International Journal of Multicultural and Multireligious Understanding

http://ijmmu.com
editor@ijmmu.com
ISSN 2364-5369
Volume 12, Issue 10
October, 2025
Pages: 150-157

Improving Third-Grade Students' Mathematical Problem-Solving Skill in Sekolah Indonesia Kuala Lumpur Using Problem-Based Learning

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http://dx.doi.org/10.18415/ijmmu.v12i10.7097

Abstract

This research addresses the challenges faced by third-grade students at Sekolah Indonesia Kuala Lumpur (SIKL) in solving mathematical problems that require deep analysis and comprehension. Initial interviews revealed that students were more accustomed to short, straightforward problems and struggled with complex mathematical structures. To overcome this issue, the research aimed to investigate the effectiveness of the Problem-Based Learning (PBL) model in strengthening the mathematical problem-solving skills of 34 third-grade students. Focusing on data representation, this study utilized data collection methods including direct observation, mathematical worksheets, student performance analysis, and interviews. The research was conducted in four learning cycles and demonstrated that the implementation of the PBL model significantly improved students' mathematical problem-solving skills, as evidenced by a consistent increase in learning outcomes across each cycle. In conclusion, this study finds that the problem based learning model is an effective approach to enhance students' mathematical problem-solving abilities.

Keywords: *Problem Based Learning; Problem-Solving Skill; Data Representation*

Introduction

Mathematics is a fundamental science that serves as a tool for studying various other disciplines. Learning mathematics plays a crucial role in developing students' logical, systematic, and critical thinking skills. These thinking abilities are essential components of 21st-century skills, often referred to as the 4Cs: critical thinking and problem-solving, creativity, communication, and collaboration (Abidin & Tohir, 2019). The learning of mathematics goes beyond simply memorizing formulas and procedures. It is a discipline that demands strong problem-solving abilities.

According to Laela (2023), Kurikulum Merdeka is a curriculum that features intracurricular learning with diverse content, giving students optimal time to deepen their understanding of concepts and strengthen their competencies. This curriculum allows students to develop 21st-century skills such as creativity, collaboration, and problem-solving. In the process of managing their own learning, students will learn to make decisions, manage their time, collaborate with others, and think critically.

Problem-Based Learning is a learning model that exposes students to real-world problems they experience, with a focus on issues relevant to their daily lives (Ejin, 2016). According to Ibrahim (in Putri, 2019), the syntax of problem based learning model consists of five phases. The first phase is orienting students to the problem. After initial habituation, orientation, and providing apperception and motivation, this phase is carried out by giving students trigger questions related to the problem they will study. The second phase is organizing students, which involves distributing group worksheets in accordance with the predetermined learning groups and having students listen to the teacher's instructions regarding the group discussion activities. The third phase is guiding investigation. The teacher provides direction and guidance and monitors the involvement of each group. In this phase, the teacher also distributes literacy materials or reading references to help students complete their group discussion tasks to solve the problems on the worksheets. Next, the fourth phase is developing and presenting results. In this phase, the teacher concludes the group discussion and directs students to present their discussion results in front of the class. After the group presentations, the teacher provides feedback to each group. The final phase is analyzing and evaluating the problem-solving process. Here, the teacher provides reinforcement of the material. This material reinforcement is done at the end of the phase because, according to Saputro (in Zahrotin, 2021), problem-based learning is a learning model that fully involves students in solving every problem they face independently by constructing their own knowledge and understanding. The problem-based learning model is designed to help students develop their problem-solving abilities using their existing knowledge, thereby creating meaningful learning.

Students' problem-solving skills can be observed by how they solve different types of questions. Problem-solving questions are typically presented as word problems that contain non-routine issues, meaning they cannot be solved directly with a single existing formula. As a result, problem-solving questions are often considered difficult (Supraptinah, 2019). Recognizing the importance of a learning system that develops these skills, there is a need for mathematics instruction that actively involves students. According to Ruseffendi (in Anggiana, 2019), student creativity can be developed when they are trained through exploration, inquiry, discovery, and problem-solving.

According to the National Council of Teachers of Mathematics (NCTM), problem-solving should be the central focus of the mathematics curriculum. Problem-solving is crucial in mathematics education, as it is a core skill students need to learn and master the subject. Therefore, problem-solving in mathematics is highly important and must be taught to students (Lestari, 2020). This skill has become particularly relevant in the context of 21st-century education, where competencies like critical thinking and problem-solving serve as essential foundations for an individual's success in navigating the complexities of the real world.

According to Polya (in Amir, 2015), the problem-solving process consists of four key steps. The first step, understanding the problem, involves identifying the known and unknown data and restating the original problem in a more operational form. The second step is devising a plan, which requires recalling or searching for similar problems that have been solved, finding patterns or rules, and formulating a procedure to solve the current problem. Next, students must carry out the plan by executing the procedure developed in the previous step to find a solution. Finally, the process concludes with looking back, where students review both the procedure and the solution to analyze and evaluate whether the applied procedure and the obtained results are correct or if the procedure can be generalized.

One of the topics in elementary school mathematics is data representation. This material has been taught since Phase A, in the second grade. In Phase B (third and fourth grade), data representation is included in the Kurikulum Merdeka learning outcomes for the data analysis and probability element. Specifically, students are expected to "order, compare, present, analyze, and interpret data in the form of tables, pictograms, and bar charts (with a single unit scale)." The topic of data representation in mathematics plays an important role as a tool for analysis and decision-making. In the third grade, data is presented specifically in the form of tables.

Initial observations in a third-grade class at Sekolah Indonesia Kuala Lumpur (SIKL) revealed indications of low mathematical problem-solving skills among students. This situation was evident in the difficulties students faced when confronted with word problems that required deep analysis rather than simple calculations. This was further supported by interviews with the homeroom teacher, who stated that students in this class were unaccustomed to complex or lengthy word problems and were more familiar with short, straightforward question formats. In line with these findings, interviews with several students also indicated an inability to comprehend and solve long word problems in mathematics, which directly hinders the development of their problem-solving skills. If left unaddressed, this condition could lead to suboptimal learning outcomes and impede the long-term development of students' critical thinking. Therefore, a concrete action in learning is needed to improve students' mathematical problem-solving skills, particularly on the topic of data representation in tables.

Problem-Based Learning model is an effective tool for teaching and learning. This is supported by several previous studies that have used the problem-based learning model to improve problem-solving skills. For example, a study by Anggiana (2019), titled "The Implementation of the Problem-Based Learning (PBL) Model to Improve Students' Mathematical Problem-Solving Skills," found that the PBL model can enhance students' problem-solving skills and math learning outcomes. The study reported effective results, showing an increase in critical thinking and learning outcomes in each cycle. Another study, conducted by Widyastuti et al. (2021) and titled "The Effectiveness of the Problem-Based Learning Model on Elementary School Students' Mathematical Problem-Solving Skills," concluded that the PBL model is highly effective when implemented in the learning process. It was found to be particularly effective in improving students' mathematical problem-solving abilities compared to conventional learning models.

Based on the problems and phenomena outlined above, the researcher is interested in conducting a study titled "Improving Third-Grade Students' Mathematical Problem-Solving Skill in Sekolah Indonesia Kuala Lumpur Using Problem-Based Learning." The purpose of this research is to determine the increase in mathematical problem-solving skills among third-grade students at Sekolah Indonesia Kuala Lumpur through the Problem-Based Learning model.

Method

This study is a Classroom Action Research (CAR) aimed at improving the mathematical problem-solving skills of elementary students at Sekolah Indonesia Kuala Lumpur (SIKL) on the topic of data representation in tables. The research was conducted from April to May 2025, during the second semester of the 2024/2025 academic year, with a total of 34 students. As a CAR, this study represents a self-reflective activity carried out by the teacher in the classroom through planned, systematic, and repetitive actions in a cyclical process. The objective is to improve the teacher's instructional performance as well as students' learning processes and outcomes (Utomo, 2024). This study was implemented in four cycles, with each cycle comprising four key stages: planning the lesson and its materials, implementing the lesson, evaluating and reflecting on the learning process, and preparing a follow-up plan.

The instruments used in this study were a mathematical problem-solving skills test, interviews, and observation. To measure students' problem-solving abilities, their initial skills were evaluated in Cycle 1 when they were first introduced to the Problem-Based Learning (PBL) model. This initial assessment then served as a baseline to monitor improvements in Cycles 2, 3, and 4. In this way, the study could observe students' gradual and continuous development throughout the learning process. The success of this research was measured by the improvement in students' mathematical problem-solving skills based on the minimum passing grade of 75 set by Sekolah Indonesia Kuala Lumpur.

Result and Discussion

A. Result

The study was conducted in a third-grade class at Sekolah Indonesia Kuala Lumpur. The initial condition of the class showed a dynamic and responsive student population that was generally adaptable to new methods and enthusiastic about class activities. The students' strong sense of curiosity served as a positive foundation for learning. However, observations also noted that levels of noise and a lack of concentration were issues that could potentially affect the effectiveness of the intervention.

Generally, mathematics instruction in the classroom was conventional and classical. Interactions were dominated by the teacher, who actively delivered material while students took notes and answered questions. This pattern resulted in students having limited experience in solving complex problems, which is the core of problem-solving skills. Based on these conditions, this study implemented the Problem-Based Learning method in mathematics instruction. The use of this method was expected to create a more authentic and stimulating learning environment, ultimately contributing to an improvement in students' problem-solving skills. To investigate the improvement in students' problem-solving skills through the Problem-Based Learning model, particularly for the topic of data representation in tables in the third grade, a total of four learning cycles were conducted. The assessment of problem-solving skills was not carried out using separate pre- and post-experiment instruments. Instead, students' performance in Cycle 1 served as the baseline data to represent their initial abilities in handling problem-based tasks. Subsequently, skill improvement was progressively evaluated by comparing the results from Cycles 2, 3, and 4. This approach allowed the researcher to meticulously observe the students' skill development over time throughout the implementation of the PBL method.

Cycle 1 was implemented on April 16, 2025. A day prior, the researcher conducted a diagnostic assessment and classroom observation to understand the characteristics of third-grade students at Sekolah Indonesia Kuala Lumpur (SIKL). Based on this initial data, the researcher prepared a learning module that aligned with the Phase 3 Learning Objectives and Curricular Goals for the topic of data representation in tables, tailored to the students' specific characteristics. In this first cycle, the Problem-Based Learning (PBL) model was applied using methods such as lectures, question-and-answer sessions, group discussions, and group presentations. The material covered was sorting mathematical data. Students were seated in groups based on the results of the diagnostic assessment. The lesson began with standard classroom procedures, including greetings, a joint prayer, and a roll call. The researcher then provided an apperception by reviewing previously learned math topics and outlining the day's learning objectives, followed by a series of trigger questions related to the topic of sorting data. Students showed high enthusiasm in answering these questions. After the trigger questions, the researcher assigned group worksheets containing real-world mathematical problems to be solved through group discussion. At this stage, many students expressed difficulty, stating that the problems were too hard and too long because they were presented as word problems. The researcher guided the groups during their discussions to help them solve the problems on the worksheets. After the group work was completed, students presented their findings, and the researcher provided feedback on their presentations before reinforcing the material on sorting data. Finally, students individually completed an evaluation test to assess their understanding of the material after learning with the PBL model. The session concluded with a joint prayer.

Following the first cycle of instruction, the researcher assessed the individually completed evaluation tests. The results showed that out of 34 students, 21 students achieved a score above the minimum passing grade, with the average class score for the first cycle being 72.94. This indicated that some students still had low mathematical problem-solving skills. The researcher then conducted a reflection on the first cycle with the cooperating teacher and the field supervisor. Based on the reflection, the implementation of the Problem-Based Learning model was not yet entirely satisfactory, as only 61% of students had surpassed the minimum passing grade. While the evaluation results showed that a

majority of students had become proficient in problem-solving, not all students had mastered the skill. Therefore, further action was needed to ensure all students truly understood the material on data representation in tables.

The second cycle took place on April 23, 2025, with a focus on comparing data. Based on the evaluation, observation, and reflection from the first cycle, the researcher implemented several improvements. These included better time management during the lesson and the establishment of classroom agreements to create a more conducive learning environment. For the planning stage, the researcher created a new learning module aligned with the learning objectives, taking into account the feedback from the previous cycle.

The lesson began with standard classroom procedures and the introduction of classroom agreements. Students appeared more enthusiastic and active than in the first cycle. The researcher provided apperception by having students recall the previous lesson on sorting data, which they answered with great enthusiasm. Following this, trigger questions related to the new topic of comparing data were introduced. As in Cycle 1, students were assigned group worksheets containing real-world mathematical problems to solve through group discussion. At this stage, students showed more familiarity with problem-solving questions. While some groups still faced difficulties, the number was significantly lower than in the first cycle. The majority of groups understood the task and did not require the teacher's assistance. After the group discussion, students presented their findings, and the researcher provided feedback before reinforcing the material on comparing data. Students then completed an individual evaluation test to assess their understanding of the material on comparing data after the lesson using the Problem-Based Learning model. The session concluded with a joint prayer.

Following the second cycle, the researcher assessed the individual evaluation tests. The results showed that 27 out of 34 students received a score above the minimum passing grade, with an average class score of 81.17. This indicated an increase in both the number of students who reached the passing grade and the class's average score. The percentage of students who scored above the minimum passing grade increased from 61% in the first cycle to 79% in the second cycle, showing an 18% improvement in students' understanding and problem-solving abilities. The average class score also increased by 11% from the first cycle. The researcher then reflected on the second cycle with the cooperating teacher. The results showed an improvement in classroom management due to the implementation of classroom agreements, which made the class more conducive to learning. There was also a clear improvement in students' understanding. With 79% of students in SIKL's third grade now scoring above the minimum passing grade, the evaluation results from the second cycle demonstrated a significant improvement in students' mathematical problem-solving skills for the topic of comparing data.

The third cycle was conducted on April 30, 2025, with the discussion focusing on tally marks in data representation. Based on the evaluation, observation, and reflection from the first two cycles, the researcher aimed for better classroom management and more efficient use of learning time to ensure a more effective lesson. The classroom agreements were maintained to keep the class even more conducive to learning. The activities in this cycle were similar to those in previous cycles. Students were more enthusiastic about completing their tasks, as they were becoming more accustomed to working on problem-based questions. While some students still faced difficulties, the number was fewer than in the previous cycles, and the majority of students understood how to solve the problems. In the third cycle, there was a further increase in the number of students who scored above the minimum passing grade, with 28 out of 34 students reaching the target. This meant 82% of the students achieved the minimum passing grade, showing a 3% improvement in problem-solving skills from the second cycle. The average class score also increased to 84.7. The evaluation results from the third cycle demonstrated that students' mathematical problem-solving skills on the topic of tally marks had improved from both the first and second cycles.Siklus terakhir atau siklus keempat dilaksanakan pada tanggal 5 Mei tahun 2025.

The fourth and final cycle covered data representation in tables as a whole, including sorting, comparing, tallying, and presenting data in tables. Based on the evaluations, observations, and reflections from the first, second, and third cycles, the researcher continued to improve classroom management and optimize learning time to enhance the lesson's effectiveness. The classroom agreements were consistently applied to maintain a conducive learning environment. The activities in this cycle were similar to those in the previous cycles. In this final cycle, almost all students were accustomed to completing problem-solving assignments. While a few students still faced difficulties, the number was significantly lower than in previous cycles, and most students now understood how to solve the given problems. In the fourth cycle, there was a further increase in the number of students who scored above the minimum passing grade, with 30 out of 34 students reaching the target. This meant that 88% of the third-grade students at SIKL demonstrated an understanding of data representation in tables. This number represented a 6% increase in students' mathematical problem-solving skills from the third cycle. The average class score for this final cycle was 90. The evaluation results from the fourth cycle confirmed that students' mathematical problem-solving skills on the topic of data representation in tables had improved significantly from the first, second, and third cycles.

Table 1. Classroom Action Research (CAR) results

Description	**Results**			
	Cycle 1	Cycle 2	Cycle 3	Cycle 4
Mean Score	72.94	81.17	84.7	90
Number of students Who Passed (>75)	21	27	28	30
Percentage of Completion	61.76%	79.41%	82.35%	88.23%

Based on the table, a clear improvement was observed across the first, second, third, and fourth cycles. In the first cycle, only 61% of students scored above the minimum passing grade, indicating that the initial learning was not yet optimal. This percentage rose to 79% in the second cycle, then to 82% in the third, and finally reached 88% in the fourth cycle. The increase in the average class score was also evident, rising from 72.94 in the first cycle to 81.17 in the second, 84.7 in the third, and culminating at 90 in the fourth cycle.

This research was conducted over four cycles as planned in the teaching module and aligned with the predetermined learning objectives. The findings confirm the study's hypothesis that using the Problem-Based Learning (PBL) model to teach data representation in tables can effectively improve the mathematical problem-solving skills of third-grade students at Sekolah Indonesia Kuala Lumpur (SIKL).

B. Discussion

Based on the data obtained from interviews, tests conducted across the four cycles, and observations, the mathematical problem-solving skills of third-grade students at SIKL showed a significant improvement. In the first cycle, 13 out of 34 students scored below the minimum passing grade, and the class average was a relatively low 72.94. At this stage, students still found it difficult to work on problem-based questions and were hesitant to ask the teacher for help. Given these suboptimal results, the researcher decided to proceed with further action in the subsequent cycles.

In the second cycle, only 7 students still had scores below the minimum passing grade. This demonstrated an improved learning outcome compared to the previous cycle. The class's average score also increased from 72.94 to 81.17, surpassing the predetermined minimum passing grade of 75. Student participation also saw a slight increase, as students became more active in asking questions and finding the information needed to solve the problems. Based on the evaluation and reflection, although students'

problem-solving skills had improved from the previous cycle, the researcher decided to continue with a subsequent cycle because some students were still struggling to solve the assigned problems.

In the third cycle, the number of students with scores below the minimum passing grade decreased to 6, indicating a further improvement in learning outcomes. The class average score also continued to rise, from 81.17 to 84.7. Group discussions became more effective, and student participation increased compared to the previous cycles.

Fourth cycle or final cycle, only 4 students had scores below the minimum passing grade, and the class average score increased to 90, its highest point. The evaluation results from this cycle demonstrated a significant improvement in students' learning outcomes. This confirms that the mathematical problem-solving skills of third-grade students at SIKL improved throughout the study. Therefore, the use of an appropriate learning model can effectively enhance students' mathematical problem-solving abilities. In addition to improving problem-solving skills, the Problem-Based Learning (PBL) model also enhances students' learning activity and outcomes by providing them with direct, hands-on experience.

Conclusion

Based on the data analysis and discussion, it can be concluded that the Problem-Based Learning (PBL) model effectively improves the mathematical problem-solving skills of elementary school students at Sekolah Indonesia Kuala Lumpur, specifically on the topic of data representation in tables. This is evidenced by the consistent increase in students' learning outcomes across each implemented cycle. This study was limited to an analysis of student evaluation results and learning activities. Therefore, it is hoped that future researchers can further investigate the application of the PBL model and consider a broader scope to enrich the findings on its implementation in the classroom.

References

Abidin, Z., & Tohir, M. (2019). Keterampilan berpikir tingkat tinggi dalam memecahkan deret aritmatika dua dimensi berdasarkan taksonomi bloom. *Alifmatika: Jurnal Pendidikan Dan Pembelajaran Matematika*, *1*(1), 44-60. https://journal.ibrahimy.ac.id/index.php/Alifmatika/article/view/44-60.

Amir, M. F. (2015). Proses berpikir kritis siswa sekolah dasar dalam memecahkan masalah berbentuk soal cerita matematika berdasarkan gaya belajar. *JURNAL MATH EDUCATOR NUSANTARA: Wahana Publikasi Karya Tulis Ilmiah di Bidang Pendidikan Matematika*, *1*(2). https://ojs.unpkediri.ac.id/index.php/matematika/article/view/235.

Anggiana, A. D. (2019). Implementasi Model Problem Based Learning (Pbl) Untuk Meningkatkan Kemampuan Pemecahan Masalah Matematis Siswa: Pembelajaran Berbasis Masalah: Problem Based Learning: Pemecahan masalah. *Symmetry: Pasundan Journal of Research in Mathematics Learning and Education*, *4*(2), 56-69. https://journal.unpas.ac.id/index.php/symmetry/article/view/2061.

Ejin, S. (2016). Pengaruh Model Problem Based Learning (PBL Terhadap Pemahaman Konsep dan Keterampilan Berpikir Kritis Siswa Kelas IV SDN Jambu Hilir Baluti 2 Pada Mata Pelajaran Ilmu Pengetahuan Alam. *JP (Jurnal Pendidikan): Teori Dan Praktik*, *1*(1), 66-72. https://journal.unesa.ac.id/index.php/jp/article/view/366.

Laela, I. N., Badarudin, B., & Prasetianingtyas, K. I. (2023). Penerapan Model Problem Based Learning Dalam Meningkatkan Kemampuan Berpikir Kritis Siswa Pada Materi Pancasila Dalam Kehidupan Di Kelas V Sekolah Dasar. *Khazanah Pendidikan*, *17*(2), 166-178. https://jurnalnasional2.ump.ac.id/index.php/khazanah/article/view/19521.

Meisy, M. S. M., Aniah, T., & Salamah, S. (2022). Analisis Kemampuan Pemecahan Masalah Materi Penyajian Data Kelas IX SMP Sungai Raya. *Cartesian: Jurnal Pendidikan Matematika*, *1*(2), 91-99. https://ejournal.unhasy.ac.id/index.php/cartesian/article/download/2515/1549/4644.

Nadhifa, N., Maimunah, M., & Roza, Y. (2019). Analisis kemampuan pemecahan masalah siswa pada materi bangun ruang sisi datar. *Numerical: Jurnal Matematika Dan Pendidikan Matematika*, 63-76. https://journal.iaimnumetrolampung.ac.id/index.php/numerical/article/view/477.

Putri, R. S., Suryani, M., & Jufri, L. H. (2019). Pengaruh penerapan model problem based learning terhadap kemampuan pemecahan masalah matematika siswa. *Mosharafa: Jurnal Pendidikan Matematika*, *8*(2), 331-340. https://journal.institutpendidikan.ac.id/index.php/mosharafa/article/view/566.

Setiawati, S., Bernard, M., & Afrilianto, M. (2022). Meningkatkan Kemampuan Pemecahan Masalah Matematis Siswa Smk Pada Materi Determinan Matriks Melalui Model Problem Based Learning. *JPMI (Jurnal Pembelajaran Matematika Inovatif)*, *5*(6), 1761-1770. https://journal.ikipsiliwangi.ac.id/index.php/jpmi/article/view/11082/0.

Supraptinah, U. (2019). Upaya meningkatkan kemampuan pemecahan masalah matematika siswa melalui penerapan model problem based learning. *Jurnal Litbang Sukowati: Media Penelitian Dan Pengembangan*, *2*(2), 13-13. https://journal.sragenkab.go.id/index.php/sukowati/article/view/37.

Susilawati, S. (2019). Upaya meningkatkan kemampuan pemecahan masalah matematika dan kreativitas siswa melalui model pembelajaran problem based learning. *PEDAGOGIA*, *17*(1), 67-79. https://ejournal.upi.edu/index.php/pedagogia/article/view/16406/pdf.

Utomo, P., Asvio, N., & Prayogi, F. (2024). Metode penelitian tindakan kelas (PTK): Panduan praktis untuk guru dan mahasiswa di institusi pendidikan. *Pubmedia Jurnal Penelitian Tindakan Kelas Indonesia*, *1*(4), 19-19. https://edu.pubmedia.id/index.php/ptk/article/view/821.

Widyastuti, R. T., & Airlanda, G. S. (2021). Efektivitas Model Problem Based Learning Terhadap Kemampuan Pemecahan Masalah Matematika Siswa Sekolah Dasar. *Jurnal Basicedu*, *5*(3), 1120-1129. https://jbasic.org/index.php/basicedu/article/view/896.

Zahrotin, S., Badarudin, B., & Eka, K. I. (2020). Peningkatkan Kemampuan Berpikir Kritis Dan Komunikasi Matematis Menggunakan Model Pembelajaran Problem Based Learning (PBL) Berbasis Literasi Matematis. *Journal for Lesson and Learning Studies*, *3*(1), 131-140. https://ejournal.undiksha.ac.id/index.php/JLLS/article/view/24242.

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