ANALYSIS OF STUDENTS' MATHEMATICAL PROBLEM-SOLVING ABILITY BASED ON JUDGING AND PERCEIVING PERSONALITY TYPES

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ABSTRACT

Problem-solving ability is one of the essential skills in mathematics education at the university level. However, there has been limited research specifically examining the influence of personality types on this ability, especially in the context of Systems of Linear Equations in Three Variables (SPLTV). This study aims to analyze the mathematical problem-solving ability of students based on Judging and Perceiving personality types. The research approach used is qualitative with a case study design. The subjects of the study consist of four students from the Tadris Mathematics program at IAIN Kerinci, selected based on the results of the MBTI test, consisting of two students with the Judging personality type and two with the Perceiving personality type. The research instruments include an SPLTV test and an interview guide, while data analysis techniques are carried out through data reduction, data presentation, and drawing conclusions using the Miles and Huberman model. The results show that students with the Judging personality type tend to excel in planning and executing problem-solving strategies systematically but are less strong in evaluating results. Conversely, Perceiving students demonstrate flexibility in understanding problems and devising strategies but tend to lack in evaluative aspects and structured presentation. These findings emphasize that personality types play a role in shaping students' problem-solving patterns, suggesting the need for teaching strategies that consider the personality characteristics of each individual.
Keywords: Mathematical Problem-solving, Judging Personality, Perceiving Personality, SPLTV, Polya's steps.

PRELIMINARY

Mathematics is a discipline that not only focuses on understanding concepts but also on mastering the skills required to solve various problems (Siswanto & Meiliasari, 2024). Mathematical problem-solving ability is an essential competence that students must possess, as it reflects a deep understanding and the ability to apply mathematical concepts to solve complex problems (Asdamayanti et al., 2023; Novitasari & Aisyah, 2024). Mathematical problem-solving is beneficial in enhancing conceptual understanding, training logical and systematic thinking, developing analytical and synthetic skills, improving critical and

creative thinking, facilitating knowledge transfer, and building confidence in solving mathematical challenges (Murdiana, 2015).

Problem-solving ability is an important skill in learning, especially in the field of mathematics (Asdamayanti et al., 2023). According to Polya (1973), this ability includes several key indicators. First, understanding the problem, which is the ability to identify the known and unknown information in a problem. This step is important because a clear understanding will determine the effectiveness of problem-solving. Second, planning the solution, which involves developing strategic steps to find the right solution. This planning includes choosing methods or concepts that align with the characteristics of the problem. Third, executing the plan, which is applying the systematic steps that have been developed to obtain the result. In this stage, accuracy in the calculation or execution of strategies is essential. Lastly, reviewing the solution involves revisiting the obtained solution and the process undertaken to ensure the accuracy and effectiveness of the strategy used. This review allows one to correct mistakes and continuously improve problem-solving skills (Anhar et al., 2019; Ramadhani & Firmansyah, 2021).

The way students solve mathematical problems is not always the same (Mairing, 2016). Each individual has different characteristics and approaches to facing these challenges (Kurniawati et al., 2019). One of the factors influencing how a person solves problems is their personality type, particularly between the Judging and Perceiving types (Satya et al., 2022). The Judging type tends to be more structured and solves problems systematically, whereas the Perceiving type is more flexible, open to various possibilities, and tends to try different approaches to problem-solving (Solihati, 2020). These differences can affect how students solve mathematical problems, including in the material of SPLTV (Nismaya, 2018).

One of the instruments commonly used to identify personality types is the Myers-Briggs Type Indicator (MBTI), which divides personality into several dimensions, including Judging (J) and Perceiving (P) (Utami & Bahtiar, 2022). Individuals with a Judging preference tend to be structured, organized, and like certainty, while those with a Perceiving preference are more flexible, spontaneous, and open to various possibilities (Ikhram & Ramsari, 2024). These preference differences can affect how students approach and solve mathematical problems.

Mathematical problem-solving ability among students in Indonesia remains a major concern in the education sector (Junaedi et al., 2023). International surveys such as the Programme for International Student Assessment (PISA) and Trends in International

Mathematics and Science Study (TIMSS) have shown that Indonesian students' performance in mathematical problem-solving is below the international average (Darmawan & Ramlah, 2021). For example, in the 2015 TIMSS survey, Indonesia ranked 49th out of 53 countries with an average score of 397, below the international average score of 500 (Hadi & Novaliyosi, 2022). Similarly, the PISA survey results indicated that Indonesian students' mathematical problem-solving ability is still low, suggesting difficulties in solving math problems, especially problem-solving questions (Arifin et al., 2019).

The low level of mathematical problem-solving ability at the secondary school level has a significant impact when students enter higher education (Siswanto & Meiliasari, 2024). Students with a weak foundational ability tend to struggle to understand advanced mathematical concepts (Winda et al., 2024), which can affect academic performance and the development of critical thinking skills (Anugraheni, 2020). Moreover, this weakness also reduces readiness to face the workforce, which demands high analytical skills (Hodiyanto, 2017). Therefore, it is essential for higher education institutions to identify the influencing factors, including personality types such as Judging and Perceiving so that learning strategies can be adjusted effectively.

Previous research has shown that personality types influence mathematical problem-solving abilities. Putri & Masriyah (2020) found that introverted students were able to go through all stages successfully, while extroverted students encountered difficulties in several stages. However, studies specifically examining the influence of the Judging and Perceiving types on solving SPLTV remain limited. This lack of understanding can lead to less appropriate teaching strategies (Nismaya, 2018), potentially resulting in students of certain personality types not receiving the support that aligns with their learning needs.

To address this issue, in-depth research is needed to analyze students' mathematical problem-solving abilities based on the Judging and Perceiving personality types. By understanding these differences, educators can develop more effective teaching strategies that are tailored to the needs of each personality type. This aligns with the findings of Sari & Kurniasari (2022), which show that personality type differences can influence problem-solving abilities in SPLTV material. Such a solution is chosen because an approach tailored to personality types can enhance the effectiveness of learning. By understanding students' learning characteristics and preferences, educators can design more suitable teaching methods, thereby improving students' motivation and learning outcomes (Pradita et al., 2025).

This research is important as it can make a significant contribution to the field of mathematics education. By understanding how personality types affect mathematical problem-solving abilities, educators can develop more effective and inclusive teaching strategies (Nismaya, 2018). Additionally, this research can assist in curriculum development that takes individual differences into account, allowing each student to reach their full potential in learning mathematics.

Previous research by Wahidaturrahmi & Baidowi (2022) analyzed the mathematical problem-solving abilities of physics education students in terms of Myers-Briggs personality types. The results showed that personality types influence students' mathematical problem-solving abilities. However, this study did not specifically examine the Judging and Perceiving personality types and did not focus on the topic of SPLTV. Another study by Nismaya (2018) investigated the mathematical problem-solving abilities of high school students based on their personality types. The results showed that personality types affected students' mathematical problem-solving abilities. However, this study also did not specifically examine the Judging and Perceiving types and did not focus on the SPLTV material.

The study by Putri & Masriyah (2020) showed that introverted students were able to complete all stages of problem-solving well, while extroverted students struggled with several stages. However, this research did not examine the Judging and Perceiving personality types, nor did it focus on the SPLTV material. Sari & Kurniasari (2022) explored personality types based on MBTI and found that personality types influence problem-solving abilities but did not specifically address Judging and Perceiving. Similarly, Satya et al. (2022) stated that personality types affect mathematical problem-solving skills, but their study also did not specifically investigate the Judging and Perceiving aspects of the SPLTV topic.

The novelty of the current research lies in its focus on analyzing students' mathematical problem-solving abilities based on Judging and Perceiving personality types in problems. Previous studies have not specifically examined the relationship between Judging and Perceiving personality types and mathematical problem-solving abilities in the context of SPLTV. Therefore, this research is expected to contribute new insights to the field of mathematics education, particularly in understanding how personality types influence students' mathematical problem-solving abilities.

METHODS

This research employs a qualitative approach with a case study type to gain an in-depth understanding of the mathematical problem-solving abilities of students with Judging and Perceiving personality types in solving SPLTV. The qualitative approach enables the researcher to explore participants' perceptions, motivations, and actions in their natural contexts, resulting in rich and detailed descriptive data (Creswell & Creswell, 2018).

The population of this study consisted of 36 Mathematics Education students at IAIN Kerinci. The sample was determined using the MBTI test to identify personality types, and 2 students with the Judging type and 2 with the Perceiving type were selected as the main respondents (Faradilla & Nasution, 2024). This selection aligns with the qualitative approach using the principle of data saturation, where a small number is considered sufficient if no new findings emerge (Guest et al., 2006). This study employed a case study method to conduct an in-depth comparison between two contrasting groups (Yin, 2018) while also considering time and resource efficiency (Niam et al., 2024). The research variables included mathematical problem-solving ability-which consists of understanding the problem, devising a plan, carrying out the plan, and looking back-as well as the Judging and Perceiving personality types based on MBTI test results. The following is a table of indicators for Judging/Perceiving personality types according to the Myers-Briggs Type Indicator:

Table 1. Indicators of Judging and Perceiving Personality Types

Personality Type	Indicator	Traits	Characteristics
Judging	It tends to be structured and organized and prefers certainty.	• Enjoys routines and planning. • Prefers quick and clear decisions. • Tends to follow schedules.	• Disciplined in completing tasks. • Likes clear to-do lists and targets. • Values structure and rules. • Uncomfortable with surprises or sudden changes.
Perceiving	Flexible, adaptive, and open to various possibilities.	• Comfortable with spontaneity and change. • Open to new opportunities. • Dislikes are tied to strict schedules.	• Easily adapts to new situations. • Prefers to work flexibly and spontaneously. • Tends to postpone decisions to explore more options. • Enjoys freedom in working and learning.

The instruments used in this study consist of primary and supporting instruments. The primary instrument in qualitative research is the researchers themselves, as in qualitative studies, the researcher plays a key role in collecting, analyzing, and interpreting data (Hasan et al., 2022). The researcher interacts directly with participants to gain an in-depth understanding of the phenomenon being studied.

The supporting instruments in this study included the MBTI questionnaire, a test on Three-Variable Linear Equation Systems (SPLTV), and an interview guideline, all of which were validated by two Mathematics Education lecturers at IAIN Kerinci. The MBTI questionnaire was used to identify students' personality types, particularly the Judging and Perceiving aspects, which reflect their tendencies in strategy formulation and dealing with uncertainty (Myers, 1998). The SPLTV test was designed to assess problem-solving skills based on Polya's (1973) four stages: understanding the problem, devising a plan, carrying out the plan, and looking back. Each stage represents a systematic thinking process students go through when solving systems of three-variable linear equations.

An interview guide is also used to explore in more depth how students with Judging and Perceiving personality types apply problem-solving strategies. The interviews aim to identify the factors influencing their approach to solving SPLTV problems, such as thinking patterns, study habits, and levels of comfort in facing mathematical problems (Silverman, 2016). As supporting evidence in the research analysis, documentation in the form of students' completed test answers will also be included. This documentation serves to support the research findings and provide a concrete illustration of the problem-solving patterns of students with different personality types (Cohen et al., 2018).

Data analysis in this study employed the Miles and Huberman model, which consists of three stages: data reduction, data display, and conclusion drawing/verification (Miles & Huberman, 1994). Data from the MBTI questionnaire, SPLTV test, and interviews were reduced to categorize students into Judging and Perceiving types and analyzed based on Polya's stages (Myers, 1998; Polya, 1973). The data were presented narratively and in table form to facilitate interpretation. Conclusions were drawn through triangulation by comparing the results from the three instruments to enhance validity. The conclusion drawing also took into account the MBTI and Polya theories as the analytical foundation. This study is expected to support the development of mathematics learning strategies that align with students' personality characteristics.

RESULT AND DISCUSSION

Of the 36 students who participated as respondents in this study, data regarding personality types were obtained using the MBTI instrument. A total of 25 students were identified as having the Judging (J) personality type, while 11 students had the Perceiving (P) personality type. This data provides an overview of the dominance of the Judging personality type among students, which indicates their preference for structure, thorough planning, and a more organized approach to completing their tasks.

Table 2. Results of the MBTI Questionnaire

Personality Type	Number of Students	Percentage
Judging (J)	25	69,44%
Perceiving (P)	11	30,56%
Total	36	100%

Test results were obtained from four research subjects with two different personality types: Judging (J1 and J2) and Perceiving (P1 and P2). Based on the given problem-solving test, data were collected on their ability to solve problems related to the SPLTV. Each subject was analyzed according to the four problem-solving indicators by Polya: Understanding the Problem (UP), Devising a Plan (DP), Carrying Out the Plan (CP), and Looking Back (LB).

Based on the test results analyzed using the assessment grid, scoring rubric, and answer key, students with Judging (J1 and J2) and Perceiving (P1 and P2) personality types showed different patterns in solving the problems. In general, Judging students had a higher average score (75%) compared to Perceiving students (67.19%), indicating that they were superior in terms of planning and executing solutions. The students' score results based on Polya's four problem-solving indicators can be seen in the following table:

Table 3. SPLTV Problem-Solving Test Results Based on Polya's

Personality	No.	Up	DP	CP	LB	Total	Percentage
Judging 1 (J1)	1	2	3	3	2	10	79,92%
	2	2	3	3	2	10	79,92%
Judging 2 (J2)	1	2	3	3	0	8	61,53%
	2	3	3	3	2	11	84,61%
Total		9	12	12	6		
Percentage		75%	100%	75%	50%		
Average				75%			
Perceiving 1 (P1)	1	3	3	3	0	9	69,23%
	2	2	2	1	0	5	38,46%
Perceiving 2 (P2)	1	3	3	4	3	13	100%
	2	2	3	3	0	8	61,53%
Total		10	11	11	3		
Percentage		83,33%	91,66%	68,75%	25%		
Average				67,19%			

Based on the scoring results, students with the Judging personality type achieved the highest score in the *Devising a Plan* (DP) indicator at 100%, in line with the Judging personality characteristics which indicate a tendency toward systematic and structured thinking (King & Mason, 2020; Myers, 1998). They also performed quite well in *Understanding the Problem* (UP) (75%) and *Carrying Out the Plan* (CP) (75%), but were still weak in *Looking Back* (LB) (50%) due to their tendency not to verify the answers they had obtained. This suggests that confidence in the steps taken often leads them to skip the evaluative process.

On the other hand, students with the Perceiving personality type excelled in the *UP* indicator with a score of 83.33%, reflecting their ability to quickly and adaptively understand information (Myers, 1998). However, they experienced a decrease in their CP (68.75%) and LB (25%) scores, indicating weaknesses in following through and evaluating their problem-solving processes. These findings are supported by Sari et al. (2023), who explain that the Perceiving type tends to struggle with maintaining consistency and final reflection in problem-solving, even though they have a good initial understanding.

These results show that Judging-type students tend to be more organized in devising and executing strategies for solving SPLTV, while Perceiving-type students are quicker in understanding the problem but weaker in evaluating the result. Evaluation becomes a major challenge for both types, especially Perceiving. Therefore, problem-based learning should explicitly integrate the evaluation phase (LB) along with planning (DP) and implementation (CP) (Ginevra et al., 2015) and encourage students to make a habit of verifying their answers to minimize errors (Hartini & Setyaningsih, 2023).

Problem 1: One day, Ana, Budi, Citra, and Dika went to a stationery store to buy school supplies. After browsing, they noted the prices of the items they bought. Budi bought 3 notebooks, 2 pencils, and 3 pens for a total price of Rp28,500. Meanwhile, Citra bought 2 notebooks, 3 pencils, and 1 pen for Rp21,500. Dika, who only needed a few items, bought 1 notebook, 1 pencil, and 2 pens for Rp13,000. After seeing the prices, Ana wants to buy 4 notebooks, 2 pencils, and 5 pens. Based on the given information, how much money does Ana need to pay?

Problem 2: Dewi, Sari, and Dio are three siblings. The total of their ages is 28 years. If Dewi's age is increased by 2 years and Sari's by 3 years, the result is equal to 5 plus three times Dio's age. In addition, twice Dewi's age minus Sari's age, then added to Dio's age, equals 13 years. Determine their ages!

1) Understanding the Problem

Judging Personality Type
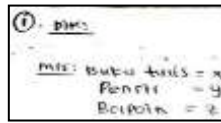
Figure 1. Answer to Question 1 by J1 UP

In understanding the SPLTV problem, subject J1, who has a Judging (J) personality type, demonstrated a structured approach with an initial focus on the given information. In the first question, J1 only wrote the *"Given"* part without including the *"Asked"* part, as they preferred to identify concrete information as the starting step. During the interview, the subject mentioned that noting down important information helped in understanding and matching the data before solving the problem. This aligns with Myers et al. (1998), who stated that individuals with a Judging type tend to prefer order, planning, and quick, systematic decision-making.

Figure 2. Answer to Question 1 by J2 UP

Subject J2 focused more on identifying what needed to be found in the problem, as seen from their habit of only writing down what is being asked (the question) without stating the known information. In the interview, they stated that understanding the main question helped determine the direction of the solution. This approach reflects a goal-oriented strategy, which is typical of individuals with a Judging personality type, who tend to be systematic and structured (Faradilla & Nasution, 2024). This finding is consistent with Dardiri et al. (2020), who noted that Judging individuals are more likely to set their goals first before seeking supporting information.
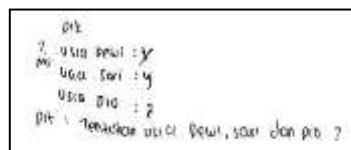
Figure 3. Answer to Question 2 by J2 UP

In the second question, J1 only wrote the *"Given"* part without the "*Asked"*, whereas J2 included both. An interview with J1 revealed that they were more comfortable identifying the information first, while J2 focused on the main question before seeking relevant information. This difference illustrates a variation in problem-solving approaches despite both having the Judging personality type, influenced by personal preferences in structuring the solution steps (Faradilla & Nasution, 2024). Research by Dardiri et al. (2020) also

supports that even though Judging types are structured, the sequence of steps chosen can vary depending on individual focus and strategy.

From this difference, it can be concluded that although both subjects exhibit a structured problem-solving pattern, J1 places more emphasis on gathering initial information, while J2 focuses more on determining the final outcome first. These two approaches indicate that individuals with a Judging personality type tend to have systematic problem-solving strategies, but the sequence of steps is arranged based on their personal preferences.

Perceiving Personality Type

Figure 4. Answer to Question 1 by P1 UP

In understanding the SPLTV problems, Perceiving (P) subjects demonstrated a flexible approach while still paying attention to key elements. Both P1 and P2 wrote the *Given* and *Asked* components completely. P1 felt comfortable noting down all information to explore various solutions, reflecting openness to possibilities (Faradilla & Nasution, 2024). P2 also exhibited a free yet focused pattern, ensuring the two main components were included to maintain clarity, aligning with the cognitive flexibility of the Perceiving type (Tarigan et al., 2019).

In the second problem, both subjects wrote only the *given* part without specifying the *asked*. P1 felt that the purpose of the question was already understood without needing to be written down, which aligns with cognitive load theory (Sweller, 2011). P2 also relied on an intuitive understanding of the context. Overall, individuals with a Perceiving personality still consider structure, but in a flexible way. They are adaptive in organizing information (Costa Jr & McCrae, 2000), though omitting components like the *Asked* may hinder focus in problem-solving (Liu & Campbell, 2017).

2) Devising a Plan

Judging Personality Type

Individuals with the Judging (J) personality type tend to have a structured and systematic approach when devising a plan to solve a problem (Faradilla & Nasution, 2024). This is evident in how J1 and J2 wrote all three equations correctly and explained their problem-solving strategies during the interviews.

Figure 5. Answer to Question 1 by J1 DP

In the first problem, both J1 and J2 correctly wrote the three equations, but J1 arranged them in a more systematic and organized manner. This reflects J1's structured thinking, while J2 was more focused on the final result without paying much attention to the presentation. J1 stated that he preferred to write down the key information first to make it easier to form the equations. This approach reflects the characteristics of Judging individuals who favor structure and planning (Setiyaningrum et al., 2020). In contrast, J2 immediately sought relationships between variables without recording additional information, demonstrating a practical yet contextual approach, which is still consistent with the tendencies of the Judging type (Ginevra et al., 2015).

Figure 6. Answer to Question 2 by J2 DP

In the second problem, both J1 and J2 immediately determined the method of solution. J1 chose elimination or substitution flexibly depending on the form of the equation, demonstrating efficiency and organized thinking. J2 also used a similar method but focused more on avoiding calculation errors. Both reflect typical judging characteristics, such as a preference for clear and well-planned strategies from the start. The difference lies in that J1 stands out in strategic flexibility, while J2 emphasizes accuracy more.

From the analysis of both problems, it is evident that both exhibit a systematic thinking pattern typical of the Judging type, albeit with different approaches. These findings are supported by Fitriana (2021), who stated that Judging individuals tend to possess high critical thinking skills, and Ilmiyana (2018), who emphasized that they prefer systematic and goal-oriented problem-solving.

Perceiving Personality Type

In the first problem, P1 wrote all three equations correctly and systematically, ensuring each piece of information was converted in a sequential manner. Meanwhile, P2 also wrote the equations correctly but was more flexible in their approach. P2 tended to try several methods first before choosing the most efficient one, demonstrating a more practical and adaptive approach.

Figure 7. Answer to Question 2 by P1 DP

However, the difference became more apparent in the second question. P1 made an error in writing the first equation, which resulted in an incorrect overall solution. Although P1 had a systematic thinking pattern, this mistake indicated a lack of accuracy when converting information into a mathematical model.

Figure 8. Answer to Question 2 by P2 DP

Conversely, P2 continued to demonstrate flexibility in problem-solving. Although P2's answer differed from the answer key, the model constructed was still mathematically valid and correct. This indicates that P2 prioritized effectiveness in solving the problem without being too fixated on a specific form of representation.

The main difference between P1 and P2 in the planning stage lies in their thinking patterns. P1 followed a systematic approach that had been taught, although errors were still possible, while P2 was more flexible and exploratory in selecting strategies, reflecting the adaptive characteristics of the Perceiving type (Novitasari & Setianingsih, 2019). Both had a good understanding of the SPLTV concept and were able to structure their steps logically. P1 relied on methods taught in class, whereas P2 adjusted strategies according to the situation, in line with the findings of Ahmadah & Ekawati (2021), which state that Perceiving individuals tend to use metacognition in determining problem-solving approaches.

3) Carrying Out the Plan

Judging Personality Type

Based on the results of the first and second problems as well as the interviews, both J1 and J2, who share the Judging personality type, showed a tendency to carry out their plans in a structured manner. They solved the SPLTV problems by following the steps they had previously planned, although there were still some shortcomings in the completeness of the written solution process.

Figure 9a and 9b. Answer to Question 1 by J1 CP

In the first problem, both J1 and J2 successfully solved the question correctly. They demonstrated an understanding of the solution plan and applied it systematically. However, they did not include several important details, such as a clear explanation of the elimination process between equations. This indicates that, although their thinking patterns are organized, the presentation of their steps is still lacking in completeness.

A similar pattern appeared in the second problem. Although both J1 and J2 arrived at correct final answers, their explanations of the process—such as naming equations, performing eliminations, and showing transformations—were less detailed, making the execution of their plans appear less transparent. From the interviews, both subjects followed their pre-determined plans. J1 was more meticulous and reflective, frequently checking each step due to an awareness of potential calculation errors. Meanwhile, J2 consistently followed the plan but provided brief explanations, showing less in-depth reflection. This reflects the Judging personality type's preference for order (Setiyaningrum et al., 2020) and highlights the importance of metacognitive skills in problem-solving strategies (Silaban & Darhim, 2023).

Overall, J1 and J2 executed their plans with structured thinking consistent with Judging personality traits (Setiawati et al., 2015), though there is still a need to improve the clarity of their written processes. J1 appeared slightly more reflective and meticulous than J2 in explaining the solution steps.

Perceiving Personality Type

Participant P1 successfully completed the problem with the correct final result, but the written steps of the solution were somewhat incomplete and unclear. Key information, such as explanations of the elimination process between equations used, was not included—despite being quite important to illustrate the systematic thinking fl ow. This aligns with the general traits of Perceiving individuals, who tend to be flexible and not too bound by rigid structures. Based on the interview, P1 stated that they tried to follow the plan that had been prepared but did not mention having a strategy in case of errors. This indicates the Perceiving tendency to carry out plans openly, though sometimes lacking reflection on the process.

Figure 10a and 10b. Answer to Question 1 by P2 CP

Participant P2 was able to construct a complete and systematic solution, even though not entirely following the initial plan. P2 preferred to carry out the steps flexibly and adjust when encountering difficulties. When confused, P2 chose to pause and re-evaluate the approach—showing cognitive flexibility and the ability to adapt strategies when facing obstacles. This approach reflects the typical traits of the Perceiving personality, which is adaptive and open to change (Faradilla & Nasution, 2024).

Although they share the same personality type, P1 and P2 employed different approaches. P1 tended to follow the initial plan but lacked detail in the execution. In contrast, P2 was more reflective and able to carry out the plan in a more structured way, even though the initial steps were flexible. This shows that Perceiving individuals, while similarly flexible (Tarigan et al., 2019), still exhibit a variety of strategies based on personal preference. This flexibility becomes their key strength in facing problem-solving challenges (Sweller, 2011).

Figure 11a and 11b. Answer to Question 2 by P1 CP

In the second problem, P1 showed a systematic approach, but an error in writing the initial equation caused the substitution and elimination results to be invalid. Despite completing the problem until the end, the final answer remained incorrect. P1 felt confident in their calculations and did not realize the mistake, indicating a lack of attention to verifying the initial information (Silaban & Darhim, 2023). According to the scoring guidelines, P1 only received a score of 1 due to this error. This finding is consistent with the study by Himawati et al. (2021), which revealed that students often make mistakes in understanding the problem and tend to be less meticulous in planning and executing problem-solving

strategies in the topic of SPLTV. Based on the scoring rubric, P1 only received a score of 1 due to this error.

Figure 12a and 12b. Answer to Question 2 by P2 CP

In contrast to P1, P2 used a more flexible method without adhering to the substitution-elimination procedure, allowing them to solve SPLTV concisely and correctly. However, P2 was less communicative, as they did not elaborate on each step (for example, the substitution of the value of x), making the presentation less informative. From the interview, P2 felt that explicit explanations were unnecessary if the result was clear, reflecting the spontaneous nature of the Perceiving personality. Nevertheless, the correctness of the result warranted a score of 3, with the note that communication and the completeness of the steps need to be improved.

4) Looking Back

Judging Personality Type

On the fourth indicator, which is evaluating results, Judging subjects demonstrated different behaviours in checking their answers yet still reflected a tendency toward order and structured completion.

Figure 13. Answer to Question 1 by J1 LB

In the first problem, J1 evaluated the result by substituting the variable values into one of the equations. He felt this step was sufficient and was confident in his procedures, thus receiving a score of 2. In contrast, J2 did not perform any evaluation and considered the task complete once the final answer was obtained, resulting in a score of 0. In the second problem, both J1 and J2 evaluated their results, but only on one equation. J1 was confident in the procedure used, while J2 used the remaining time to recheck his work due to rushing earlier. This behaviour reflects the monitoring phase in self-regulated learning, where evaluation is influenced by confidence and time management (Silaban & Darhim, 2023).

Perceiving Personality Type

Perceiving subjects exhibited varying attitudes when evaluating results. In the first problem, P1 did not perform any evaluation because they were confident in their steps and considered it a *"repetition of the process."* Time constraints were also a factor in their decision.

Figure 14. Answer to Question 1 by P2 LB

In contrast, P2 thoroughly checked all three equations and considered evaluation to be important. Although classified as a Perceiving type, P2 appeared more meticulous, possibly due to learning habits. However, in the second problem, neither P1 nor P2 conducted any evaluation. P1 again cited time limitations, while P2 prioritized reaching the final answer. This indicates that evaluation behaviour among Perceiving types varies and is influenced by metacognition and learning conditions (Silaban & Darhim, 2023).

CONCLUSION

Based on the analysis, subjects with the Judging personality type demonstrated a more systematic and structured thinking pattern on each of Polya's indicators, especially during the planning and execution stages. However, they tend to be less thorough in documenting the process and only conduct partial evaluations. On the other hand, Perceiving subjects exhibited a more flexible and adaptive approach. In the understanding and planning stages, they are able to adjust strategies spontaneously but do not always write down important parts explicitly. In the execution of plans, they are fairly efficient, though they are less communicative in explaining the process. The evaluation of results in Perceiving types also varies, depending on their conditions and confidence in the work's outcome. Despite having the same personality type, differences in strategy still arise, influenced by individual factors such as study habits and time management. Therefore, it is important for students to be accustomed to writing down the steps in solving problems and conducting thorough evaluations to ensure more accurate outcomes rather than relying solely on their personality tendencies.

ACKNOWLEDGMENT

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