JPP (Jurnal Pendidikan dan Pembelajaran)
Vol. 32, No. 2, October 2025, p. 76~85
ISSN: 2580-2313, DOI: 10.17977/um047v32i22025p76-85

Analysis of reflective thinking skills from the perspective of Gregorc's thinking style

Eko Santoso, Ahmad Yani T, Nurfadilah Siregar, Ade Mirza, Dede Suratman
Mathematics Education, Faculty of Teacher Training and Education, Universitas Tanjungpura, Pontianak, Indonesia

Article Info

Article history:

Received 01 09, 2025
Revised 03 10, 2025
Accepted 30 10, 2025

Keywords:

High order thinking skills;
Reflective thinking;
Gregorc's thinking style;
Mathematics learning;
Thinking style test

ABSTRACT

Reflective thinking skills are very important because they are a major part of achieving mathematics learning objectives. However, the reality in the field found problems in students, such as their difficulty in connecting new knowledge with what they already know before. The research conducted aims to describe the ability of reflective thinking in terms of Gregorc thinking style of class XI students at SMA Negeri 8 Pontianak. Descriptive qualitative is the method used in this research with instruments in the form of thinking style tests, reflective thinking ability tests, and interview guidelines. This research involved 4 students of class XI C SMA Negeri 8 Pontianak as subjects. Based on the research results, it was found that subjects with SK thinking style fulfilled all indicators of reflective thinking, subjects with SA thinking style only fulfilled two indicators of reflective thinking, subjects with AK thinking style only fulfilled one indicator of reflective thinking, and subjects with AA thinking style only fulfilled one indicator of reflective thinking. Teachers are advised to consider students thinking styles in learning, while other researchers are advised to examine the comparison of reflective thinking abilities based on differences in thinking styles.

Corresponding Author:

Eko Santoso
Mathematics Education, Faculty of Teacher Training and Education, Universitas Tanjungpura
Jalan Prof. Dr. H. Hadari Nawawi, Pontianak, Indonesia
Email: f1041211009@student.untan.ac.id

1. INTRODUCTION

Higher-order thinking skills are the ability to utilize existing knowledge to solve problems through the stages of analysis, evaluation, and idea generation from a given problem (Desiriah & Setyarsih, 2021). Kemampuan berpikir tingkat tinggi are also known by another term, namely Higher Order Thinking Skills (HOTS). These skills involve more complex processes, not just remembering and repeating information that is already known (Astuti, 2018; Prabandari, 2023). Good higher-order thinking skills will be able to overcome weaknesses in learning activities so that they can support a better learning process. These skills can also help solve complex problems, make the right decisions, and find creative solutions to every problem. Thus, these skills are important for everyone to have.

The scope of higher-order thinking skills includes the ability to think reflectively, creatively, logically, critically, and metacognitively (Susanti et al., 2023; Widyastuti & Nuriadin, 2021). One of the crucial abilities to improve is reflective thinking, as explained by Trisnani (2020) and Mawardi et al. (2024). Reflective thinking skills are essential in mathematics learning because students usually encounter problems that require deep thinking and indirect solutions (Kurniasari & Wathon, 2019; Wardani et al., 2021; Junaedi et al., 2022). The importance of reflective thinking skills is stated in the rationale for mathematics learning outcomes in the 2024 BSKAP (*BSKAP*, 2024).

Although this reflective thinking skill has been taught by teachers, the facts on the ground reveal several problems among students, such as their inability to connect new concepts with their existing knowledge and

difficulty in evaluating their own learning outcomes. This reflective thinking skill does not stand alone but is related to other higher-order mathematical thinking skills, such as critical and creative thinking. Research by Ratnasari & Nurhidayah (2020) supports this, stating that observations of students' reflective thinking skills can reveal other higher-level mathematical thinking skills. Reflective thinking skills are also related to a person's thinking style in the learning process.

Different thinking styles can influence a persons reflective thinking abilities, because each thinking style provides a unique way of receiving and processing information. Differences in thinking styles also affect the quality of student learning outcomes (Azahra & Subekti, 2024; Susanto et al., 2017), so it is crucial for teachers to recognize their students' thinking styles. Thinking styles refer to the unique ways in which individuals acquire, process, and organize information to solve problems and make accurate decisions, which can lead to differences among students. Students who are aware of their own thinking styles will find it easier to identify the steps they need to take. Several experts have explained thinking style theories, such as Guildford (1956), Gregorc (1998), and Ferri (2010).

The choice of thinking style may depend on the context of its use, but the Gregorc thinking style was chosen because it focuses on how a person receives information, the depth of understanding of information, and the ability to process information. The Gregorc thinking style recognizes that everyone has a unique way of processing information and provides a balance between concrete and abstract thinking that can provide a more comprehensive insight into how students understand complex concepts.

According to Gregorc's theory, thinking styles are classified into four types, namely sequential concrete (SK), sequential abstract (SA), random concrete (AK), and random abstract (AA). A person's thinking style greatly influences the achievement of learning objectives. Thus, it is not surprising that thinking style has become a standard for success in mathematics learning, especially in terms of higher-order thinking skills (Noviyanti et al., 2021).

High-level thinking skills in students can be measured through story problems, which require students to have a deep understanding of the material they have learned in order to solve them properly (Buyung & Sumarli, 2021; Farida et al., 2023). However, in practice, almost all students have difficulties in solving story problems, mainly because they are not careful enough in reading the questions and because they assume that mathematical story problems are conceptual and complex to understand (Agustini & Pujiastuti, 2020; Baweleng et al., 2023; Putridayani & Chotimah, 2020). These obstacles often make students feel hindered in solving problems presented in the form of word problems.

The Two Variable Linear Equation System (SPLDV) is one of the topics that students must master in mathematics, because this topic is often applied in daily routines and its implications are directly related to solving real-world problems. In SPLDV, many problems are illustrated through stories that require students to not only understand mathematical concepts but also be able to translate contextual problems into mathematical models (Agustini & Pujiastuti, 2020; Khusna & Ulfah, 2021). The obstacle that students often face is the difficulty of understanding the context of the problem and converting the information into an equation, so mastery of SPLDV is key to helping students overcome more complex story problems.

Research discussing reflective thinking skills in mathematics learning has been conducted by other researchers such as Maulida et al. (2024), Nugrahani et al. (2024), and Noviyanti et al. (2021). Research discussing thinking styles has also been conducted by several researchers such as Anggraeni et al. (2023) and Fauzi et al. (2020). However, there has been no research discussing students reflective thinking skills in terms of Gregorc's thinking styles.

2. METHOD

In this study, the qualitative descriptive method was used as the approach. The research subjects were students of class XI C at SMA Negeri 8 Pontianak who were selected based on certain criteria. Class XI C was chosen because it had a diverse range of academic abilities, so it was expected to provide adequate and relevant research results. The selection of subjects took into account the following criteria:

a. Thinking style test score
b. Student ability to convey information well when expressing opinions/ideas in writing and orally
c. Willingness to participate in all stages of information gathering in this study

Data were obtained through tests and interviews using instruments that included thinking style tests, reflective thinking ability tests, and interview guidelines. In the process of grouping students based on four types of thinking styles, thinking style tests were used. The thinking style test was adopted from the theory proposed by DePorter & Hernacki (2000). Meanwhile, to measure students ability to think reflectively when solving mathematical problems related to SPLDV material, a reflective thinking ability test was used. This test consisted of six essay questions. This test contains indicators of reflective thinking developed by Surbeck et al. (1991), namely reacting, comparing, and contemplating. To facilitate the researcher in conducting the interview process, an interview guide was used. The interview guide contained questions to be asked during the interview process.

The data analysis technique according to Miles & Huberman (1994) was used to analyze the data obtained. In the data reduction stage, students were grouped based on their thinking styles. Then, students were given a reflective thinking ability test. Next, the students test results were analyzed and interviews were conducted. In the data presentation stage, the test and interview results are combined and presented in a narrative description. In the conclusion drawing/verification stage, conclusions are drawn about the reflective thinking abilities of students with different thinking styles. To check the validity of the data, triangulation techniques are used. A combination of student answers and interviews is used to draw conclusions.

3. RESULTS AND DISCUSSION

The data in this study consisted of thinking style test results, reflective thinking ability test results, and interview results. The thinking style test was administered to 35 students in class XI C at SMA Negeri 8 Pontianak. The students were then grouped into four categories according to their thinking style. The results of the students' thinking style tests are presented in Table 1 as follows:

Table 1. Student Thinking Style Test Results

Type of Thinking Style	Number of Students	Percentage (%)
Sequential Concrete	16	45,7
Sequential Abstract	5	14,3
Random Concrete	3	8,6
Random Abstract	11	31,4
Total	35	100

Based on the grouping of thinking styles, the researcher selected one subject from each category of thinking style. The researcher selected one subject from each category of thinking style to ensure sufficient representation for each thinking style. The selection of four subjects was based on the criteria described in the research methods section. The selected subjects are presented in Table 2 below:

Table 2. Research Subject

No	Student Name Initials	Thinking style	Student Code
1	ASRP	Sequential Concrete	SK
2	KHA	Sequential Abstract	SA
3	AAA	Random Concrete	AK
4	EDN	Random Abstract	AA

The four students selected as research subjects were given a reflective thinking ability test, and the results can be seen in Table 3:

Table 3. Results of Students Reflective Thinking Ability Test

No	Thinking Style	Student Code	Indicators of Reflective Thinking		
			Reacting	Comparing	Contemplating
1	Sequential Concrete	SK	✓	✓	✓
2	Sequential Abstract	SA	✓	✓	-
3	Random Concrete	AK	✓	-	-
4	Random Abstract	AA	✓	-	-

Explanation:
(✓) = indicates that the research subject has met the reflective thinking indicator.
(−) = indicates that the research subject has not met the reflective thinking indicator.

Table 3 indicates that students with different thinking styles tend to have varying levels of reflective thinking skills. However, students with the same thinking style still have the potential to show differences in reflective thinking skills.

3.1. Analysis of Students Reflective Thinking Skills with Concrete Sequential Thinking Styles

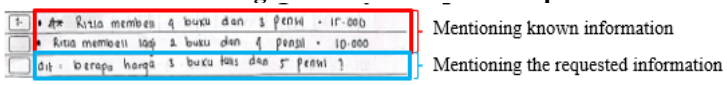

Figure 1. Results of Answering SK Number 1

Figure 1 shows that the subject SK wrote down the information completely and accurately, both the known and asked information. This is reinforced by the interview results below:

P : "Are you sure you have written down all the known and asked information completely?"
SK : "Yes, I am sure I have written down the information completely."

The subject demonstrated a consistent understanding of the available information. The subject mentioned the information accurately according to the data in the question, without rephrasing the sentence in their own words. This can be seen from the interview results below:

P : "What information is known in the question?"
SK : "In question number 1, what is known is that Rizla bought 4 notebooks and 3 pencils for Rp15,000.00 and Rizla bought another 2 notebooks and 4 pencils, so the amount to be paid is Rp10,000.00."

The subject understands the information and can confirm that the information is sufficient to answer the question. This can be seen from the interview results below:
P : "What the information given in the question sufficient to answer this question?"
SK : "Yes."
Thus, subject SK is able to meet the reacting indicator.

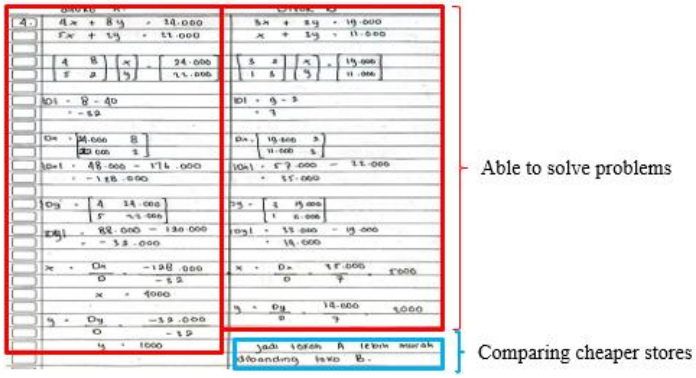

Figure 2. Results of Answering SK Number 4

Figure 2 shows that the subject SK chose the appropriate solution method, namely the matrix determinant method, and worked on the problem using the correct steps. This is reinforced by the interview results below:
P : "So, what method did you use to answer this question?"
SK : "I used the matrix determinant method."

The subject also explained the reasons for choosing this method and explained the appropriate steps to complete the problem. This can be seen from the interview results below:
P : "Why did you choose that method?"
SK : "Because in eleventh grade, I learned the matrix determinant method."
Thus, subject SK was able to meet the comparing indicator.

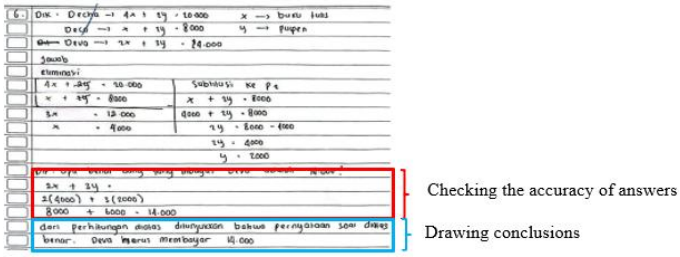

Figure 3. Results of Answering SK Number 6

Figure 3 shows that the subject SK checked the correctness of the answers and drew the right conclusions. This is reinforced by the interview results below:
P : "Did you check the answers you wrote?"
SK : "Yes, I checked it."

The subject said that they checked the answers for each step and matched the results obtained with the answers listed in the questions. The subject mentioned the conclusions systematically based on the results of their work. This can be seen from the interview results below:
P : "How did you check the answers you wrote?"
SK : "By matching the results obtained with the answers already known in the questions."
P : "Did you check each step or just the final result?"
SK : "Yes, I checked each step."
Thus, subject SK was able to fulfill the contemplating indicator.

Subjects with SK were able to fulfill all indicators of reflective thinking according to Surbeck et al. (1991), namely reacting, comparing, and contemplating. Subjects were able to write down known information, asked information, and explain that the available information was sufficient to answer questions completely and accurately. This happened because subjects understood each piece of information received carefully and without haste. As stated by Firdaus et al. (2019), students with an SK thinking style first understand the information before solving problems. DePorter & Hernacki (2000) also revealed that people with an SK thinking style have the ability to pay attention to evidence, data, formulas, and certain rules without difficulty through their senses.

Subjects are able to choose the appropriate solution method. Subjects choose the matrix determinant method and are able to provide rational reasons for choosing that method and are able to solve problems using the correct procedure. This is consistent with the thinking of Fitri et al. (2023), who revealed that subjects with an SK

thinking style were able to solve problems correctly and were able to explain their reasoning. Referring to the views of DePorter & Hernacki (2000) that subjects with SK thinking styles organize tasks in stages, focus on perfect completion at each step, by recording procedures sequentially to obtain the best results.

The subject successfully checked the correctness of the answers and was able to draw accurate conclusions. The subject checked each step of the solution, for fear of missing any errors. This indicates that subjects with an SK thinking style want perfect results (perfectionists). This is consistent with the thinking of Fitri et al. (2023), who assert that subjects with an SK thinking style double-check to ensure that the arguments presented are correct. The subject did not only rely on the final result, but also ensured that each stage was correct. In addition, the SK subject's ability to check the correctness of answers and draw accurate conclusions is also supported by the findings of Firdaus et al. (2019), namely that SK subjects have the ability to draw accurate conclusions after conducting investigations and considering the suitability of available information sources.

3.2. Analysis of Students Reflective Thinking Skills with Abstract Sequential Thinking Styles

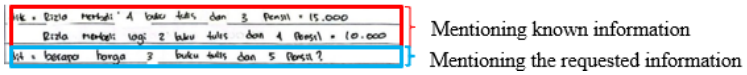

Figure 4. Results of Answering SA Number 1

Figure 4 shows that subject SA completely and accurately wrote down the known information and the information asked. This is reinforced by the interview results below:

P : "For question number 1, what is the known information in the question?"
SA : "Rizla bought 4 notebooks and 3 pencils for Rp15,000.00, then Rizla bought another 2 notebooks and 4 pencils for Rp10,000.00."

The subject stated that the known information was sufficient to solve the given problem. This is evident from the interview results below:

P : "What the information written in the problem sufficient to answer the question?"
SA : "Yes, it is sufficient."

Thus, subject SA was able to meet the reacting indicator.

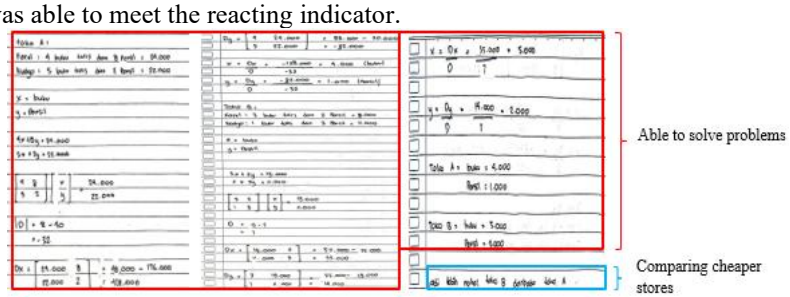

Figure 5. Results of Answering SA Number 4

Figure 5 shows that subject SA chose the appropriate solution method, namely the matrix determinant method, and worked on the problem using the correct steps. This is reinforced by the interview results below:

P : "What method did you use to answer the question?"
SA : "Determinant."

The subject explained that he chose the matrix determinant method because it is easy. This is evident from the interview results below:

P : "Why did you choose that method?"
SA : "Because it's easy."

Thus, the SA subject was able to meet the comparing indicator.

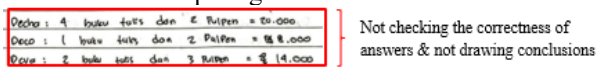

Figure 6. Results of Answering SA Number 6

It can be seen from Figure 6 that subject SA is not yet able to check the correctness of answers and make accurate conclusions. The subject said that he did not check his work. This can be seen from the interview results below:

P : "Have you checked your answer to number 6?"
SA : "Not yet, sir."
P : "Why haven't you checked your answers?"
SA : "Because I haven't finished, so I haven't checked."

Thus, subject SA does not meet the contemplating indicator.

Subject SA was only able to fulfill two indicators of reflective thinking according to Surbeck et al. (1991), namely reacting and comparing. The subject was able to identify the information that was known and asked completely and accurately. The subjects demonstrated their understanding of the questions by copying the

information in the questions using their own sentences. This is consistent with the findings of Firdaus et al. (2019), who revealed that SA students tend to identify questions systematically by writing down known information completely and in order. In addition, the subjects' tendency to express information using their own words is in line with the views of Lestanti et al. (2016), who revealed that SA students tend to process information by rearranging words according to their understanding.

The subject was able to choose the appropriate solution method. The subject chose the matrix determinant method as a solution strategy and successfully completed the problem using a correct and structured procedure. As stated by Fitri et al. (2023), subjects with an SA thinking style tend to be able to organize the steps of the solution in a structured and neat manner. The subject not only successfully answered the question accurately, but was also able to explain the reasons and provide an explanation for the procedure chosen to solve the problem. This ability reflects that SA subjects do not only focus on the end result, but also value the process. Theoretical support from DePorter & Hernacki (2000) also reinforces this finding by stating that people with an SA thinking style analyze information and think in concepts.

The subject was unable to check the correctness of the answers and was unable to make accurate conclusions. This is consistent with the results of research by Lestanti et al. (2016) that people with SA thinking styles do not review their work in detail at each stage to ensure correct answers. These results are also consistent with the findings of Firdaus et al. (2019), who revealed that individuals with an SA thinking style still have difficulties drawing conclusions based on accurately understood logical interpretations. This is evident in the subject's inability to draw accurate conclusions from the results of their work.

3.3. Analysis of Students Reflective Thinking Skills with Concrete Random Thinking Styles

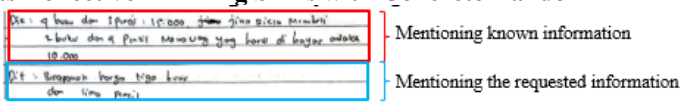

Figure 7. Results of Answering AK Number 1

Figure 7 shows that subject AK wrote down the known information and the information requested completely and accurately. This is reinforced by the interview results below:

P : "Are you sure you have written down all the information completely?"
AK : "Yes."

The subject explained that the known information was sufficient to answer the questions. This can be seen from the interview results below:

P : "What the information in the questions sufficient to answer the questions given?"
AK : "Yes."

Thus, it can be concluded that subject AK meets the indicators.

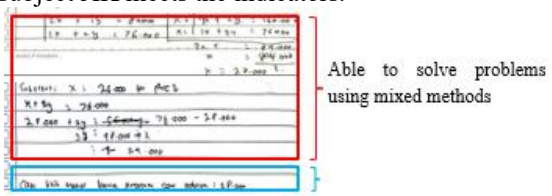

Figure 8. Results of Answering AK Number 3

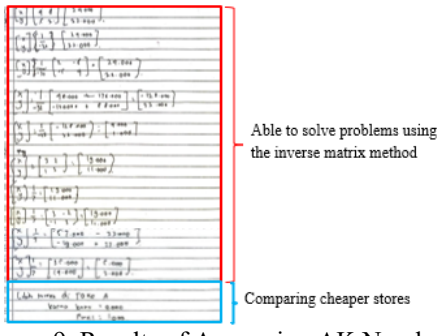

Figure 9. Results of Answering AK Number 4

It can be seen from Figure 8 and Figure 9 that subject AK chose the mixed method for question number 3 and the inverse matrix method for question number 4. From the interview results, the subject did not understand the method used to answer the questions. When explaining question number 3, the subject said that the method used was the inverse matrix, even though in the test the subject actually used the mixed method. This can be seen from the interview results below:

P : "What method did you choose to solve question number 3?"

AK : "The matrix inverse method."

The inaccuracy in explaining this method shows that the subject did not fully understand the steps in solving the question. Thus, subject AK did not meet the comparing indicator.

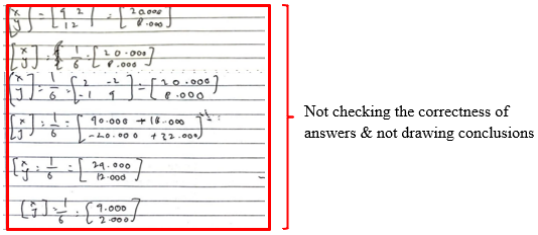

Figure 10. Results of Answering AK Number 6

Figure 10 shows that subject AK is not yet able to check the correctness of answers or draw conclusions. From the interview results, the subject said that he only checked the final results without checking the steps taken. This is reinforced by the interview results below:

P : "How do you check the answers?"
AK : "By looking at the results of the formulas that have been found."

The subject stated that they only checked the final result without checking the steps taken. This is evident from the interview results below:

P : "So you only look at the result?"
AK : "Yes."

Based on the interview results, the answer given by subject AK shows that the subject does not yet understand the answer checking process correctly. This indicates a misconception, where the subject mistakenly understands that checking answers is about ensuring the use of the formulas that have been found.

Thus, subject AK does not meet the contemplating indicator.

Subject AK was only able to fulfill one indicator of reflective thinking according to Surbeck et al. (1991), namely reacting. The subject was able to write down known information, asked information, and explain that the available information was sufficient to solve the problem. The subject showed a tendency to quickly understand the core of the problem and immediately identify the important facts from the given question. This is consistent with the thinking of Firdaus et al. (2019) that a person with an AK thinking style is able to analyze and respond to problems clearly and appropriately.

Subjects were able to choose the appropriate solution method but were inconsistent and unable to complete the problem using the correct procedure. This is in line with DePorter & Hernacki's (2000) theory that individuals with an AK thinking style tend to solve problems in a less structured manner and rely on trial and error. Furthermore, research by Firdaus et al. (2019) supports this finding by stating that individuals with an AK thinking style can choose the correct formula in problem solving, even though there are shortcomings in the use of the correct procedure.

The subject was unable to check the correctness of the answers and was unable to draw accurate conclusions. The subject only checked the final results without checking the steps taken and was unable to explain how to check them. This is consistent with the findings of Lestanti et al. (2016), which revealed that people with an AK thinking style are less thorough in checking the results of their work step by step to ensure correct answers. These results are consistent with the findings of Fitri et al. (2023), who stated that individuals with an AK thinking style do not verify the accuracy of the arguments presented and fail to convey the correct conclusions.

3.4. Analysis of Students Reflective Thinking Skills with Abstract Random Thinking Styles

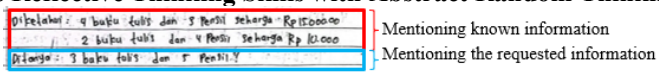

Figure 11. Results of Answering AA Number 1

Figure 11 shows that subject AA wrote down the information completely and accurately, both the known information and the information asked. This is reinforced by the interview results below:

P : "Are you sure you have written down all the information completely?"
AA : "Yes."

The subject mentioned that the information known in the question was sufficient to complete the question. This can be seen from the interview results below:

P : "Was the information in the question sufficient to answer the question?"
AA : "Yes."

Thus, subject AA meets the reacting indicator.

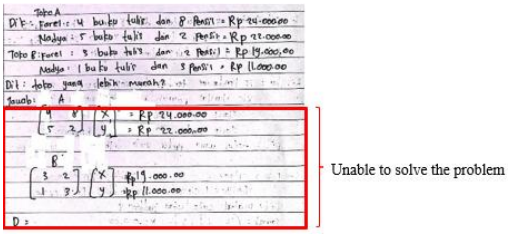

Figure 12. Results of Answering AA Number 4

Figure 12 shows that subject AA chose the matrix determinant method but was unable to solve the problem. This is reinforced by the interview results below:

P : "What method did you use to answer the question?"
AA : "Matrix determinant."

The subject was unable to complete the question at all, indicating that the subject did not understand how to solve the question. From the interview results, the subject said that the difficulty in solving the question was mainly in determining the value of the determinant, the value of x, and the value of y, which were important parts of solving the question. This can be seen from the interview results below:

P : "The answer to question number 4 is incomplete. Did you find it difficult?"
AA : "Yes."
P : "Which part?"
AA : "(silent) "The part about finding the values of x and y."

Thus, subject AA did not meet the comparing indicator.

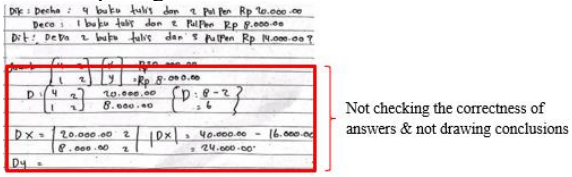

Figure 13. Results of Answering AA Number 6

It can be seen from Figure 13 that subject AA did not check the correctness of the answers and did not make conclusions. From the interview results, the subject said that he did not check his answers. This can be seen from the interview results below:

P : "You didn't do number 6, right? What was the reason?"
AA : "Because there wasn't enough time."
P : "So you didn't check your answers?"
AA : "Yes."

Thus, subject AA did not meet the contemplating indicator.

Subject AA was only able to fulfill one indicator of reflective thinking according to Surbeck et al. (1991), namely reacting. The subject was able to write down known information, identify the information being asked, and ensure that the data possessed was sufficient to answer the question correctly. This ability indicates that the subject has a good command of the concept in identifying and utilizing important information from the question. This is consistent with the thinking of Firdaus et al. (2019), who stated that someone with an AA thinking style is able to focus on problems through problem identification and recording facts or information from the question. The subject can systematically organize facts or information from the question and use them as a basis for determining the correct answer. In other words, this thinking style is able to filter information and adapt it to the needs of problem solving. In addition, the research by Fitri et al. (2023) also supports these results by stating that people with AA thinking styles tend to be highly sensitive to the information contained in the question. Subjects are able to recognize and understand this information accurately, making it easier for them to identify the core of the problem and determine the first steps in the solution process.

Subjects are able to choose the appropriate solution method but are not yet able to complete the problem with the correct steps. Subjects have difficulties in applying the chosen method to reach the final solution. These findings are consistent with the thoughts of Fitri et al. (2023), who state that people with AA thinking styles tend to give up easily when faced with difficulties in finding the right solution. This reflects the characteristics of the abstract random thinking style, in which a person is often oriented towards ideas or concepts but lacks focus on the application of systematic steps. Research by Lestanti et al. (2016) also supports these findings by revealing that people with an AA thinking style tend to provide incomplete procedures and are unable to implement their solution plans.

Subjects were unable to check the correctness of their answers and had difficulty drawing accurate conclusions. This was evident in the subjects' inability to write down their answers and complete the questions thoroughly. The subject tends to spend too much time thinking about what they feel is the right answer, so the process stops without producing a solution. This finding is in line with DePorter & Hernacki (2000), who explain that people with an AA thinking style take longer to think because they tend to work according to their own conditions. This thinking style is often not bound by time constraints or strict structures, so that the completion process becomes unfocused and experiences delays. In addition, research by Fitri et al. (2023) also reveals that people with AA thinking styles often do not double-check the answers they have found. This indicates that subjects find it difficult to ensure that the solutions they produce are correct. The research by Firdaus et al. (2019) further supports this finding, stating that individuals with a random abstract thinking style are not yet able to draw conclusions. This is due to limitations in constructing arguments based on assumptions, facts, and alternative considerations for problem solving.

4. CONCLUSION

The reflective thinking abilities of students were examined based on the thinking styles of 11th grade students at SMA Negeri 8 Pontianak, which varied. Specifically, based on the types of thinking styles of the students, it can be concluded that subjects with a concrete sequential thinking style were able to fulfill all indicators of reflective thinking abilities, namely reacting, comparing, and contemplating; subjects with a sequential abstract thinking style are only able to fulfill two indicators of reflective thinking ability, namely reacting and comparing; subjects with a concrete random thinking style are only able to fulfill one indicator of reflective thinking ability, namely reacting; and subjects with an abstract random thinking style are only able to fulfill one indicator of reflective thinking ability, namely reacting.

ACKNOWLEDGEMENTS

The authors would like to thank everyone concerned for supporting this research, including colleagues who provided support throughout the research process.

REFERENCES

Agustini, D., & Pujiastuti, H. (2020). Analisis Kesulitan Siswa Berdasarkan Kemampuan Pemahaman Matematis dalam Menyelesaikan Soal Cerita Pada Materi SPLDV. *Media Pendidikan Matematika*, *8*(1), 18–27. https://doi.org/10.35508/fractal.v2i2.5638

Anggraeni, D., Madawistama, S. T., & Rustina, R. (2023). Analisis Kemampuan Berpikir Lateral Peserta Didik Ditinjau Dari Gaya Berpikir Gregorc. *Jurnal Siliwangi*, *9*(1), 38–43.

Astuti, P. (2018). Kemampuan Literasi Matematika dan Kemampuan Berpikir Tingkat Tinggi. *PRISMA, Prosiding Seminar Nasional Matematika*, *1*(1), 263–268.

Azahra, M., & Subekti, F. E. (2024). Kemampuan Pemecahan Masalah Matematis Berdasarkan Gaya Kognitif pada Siswa. *Proximal: Jurnal Penelitian Matematika Dan Pendidikan Matematika*, *7*(1), 475–484. https://doi.org/10.30605/proximal.v7i1.4117

Baweleng, G. A., Tilaar, A. L. F., & Sumarauw, S. J. A. (2023). Analisis Kesulitan Dalam Menyelesaikan Soal Cerita Sistem Persamaan Linear Dua Variabel Siswa Kelas X Akuntansi Di SMK Negeri 1 Tenga. *Journal on Education*, *06*(01), 5673–5685.

BSKAP. (2024).

Buyung, & Sumarli. (2021). Analisis Kesulitan Siswa dalam Menyelesaikan Soal Cerita Berbasis Kemampuan Pemecahan Masalah. *VARIABEL*, *4*(2), 61–66. https://doi.org/10.32505/qalasadi.v5i1.2366

DePorter, B., & Hernacki, M. (2000). Quantum Learning: Membiasakan Belajar Nyaman dan Menyenangkan. *Bandung: Kaifa*.

Desiriah, E., & Setyarsih, W. (2021). Tinjauan Literatur Pengembangan Instrumen Penilaian Kemampuan Berpikir Tingkat Tinggi (Hots) Fisika Di Sma. *ORBITA: Jurnal Kajian, Inovasi Dan Aplikasi Pendidikan Fisika*, *7*(1), 79–89. https://doi.org/10.31764/orbita.v7i1.4436

Farida, I., Afifah, A., Nurmalitasari, D., & Naim, M. A. (2023). Penerapan Komik Matematika Islam Sebagai Upaya Meningkatkan Kemampuan Berpikir Kritis. *Jurnal Penelitian Tindakan Kelas*, *1*(1), 11–17. https://doi.org/10.61650/jptk.v1i1.118

Fauzi, F. A., Ratnaningsih, N., & Nimah, K. (2020). Analisis kemampuan berpikir kritis matematis peserta didik ditinjau dari gaya berpikir gregorc. *Journal of Authentic Research on Mathematics Education (JARME)*, *2*(2), 96–107. http://jurnal.unsil.ac.id/index.php/jarme/article/view/1734

Ferri, R. B. (2010). On the Influence ofMathematical Thinking Styles on Learners' Modeling Behavior. *Journal Fur Mathematik-Didaktik*, *31*(1), 99–118. https://doi.org/10.1007/s13138-010-0009-8

Firdaus, A., Nisa, L. C., & Nadhifah, N. (2019). Kemampuan Berpikir Kritis Siswa pada Materi Barisan dan Deret

Berdasarkan Gaya Berpikir. *Kreano, Jurnal Matematika Kreatif-Inovatif*, *10*(1), 68–77. https://doi.org/10.15294/kreano.v10i1.17822

Fitri, S. N., Liana, M., & Rosmery, L. (2023). Penalaran Matematis Siswa Ditinjau dari Gaya Berpikir menurut Gregorc. *AKSIOMA: Jurnal Matematika Dan Pendidikan Matematika*, *14*(2), 131–146.

Gregorc, A. F. (1998). The Mind styles model : theory, principles and practice: a primer. In *Gregorc Associates*. Gregorc Associates. https://doi.org/LK - https://worldcat.org/title/56603723

Guildford, J. P. (1956). Fundamental Statistic in Psychology and Education (3rd Editio). *New York: McGraw-Hill Book Company, Inc.*

Junaedi, Y., Maryam, S., & Lutfi, M. K. (2022). Analisis Kemampuan Berpikir Reflektif Siswa SMP Pada Pembelajaran Daring. *Journal of Mathematics Education and Learning*, *2*(1), 49. https://doi.org/10.19184/jomeal.v2i1.30228

Khusna, H., & Ulfah, S. (2021). Kemampuan Pemodelan Matematis dalam Menyelesaikan Soal Matematika Kontekstual. *Mosharafa: Jurnal Pendidikan Matematika*, *10*(1), 153–164. http://journal.institutpendidikan.ac.id/index.php/mosharafa

Kurniasari, R., & Wathon, A. (2019). Pembelajaran Konstruktif Melalui Alat Permainan Edukatif. *Sistim Informasi Manajemen*, *2*(2), 96–112.

Lestanti, M. M., Isnarto, & Supriyono. (2016). Analisis Kemampuan Pemecahan Masalah Ditinjau Dari Karakteristik Cara Berpikir Siswa Dalam Model Problem Based Learning. *Unnes Journal of Mathematics Education*, *5*(1), 16–23.

Maulida, N. S. S., Happy, N., & Sugiyono, E. (2024). Analisis Kemampuan Berpikir Reflektif Dalam Menyelesaikan Masalah Ditinjau Dari Gaya Belajar Siswa. *Didaktik: Jurnal Ilmiah PGSD FKIP Universitas Mandiri*, *10*(2), 677–687.

Mawardi, D. N., Sulistyowati, E., & Hukom, J. (2024). Meta-Analysis of investigation of the flipped classroom model on students' high order thinking skills (HOTS) mathematics: Analysis of combined effects and heterogeneity. *Jurnal Math Educator Nusantara*, *10*(1), 154–166. https://pdfs.semanticscholar.org/53a3/ac678350d15ea7def07f876d1c09d54add6c.pdf

Miles, M. B., & Huberman, M. A. (1994). An Expanded Sourcebook: Qualitative Data Analysis. *London: Sage Publications*.

Noviyanti, E. D., Purnomo, D., & Kusumaningsih, W. (2021). Analisis Kemampuan Berpikir Reflektif dalam Pemecahan Masalah Matematika Ditinjau dari Gaya Kognitif. *Imajiner: Jurnal Matematika Dan Pendidikan Matematika*, *3*(1), 57–68. https://doi.org/10.26877/imajiner.v3i1.7097

Nugrahani, R. P., Nurcahyo, A., & Kholid, M. N. (2024). Analisis Kemampuan Berpikir Reflektif Matematis Siswa Pada Materi Statistika Ditinjau Dari Self-Regulated Learning. *Lebesgue: Jurnal Ilmiah Pendidikan Matematika, Matematika Dan Statistika*, *5*(1), 232–243.

Prabandari, F. (2023). Pengaruh Penerapan Metode Pembelajaran Inkuiri Terhadap Kemampuan Berpikir Tingkat Tinggi. *Oikos: Jurnal Kajian Pendidikan Ekonomi Dan Ilmu Ekonomi*, *08*(01), 291–301.

Ratnasari, Y., & Nurhidayah, D. A. (2020). Analisis Berpikir Reflektif Siswa dalam Menyelesaikan Masalah Matematika. *Jurnal Edupedia Universitas Muhammadiyah Ponorogo*, *4*(2), 162–171.

Surbeck, E., Han, E. P., & Moyer, J. E. (1991). Assessing Reflective Responses in Journaals. *Educational Leadership*, *48*(6), 25–27. https://files.ascd.org/staticfiles/ascd/pdf/journals/ed_lead/el_199103_surbeck.pdf

Susanti, D., Retnawati, H., Arliani, E., & Irfan, L. (2023). Peluang dan tantangan pengembangan asesmen high order thinking skills dalam pembelajaran matematika di indonesia. *Jurnal Inovasi Pembelajaran Matematika: PowerMathEdu*, *2*(2), 229–242. https://doi.org/10.31980/powermathedu.v2i2.3096

Susanto, H., Sa'dijah, C., & Gipayana, M. (2017). Pengaruh Penggunaan Metode Guided Inquiry dan Gaya Berpikir Terhadap Hasil Belajar Kognitif Kelas V. *Jurnal Pendidikan: Teori, Penelitian, Dan Pengembangan*, *2*(9), 1202–1211.

Trisnani, N. (2020). Tingkat Kemampuan Berfikir Reflektif Siswa Sekolah Dasar Kelas Tinggi. *AR-RIAYAH : Jurnal Pendidikan Dasar*, *4*(2), 131. https://doi.org/10.29240/jpd.v4i2.1921

Wardani, A., Mytra, P., & Fitriani, F. (2021). Profil Berpikir Reflektif dalam Memecahkan Masalah Sistem Persamaan Linear Dua Variabel Ditinjau Dari Kemampuan Awal. *JTMT: Journal Tadris Matematika*, *2*(1), 1–8. https://doi.org/10.47435/jtmt.v2i1.641

Widyastuti, D., & Nuriadin, I. (2021). Hubungan Self-Efficacy dalam Pembelajaran Daring Terhadap Kemampuan Berpikir Reflektif Matematis Siswa di SMK. *Urnal Cendekia: Jurnal Pendidikan Matematika*, *05*(02), 1893–1901.