Journal of Learning on History and Social Sciences
Homepage: https://journal.antispublisher.id/index.php/EJLHSS
Email: admin@antispublisher.com

e-ISSN: 3031-7347
JLHSS, Vol. 2, No. 7, July 2025
Page 452-459

Analysis of The Thinking Process of Grade XI Students in Solving Mathematics Problems Reviewed from The Extrovert and Introverted Personalities of Students of SMK PGRI 24 Jakarta

Saeful Amri
Indraprasta PGRI University, Indonesia

DOI: https://doi.org/10.61796/ejlhss.v2i7.1359

Sections Info

Article history:
Submitted: May 24, 2025
Final Revised: May 31, 2025
Accepted: June 16, 2025
Published: July 9, 2025

Keywords:
Extroverts and introverts
Metacognition
Problem solving
Thinking

ABSTRACT

Objective: *I conducted research with the aim of training and determining the skills of students at SMK PGRI 24 Jakarta. Students' ability to think and solve math problems is examined from the perspective of introverted and extroverted students.* ***Method:*** *To make my research easier, I used a qualitative approach. Six Class XI students from SMK PGRI 24 in Jakarta were the subjects of the study; The three participants each represented extroverted and introverted personality types. Questionnaire, interview, and documentation approaches were used to collect data for this study. To collect this data, aspects of the student's personality were considered, along with testing the data and the conclusions drawn from the participants. A triangulation approach was used to collect data for the study.* ***Results:*** *The study found that introverted and extroverted students were at a full level of understanding of the difficulties used in their thought processes as well as carrying out planning, evaluation, and monitoring procedures. Planning steps are followed, which are completed by having students double-check the planning procedures. According to the results of the research interviews, extroverted students were at the level of tacit use, and introverted students were at the level of strategic use.* ***Novelty:*** *Students' ability to think and solve math problems is examined from the perspective of introverted and extroverted students.*

INTRODUCTION

Education is a vehicle to gather experience and improve the ability to solve difficulties, both big and small, as well as fundamental problems in daily life [1], [2]. Mathematics is one of the subjects taught starting from elementary school (SD), even to college. This shows that one of the important scientific domains in the field of education is mathematics. The ability to answer math problems is one of the skills that students must have in mathematics subjects. Permendikbud Number 58 of 2014 emphasizes the importance of the ability to solve mathematical problems, by emphasizing that the ability to solve problems is one of the components of ability that must be outlined in mathematics assessment.

According to [3] explains how each student's mentality differs when it comes to dealing with math literacy problems, integrating representations, and honing skills in real-world scenarios without context. [4] that there is a difference between introverted and extrovert personality types in the ability to write down mathematical solving steps.

According to Permendikbud Number 21 of 2016 concerning Content Standards for Primary and Secondary Education, one of the skills that students need to possess and develop is problem solving, especially in mathematics lessons. Problem-solving is useful in everyday life. This is because the practice questions given are usually related to daily life and are written in the form of non-routine math problems. However, it turns out that

children have difficulty in answering these unusual questions. Therefore, solving problems, especially non-routine ones, requires more than memorizing formulas, and constant practice [5].

Mathematical reflective thinking is a thinking ability that connects the knowledge gained in analyzing problems, evaluating problems, and relating previous knowledge to get a conclusion in solving mathematical problems. Reflective thinking will help students to develop high-level thinking skills by encouraging students to relate new knowledge to previous understanding. [6] think abstractly and conceptually, demonstrate specific strategies in new tasks, and understand one's own thinking and learning strategies. Reflective thinking is very important for students, because they are required to be able to solve mathematical problems by analyzing the problem-solving process using the right strategies and conducting evaluations to correct mistakes [7], [8], [9]. Therefore, reflective thinking skills are needed by students in solving mathematical problems and the importance of reflective thinking is a must to be developed, and gets the attention of teachers to develop these thinking skills. In general, educators only look at the results of student work based on the final results of problem solving.

The majority of students at SMK PGRI 24 Jakarta grade XI still have poor math problem-solving skills, according to a preliminary study that included exam questions on linear equations and inequalities. One of the goals of mathematics learning, namely problem solving, will not be achieved if students' mathematical problem-solving skills are still lacking, especially at SMK PGRI 24 Jakarta. Therefore, teachers should make every effort to help students develop their problem-solving skills to the fullest. Although math teachers use a variety of methods, [10] various efforts can be made by teachers, including by providing good learning media, or by providing a suitable teaching model for students.

RESEARCH METHOD

Qualitative research is research that is carried out. The approach used is a case study. Purposive sampling procedures were used to select research volunteers. Six grade XI students at SMK PGRI 24 Jakarta were the subjects of the research. They are divided into two groups based on their personality type: extroverts and introverts. Questionnaires, testing, interviews, documentation, and triangulation are some of the methods used in this data collection. Data analysis of the Miles and Huberman model, which includes data reduction, data presentation, and conclusion preparation, was used in this study [5], [11], [12], [13].

The methodology of this research is a mixed, research approach that combines quantitative and qualitative techniques to be used in a research [3]. To assess students' critical thinking skills in relation to personality type, researchers in this study gave them math problems they had previously taught.

RESULTS AND DISCUSSION

Result

The initial data in this study were the results of questionnaire answers which were grouped into extroverted and introverted students. This questionnaire was given to students of grade XI of SMK PGRI 24 Jakarta and then grouped based on the results of the scores obtained. Here are the rules.

Table 1. Personality categories.

Score	Personality Type
>12	**Extrovert**
≤12	*Introvert*

Based on table 1 above, students with a questionnaire score obtained >12 are included in the student who has an extroverted personality tendency. As for students who obtain a questionnaire score of ≤12, these students are included in having introverted personality tendencies. The following are the techniques for selecting subjects in this study.

Table 2. Subject data.

Selected Subject	Questionnaire Score	Subject Code	Personality Type
DR	16	SKE1	*Extrovert*
SNM	17	SKE2	*Extrovert*
PA	18	SKE3	*Extrovert*
RN	6	SKI1	*Introvert*
DS	7	SKI2	*Introvert*
AN	8	SKI3	*Introvert*

From table 2 above, it can be seen that there are six subjects: three people with an extroverted personality type and three people with an introverted personality type. The selected students were then given problem-solving test questions to help them learn more about how to solve their problems, and interviews were conducted to find out how they could use metacognition to solve problems.

Table 3. Metacognition abilities in problem solving.

Problem Solving Stage	Metacognitive Process	Students with Extrovert Personality			Students with Introvert Personality		
		Q1	Q2	Q3	Q1	Q2	Q3
Understanding the Problem	Planning	✓	✓	✓	✓	✓	✓
	Monitoring	✓	✓	✓	✓	✓	✓

Problem Solving Stage	Metacognitive Process	Students with Extrovert Personality			Students with Introvert Personality		
		Q1	Q2	Q3	Q1	Q2	Q3
Planning the Solution	Evaluation	✓	✓	✓	✓	✓	✓
	Planning	✓	✓	✓	✓	✓	✓
	Monitoring	–	✓	–	✓	✓	✓
	Evaluation	–	–	–	✓	✓	✓
Executing the Solution	Planning	✓	✓	✓	✓	✓	✓
	Monitoring	–	–	–	–	✓	–
	Evaluation	–	–	–	–	✓	–
Rechecking	Planning	✓	✓	–	✓	✓	✓
	Monitoring	–	–	–	✓	✓	–
	Evaluation	–	–	–	–	✓	–

The table above shows that subjects with extroverted personality types have not used their overall metacognition abilities in the problem-solving stages. Extroverted subjects at the stage of understanding problems only met all the metacognition indicators, namely planning, monitoring and evaluation, while the other stages of problem solving were only planning indicators. For subjects with introverted personality types, they were able to meet the metacognition indicators at the almost overall problem-solving stage. Introverted students at the stage of understanding problems and planning solutions are able to use all metacognition indicators, namely planning, monitoring and evaluation. Meanwhile, in the stage of implementing the completion that was fulfilled, only the metacognition indicator of planning and at the stage of re-examining the subject met the planning and monitoring indicators in students. The following are the data from the analysis of students' thinking skills in solving mathematical problems based on extroverted and introverted personality types.

Subject Analysis

The following is an excerpt of the subject matter analysis at the stage of understanding the problem that is able to use students' thinking skills. Students are able to fulfill two thinking skills in all the questions given, namely planning and motivation. All students' thinking skills are fulfilled at the stage of understanding the problem and planning the solution.

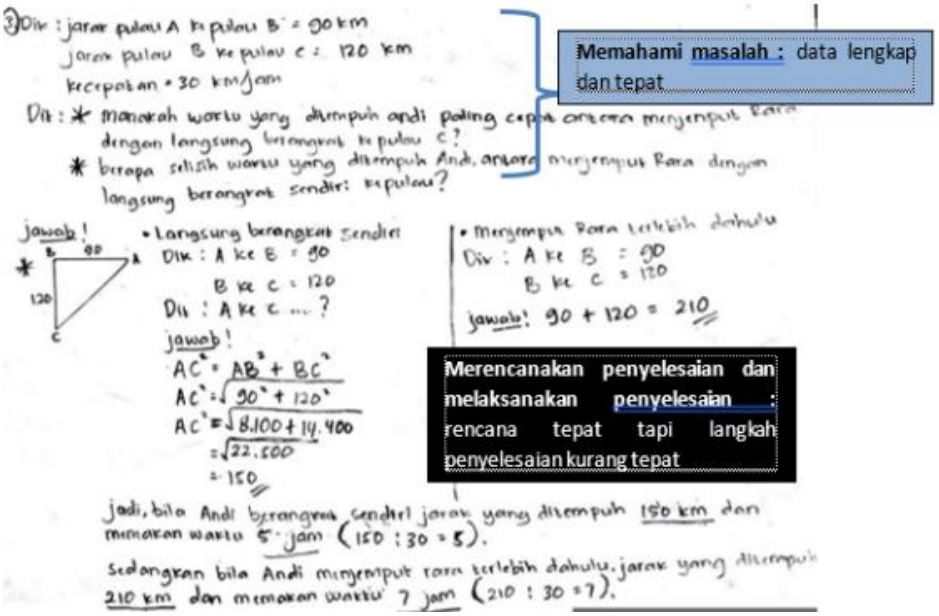

Figure 1. Analysis of stages and thinking skills.

It can be seen from the answers above, students can write and answer all the questions they get in the question. Students are able to write down some things that are known and asked questions in the questions because students can monitor and evaluate while understanding the problem. Here are some excerpts from interviews with students;

I : "How do you understand the question?"
Student : "Keep reading ma'am, and look for what has been explained by you"
I : "What do you know that is asked in the above question?"
Student : "The following is an area of 720m2, 801 m. that is the length of the wire, sir"
I : "Is there anything else?"
Student : "Yes sir, that's all there is to it"
I : "Has it been checked again?"
Student : "It has been checked repeatedly sir"

Based on the interview above, it can be seen that students use their thinking skills in planning, This can be seen when students are able to make ways to understand problems. Then students also carry out monitoring and evaluation by being able to make whatever things are known and asked and make sure everything is correct.

Discussion

Extroverted Subject Analysis (SKE1, SKE2, and SKE3)

Subjects with extroverted personalities from the results of test analysis and interviews with the three subjects obtained the result that the subjects were not able to use their overall metacognition abilities at each stage of problem solving.

Introverted Subject Analysis (SKI1, SKI2, and SKI3)

Based on the results of test answers and interviews conducted with introverted students, the results were obtained that the subjects had not used all indicators of their

metacognition ability at all stages of problem solving. However, in several stages it has been implemented.

Based on the above results, students in the extrovert category (SKE1, SKE2, and SKE3) were not able to use their metacognitive skills (planning, monitoring, and evaluation) holistically during the problem-solving stage. Extroverts are able to use all of their metacognitive markers, including planning, monitoring, and evaluation, at a phase or stage of understanding a problema [1]. This is in contrast to research findings that show that artisan students are not able to solve problems properly. Finally, it was found that artisan students had neglected to review or re-evaluate the results of their work during the review phase.

Then, in keeping with Satya's research, which focused on how extroverted participants understood their difficulties, they did so by reading the questions over and over again, writing down what they knew and asked, and tracing each step of the problem-solving process. Through the monitoring process, participants can explain how the plan is implemented to find the data and the reasons behind it to understand the problema [14]. According to the study, subjects with high, medium, or low metacognitive ability categories at the monitoring or evaluation stage were able to explain how identification was carried out and how invisible information could be understood at the problem understanding stage.

Furthermore, the monitoring process is carried out because it is able to explain the implementation of re-checking by explaining the conclusion of the answer. The subject explains how to get the conclusion, i.e. the subject re-examines the results obtained. However, the subject has not checked the whole on some questions. This happens because the subject feels confident and has been careful that the solving of the problem has been well arranged. So that the subject has not evaluated properly with full confidence. Therefore, it can be concluded that subjects with the introverted category have a level of metacognition ability at the strategic use level because in most of the problem-solving process, students are aware of their thinking process, namely by using special strategies in order to improve the accuracy of the solutions they do but have not been able to find other strategies. This characteristic agrees with the results of the study that subjects with a level of strategic use in the process of solving problems using certain methods [15].

CONCLUSION

Fundamental Finding : From the results of the research that has been carried out, it can be concluded that students' thinking ability in solving mathematical problems is reviewed from the extroverted and introverted personality types, that students who have thinking skills are students who have extroverted and introverted personalities. However, introverted students have better thinking skills than extroverted students. Extroverted students at the stage of understanding problems are able to use their metacognitive abilities well, namely in the indicators of the planning, monitoring and evaluation process which are generally well met. Meanwhile, at the other stage of

problem solving, extroverted students are only able to use their thinking skills in the planning process. The low thinking ability of extroverted students is due to the fact that most of the students' answers use unconscious minds. **Implication** : Then introverted students at the stage of understanding problems and planning solutions are able to use their thinking skills well, namely in the planning, monitoring and evaluation processes. This suggests that personality traits influence the use of metacognitive processes during problem solving, where introverted students might benefit from instructional strategies that support their reflective thinking style. **Limitation** : However, at the stage of implementing the completion, students have not used their thinking skills properly because they are only in the planning process. Meanwhile, in the test stage, students only use metacognitive abilities in the planning and monitoring process. This indicates a limitation in both personality types' ability to fully utilize thinking skills across all problem-solving stages. **Future Research** : The level of thinking ability of introverted students is at the level of strategic use because most of the students' answers use thinking with a specific strategy. Future research could further investigate the cognitive transitions that occur between planning and execution in problem-solving tasks, particularly how personality types affect the consistency of strategy application in real-time scenarios.

REFERENCES

[1] A. Rabbani, B. Baidowi, W. Wahidaturrahmi, and S. Sripatmi, "Kemampuan Pemecahan Masalah Matematika Ditinjau dari Tipe Kepribadian Myers Briggs Type Indicator (MBTI) Siswa Kelas IX," *J. Ilm. Profesi Pendidik.*, vol. 7, no. 3b, pp. 1525–1533, Sep. 2022, doi: 10.29303/jipp.v7i3b.815.

[2] R. N. Suryadi, "Pengaruh Budaya Organisasi, Motivasi Kerja Dan Disiplin Kerja Terhadap Kinerja Guru Sma Negeri Di Kota Makassar," *Indones. J. Econ. Entrep. Innov.*, vol. 1, no. 1, pp. 14–28, 2020, doi: 10.31960/ijoeei.v1i1.439.

[3] P. Padlya, Z. Zulyadaini, and S. Dewi, "ANALISIS KEMAMPUAN LITERASI MATEMATIKA DITINJAU DARI KEPRIBADIAN INTROVERT DAN EKSTROVERT DALAM MENYELESAIKAN MASALAH PROGRAM LINEAR PADA SISWA KELAS XI SMAN 1 TANJUNG JABUNG BA," *PHI J. Pendidik. Mat.*, vol. 9, no. 1, p. 150, Apr. 2025, doi: 10.33087/phi.v9i1.521.

[4] M. Sulastri, L. Hayati, N. Hikmah, and S. Azmi, "Analisis Kemampuan Pemecahan Masalah Matematika ditinjau dari Tipe Kepribadian Siswa Madrasah Tsanawiyah," *Desember 2021 J. Math. Educ. Appl.*, vol. 1, p. 648, 2021.

[5] F. Nuraini, A. Setiani, and N. A. Nurcahyono, "Analisis Kemampuan Metakognisi Siswa dalam Pemecahan Masalah Matematika Ditinjau dari Tipe Kepribadian Ekstrovert dan Introvert," *J. Cendekia J. Pendidik. Mat.*, vol. 8, no. 1, pp. 759–777, Mar. 2024, doi: 10.31004/cendekia.v8i1.2678.

[6] N. Maya, "ANALISIS TIPE KEPRIBADIAN SISWA DAN PENGARUHNYA TERHADAP KEMAMPUAN PEMECAHAN MASALAH MATEMATIKA MENGGUNAKAN MODEL PROBLEM BASED LEARNING," *Symmetry | Pas. J. Res. Math. Learn. Educ.*, vol. 3, no. 1, 2018.

[7] R. Nurmalasari, N. Ratnaningsih, and P. Lestari, "Analisis proses berpikir reflektif matematis peserta didik ditinjau dari tipe kepribadian guardian, artisan, rational, dan idealist," 2022.

[8] M. Suryani, L. H. Jufri, and T. A. Putri, "Analisis Kemampuan Pemecahan Masalah Siswa Berdasarkan Kemampuan Awal Matematika," *Mosharafa J. Pendidik. Mat.*, vol. 9, no. 1, pp.

119–130, 2020, doi: 10.31980/mosharafa.v9i1.605.
[9] E. Siswanto and M. Meiliasari, "Kemampuan Pemecahan Masalah pada Pembelajaran Matematika: Systematic Literature Review," *J. Ris. Pembelajaran Mat. Sekol.*, vol. 8, no. 1, pp. 45–59, 2024, doi: 10.21009/jrpms.081.06.
[10] A. Kemampuan Berpikir *et al.*, "Analysis Of Students' Mathematical Critical Thinking Abilities Reviewed From Introvert And Extrovert Personality Types On Cube Building Materials At Smp Negeri 14 Medan."
[11] M. Ismail, M. Zubair, B. Alqadri, and B. Basariah, "Analisis Kebutuhan Technological Pedagogical and Content Knowledge (TPACK) dalam Pembelajaran PPKn," *J. Ilm. Profesi Pendidik.*, vol. 7, no. 4b, pp. 2442–2447, 2022, doi: 10.29303/jipp.v7i4b.1027.
[12] W. D. Handoko, P. Fauziah, and D. Dimyati, "Gaya Pengasuhan Anak Usia Dini pada Suku Dayak Dusun Laek Desa Bengkilu," *J. Obs. J. Pendidik. Anak Usia Dini*, vol. 6, no. 2, pp. 728–737, 2021, doi: 10.31004/obsesi.v6i2.1021.
[13] M. B. Miles and A. M. Huberman, *Analisis Data Kualitatif*. Universitas Indonesia Press, 1992.
[14] I. K. Qadry, F. Arriah, and W. Abdillah, "Deskripsi Kemampuan Pemecahan Masalah Matematika Ditinjau Dari Tipe Kepribadian Extrovert Dan Introvert Pada Siswa Kelas Vii Mts Muhammadiyah Songing Kabupaten Sinjai," *J. Ris. dan Inov. Pembelajaran*, vol. 3, no. 3, pp. 197–204, 2023, doi: 10.51574/jrip.v3i3.1144.
[15] W. Qonita, "Kemampuan Komunikasi Matematis Siswa Ditinjau dari Tipe Kepribadian Extrovert dan Introvert," *J. Inov. Pembelajaran Mat.*, vol. 3, no. 1, pp. 32–38, 2022, doi: 10.36379/jipm.v3i1.189.

***Saeful Amri (Corresponding Author)**
Indraprasta PGRI University, Indonesia
Email: saefulamri812@gmail.com