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Empowering Mathematical Problem Solving in Elementary Classrooms: Challenges and Opportunities in Society 5.0

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Abstract

The Society 5.0 era demands the world of education to equip students with critical, creative, and solution-oriented thinking skills in dealing with real problems. This study aims to explore the level of elementary school students' mathematical problem-solving abilities and identify the challenges and opportunities faced by teachers in building these skills in the Society 5.0 era. This study uses a mixed method approach with a sequential explanatory model. Quantitative data were obtained through problem-solving tests given to 60 fifth-grade students from two public elementary schools in Bandung Regency who were selected using stratified random sampling. The results showed that students' problem-solving abilities were in the moderate category (average = 21.6 out of a maximum score of 32), with the highest performance at the "implementing the plan" stage and the lowest at the "re-checking" stage. Qualitative data was obtained through interviews and observations of four mathematics teachers. Thematic analysis revealed challenges in the form of limited time, reflective materials, and the use of technology. However, teachers also saw opportunities through contextual approaches and digital platforms. These results demonstrate the importance of innovative, reflective, and technology-integrated mathematics learning designs to equip students with 21st-century skills.

Keywords: *problem solving, elementary classrooms, society 5.0.*

Abstrak

Era Society 5.0 menuntut dunia pendidikan untuk membekali peserta didik dengan keterampilan berpikir kritis, kreatif, dan berorientasi solusi dalam menghadapi permasalahan nyata. Penelitian ini bertujuan untuk mengeksplorasi tingkat kemampuan pemecahan masalah matematika siswa sekolah dasar dan mengidentifikasi tantangan serta peluang yang dihadapi guru dalam membangun keterampilan tersebut di era Society 5.0. Penelitian ini menggunakan pendekatan metode campuran dengan model eksplanatori sekuensial. Data kuantitatif diperoleh melalui tes pemecahan masalah yang diberikan kepada 60 siswa kelas V dari dua sekolah dasar negeri di Kabupaten Bandung yang dipilih menggunakan stratified random sampling. Hasil penelitian menunjukkan bahwa kemampuan pemecahan masalah siswa berada pada kategori sedang (rata-rata = 21,6 dari skor maksimum 32), dengan kinerja tertinggi pada tahap "melaksanakan rencana" dan terendah pada tahap "memeriksa ulang". Data kualitatif diperoleh melalui wawancara dan observasi terhadap empat guru matematika. Analisis tematik mengungkap tantangan berupa keterbatasan waktu, materi reflektif, dan penggunaan teknologi. Namun, guru juga melihat peluang melalui pendekatan kontekstual dan platform digital. Hasil-hasil ini menunjukkan pentingnya desain pembelajaran matematika yang inovatif, reflektif, dan terintegrasi dengan teknologi untuk membekali siswa dengan keterampilan abad ke-21.

Kata kunci: *pemecahan masalah, sekolah dasar, society 5.0.*

INTRODUCTION

The advent of Society 5.0 marks a major shift in the way humans think, learn, and interact, with the integration of advanced technology into everyday life becoming an integral part. The concept of Society 5.0 depicts a “super-smart” society that combines the virtual and physical worlds to solve various social problems through human-centered technology and innovation (Schwab, 2016; Rojas et al., 2021). In this context, education is no longer limited to the transmission of knowledge but also serves as a platform for cultivating critical, creative, and solution-oriented thinking among students (Ikeda, 2024; Aprilisa, 2020; Cipta et al., 2023). Basic education plays a strategic role in building students' basic competencies, including mathematical problem-solving skills, so they can adapt and contribute effectively amidst rapid social change and technological advancements (Susanta et al., 2023; Cipta et al., 2024).

Mathematical problem-solving skills are a key component of mathematics learning and serve as an important tool in developing 21st-century skills such as critical thinking, collaboration, creativity, and digital literacy (NCTM, 2000; Anselmo et al., 2025). Through problem-solving activities, students learn to connect mathematical concepts to real-life situations, analyze problems critically, and generate various solution strategies, making learning more meaningful and engaging (Polya, 2014; Santos-Trigo, 2024). However, various studies show that students often experience difficulties when faced with complex mathematical problems, particularly in understanding the context, constructing mathematical models, and formulating effective solution strategies (Suseelan et al., 2022; Sadak et al., 2022). These difficulties are exacerbated by teachers' limitations in implementing contextual pedagogical approaches, a lack of relevant teaching materials, and the low integration of digital technology into the learning process (Beswick, 2007; Toh et al., 2019; Cipta, Suryadi, Herman, Jupri, et al., 2024). On the other hand, technological advances that characterize Society 5.0, such as artificial intelligence, digital learning platforms, and game-based learning environments (gamification), offer great potential to strengthen mathematics learning in elementary schools (Heffernan & Heffernan, 2014; Vandercruysse et al., 2016; Tong et al., 2025).

Mathematical problem-solving activities not only enhance students' conceptual understanding but also develop their logical thinking skills and creativity. Through these activities, students are trained to identify important information, plan problem-solving strategies, and reflect on their thinking processes (NCTM, 2014; Ghorbani & Jafari, 2024). Empirical evidence shows that a problem-solving-based learning approach can significantly improve elementary school students' logical and creative thinking skills. For example, research conducted by Kurino and Herman (2024) found that the application of the discovery learning model with collaborative and competitive grouping significantly improved elementary school students' mathematical problem-solving skills. Although this study focused on improving problem-solving skills, the results aligned with other findings showing that problem-solving experiences contribute to the development of students' logical reasoning and creativity.

Various international studies have shown that problem-solving-based learning combined with digital technology can improve students' motivation, creativity, and mathematics learning achievement. Maskur et al. (2020) found that problem-based learning strategies significantly improved students' mathematical creative thinking skills. Similarly, Myers et al. (2022) and Kim and Xin (2024) reported that technology-based interventions such as the use of adaptive digital platforms and artificial intelligence-based feedback systems can strengthen students' problem-solving skills and conceptual understanding. Sadak et al. (2022) also confirmed a strong relationship between mathematical creativity and students' ability to pose and solve problems, indicating that the cognitive and affective aspects of mathematics learning are intertwined through problem-solving activities.

Additionally, Cai et al. (2015) and Trigo (2007) emphasize the importance of teacher training focused on technology-based problem-solving learning strategies to improve teaching effectiveness and student learning outcomes. Teachers who have a deep understanding of the application of technology in problem-solving contexts tend to be better able to create interactive, collaborative, and adaptive learning environments that meet students' needs. Overall, these findings reinforce the view that technology integration in problem-solving-based learning not only improves cognitive outcomes but also shapes students who are adaptive, reflective, and innovative in facing the complex challenges of Society 5.0.

However, there are still research gaps that need to be filled. Most previous studies have focused on secondary or higher education contexts, while research at the elementary school level is still limited (Beswick, 2007; Huang et al., 2019). Furthermore, most studies focus on short-term cognitive impacts rather than examining how technology-based learning environments can shape adaptive and creative thinking dispositions in the long term.

Therefore, more in-depth research is needed to explore how pedagogical and technological innovations can empower mathematical problem-solving skills in elementary school classrooms. This study aims to identify challenges and opportunities in empowering mathematical problem-solving skills in elementary schools in the context of Society 5.0. The results are expected to contribute to the development of adaptive, innovative, and contextual learning models in accordance with the demands of 21st-century education (Beswick, 2007; Kusaka, 2020).

This study has several limitations. First, the scope of the study focused on the context of mathematics learning in elementary schools, so these findings cannot be generalized to secondary or higher education levels. Second, variations in teachers' digital literacy levels and limited access to technological infrastructure may impact implementation effectiveness, especially in schools with limited resources. Third, differences in social and cultural contexts across regions may influence student engagement in the problem-solving process. Therefore, further research is recommended to expand this study to different educational levels and regions, as well as to design more scalable and sustainable learning models in accordance with the principles of human-centered innovation in the Society 5.0 era.

METHODS

This study employed a mixed-methods approach with a sequential explanatory model, beginning with the collection and analysis of quantitative data to describe students' mathematical problem-solving abilities. Qualitative data were then collected to deepen and explain these quantitative results, particularly regarding the challenges and opportunities in problem-solving learning in the Society 5.0 era (Creswell, 2016). This approach was chosen because it allowed for a more comprehensive exploration of the relationship between numerical findings and pedagogical contexts in the field.

The study was conducted in January–March 2025 at two public elementary schools in Bandung Regency, selected using purposive sampling, considering the teachers who have implemented technology elements in learning. The quantitative sample consisted of 60 fifth-grade students (30 students per school) selected using stratified random sampling based on class. The qualitative subjects consisted of four fifth-grade mathematics teachers selected purposively based on a minimum of five years of teaching experience and active involvement in the use of learning technology.

Quantitative data were collected through a mathematics problem-solving test based on Polya's four stages, namely understanding the problem, where students are asked to identify important information in the problem, determine what is known and what is asked, and rewrite the problem situation in their own words; devising a plan, where students choose an appropriate strategy such as making a diagram, table, or equation, and explain the reasons for choosing the strategy; carrying out the plan, where students apply the strategy that has been made to obtain a solution and write down the steps for solving it systematically; and looking back, where students review the results of the solution, verify the suitability of the results with the context of the problem, and consider other alternative solutions. Each stage is assessed using a rubric with a score range of 0–8, so that the maximum total is 32. The assessment was carried out by two independent assessors, with an inter-rater reliability result of 0.87, indicating high consistency.

The test instrument underwent content validation by three mathematics education experts with expertise in instrument design and mathematical thinking assessment. The validation process was conducted in two rounds. In the first round, the three experts assessed the suitability of the test items to Polya's problem-solving ability indicators and the cognitive level of elementary school students. The average content validity index (CVI) value was 0.91, indicating high suitability. Two test items were revised based on expert input, highlighting context clarity and language readability. After the revision, the CVI increased to 0.95. Furthermore, the instrument's reliability was calculated using Cronbach's Alpha and obtained a value of 0.81, indicating high reliability.

Quantitative data was analyzed using descriptive statistics to obtain the average score of students' problem-solving abilities based on Polya's four stages, as well as a simple comparative analysis to compare results between schools. Interpretation of the scores was based on a percentage of the maximum score with assessment categories adapted from Widoyoko (2015), as presented in Table 1.

Table 1. Classification of Interpretation of Math Problem Solving Scores

Category level	**Score Interval per Stage (Maks. = 8)**	**Total Score Interval (Maks. = 32)**	**Percentage**
Good	6,0 – 8,0	24 – 32	≥ 75%
Keep	4,0 – 5,9	16 – 23	50% – 74%
Low	< 4,0	< 16	< 50%

Qualitative data were obtained through (1) semi-structured interviews with four teachers covering aspects of learning strategies, obstacles faced, use of technology, and innovation opportunities in the context of Society 5.0; and (2) classroom observations to observe the implementation of mathematics learning that focuses on problem-solving activities and the use of digital technology.

Qualitative data analysis was conducted using a thematic analysis approach through four main stages: transcription, open coding, identification of main themes, and interpretation of meaning. In the transcription stage, all interview results were recorded and transcribed in full according to the interview results, then compared with field notes from classroom observations to ensure data accuracy. The open coding stage was carried out by reading each line of the transcript repeatedly and assigning initial codes based on the main ideas that emerged, such as learning strategies, technological constraints, student responses, and teacher innovation, resulting in 48 initial codes. Next, in the main theme identification stage, these codes were grouped into broader themes, namely: (a) technology integration in problem solving, (b) pedagogical challenges, (c) teacher adaptive strategies, and (d) opportunities for innovation based on Society 5.0. Theme validation was carried out through member checking with two participating teachers to ensure appropriateness of meaning. The final stage, namely interpretation of meaning, was carried out by interpreting the relationships between themes, linking them to quantitative results, and identifying general patterns that explain the challenges and opportunities in empowering mathematical problem solving in the Society 5.0 era.

Data validity was maintained through triangulation of sources and methods, member checking, and an audit trail documenting the analysis process. The integration of quantitative and qualitative results was carried out through methodological triangulation to gain a comprehensive and in-depth understanding of the phenomenon of problem-solving learning in elementary school classrooms within the context of Society 5.0.

RESULTS AND DISCUSSION

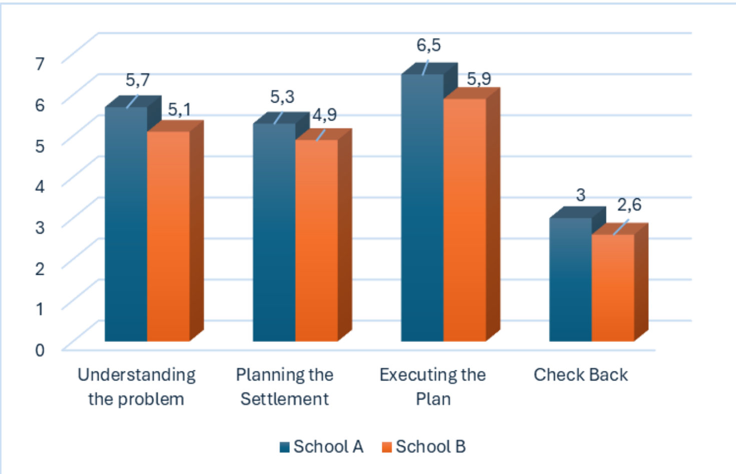
Quantitative data analysis was carried out to measure the mathematical problem-solving ability of grade V students through Polya's four-stage test, namely understanding problems, planning solutions, implementing plans, and re-examination. The results of the analysis showed that students' problem-solving skills were generally in the medium category, with an average score of 21.6 out of a maximum score of 32. Details of student performance in the four stages of problem solving according to Polya can be seen in Table 2.

Table 2. Average score of students' mathematical problem-solving ability based on Polya stages (n=60)

Troubleshooting Stages (Polya)	Maximum Score	Average Score	Information
Understanding the Problem	8	5,4	Keep
Planning the Settlement	8	5,1	Keep
Implementing the Plan	8	6,2	Good
Checking Back	8	2,8	Low
Total	**32**	**21,6**	**Keep**

From Table 2, students showed the best performance at the "implementing the plan" stage with an average score of 6.2 out of 8, while the "rechecking" stage obtained the lowest score of 2.8. This shows that most students are quite capable of carrying out mathematical procedures but are still weak in evaluating and reflecting on the results of problem solving. Students tend to follow the operational steps that have been taught but are not used to re-evaluating the solutions they obtain.

Furthermore, the distribution of scores between schools shows a significant variation. School A scored higher on average than School B at almost all stages of problem-solving. A complete comparison of the average scores of each stage between the two schools is shown in Graph 1.



Graph 1. Comparison of Average Problem Solving Scores

From Graph 1, it can be observed that although both schools showed similar patterns with the highest scores at the implementing the plan stage and the lowest scores at the reviewing stage School A consistently scored higher at all stages. This indicates contextual differences that may be related to teachers' learning approaches, availability of learning resources, or technology support.

This finding is in line with previous studies (Trigo, 2007; Amland et al., 2025) which showed that students often have difficulty in aspects that require higher order thinking skills, such as strategizing and evaluating. In contrast, they are relatively more comfortable in procedural stages, especially when mathematics learning is focused on routine problem exercises without involving strategy exploration or reflection.

Thus, a learning strategy is needed that emphasizes the development of students' metacognitive skills through open-ended questions, reflective activities, and the use of technology as a tool for exploring concepts. This strategy is important so that the problem-solving skills built are not only procedural, but also conceptual and reflective, in accordance with the demands of the Society 5.0 era.

To complement the quantitative findings and better understand the factors that influence students' problem-solving abilities, qualitative data were collected through interviews and observations of four mathematics teachers from two elementary schools. Data analysis was conducted using a thematic analysis approach, which resulted in several main themes related to the challenges and opportunities for empowering mathematics problem solving in the classroom. The analysis was conducted using a thematic approach following the steps suggested by Braun and Clarke (2006), namely: (1) data familiarization, (2) initial coding, (3) theme search, (4) theme review, (5) theme naming, and (6) report writing. This process resulted in three main themes which are explained below:

Limitations of Reflective Learning Strategies

Teachers from both schools said that most students are used to doing math problems procedurally without being asked to explain the reasons or strategies used. One of the teachers stated:

> *"Children usually work directly in a way that they memorize. I rarely ask them to explain why they chose that way, because the time is limited."* (Teacher A, interview, February 2025).

This statement indicates that mathematics learning in elementary schools is still predominantly oriented toward the result, rather than the thought process. Students tend to rely on routine steps without reflecting on the strategies used, resulting in underdevelopment of their metacognitive abilities. This aligns with Polya's (2014) findings, which emphasize that problem-solving is not simply the application of algorithms, but rather a cognitive process that encompasses understanding, planning, implementing, and reviewing solutions.

Several studies support this phenomenon, Sholikhin et al. (2021) found that students' levels of reflective thinking in solving mathematical problems are significantly influenced by their ability to evaluate and revise their problem-solving strategies. Sadak et al. (2022) also stated that reflective thinking skills are positively correlated with mathematical creativity and non-routine problem-solving skills. Thus, limited reflective learning strategies have the potential to be a major obstacle to the development of comprehensive problem-solving skills (Huang et al., 2019; Kurino & Herman, 2024).

Limited Learning Resources and Learning Time

Some teachers admitted that time constraints hindered them in providing open or context-based questions. In addition, the limited availability of interactive and contextual teaching materials was also an obstacle. One teacher said:

> *"If the teaching materials are limited, I usually just take them from books, and it's more like routine practice. Whether I want to give long story questions or open-ended questions, sometimes there's not enough time." (Teacher B, interview, February 2025)*

This situation shows that teachers still rely on conventional learning resources that focus on routine practice, rather than exploring thinking strategies. This finding aligns with research by Beswick (2007) and Toh et al. (2019), which showed that time constraints and curriculum load are the main obstacles for teachers in implementing problem-solving-based learning. Furthermore, Maskur et al. (2020) added that without the support of contextual learning materials, students struggle to develop creative and flexible thinking skills in problem-solving.

Theoretically, Clements (2014) emphasize the importance of using learning trajectories to develop students' progressive mathematical thinking. Without the support of relevant media and learning resources, teachers struggle to facilitate these stages of thinking, leading to learning that tends to stop at the procedural aspect.

Innovation Opportunities Through Technology and Real Context

Despite the challenges, teachers see opportunities using technology. Some teachers have tried using online learning applications or visual media to help students understand the context of the problem. One teacher stated:

> *"I have used a game-based math application, the children are more enthusiastic, and they understand the story faster." (Teacher C, interview, March 2025)*

These findings suggest that technology integration can bridge abstract concepts and students' concrete experiences. This aligns with research by Kim & Xin (2024), which found that digital learning environments can enhance problem-solving skills through interactive visualization and adaptive feedback. Myers et al. (2022) also emphasized that the use of adaptive digital platforms helps students explore various problem-solving strategies and develop higher order thinking skills.

In the context of Society 5.0, this approach becomes particularly relevant. According to Toh et al. (2019), Society 5.0 demands the integration of human and artificial intelligence to create personalized, adaptive, and reflective learning. Thus, technology-based innovation can be a significant opportunity to overcome the limitations of traditional learning in mathematics classrooms.

In addition to technology, teachers also try to relate the material to students' daily lives to make learning more meaningful. This approach aligns with Cai et al. (2015) findings that contextual learning encourages students' cognitive and affective engagement in problem-solving, resulting in deeper conceptual understanding. However, interviews indicate that the implementation of contextual learning remains unsystematic and requires clearer pedagogical guidance.

To strengthen our understanding of teachers' perceptions and experiences, the interview results were visualized in the form of a theme-respondent matrix. This matrix illustrates the distribution of theme occurrences among each teacher, as presented in Table 3.

Table 3. Distribution of Interview Themes Based on Teacher Respondents

Theme	**Teacher A**	**Teacher B**	**Teacher C**	**Teacher D**
Reflective strategies are not optimal	✓	✓	✓	✓
Limited interactive teaching materials	x	✓	✓	✓
Use of game-based apps	x	x	✓	✓
The contextual approach is not yet systematic	✓	✓	✓	✓

Table analysis shows that the four teachers share a common view regarding the suboptimal implementation of reflective strategies and contextual approaches in mathematics learning. However, two teachers have begun utilizing digital technology, indicating a paradigm shift toward innovative learning relevant to the Society 5.0 era. This finding reinforces the argument that successful problem-solving learning depends on a balance between pedagogical strategies, the availability of learning resources, and technology integration (Kim and Xin, 2024; Kurino and Herman, 2024; Sihombing et al., 2024; De Villiers, 2024).

The qualitative findings in this study reinforce the quantitative results that low student scores in the planning and evaluation stages of problem-solving are not solely due to limited cognitive abilities, but also due to classroom learning that does not encourage strategic exploration, reflective discussion, and connections to real-world contexts. Polya (2014) emphasized that the stages of understanding, planning, implementing, and reviewing constitute a unified thinking process that must be developed through reflective interactions between teachers and students. These results are consistent with the findings of Cai et al., (2015) and Trigo, (2007), which showed that students with reflective learning experiences are better able to self-explanatory and evaluate their own solutions. Therefore, learning that focuses solely on routine practice without reflection has been shown to hinder the development of higher order thinking skills (Huang et al., 2019; Kurino & Herman, 2024).

In the context of Society 5.0, education no longer emphasizes mastery of factual knowledge but must prepare students to solve complex problems through the integration of critical thinking skills and technological literacy. De Villiers (2024) emphasized that learning in this era must combine human and artificial intelligence to generate innovative solutions to real-world problems. Sihombing et al. (2024) added that 21st-century competencies require students to master collaborative, reflective, and adaptive skills. Therefore, the results of this study demonstrate the urgency of designing mathematics learning that encourages students to think independently, engage in discussion, and reflect on their thinking processes (Beswick, 2007; Kim & Xin, 2024).

The mixed methods sequential explanatory model approach used in this study allows for a deeper understanding of students' mathematical problem-solving abilities. Quantitative analysis reveals general patterns, while qualitative data explains the context and causal factors behind these results. This integrative approach aligns with the views of Tashakkori and

Teddlie (2010) and Creswell & Plano Clark (2018), who assert that combining the two approaches provides a more comprehensive and ecologically valid understanding. In this study, data triangulation helped confirm that students' weaknesses in the evaluation stage were not simply due to a lack of practice, but rather because the learning environment did not facilitate in-depth reflection and discussion (Hartati et al., 2020; Sholikhin et al., 2021).

Quantitative results show that students are relatively superior at the "implementing the plan" stage, but weak at the "re-examining" stage. This pattern indicates a tendency towards procedural learning, as also reported by Maskur et al. (2020) and NCTM (2000), where students in many countries still focus more on results than on processes. Cai et al. (2015) added that reflective ability can only develop if students are given space to explain the reasons behind the steps in solving problems. In this context, the results of the study support Polya's (2014) theory that successful problem-solving depends on the interaction between cognitive aspects (solution strategies) and metacognitive aspects (reflection on solutions).

From the interviews, teachers identified three main obstacles: time constraints, a lack of interactive teaching materials, and the limited availability of technology-based learning resources. This phenomenon is consistent with the findings of Toh et al. (2019) and Beswick (2007), who stated that curriculum pressures and limited facilities often lead teachers to prefer traditional learning strategies. Myers et al., (2022) also highlighted that without the support of digital learning media, students have difficulty visualizing abstract concepts and connecting mathematics to real life. Therefore, increasing teachers' capacity to utilize innovative learning resources is a prerequisite for empowering problem-solving skills in elementary schools (Kim & Xin, 2024; Huang et al., 2019).

However, teachers also see positive opportunities in utilizing digital technology and contextual approaches. The use of game-based learning applications or interactive simulations has been shown to increase student motivation and understanding of contextual problems. This aligns with the findings of Kim and Xin (2024), who stated that digital learning environments can stimulate exploration of problem-solving strategies and provide adaptive feedback for students. Furthermore, Myers et al. (2022) found that technology-based learning strengthens the connection between abstract concepts and concrete experiences. Thus, technology integration can bridge mathematical concepts and their application in the context of Society 5.0 (Mytra et al., 2020; Suzuki, 2021; Rojas et al., 2021).

From a theoretical perspective, these findings support the learning trajectory concept proposed by Clements (2014), where the development of mathematical understanding occurs through progressive stages that need to be systematically facilitated. In this study, the limitations of reflective strategies and the lack of contextual teaching materials hindered the formation of meaningful learning trajectories. Cai et al. (2015) emphasized that context-based pedagogical interventions can help students build connections between concepts and applications. Therefore, developing teaching materials relevant to students' real-life experiences is key to improving critical and reflective thinking skills (Huang et al., 2019; Kurino & Herman, 2024).

Overall, the combination of quantitative and qualitative results in this study suggests that improving students' problem-solving abilities requires a more holistic learning strategy—not just practicing procedures, but also developing reflection, strategy exploration, and self-assessment. This aligns with the findings of Sadak et al. (2022) and Kurino & Herman (2024), which emphasize the importance of reflection-based learning in fostering adaptive thinking skills. Teachers need training in reflective pedagogy and support in developing technology-based learning resources to optimize students' potential in the context of 21st-century learning (Maskur et al., 2020; Kim & Xin, 2024).

Thus, this study emphasizes the need for a paradigm shift in mathematics learning from an outcome-oriented approach to learning that fosters solution-oriented and reflective mathematical thinking. In the era of Society 5.0, this paradigm is not merely an ideal but an urgent necessity to equip students to face global challenges (Maskur et al., 2020; Myers et al., 2022). These findings not only support previous research but also broaden our understanding of how the integration of technology, real-life contexts, and reflective strategies can synergistically empower mathematical problem-solving skills at the elementary school level.

CONCLUSION

This study revealed that elementary school students' mathematical problem-solving abilities are generally in the moderate category. Students showed the best performance at the "implementing the plan" stage, but were weak in "re-checking", which indicates the dominance of the procedural approach without being accompanied by reflective abilities. The results of teacher interviews and observations support this finding, where mathematics learning in the classroom tends to focus on routine problem exercises and provides less space for strategy exploration and reflection. On the other hand, teachers also identified the potential for utilizing technology and contextual approaches as opportunities to strengthen students' problem-solving abilities. Thus, the integration of quantitative and qualitative results confirms that empowering problem-solving abilities in the Society 5.0 era requires an innovative, contextual, and technology-based learning approach.

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