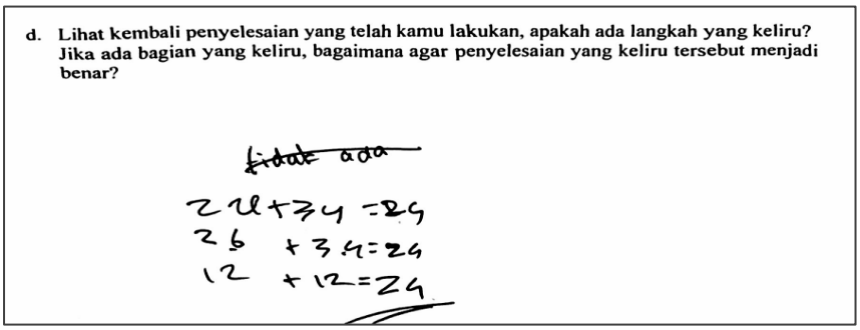


Figure 6. Subject's Answer S20 Question Number 1 in the Reviewing Answers Stage

Based on Figure 6, it is known that subject S20 wrote "no" and confirmed his answer by providing proof, namely by using the substitution method to check the correctness of the result obtained in one of the equations.

Results of student answers and interviews for question number 2

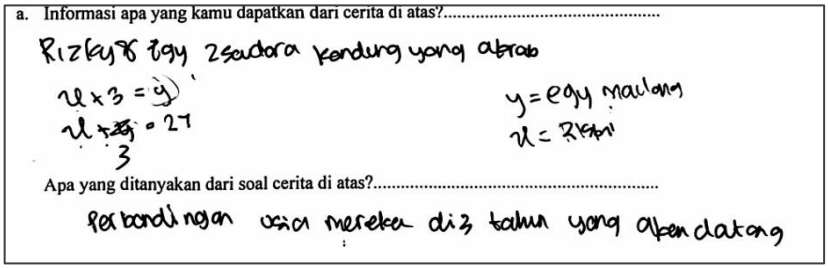


Figure 7. Subject's Answer S20 Question Number 2 in the Problem Understanding Stage

Based on Figure 7, it can be seen that subject S20 wrote down the known information by assuming the variable x as Rizky and y as Egy. Subject S20 also wrote down the mathematical equation/model, but there were still errors. When interviewed, the subject could state the second equation correctly, namely. The following are the results of the answers at the stage of developing a solution strategy:

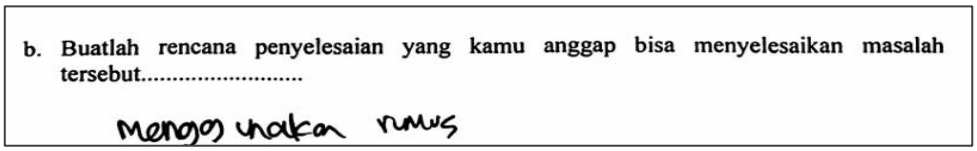


Figure 8. Subject's Answer S20 Question Number 2 in the Strategy Development Stage

Based on Figure 8, subject S20 only wrote using the formula, but when interviewed, the subject confirmed that he used the substitution method. The following are the results of the answers at the stage of implementing the solution strategy.

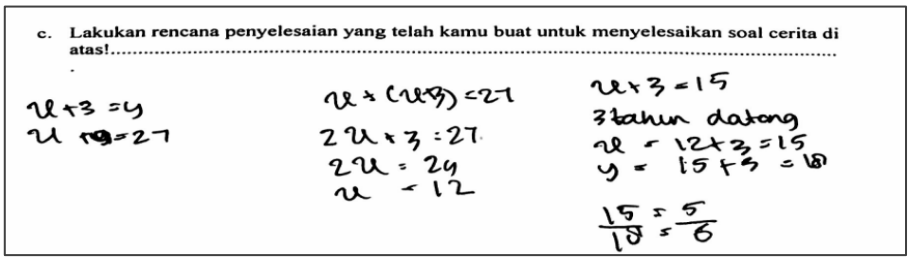


Figure 9. Subject's Answer S20 Question Number 2 in the Implementing the Resolution Strategy Stage

Subject S20 completed the process correctly by substituting the second equation to obtain x or Rizky's age of 12 years and the first equation to obtain Egy's age of 15 years. The subject correctly determined the ratio of their ages, which is 18:15 or 5:6. The following are the results of the answer at the stage of checking the solution:

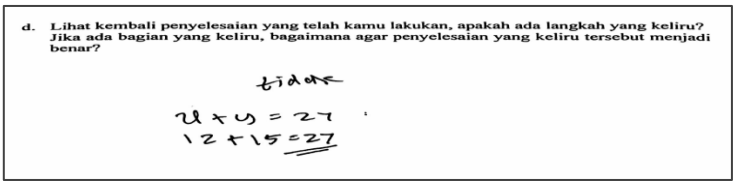


Figure 10. Subject's Answer S20 Question Number 2 in the Stage of Rechecking the Completion Results

Based on Figure 10, subject S20 checked the answers by substituting the values of variables x and y obtained into one of the equations.

Results of student answers and interviews for question number 3

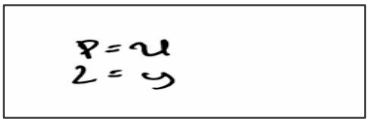


Figure 11. Subject's Answer S20 Question Number 3 in the Problem Understanding Stage

Subject S20 did not write down all the information known and did not write down the information requested, but when interviewed, the subject was able to provide the known information and the requested information correctly.

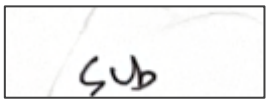


Figure 12. Student's Answer to Question Number 3 in the Strategy Development Stage

Subject S20 uses "sub," which is short for substitution, to write down his problem-solving strategy. The following is his answer at the stage of implementing the solution strategy:

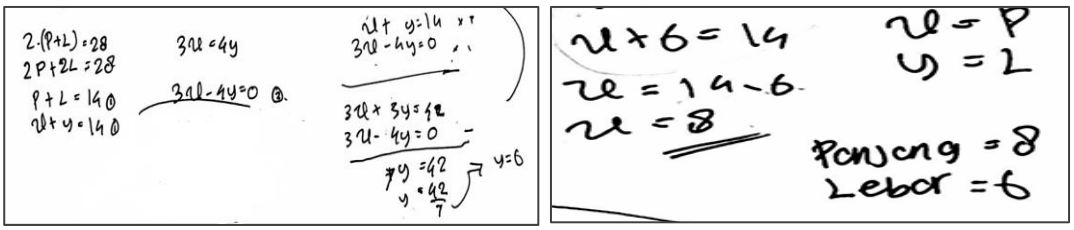


Figure 13. Student's Answer to Question Number 3 in the Implementing the Completion Strategy Stage

Subject S20 solved the problem correctly by performing the elimination process, changing the form of the equation to an equation with the same value for the variable x. After that, the two equations were subtracted to obtain the value of y, which is the rectangle's width. Subject S20 also performed the substitution process correctly after receiving one of the variable values. The following is the answer to the step of checking the solution:

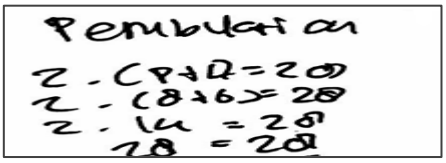


Figure 14. Student's Answer to Question Number 3 in the Reviewing Completion Results Stage

Students with an adversity quotient camper and high self-efficacy

Subject S1 had a high adversity quotient and self-efficacy. Based on the question numbers, the students' mathematical problem-solving ability test results on the SPLDV material are described and analyzed below. The following are the results of the students' answers and interviews at the problem comprehension stage:

The results of the answers and student interviews for question number 1

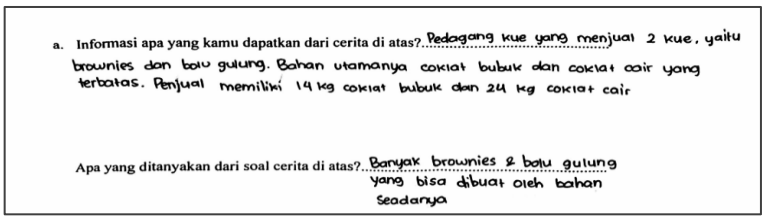


Figure 15. Answer of Subject S1 to Question Number 1 in the Problem Understanding Stage

Subject S1 can write down the information provided, namely a cake seller who sells two types of cakes, brownies and rolled cakes, with the main ingredients being cocoa powder and liquid chocolate. The seller has 14 kg of cocoa powder and 24 kg of liquid chocolate. Subject S1 also writes down the information requested. The following are the answers to Formulating a solution strategy:

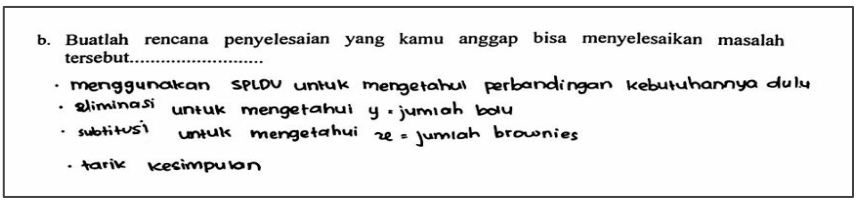


Figure 16. Answer of Subject S1 to Question Number 1 in the Stage of Developing a Solution Strategy

Subject S1 can plan a strategy to solve the problem based on these answers. Subject S1 uses the elimination and substitution methods. The following are the answers at the stage of implementing the solution strategy:

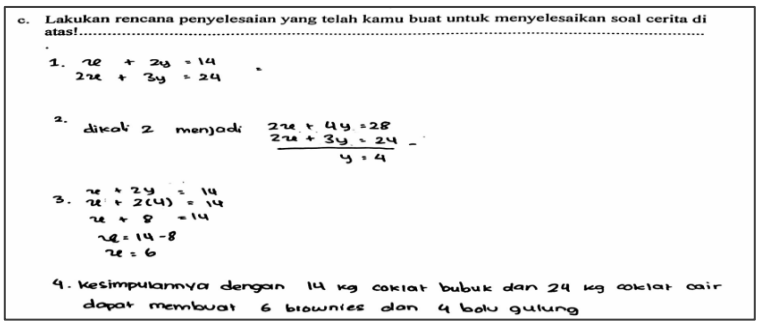


Figure 17. Answer of Subject S1 Question Number 1 in the Stage of Implementing the Settlement Strategy

Based on these answers, S1 can correctly explain the elimination process. S1 eliminates the variable *x* first to obtain the value of the variable y because it is easy to equalize the coefficients. After that, the student performs substitution. The following are the students' answers after they checked their answers:

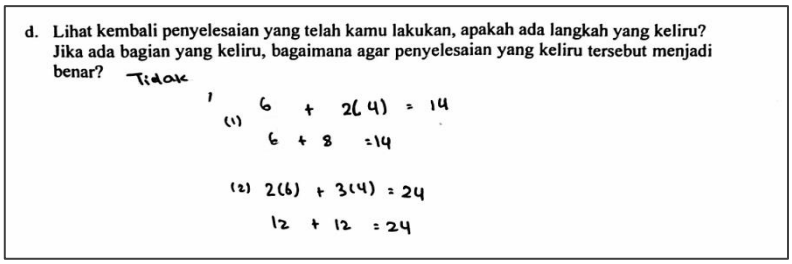


Figure 18. Answer of Subject S1 Question Number 1 in the Stage of Rechecking the Completion Results

This answer indicates that Subject S1 is confident in his answer. Furthermore, S1 reveals that he has checked his answer by substituting the values of variables x and y to prove that his answer is correct.

The results of the answers and student interviews for question number 2

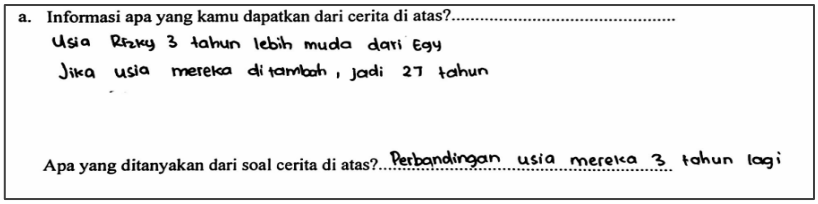


Figure 19. Answer of Subject S1 to Question Number 2 in the Stage of Understanding the Problem.

Based on these answers, it is clear that the S1 subject can convey the information in the question and explain the relationship between the information provided and what is being asked. The subject expresses the information provided and the information requested accurately. The following are answers that form a strategy for solving the problem:

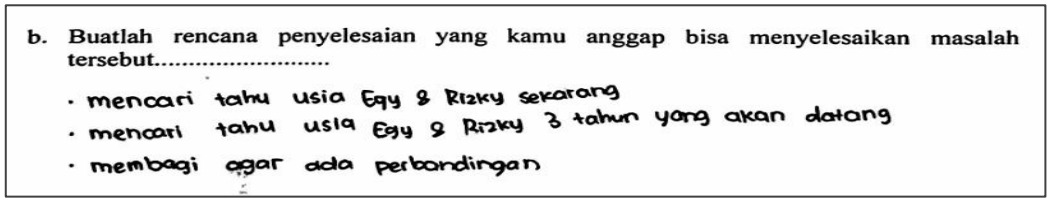


Figure 20. Answer of Subject S1 Question Number 2 in the Stage of Developing a Resolution Strategy

Based on the answer, it is known that subject S1 wrote down the steps used to solve the problem, which were to find the current ages of Egy and Rizky and their ages three years from now, then divide them to obtain the ratio. When interviewed, subject S1 revealed that he only used a manual method to solve the problem using words. The following are the answers at the stage of implementing the solution strategy:

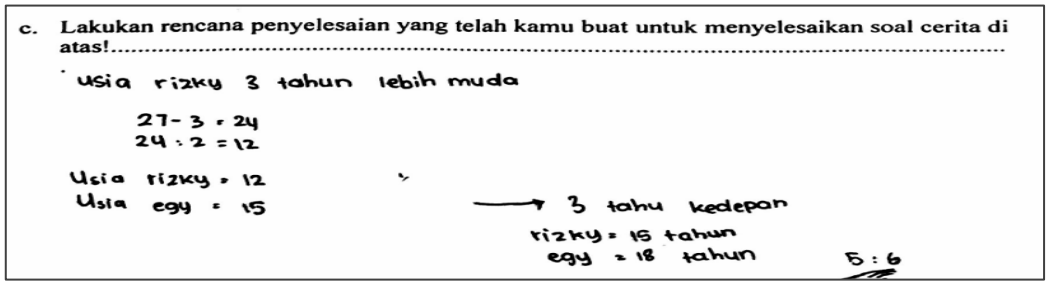


Figure 21. Answer of Subject S1 Question Number 2 in the Stage of Implementing the Settlement Strategy

The answer given by subject S1 is correct because he successfully found Rizky and Egy's current ages and their ages in 3 years. Subject S1 answered the question using a different method, performing basic mathematical operations. Subject S1 was able to explain clearly the problem-solving method he used. The following is the student's answer when revising the solution:

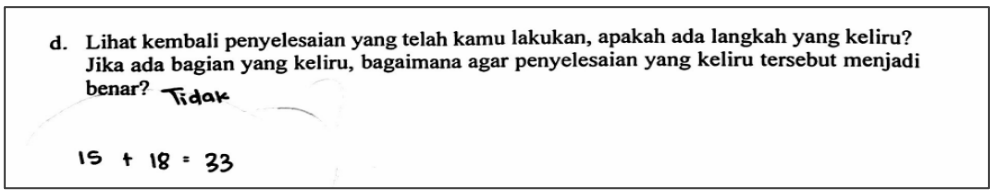


Figure 22. Answer of Subject S1 Question Number 2 in the Stage of Rechecking the Completion Results

The answers and interview results indicate that subject S1 is confident in his answers. Subject S1 revealed that he double-checked his answers by adding Rizky and Egy's ages.

The results of the answers and student interviews for question number 3

The interview results showed that subject S1 had difficulty understanding the questions, especially those related to flat shapes. However, the subject could express known information and requested information correctly. Subject S1 did not write down a solution plan but directly wrote down the mathematical steps to solve the problem. The following are the results of the answers at the stage of implementing the solution strategy:

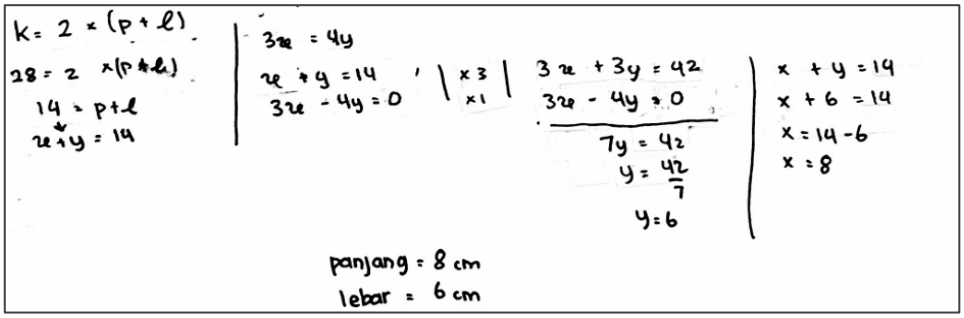


Figure 23. Answer of Subject S1 Question Number 3 In the Stage of Implementing the Settlement Strategy

Based on the answer, it is clear that S1 can explain the solution process correctly and accurately. S1 stated that he solved the problem using elimination and substitution. The following are the results of the answer at the stage of checking the solution:

Figure 24. Answer of Subject S1 to Question Number 3 in the Stage of Rechecking the Completion Results

The results of the answers and interviews indicate that the S1 subjects were confident in the answers they obtained.

Students with quitter adversity quotient and low self-efficacy

The subjects of this study were selected based on their test results, which the researcher will present. The following is a description and analysis based on the results of the students' mathematical problem-solving ability tests on SPLDV material based on question numbers. The following are the students' answers and interview results for question number 1:

The results of student answers and interview results on question number 1

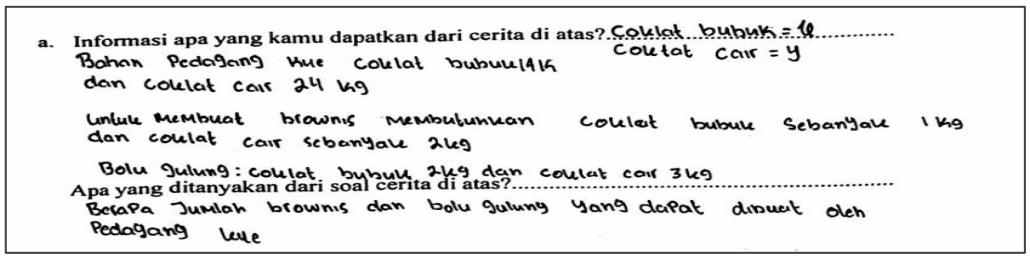


Figure 25. Answer of Subject S2 to Question Number 1 in the Stage of Understanding the Problem**.**

Based on these answers, it is clear that the S2 subject can write down the known information and the information requested completely, but the S2 subject does not define the variables correctly. The following are the answers from the solution strategy:

Figure 26. Answer of Subject S2 to Question Number 1 in the Stage of Formulating the Resolution Strategy.

Subject S2 can convert the information in the question into mathematical equations. Subject S2 uses substitution and elimination methods as problem-solving strategies. The following are the answers at the stage of implementing the solution strategy:

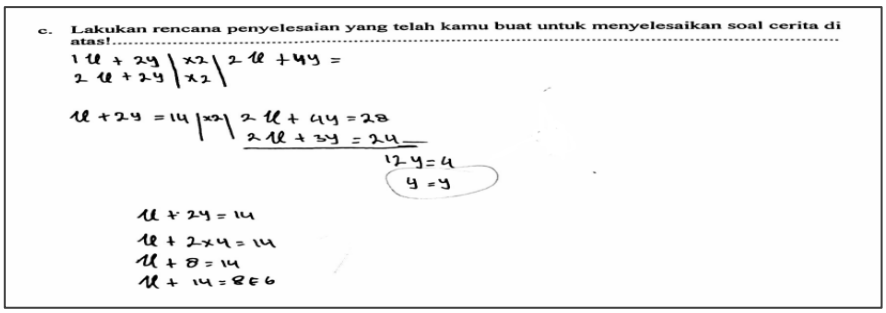


Figure 27. Subject S2 Answers Problem Number 1 at the Stage of Implementing the Solution Strategy

Based on these answers, it is known that S2 can express the elimination process correctly, although they wrote it down incorrectly. Subject S2 did not continue the substitution process because they had difficulty completing the question. The interview results show that subject S2 did not meet the indicator of checking their answers because they had difficulty completing the question.

The results of students' answers and interview results on question number 2

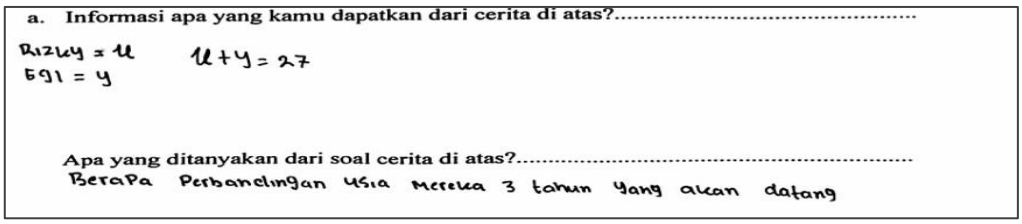


Figure 28. Answer of Subject S2 to Question Number 2 in the Stage of Understanding the Problem**.**

Subject S2 wrote down the information known by assuming variable x as Rizky and variable y as Egy. Subject S2 was able to write down the mathematical model. Subject S2 also wrote down the information requested correctly. The following are the results of the answers at the stage of developing a solution strategy:

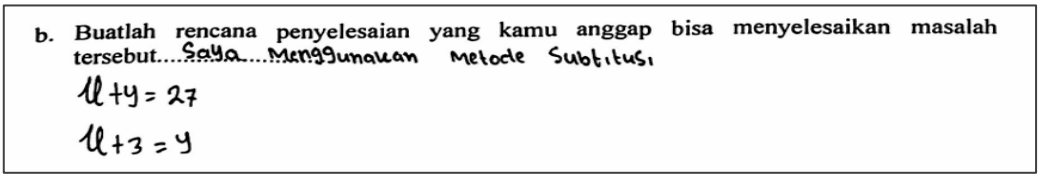


Figure 29. Answer of Subject S2 to Question Number 2 in the Stage of Formulating the Resolution Strategy.

The answers and interviews showed that the master's degree subjects used the substitution method to solve problems. The following are the results of the answers to implement the solution strategy:

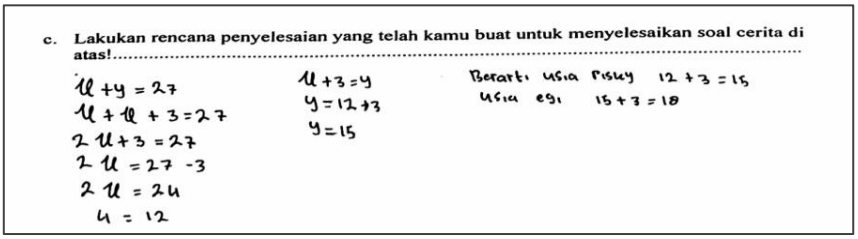


Figure 30. Answer of Subject S2 to Question Number 2 in the Stage of Implementing the Resolution Strategy.

Based on the answers, it is known that subject S2 used substitution to solve the problem. Subject S2 did not continue to look for the comparison between Rizky and Egy's ages. The following are the answers at the stage of checking the results of the solution:

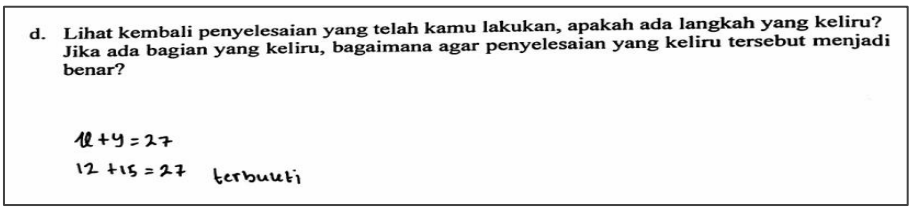


Figure 31. Answer of Subject S1 to Question Number 2 in the Stage of Reviewing the Resolution Results.

Based on these answers, subject S2 rechecked their answers by providing appropriate evidence, namely by using the substitution method to check the results' accuracy. The interview results showed that subject S2 was unsure of their answer because they could not compare Rizky and Egy's ages.

The results of students' answers and interview results on question number 3

The interview results showed that the S2 subjects tended not to understand the content of the questions. The S2 subjects did not write down the information they knew and what was asked, but they could express the information they knew and what was asked correctly. The S2 subjects also revealed that they used the elimination method to solve question number three. The following are the results of the answers using the solution strategy:

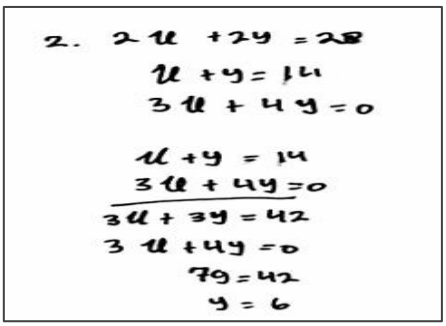


Figure 32. Answer of Subject S2 to Question Number 4 in the Stage of Implementing the Resolution Strategy**.**

Based on the interview with Subject S2, it was found that Subject S2 did not know how to solve the problem, so he solved it by discussing it with his friends. Subject S2 also revealed that he was unsure of his answer because he did not solve the problem carefully.

DISCUSSION

GenerallyGenerally, students' problem-solving abilities based on adversity quotient (AQ) and self-efficacy (SE) indicate that students in the Climber AQ and High SE categories can understand problems well, formulate solutions, implement plans, and check their answers. Meanwhile, students in the AQ Camper category and High SE can understand problems, develop plans, and implement solution plans, but cannot yet review the answers they have obtained. On the other hand, students in the AQ Quitter and Low Self-Efficacy categories can only understand problems and develop plans. Still, they cannot implement plans and review the results they have obtained. A detailed explanation of this can be seen in Table 1.

Table 1. Results of Students' Mathematical Problem-Solving Ability in Terms of Adversity Quotient and Self-Efficacy

Category	P1	P2	P3	P4
AQ Climber and High SE	√	√	√	√
AQ Camper and High SE	√	√	√	
AQ Quitter and Low SE	√	√		

Explanation:
P1: Understand the problem
P2: Develop a solution strategy
P3: Implement the strategy
P4: Check the results of the answers

Students with High Adversity Quotient Climber and High Self-Efficacy

Students with a high adversity quotient and self-efficacy tend to have high mathematical problem-solving abilities. The selected subjects were S20, based on the students' answer patterns on problem-solving indicators and their representation of other subjects. Based on the results of the study, subject S20 was able to solve all three problems with various levels of mathematical problem-solving in the SPLDV material, ranging from easy to difficult. Subject S20 tried to solve all the problem-solving questions given. Subject S20 met the four indicators of mathematical problem-solving, namely understanding the problem by accurately writing down the known information and the information asked for. In the planning stage, students used elimination-substitution. In the implementation stage, students can solve problems accurately and without errors. In the checking stage, students provided proof using the substitution method on one of the equations. These findings are supported by research by Putra, Hobri, and Setiawani (2020), which found that climber students have high self-efficacy in solving mathematical problems. This is also in line with the research by Ahmad and Dewi (2024) that the higher the level of self-efficacy and adversity quotient of students, the better their ability to solve mathematical problems. This means students with a climber adversity quotient demonstrate high self-

efficacy and good academic performance. As stated by Slameto (2010) in Ahmad and Dewi (2024), psychological factors within students, including self-efficacy and adversity quotient, play a crucial role in their mathematical problem-solving abilities. This aligns with Bandura's theory (1997) in Karaoglan Yilmaz (2022), which states that individuals with high self-efficacy believe they can solve various problems. Students with high self-efficacy become more motivated to work on issues, resulting in better performance.

Furthermore, students' adversity quotient also plays a vital role in problem-solving. As climbers, students do not easily give up, can persevere under pressure, and continue to seek solutions even when faced with difficulties. This is also in line with the adversity quotient theory presented by Stoltz (2000) in Baharullah et al (2022), which reveals that climber students tend to choose to keep fighting and are not easily satisfied with the results obtained. Therefore, the work outcomes of climber students can be better. Climber students view obstacles as challenges that can be overcome, not as barriers. The combination of a high adversity quotient and high self-efficacy is the primary factor supporting students' mathematical problem-solving abilities.

Students with Camper Adversity Quotient and High Self-Efficacy

Students with a high adversity quotient and high self-efficacy tend to have high mathematical problem-solving abilities. Only one subject had a high adversity quotient and high self-efficacy, namely subject S1. Based on the study's results, subject S1 could solve all three problems with various levels of mathematical problem-solving related to SPLDV, ranging from easy to difficult. Subject S1 tried to solve all the problem-solving questions given, even though it took a long time to complete the questions. Subject S1 almost met the four indicators of mathematical problem solving. In questions one and two, subject S1 met the four indicators of mathematical problem solving. Subject S1 had a different way of answering question two; subject S1 used basic operations in mathematics to solve the question. This indicates that the subject understands fundamental mathematics well and can apply it to solve more complex problems. In line with Stoltz's theory (2000) in Fahrudin et al (2024), camper students will still try to solve their problems, even if not to the best of their ability. They will stop when they feel they can no longer do anything after trying. Camper-type students will try to solve mathematical problems, but will not use all their abilities. In solving mathematical problems, they are unwilling to take too many risks and are sometimes satisfied with the current conditions or circumstances. However, despite this, the S1 subjects can still solve problems well, driven by high self-efficacy. The self-confidence possessed by the subjects allows them to continue trying to solve problems using existing methods, even though these may not be entirely optimal. According to Bandura (1997), in Septhiani (2022), high self-efficacy gives students the confidence to complete complex tasks. Supported by the opinions of Hoffman and Schraw (2009) in Fatmasari et al (2021), students with high self-efficacy will not easily give up on solving various mathematical problems that are considered difficult. They will be more careful and accurate in performing mathematical calculations. Thus, even though the S1 subject did not use all of his abilities and did not take significant risks, he could still overcome the problems he faced with the support of his self-efficacy, so that the S1 subject continued to try to solve the problems.

In question number three, the student almost met all four indicators of mathematical problem solving. Still, the student did not write down the steps to check the answer because, based on the interview results, the student was already confident with the answer after recalculating the solution process. The student was able to solve question number three well. Although the student has a camper-type AQ, which tends to be quickly satisfied with the results obtained, the student could still complete the problems given well due to high self-efficacy support. In line with what was stated by Yustiana et al (2021), students with the camper type tend to have a moderate level of resilience in facing difficulties in solving math problems, continuing to strive toward their goals, but becoming satisfied once they succeed at a particular stage. The results of Nurfitriyanti, Rosa, and Nursa'adah (2020) also indicate that adversity quotient alone is not sufficient to influence students' mathematics achievement because if adversity quotient is not accompanied by other abilities and a strong belief that they can change their circumstances, the efforts made will not be maximized. In conclusion, although students with the camper type tend to be quickly satisfied with their results, they can still solve math problems well due to their high self-efficacy. Strong self-efficacy helps students continue to strive to solve problems.

Students with Quitter Adversity Quotient and Low Self-Efficacy

Students with low adversity quotient and self-efficacy tend to have low mathematical problem-solving abilities. The selected subjects were master's students based on their answers to problem-solving indicators. Based on the results of the study, the master's students were unable to complete all the questions given. They only met two problem-solving indicators: understanding the problem and formulating a solution strategy. The subjects could not carry out the steps to solve the issues and easily gave up when working on the questions. Therefore, the subjects were unable to solve every problem given. One of the factors causing students' low mathematical problem-solving ability is the tendency to give up easily when faced with mathematical problems (Putra, Hobri, Setiawani, 2020). In line with theory (Stoltz, Stoltz, 2000) in (Damiles et al., 2022), students with a high adversity quotient tend to view difficulties as the end of their struggle, leading to poor learning outcomes. Other factors contributing to students' inability to solve problems include a lack of self-efficacy, causing them to give up more quickly when faced with difficulties. According to Bandura (1997), in Muhtadi et al. (2022), low self-efficacy influences how students view challenges, and they are more likely to avoid tasks that are considered difficult. In this context, the S2 subjects had difficulty implementing problem-solving strategies and were hindered by a lack of confidence in their ability to overcome more complex problems. This worsens their problem-solving ability, ultimately leading to their inability to solve problems well.

The results of this study are supported by research conducted by Ahmad and Dewi (2024), which found a positive and significant relationship between the adversity quotient and self-efficacy on students' mathematical problem-solving ability. Students with a lower AQ show low self-efficacy and mathematical problem-solving skills. This aligns with the AQ theory presented by Stoltz (2000), which states that students tend to be less willing to accept challenges and even give up before making an effort. Additionally, Bandura (1997) in Sa'diyah et al (2024) states that individuals with low self-efficacy lack confidence in their ability to solve various problems. Low self-efficacy students lack motivation to complete tasks, resulting in poorer performance. Based on this, it can be interpreted that students with a lower AQ have low self-efficacy in solving mathematical problems.

CONCLUSION

Based on the results and discussion, students with a climber adversity quotient and high self-efficacy have high mathematical problem-solving abilities. This can be seen from the students' ability to solve various mathematical problems, ranging from easy to medium to difficult. Students in this category can meet the four problem-solving indicators: understanding the problem, planning a solution strategy, implementing the approach, and reviewing the solution results. The combination of high self-efficacy and climber adversity quotient is the main factor that encourages students to succeed in solving math problems. Students with a camper adversity quotient and high self-efficacy have good mathematical problem-solving abilities, although they are not optimal. Students in this category can meet three problem-solving indicators: understanding the problem, formulating a solution strategy, and implementing the plan. Although students with a camper adversity quotient tend to be satisfied with their results, their high self-efficacy motivates them to try solving problems well. Students with a higher adversity quotient and low self-efficacy experienced difficulties solving problems. Students in this category could only meet two indicators: understanding the problem and formulating a solution strategy. Students in this category lacked motivation and were easily discouraged, hindering their problem-solving ability.

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