Students' Mathematical Reflective Thinking Ability Through the Process of Making Telong-Telong Using the Problem-Based Learning Approach

Fina Oktavia[1], Kashardi[2], Risnanosanti[3]
[1,2,3]Universitas Muhammadiyah Bengkulu, Bengkulu, Indonesia

Article Info

Article history:

Received 2024-12-24
Revised 2025-01-27
Accepted 2025-01-30

Keywords:

Mathematical reflective thinking
Problem-based learning
Telong-telong

ABSTRACT

This research aims to identify and analyze students' mathematical reflective thinking abilities through a Problem-Based Learning (PBL) approach, focusing specifically on making "telong-telong." Mathematical reflective thinking involves students' ability to connect mathematical knowledge with new experiences, find relationships between concepts, and assess and improve their problem-solving strategies. This study follows a qualitative descriptive research design, with a case study approach conducted at SMP Negeri 03 Central Bengkulu, involving 28 students from class IX-A. Data were collected through observations, semi-structured interviews, and documentation, focusing on how students approached mathematical problem-solving tasks in the context of PBL. The findings revealed that students could connect mathematical concepts such as symmetry and geometry to creating "telong-telong," demonstrating their ability to formulate creative solutions and reflect on their problem-solving approaches. Data analysis indicated that PBL facilitated students' critical, creative, and reflective thinking, enabling them to assess and refine their mathematical processes. These results suggest that the PBL approach effectively enhances students' mathematical reflective thinking abilities, providing a more practical and meaningful learning experience.

Corresponding Author:

Risnanosanti
Faculty of Teacher Training and Education, Muhammadiyah University of Bengkulu
Email: risnanosanti@umb.ac.id

1. INTRODUCTION

One of the goals to be achieved in learning mathematics at every level of education is mastery of mathematical thinking skills. King et al. [1] argue that high-level thinking skills include thinking critically, rationally, reflectively, metacognitively, and creatively. Of the four abilities described, the one that has been most developed and studied in this research is the ability to think. Mathematical reflective. Reflective thinking is a meaningful process driven by specific reasons and goals [2], [3]. This reflective thinking involves

 https://doi.org/10.58421/misro.v4i1.369

solving problems, drawing conclusions, considering relevant factors, and making decisions. This happens when someone uses practical and relevant skills according to the context and type of task at hand [4].

Reflective thinking is an important aspect a student must have in learning. Several studies also state that the ability to think reflectively in mathematics is essential for students in the mathematics learning process to obtain optimal results [5], [6], [7], [8]. Students' mathematical reflective thinking can also train mental processes involving skills to analyze and evaluate experiences and knowledge to solve problems. This process includes identifying already known information, adapting existing understanding, and applying solutions found in different contexts or situations [9], [10].

Students can also develop their mathematical reflective thinking abilities by giving assignments related to art. Mu'minah and Suryaningsih [11] and Zubaidah [12] argue that integrating art into mathematics learning allows students to see mathematical concepts from a more creative and applicable perspective. One culture that is widely known and easy to understand is traditional games [13]. In this research, students made telong-telong, which utilized mathematical principles, such as geometry, symmetry, and transformation, to deepen their understanding of mathematical concepts. Students who play an active role in solving problems can make telong-telong in the shape of fish with student creativity. According to Stephanie [14], the telong-telong event is a large lantern with various forms of animals, buildings, and others.

The telong-telong lantern is a traditional form of light display that holds significant cultural value in many communities, especially during celebrations and festivals. Its intricate designs require understanding of geometric properties, symmetry, and spatial reasoning. Making telong-telong requires students to apply mathematical concepts in a hands-on, creative manner, allowing them to engage with mathematics abstractly and see its real-world applications within a cultural context. Using telong-telong as a medium, students can see how mathematical principles manifest in cultural practices, making mathematics more relevant and meaningful. Despite its potential, many students still struggle with developing reflective thinking skills, largely due to conventional teaching methods prioritizing memorizing formulas and procedures over encouraging critical thought and reflection. Research on reflective thinking in mathematics tends to focus on theoretical frameworks or traditional classroom settings, with limited attention given to integrating cultural elements or creative activities like making telong-telong in learning. There is also a gap in research exploring the role of culturally relevant tasks in enhancing reflective thinking skills.

In practice, many students still have difficulty developing reflective thinking skills. This is caused by learning approaches that focus on memorizing formulas and procedures and do not provide opportunities for students to reflect on and evaluate their thinking processes. To overcome this problem, it is necessary to select an appropriate learning model that suits the characteristics of students. One model that can be applied is Problem-Based Learning (PBL) [15]. In this approach, students can understand their problems and collect and utilize previously acquired knowledge to solve problems independently in groups without relying on the teacher [16].

PBM encourages students to think critically, develop problem-solving skills, and acquire essential knowledge and concepts. This problem-based learning (PBM) approach can increase students' self-confidence and help them understand their ideas [17]. Problem-based learning (PBM) exposes students to real problems, which facilitates them to carry out further investigations and exploration [18], [19], [20]. The problem-based learning approach aims to help students hone their thinking, problem-solving, and intellectual skills.

This research aims to identify and analyze students' mathematical reflective thinking abilities by making telong-telong using the PBM approach. By linking mathematical concepts, it is hoped that students can see mathematics as a theoretical discipline with real applications in life and culture. This research also wants to explore how this activity can improve students' mathematical reflective thinking abilities and encourage them to discuss and collaborate in learning.

.

2. METHOD

Types of research

This research was designed as qualitative descriptive research with a case study type to explain the research results on students' mathematical reflective thinking abilities through making telong-telong using the PBM approach. This method was chosen to provide a systematic overview of field conditions, especially to measure students' mathematical reflective thinking abilities in making telong-telong. This research was carried out at junior high school (SMP) Negeri 03 Central Bengkulu, with the subject involving 28 students of class IX-A.

Subject Selection

The results of the initial interview with the class IX mathematics teacher revealed that class IX-A had the characteristics to take part in the research. There were 28 students in class IX-A. The interview subjects were selected from all students whose reflective thinking skills were achieved.

Data collection

Data were collected through participant observation and semi-structured interviews, which were documented using audio, video, and photo recordings. The semi-structured interviews were conducted after students had participated in the telong-telong activity. The interviews aimed to understand students' reflective thinking processes concerning mathematical reasoning during the task. The interviews were guided by questions that focused on their thought processes, problem-solving strategies, and reflections on how they applied mathematical concepts.

Data analysis

The data analysis process in this research refers to the Miles & Huberman [21] interactive model, which includes several stages: data reduction, data display, and Conclusion Drawing and Verification.

 https://doi.org/10.58421/misro.v4i1.369

Data Reduction: The data were systematically reduced by focusing on specific elements related to reflective thinking. This included identifying and categorizing interview responses and observations relevant to the reflective thinking indicators.

Data Display: The reduced data were displayed in matrices or tables to summarise the key points of students' reflective thinking processes. This made it easier to identify trends and patterns across the data.

Conclusion Drawing and Verification: Finally, conclusions were drawn based on the data analysis concerning the reflective thinking indicators. These conclusions were verified by revisiting the data, ensuring that the reflections observed in the interviews aligned with the student's behaviour and problem-solving strategies during the telong-telong creation process.

The analysis is carried out by referring to indicators of mathematical reflective ability relevant to this research.

In analyzing the data, Duwila's reflective ability indicators are used, namely as follows:

1. Indicators link new knowledge with previous experience
2. Indicator of the ability to find relationships and formulate solutions.
3. Indicators evaluate the settlement process.

3. RESULTS AND DISCUSSION

3.1. RESULTS

This research involved 28 class IX-A students divided into seven groups in making telong-telong. Based on observations and interviews, indicators of students' mathematical reflective thinking abilities, according to Duwila et al. [22], include connecting new knowledge with previous experience, finding relationships, formulating solutions, and evaluating the solution process. This research also identifies how Problem-based Learning (PBM) is applied in mathematics learning by making telong-telong and acting on students' mathematical reflective thinking skills.

The results of the analysis of students' mathematical reflective thinking abilities are as follows:

1. Indicators link new knowledge with previous experience

   In this aspect, whether students can relate the mathematical concepts learned with their experiences making telong-telong can be analyzed. The following is an excerpt from an interview between the researcher (P) and the student (S):

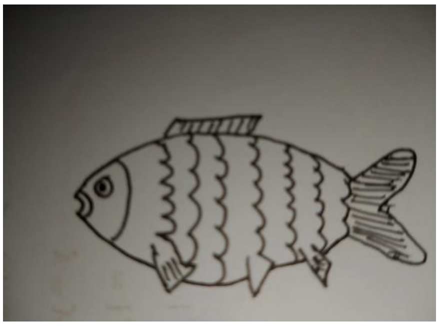

Figure 1. Student design results

P : *"When you were tasked to make telong-telong, what did you immediately think of?*

S : *"The first thing we made was according to the worksheet given; we made the design first, sis."*

P: *"From the design you made, when making telong-telong later, is there any connection with the mathematical concept you remember from the previous lesson?*

S : *"When making the design, we immediately remembered symmetry and geometry because we had learned about symmetrical shapes in math class. We thought this would help us make symmetrical telong-telong."*

P : *"So, you connected the concept of symmetry from the previous lesson with the task of making telong-telong, huh? What did you do with that knowledge?"*

S : *"That is right, sis. Because we knew symmetry was important, we immediately started planning so that the fish we made could be symmetrical. We imagined the shape of the fish having two sides that must be the same length and balanced, so before making the fish, we made the design first."*

P : *"Are there any other experiences from previous lessons that you used to make telong-telong?"*

S : *"Besides symmetry, we remember making it with curved lines."*

Based on interviews with students, they can connect the mathematical knowledge they have previously learned with the tasks given. For example, students mentioned that understanding symmetry and geometry taught in previous mathematics lessons was instrumental in making telong-telong. In the process of making telong-telong, students are faced with real problems that require the application of mathematical concepts, such as symmetry and geometry. Through the PBM approach, students remember the theories they have learned and relate this knowledge to the practical situations they face when designing telong-telong.

2. Indicator of the ability to find relationships and formulate solutions.

In this aspect, whether students can find the relationship between mathematical concepts in making telong-telong and formulating solutions in making creative telong-telong designs can be analyzed. The following is an excerpt from the researcher's interview (P) with the student (S):

Figure 2. Results of students' telong-telong work

 https://doi.org/10.58421/misro.v4i1.369

P : *"After you have identified symmetry as the main problem, how do you find a solution to make symmetrical telong-telong? Because fish have fins and a tail."*

S : *"At first, we were confused about how to symmetrical the fish. However, after considering the concepts we learned in class, we realized we could make the fish's body symmetrical. We just attached the tail and fins. We used a ruler to make sure the left and right sides of the fish were the same length."*

P : *"So, you symmetrically made the fish's body and measured it with a ruler. What do you guys do next?"*

S : *"After ensuring both sides were symmetrical, we fixed the tail to make it more balanced. We utilize the principles of geometry taught to adjust the shape of the fish so that no part is too big or small."*

P : *"How do you know if your solution is correct?"*

S : *"We checked again with a ruler to ensure they were symmetrical and no part looked bigger than the other side. We also look visually to see if the fish looks balanced."*

After identifying the main problem, namely creating symmetrical belongs, students began to look for solutions and formulate steps to overcome this challenge. With PBM, students are not given direct solutions by the teacher. However, the freedom to solve problems, identify relationships between the mathematical concepts they are learning, and find creative solutions. Students explained that after understanding the concept of symmetry, they decided to make the body of the fish. First, the symmetrical parts. They then used a ruler to ensure that both sides of the fish were the same length. Students also demonstrate problem-solving skills by paying attention to the proportions of the fish's body parts, especially the tail, to ensure all parts look balanced. This approach shows that students follow instructions and think independently to relate mathematical concepts (symmetry and measurement) to the given tasks.

3. Indicators evaluate the settlement process.

In this aspect, it can be analyzed whether students can evaluate the results of their telong-telong designs and correct errors or deficiencies in the work process, considering the mathematical principles they have learned. The following is an excerpt from the researcher's interview (P) with the student (S):

P : *"After you have finished making telong-telong, how do you evaluate the results of your work? Is there anything that needs to be fixed or adjusted?"*

S : *"Once finished, we checked the fish we had made again to see if the symmetry we had created was correct. We found that the fish's tail was longer than the other side, so we should fix it."*

P : *"So you found something less symmetrical after checking the results? What did you guys do after that?"*

S : *"We should immediately fix the fish's tail so that the length matches the rest of the* *body, but we do not have time."*

P : *"Are there any experiences or lessons you got after evaluating the results of your work?"*

S : *"Yes, bro. We learned that mathematics is about formulas, accuracy, and evaluation. I also learned that it is important to check results periodically to find errors and correct them."*

In the context of PBM, students can evaluate and improve their work after completion, enabling them to enhance their understanding of the mathematical concepts they have learned. Students demonstrate good evaluation skills regarding the results of their work. Students, for example, identified that after completing telong-telong, the fish's tail was longer than the other side. Even though they had followed the steps to make the fish symmetrical, they carried out an independent evaluation to find and correct the error. Evaluating the solution process is essential in mathematics learning because it allows students to be more thorough and critical of the results of their work. Students also realize that evaluation is part of an ongoing learning process and recognize the importance of correcting to obtain better results. Students also learn that mistakes are not failures but opportunities to improve and understand concepts more deeply.

3.2. DISCUSSION

The research results showed that students could link the knowledge they had previously acquired, such as the concepts of symmetry and geometry, with the task of making telong-telong. This is the theory that reflective thinking involves linking new knowledge with previous experience to build a more profound understanding [23]. In this context, students remember the mathematical concepts they learned and can apply them in activities such as making telong-telong. This skill shows that PBM can activate students' knowledge and allow them to see the relevance of mathematical concepts in everyday life. Applying symmetry principles in making telong-telong strengthens students' understanding of geometry, especially regarding equality of length and balance. Form. Students who recognize that a symmetrical object will be more balanced in structure and then relate this understanding to the telong-telong shape they make a show that they have experienced a reflection process in their mathematical thinking. In addition, these findings also show that students could use previously acquired knowledge in different contexts, demonstrating the flexibility and depth of their understanding.

The second indicator that is the focus of this research is students' ability to find relationships between relevant mathematical principles and formulate solutions. In making telong-telong, students face challenges in creating symmetrical objects, mainly because the shape of the fish has elements such as fins and tails that require proportional adjustments. Based on the interview results, students can formulate a solution by using a ruler to ensure the length of the left and right sides of the fish are the same, as well as using geometric principles to correct other body parts to look balanced. This ability shows that students follow procedural steps mechanically, think analytically, and relate various mathematical concepts in solving problems. This is also in line with the Problem-Based Learning (PBL) theory, which emphasizes the importance of students' role in finding solutions through investigation and exploration [24], [25]. With this approach, students can formulate solutions creatively and utilize the knowledge they have learned previously. In this context, PBM effectively improves students' problem-solving abilities, which indicates mathematical reflective thinking.

Evaluating work results is essential to reflective thinking because it allows students to reassess and correct their mistakes. In this research, students demonstrated good evaluation skills by checking whether the telong-telong they made were symmetrical and identifying parts that needed to be corrected, such as disproportionate fishtails. Students then try to correct these mistakes more thoroughly despite limited time. This ability indicates that students focus on the final result and value the learning process, which involves feedback and reflection on their work. This evaluation also aligns with PBM principles that allow students to evaluate and actively correct their problem-solving processes [26]. Students who can identify and correct errors in their work demonstrate further mastery of critical and reflective thinking skills and develop a deeper understanding of mathematical concepts. This evaluation process also teaches students that mathematics is not just about following formulas and procedures but also accuracy. , self-awareness, and a willingness to learn from mistakes. This is an essential basis for learning mathematics because the ability to correct and correct work is an integral part of developing more complex mathematical thinking skills.

Another key finding of this research is students' ability to identify relationships between relevant mathematical principles and formulate solutions to their challenges, such as creating symmetrical shapes, including elements like fins and tails on their fish models. Despite the challenges students faced in achieving perfect symmetry, they were able to formulate solutions by using tools like rulers to ensure the left and right sides of the fish were the same length, as well as applying geometric principles to adjust other body parts to achieve balance. This ability reflects mechanical thinking and analytical skills, enabling students to relate various mathematical concepts to solve problems. Furthermore, the evaluation process conducted by students checking the symmetry of the telong-telong they created and correcting errors like disproportionate fishtails indicates that they value the learning process, which involves feedback and reflection on their work. This suggests that reflective thinking is not just about recalling concepts but also involves the ability to evaluate and correct one's work independently. This evaluation process is critical because it helps students develop self-awareness and learn from their mistakes, which is a strong foundation for understanding mathematics more profoundly. Linking these findings to the PBM theory, we can see how this approach encourages students to actively evaluate and correct their problem-solving processes. Thus, PBL enhances students' understanding of mathematical concepts and cultivates their reflective and evaluative thinking skills, which are essential for developing critical thinking. In a broader context, the PBM approach can be applied to various learning areas beyond mathematics. For instance, PBL could be used in science education to help students connect scientific concepts with practical experiments or in history education to help students analyze and relate historical events to current contexts. This flexible approach can be adapted to different student groups in heterogeneous classrooms, online learning environments, or students with varying learning abilities. The flexibility of PBL makes it a powerful tool for fostering critical thinking, problem-solving, and deeper understanding across various educational settings.

.

4. CONCLUSION

The problem-based learning (PBL) approach to making telong-telong has proven effective in enhancing students' mathematical reflective thinking abilities. Through this approach, students demonstrated the ability to connect previously acquired mathematical knowledge, particularly in symmetry and geometry, with practical tasks. They could formulate creative solutions to challenges, such as ensuring symmetry in their work, and independently evaluate and correct their results.

These findings suggest that the PBL approach promotes the application of mathematical concepts in real-world contexts and fosters critical thinking, problem-solving, and self-reflection. By making telong-telong, students deepened their understanding of geometry and symmetry and learned to approach mathematical problems with greater analytical insight. Thus, PBL can significantly enrich students' learning experiences by providing opportunities to actively engage with mathematical concepts, improve their reflective thinking skills, and develop a more comprehensive understanding of mathematics. To fully leverage the benefits of PBL, educators are encouraged to design learning activities that connect theoretical knowledge to practical, real-life applications. Teachers can incorporate hands-on problem-solving tasks, encourage collaborative learning, and provide opportunities for students to reflect on and evaluate their work.

Additionally, future research could explore the effectiveness of PBL in other learning contexts and subject areas. For example, examining how PBL can enhance reflective thinking and problem-solving skills in subjects like science, history, or even the arts could provide valuable insights. Further studies could also investigate the impact of PBL on diverse student populations, such as those with different learning abilities or those in online learning environments. By expanding the scope of research, we can better understand the broader applications of PBL and refine its implementation to support more dynamic and compelling learning experiences across disciplines.

REFERENCES

[1] F. King, L. Goodson, and F. Rohani, “Higher Order Thinking Skills, Definition, Teaching Strategies, Assessment A publication of the Educational Services Program, now known as the Center for Advancement of Learning and Assessment,” *Voices from the Middle*, vol. 88, no. 18, pp. 495–496, 2010.

[2] Ani Oktafiani and H. Nindiasari, “E-LKPD Berbasis Problem Based Learning untuk Kemampuan Berpikir Reflektif Matematis,” *Proximal: Jurnal Penelitian Matematika dan Pendidikan Matematika*, vol. 6, no. 2, pp. 82–92, 2023, doi: 10.30605/proximal.v6i2.2679.

[3] M. L. Riswadi and A. G. Adirakasiwi, “Proses Berpikir Reflektif Matematis Siswa dalam Menyelesaikan Soal Bangun Ruang Berdasarkan Gender,” *Jurnal Cendekia : Jurnal Pendidikan Matematika*, vol. 7, no. 3, pp. 2420–2429, 2023, doi: 10.31004/cendekia.v7i3.2235.

[4] S. Anwar, A., & Sofiyan, “Teoritik Tentang Berpikir Reflektif Siswa Dalam Pengajuan Masalah Matematis,” *Numeracy Journal, 5(1).*, vol. 5, no. April, pp. 91–101, 2018.

[5] Y. Junaedi, S. Maryam, and M. K. Lutfi, “Analisis Kemampuan Berpikir Reflektif Siswa SMP Pada Pembelajaran Daring,” *Journal of Mathematics Education and Learning*, vol. 2, no. 1, p. 49, 2022, doi: 10.19184/jomeal.v2i1.30228.

[6] E. F. Kurniawati, N. Novaliyosi, and H. Nindiasari, "Penggunaan Model-model Pembelajaran untuk Meningkatkan Kemampuan Berpikir Reflektif Matematis," *Jurnal Cendekia : Jurnal Pendidikan Matematika*, vol. 8, no. 2, pp. 1839–1852, 2024, doi: 10.31004/cendekia.v8i2.3397.

[7] didik sugeng Pambudi, D. A. Iskarina, E. Oktavianingtyas, Susanto, and Hobri, "ANALISIS KEMAMPUAN BERPIKIR REFLEKTIF MATEMATIS SISWA SMP DALAM MEMECAHKAN MASALAH ARITMETIKA SOSIAL BERDASARKAN JENIS KELAMIN," vol. 10, no. 3, pp. 1926–1940, 2021.

[8] Y. Yenni and R. Sukmawati, "Analisis Kemampuan Berpikir Reflektif Matematis Berdasarkan Minat Belajar Pada Mata Kuliah Struktur Aljabar," *Teorema: Teori dan Riset Matematika*, vol. 4, no. 2, p. 75, 2019, doi: 10.25157/teorema.v4i2.2283.

[9] S. M. Adha and E. B. Rahaju, "Matematika Ditinjau Dari Kecerdasan Logis-Matematis," *Jurnal Penelitian Pendidikan Matematika dan Sains*, vol. 4, no. 2, pp. 62–71, 2020.

[10] B. Ambarwati, Z. Zulkardi, and E. Susanti, "Kemampuan berpikir reflektif siswa dalam menyelesaikan soal PMRI konteks ornamen jati diri Sumatera Selatan," *Delta-Pi: Jurnal Matematika dan Pendidikan Matematika*, vol. 12, no. 1, pp. 25–37, 2023, doi: 10.33387/dpi.v12i1.5455.

[11] I. H. Mu'minah and Y.- Suryaningsih, "Implementasi Steam (Science, Technology, Engineering, Art and Mathematics) Dalam Pembelajaran Abad 21," *BIO EDUCATIO : (The Journal of Science and Biology Education)*, vol. 5, no. 1, pp. 65–73, 2020, doi: 10.31949/be.v5i1.2105.

[12] Siti. Zubaidah, "STEAM (science, technology, engineering, arts, and mathematics): Pembelajaran untuk memberdayakan keterampilan abad ke-21 [STEAM (Science, Technology, Engineering, Arts, and Mathematics): Learning to Empower 21st Century Skills]," *Seminar Nasional Matematika Dan Sains*, no. September, pp. 1–18, 2019.

[13] S. H. Maulida, "Pembelajaran Matematika Berbasis Etnomatematika Melalui Permainan Tradisional Engklek," *LEMMA : Letters of Mathematics Education*, vol. 7, no. 01, pp. 35–44, 2020.

[14] G. Stephanie, "Perancangan Buku Tradisi Tabot Bengkulu," 2018.

[15] A. K. P. Ningrum, Novaliyosi, and H. Nindiasari, "Systematic Literature Review: Model Problem Based Learning terhadap Kemampuan Berpikir Reflektif Matematis Siswa," *Jurnal Educatio*, vol. 10, no. 3, pp. 873–880, 2024.

[16] M. Gega, S. H. Noer, and P. Gunowibowo, "Pengaruh Model Problem Based Learning Terhadap Kemampuan Berpikir Reflektif dan Self Efficacy Siswa," *Jurnal Pendidikan Matematika Unila*, vol. 7, no. 1, p. 117, 2019.

[17] R. Widayanti and K. Dwi Nur'aini, "Penerapan Model Pembelajaran Problem Based Learning untuk Meningkatkan Prestasi Belajar Matematika dan Aktivitas Siswa," *Mathema: Jurnal Pendidikan Matematika*, vol. 2, no. 1, p. 12, 2020, doi: 10.33365/jm.v2i1.480.

[18] S. Mashuri and H. Djidu, "Problem-based learning dalam pembelajaran matematika : Upaya guru untuk meningkatkan minat dan prestasi belajar siswa pihak dengan mudah mengakses informasi . Oleh sebab itu , siswa dituntut untuk memiliki kemampuan mengolah atas juga dialami oleh siswa y," vol. 14, no. 2, pp. 112–125, 2019.

[19] S. Meilasari, D. M. Damris M, and U. Yelianti, "Kajian Model Pembelajaran Problem Based Learning (PBL) dalam Pembelajaran di Sekolah," *BIOEDUSAINS:Jurnal Pendidikan Biologi dan Sains*, vol. 3, no. 2, pp. 195–207, 2020, doi: 10.31539/bioedusains.v3i2.1849.

[20] I. A. Puspitasari, P. Studi, P. Matematika, U. Mulawarman, K. Timur, and G. Scholar, "Penggunaan Media Pembelajaran Dalam Model Pembelajaran Problem Based Learning Pada Mata Pelajaran Matematika," *Prosiding*, vol. 2, pp. 75–92, 2022.

[21] M. B. Miles and M. A. Huberman, *Qualitative data analysis: an expanded sourcebook*, 2nd ed. London: SAGE, 1994.

[22] F. Duwila, A. Afandi, and I. H. Abdullah, "Analisis Kemampuan Berpikir Reflektif Matematis Siswa dalam Menyelesaikan Masalah Matematika pada Materi Segitiga," *Jurnal Pendidikan Guru Matematika*, vol. 2, no. 3, 2022, doi: 10.33387/jpgm.v2i3.5146.

[23] Y. Afriyanto, "Profil berpikir reflektif siswa dalam memecahkan masalah matematika ditinjau dari gaya kognitif field dependent dan field independent," *Mathedunesa*, vol. 7, no. 3, pp. 594–599, 2018.

[24] S. P. Ramadhani, F. M. Pratiwi, Z. H. Fajriah, and B. E. Susilo, "Efektivitas Model Problem Based Learning (PBL) untuk Meningkatkan Kemampuan Pemecahan Masalah Matematis terhadap Pembelajaran Matematika," *Prima*, vol. 7, pp. 724–730, 2024.

[25] I. N. Limbong, "Eksplorasi Peran Siswa dalam Proses Pembelajaran Problem Based Learning (PBL) di Sekolah Dasar," vol. 8, pp. 24167–24174, 2024.

[26] F. Istiqomah, A. Firdaus, and R. S. Dewi, "Analisis Perencanaan, Pelaksanaan, dan Evaluasi Problem Based Learning dan Project Based Learning," *Journal on Education*, vol. 6, no. 1, pp. 9245–9256, 2023.