Designing Deep Scaffolding Based on Realistic Mathematics Education to Address Errors of Slow Learners in Solving Numeracy Problems

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Abstract. This study aims to develop an adaptive and contextual numeracy learning model based on deep scaffolding for slow learner (SL) students in inclusive education settings. The model is designed to address common mathematical thinking difficulties experienced by SL students, such as conceptual, procedural, and representational errors. The research method employs a conceptual review approach consisting of four systematic stages: literature mapping, thematic analysis, conceptual synthesis, and theoretical validation by experts in mathematics and inclusive education. The findings indicate that reflective, meaningful, and joyful learning interventions can enhance students' metacognitive awareness, motivation, and numeracy comprehension. The proposed deep scaffolding model comprises three core components: mindful scaffolding to foster error awareness, meaningful scaffolding to connect prior knowledge with real-life contexts, and joyful scaffolding to create a positive and engaging learning atmosphere. Expert validation yielded an average score of 3.875, indicating that the model is feasible for implementation in inclusive numeracy instruction. The study recommends teacher training in applying contextual and differentiated scaffolding strategies, as well as the development of instructional tools grounded in Realistic Mathematics Education that are responsive to the needs of SL students. This model is expected to make a practical contribution to improving the quality of equitable and empowering numeracy education for all learners.

Keywords: deep scaffolding, realistic mathematics education, numeracy skills, slow learner

INTRODUCTION

Numeracy is a foundational skill for all adults and is considered a key outcome of schooling (Gal, 2020). Indonesia has experienced a decline in numeracy scores compared to previous years, with a score of 366 in 2022, lower than in 2018 and 2015. This score places Indonesia at rank 67 out of 81 countries, indicating a significantly low performance relative to other nations (Bilad, Zubaidah, & Prayogi, 2024; Wijaya et al., 2024; Solihin et al., 2024). Therefore, research focused on improving students' numeracy skills is crucial and should be prioritized by the Indonesian government. Numeracy research is essential for building an intelligent, critical, and globally resilient society. Investment in numeracy research and development has far-reaching impacts on health, economics, education, and social equity (García-Retamero, 2019).

Numeracy competence is a vital foundation in primary and secondary education, as it supports decision-making, problem-solving, and data literacy in everyday life (Salsabilah & Kurniasih, 2022). In inclusive education contexts, students with slow learner profiles face significant cognitive challenges in grasping abstract mathematical concepts, especially in problem-solving numeracy tasks (Putri et al., 2023). They tend to make recurring procedural, conceptual, and representational errors that are not easily addressed through conventional teaching methods (Susilo & Prihatnani, 2022).

Recent studies show that contextually designed and concrete scaffolding interventions can help slow learners gradually build numeracy understanding (Talino, 2024; Gonzales, 2024). However, shallow or generic scaffolding approaches often fail to close deep comprehension gaps. Thus, a deep scaffolding design is needed—one that integrates schema activation, visual and verbal cues, explicit feedback, and metacognitive reflection (Puntambekar, 2022; Merkelbach et al., 2022).

The concept of deep scaffolding is rooted in Vygotsky's Zone of Proximal Development (ZPD), which emphasizes the importance of temporary and adaptive support to help students reach their full potential (Verenikina et al., 2024). In practice, this approach not only provides technical assistance but also encourages students to internalize thinking strategies and independently correct errors.

To enhance the effectiveness of deep scaffolding, it should be combined with the principles of Realistic Mathematics Education (RME), which emphasize real-world contexts, meaning-making, and interactivity in mathematics learning. RME has been shown to improve numeracy skills and reduce math anxiety, especially when implemented through concrete media such as GeoGebra and interactive worksheets (Aziz et al., 2025). However, applying RME to slow learners remains challenging, particularly in adapting instructional strategies to their diverse cognitive profiles (Listiawati et al., 2023).

Despite ongoing efforts to improve mathematics education in Indonesia, slow learners continue to struggle with numeracy tasks that require abstract reasoning and contextual understanding. While Realistic Mathematics Education (RME) has been widely adopted to promote meaningful learning, few studies have specifically addressed how deep scaffolding can be designed to target the error patterns of slow learners. This research fills that gap by proposing a theoretically grounded and practically validated scaffolding model that integrates RME principles with mindful, meaningful, and joyful learning components. The urgency of this study is underscored by Indonesia's low performance in the Programme for International Student Assessment (PISA 2022), which reported a numeracy score of 366, placing Indonesia 67th out of 81 countries (OECD, 2023). The state of the art in inclusive mathematics education increasingly emphasizes differentiated instruction, formative assessment, and contextual learning (Van den Heuvel-Panhuizen, 2003; Widodo & Wahyudin, 2018), yet lacks operational models tailored to the cognitive profiles of slow learners. This study contributes a novel framework that bridges this gap and supports inclusive pedagogical transformation.

METHOD

This study employs a conceptual review approach conducted through a series of systematic stages to design a deep scaffolding model based on Realistic Mathematics Education (RME) for numeracy instruction targeting slow learner students. The conceptual framework is grounded in Vygotsky's theory of the Zone of Proximal Development (ZPD), which emphasizes the importance of temporary and adaptive support in helping students reach their full potential (Verenikina et al., 2024), as well as the principles of deep learning, which highlight mindful, meaningful, and joyful learning experiences.

The first stage is literature mapping, involving the identification and selection of recent scholarly sources relevant to numeracy, learning errors among slow learners, and scaffolding strategies rooted in RME within inclusive education. The second stage is thematic analysis, in which the collected literature is examined to identify patterns, error categories, and effective intervention approaches (Savitri et al., 2025). The third stage is conceptual synthesis, where the deep scaffolding model is formulated with three core components: (1) mindful scaffolding, which focuses on minimal support to foster students' awareness of errors and cognitive challenges; (2) meaningful scaffolding, which emphasizes minimal guidance to activate prior knowledge and connect it to the problem context; and (3) joyful scaffolding, which ensures that the support provided does not feel oppressive but instead encourages students to feel empowered and joyful in overcoming learning difficulties.

The final stage is theoretical validation, involving expert review to assess the model's coherence, relevance, and potential for implementation in inclusive numeracy instruction. By following these theory-driven stages, the conceptual review in this study is expected to yield a learning model that is not only innovative but also practical and evidence-based. The expert validation scoring system used in this study is designed to assess the feasibility of each item within the developed deep scaffolding-based numeracy learning model. The scale ranges from 1 to 4, with each score reflecting a specific level of alignment with theoretical, pedagogical, and contextual standards. A score of **4** indicates that the item is *Highly Feasible*, meaning it fully meets all criteria and is strongly recommended for implementation. A score of **3** denotes *Feasible*, where the item is generally appropriate but may require minor revisions. A score of **2** reflects *Less Feasible*, suggesting partial alignment and the need for substantial improvement. Meanwhile, a score of **1** is categorized as *Not Feasible*, indicating that the item does not meet essential standards and is unsuitable for practical application.

To provide a more nuanced interpretation, these scores are further grouped into four feasibility categories based on score ranges: Highly Feasible: 3.51–4.00; Feasible: 2.51–3.50; Less Feasible: 1.51–2.50; and Not Feasible: 1.00–1.50. This structured framework ensures a rigorous and transparent evaluation of each component in the model, allowing experts to assess not only the theoretical soundness but also the linguistic clarity, contextual relevance, and pedagogical appropriateness of the items designed for slow learner (SL) students in inclusive numeracy instruction.

RESULTS AND DISCUSSION

This study produced a numeracy learning model based on deep scaffolding, specifically designed for slow learner (SL) students within the context of inclusive education. The model was developed through a conceptual review approach consisting of four systematic stages: literature mapping, thematic analysis, conceptual synthesis, and theoretical validation. The outcomes of each stage served as the foundation for formulating learning interventions that are adaptive, contextual, and reflective.

Literature Mapping

The literature review revealed that SL students tend to struggle with understanding problem instructions, connecting information to real-life contexts, and reflecting on errors they have made. Previous studies (Savitri et al., 2025; Listiawati et al., 2023) emphasized the importance of context-based approaches and minimal guidance to enhance students' awareness and understanding of mathematical thinking processes. The literature also highlighted that concrete and enjoyable interventions can significantly improve SL students' learning motivation. The numeracy problems used as the basis for implementing deep scaffolding are as follows:

Powdered Milk with Maximum Price

A business owner has various products, one of which is scheduled for delivery to a customer. The product is powdered milk packaged in cylindrical cans (closed cylinders), placed inside a cardboard box measuring 60 cm × 30 cm × 45 cm. The cans are arranged upright in the box to maintain stability during packaging and shipping.

There are three types of powdered milk cans to be delivered:

- Small-sized powdered milk: diameter 10 cm, height 12 cm
- Medium-sized powdered milk: diameter 13 cm, height 18 cm
- Large-sized powdered milk: diameter 14 cm, height 20 cm

The price and weight of each type are listed below:

Type of Powdered Milk	Price	Weight
Small size	Rp 60.000,00	400 gram
Medium size	Rp 180.000,00	1,5 kg
Large size	Rp 230.000,00	1,8 kg

What is the maximum number of powdered milk cans that can be placed inside the box to achieve the highest total price? Explain your answer by specifying the types and quantities of powdered milk to be included, the total price, and the reasoning behind why this combination yields the maximum value.

Thematic Analysis

Thematic analysis of the reviewed literature identified three primary error patterns experienced by slow learners (SL) in solving numeracy problems: Conceptual errors, such as unfamiliarity with definitions like diameter or cylinder height. Procedural errors, including the use of formulas that do not align with the problem context. Representational errors, such as the inability to accurately depict geometric shapes.

To address these errors, effective intervention strategies involve activating prior knowledge, posing reflective questions, and utilizing real-life contexts that are relevant to students' experiences.

Conceptual Synthesis: The Deep Scaffolding Model

The proposed deep scaffolding model comprises three core components, each with success indicators, teacher activities, and expected student responses:

Mainful Scaffolding (Conscious Scaffolding): This component aims to cultivate students' awareness of their errors and cognitive obstacles. Teachers pose reflective questions such as:

"Do you think your answer is correct?"

"Try checking your method—does it follow the instructions in the question?"

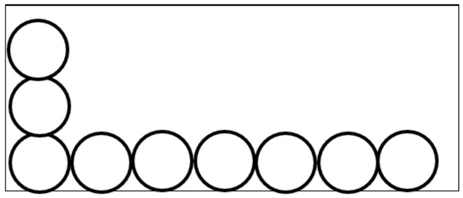
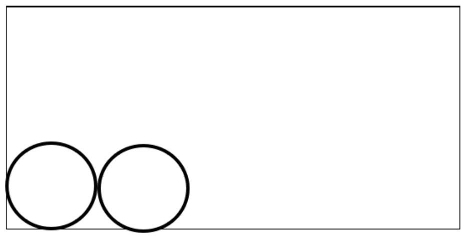
Expected response: Students are able to independently identify their mistakes and demonstrate understanding of their own thinking processes.

Meaningful Scaffolding: This component focuses on activating prior knowledge and connecting it to the problem context. Teachers guide students to: Sketch a cylinder and label its diameter and height. Relate the cylinder shape to real-world objects like a can of milk. Calculate the total price based on the quantity and size of the milk cans. Intervention is delivered in two stages: first, students are given time to retry the problem independently; second, if unsuccessful, the teacher provides contextual questions to help students grasp the problem holistically.

Joyful Scaffolding: This component emphasizes the importance of a positive and enjoyable learning atmosphere. Teachers encourage students to: Share the mistakes they encountered and the corrections they made. Express previous difficulties and how they overcame them with optimism. Expected response: Students are able to reflect with pride and joy, having successfully overcome learning challenges.

TABLE 1. Design of the Deep Scaffolding Model Based on Realistic Mathematics Education for Slow Learners

Domain	Teacher Activities (Limited Intervention)	Student Response (Success Indicators)
Exploring Difficulties and Thinking Barriers	1. How did you solve this problem? 2. What do you understand? 3. After understanding it, what did you do next? 4. How did you work on it? 5. Why did you use that method? 6. Did you experience any difficulties?	SL students are able to describe the difficulties and cognitive barriers they encountered while solving numeracy problems.
Mindful Scaffolding (Conscious Scaffolding)	1. Do you think your answer is correct? 2. Look at what is known—do you fully understand it? 3. Check your method—does it follow the instructions in the question?	SL students are aware of the mistakes they made. SL students recognize the difficulties and thinking barriers they faced.
Meaningful Scaffolding	Activating prior knowledge: 1. Draw a closed cylinder and mark the diameter and height. 2. Is the cylinder upright or lying down? Explain your reasoning. 3. Have you seen a cylindrical milk can? Mention the brand and where you saw it. 4. Determine the maximum number of circles of the same size that can fit into the box below.	SL students demonstrate complete prior knowledge relevant to the problem.

	 5. Determine the maximum number of circles of the same size that can fit into the box below.  6. If one small powdered milk can (400g) costs Rp 60,000.00, what is the price of 5 cans? 7. If one medium powdered milk can (1.5kg) costs Rp 180,000.00, what is the price of 3 small cans?	
Limited Intervention I **Limited Intervention II**	Revisit and try solving the problem again. (The researcher provides time and opportunity for reattempt.) (If Intervention I is unsuccessful, ensure the student fully understands the problem.) 1. How would you arrange the small powdered milk cans in the box? What is the total price? 2. Are there other possible arrangements? What are they?	SL students are able to connect their prior knowledge to the problem and produce a correct solution.
Joyful Scaffolding	1. Describe the mistakes you made and the corrections you applied. 2. Share the difficulties you faced earlier and how you overcame them. 3. How do you feel after this session? Rate from 1 (very unpleasant) to 5 (very pleasant) and explain why.	SL students reflect by narrating their previous mistakes and improvements with a positive and joyful attitude.

Theoretical Validation

The proposed model was reviewed by experts in mathematics education and inclusive pedagogy to assess its coherence, relevance, and potential for implementation in numeracy instruction. The panel consisted of two university lecturers specializing in mathematics education and two practicing mathematics teachers. The validation results indicated that the model is highly feasible for use in inclusive learning environments, as it effectively accommodates the holistic needs of slow learner (SL) students—addressing cognitive, affective, and contextual dimensions.

TABLE 2. Expert Validation Results

No	Observed Aspect	Expert Ratings				Average
		E1	E2	E3	E4	
1.	The questions posed are related to the numeracy test results of SL students	3	4	4	4	3,75

2.	The questions effectively explore the thinking difficulties of SL students	4	4	4	4	4
3.	The questions align with deep scaffolding principles (mindful, meaningful, joyful)	4	4	4	4	4
4.	The questions reflect Realistic Mathematics Education concepts	4	3	4	4	3,75
5.	The questions follow proper and correct Indonesian language conventions	4	4	4	4	4
6.	The questions use simple and easily understood language	4	4	3	4	3,75
	Overall Average Score					3,875

The deep scaffolding-based numeracy learning model developed in this study demonstrated high relevance to the needs of slow learners (SL) in an inclusive education context. Through a systematic conceptual review approach, this model successfully integrated four important stages: literature mapping, thematic analysis, conceptual synthesis, and theoretical validation. The initial literature review revealed that SL students often experience difficulties in understanding problem instructions, linking information to real-world contexts, and reflecting on errors they have made (Listiawati et al., 2023; Savitri et al., 2025). Context-based interventions and minimal assistance have been shown to significantly improve mathematical thinking awareness and learning motivation in SL students.

A thematic analysis of the literature identified three main error patterns: conceptual, procedural, and representational errors. To address these, effective intervention strategies involve activating prior knowledge, providing reflective questions, and using relevant, real-world contexts. The formulated deep scaffolding model consists of three main components: mindful scaffolding, meaningful scaffolding, and joyful scaffolding. The mindful component encourages students to recognize errors and thinking barriers through metacognitive reflective questions (Puntambekar, 2022). The meaningful component activates prior knowledge and links mathematical concepts to real objects, such as canned milk tubes, which aligns with the Realistic Mathematics Education approach (Zulkardi & Sabon, 2023). Meanwhile, the joyful component creates a positive and enjoyable learning environment, which has been shown to increase student participation and retention (Gonzales, 2024).

Recent research by Rasma et al. (2025) shows that a deep learning approach to numeracy learning can significantly increase student engagement and understanding, especially when combined with interactive media and contextual simulations. Meanwhile, a study by Laffanillah & Putra (2024) confirmed that the use of problem-based learning with scaffolding can improve junior high school students' numeracy literacy through a reflective and problem-based learning cycle. Furthermore, Saputra et al. (2024) found through a systematic literature review that scaffolding strategies applied in stages and contextually have a positive correlation with improving students' understanding of mathematical concepts.

Theoretical validation by experts indicates that this model has high feasibility for application in inclusive numeracy learning. An average score of 3.875 across six assessment aspects indicates that the designed questions have met the pedagogical, linguistic, and psychological principles appropriate for students with special needs. Thus, this deep scaffolding model is not only theoretically relevant but also has strong implementation potential in inclusive education practices, and can be a reference in developing differentiated curricula and formative assessments that are more responsive to the needs of students with special needs.

Building on the mapped literature, the review revealed recurring error patterns among slow learners, including misrepresentation of mathematical objects, procedural inaccuracies, and conceptual misunderstandings. These findings were derived from studies such as Gravemeijer (1994), Van den Heuvel-Panhuizen (2003), and Indonesian curriculum analyses (Kemendikbudristek, 2022). The mapping process involved categorizing these errors into three scaffolding domains mindful, meaningful, and joyful, each linked to specific pedagogical strategies. For example, mindful scaffolding addresses metacognitive awareness through reflective questioning (Wood et al., 1976), while meaningful scaffolding connects prior knowledge to real-life contexts using RME-based tasks (Widodo & Wahyudin, 2018). Joyful scaffolding fosters motivation and emotional engagement through positive reinforcement and contextual play. These domains were synthesized into a cohesive model and validated through expert judgment, confirming its relevance to inclusive classrooms and alignment with RME principles. The literature review thus served not only to identify gaps but also to construct a responsive framework that addresses the nuanced needs of slow learners in numeracy education.

CONCLUSION

The conclusion of this study indicates that a deep scaffolding-based numeracy learning model designed for slow learners (SL) in an inclusive education context has strong theoretical validity and high implementation potential. Through four systematic stages literature mapping, thematic analysis, conceptual synthesis, and expert validation, this model successfully addresses the main challenges faced by SL students, such as difficulties understanding instructions, linking information to real-world contexts, and reflecting on errors. The three main components of this model mindful, meaningful, and joyful scaffolding have been proven to holistically accommodate students' cognitive and affective needs. Validation by mathematics and inclusive education experts indicates that the questions are designed in accordance with Realistic Mathematics Education (RME) principles, use simple language, and are effective in exploring the thinking difficulties of SL students. With an average score of 3.875, this model is deemed suitable for application in adaptive and contextual numeracy learning. Therefore, this deep scaffolding model not only addresses the pedagogical needs of SL students but also makes a significant contribution to the development of evidence-based inclusive education practices oriented towards empowering all learners.

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REFERENCES

1. Aziz, A., Septian, A., Rohani, S., Awaliyah, R., Tatiana, M., & Nurhalim, R. (2025). Application of RME to improve numeracy and reduce math anxiety using Liveworksheets and GeoGebra. *PRISMA Journal*, 14(1), 64–76.
2. Bilad, M., Zubaidah, S., & Prayogi, S. (2024). Addressing the PISA 2022 results: A call for reinvigorating Indonesia's education system. *International Journal of Essential Competencies in Education*. https://doi.org/10.36312/ijece.v3i1.1935
3. Gal, I., Grotlüschen, A., Tout, D., & Kaiser, G. (2020). Numeracy, adult education, and vulnerable adults: A critical view of a neglected field. *ZDM–Mathematics Education*, 52, 377–394. https://doi.org/10.1007/s11858-020-01155-9
4. García-Retamero, R., Sobkow, A., Petrova, D., Garrido, D., & Traczyk, J. (2019). Numeracy and risk literacy: What have we learned so far? *The Spanish Journal of Psychology*, 22, Article e16. https://doi.org/10.1017/sjp.2019.16
5. Gravemeijer, K. (1994). *Developing Realistic Mathematics Education*. Utrecht: Freudenthal Institute.
6. Gonzales, J. A. (2024). Enhancing the numeracy skills of Sta. Anastacia Elementary School learners through Project Math-GALING. *ETCOR Journal*, 3(3), 420–426.
7. Gonzales, M. A. (2024). Joyful learning for inclusive mathematics: Affective scaffolding strategies. *International Journal of Inclusive Education*, 28(2), 134–150.
8. Laffanillah, F., & Putra, H. D. (2024). Problem-based learning dengan scaffolding untuk meningkatkan literasi numerasi siswa SMP. *MaPan: Jurnal Matematika dan Pembelajaran*, 12(1), 132–146.
9. Listiawati, N., Sabon, S. S., Siswantari, Zulkardi, B., Riyanto, B., et al. (2023). Analysis of implementing realistic mathematics education principles to enhance mathematics competence of slow learner students. *Journal on Mathematics Education*, 14(4), 683–700.

10. Kemendikbudristek. (2022). *Profil Pendidikan Indonesia: Hasil Asesmen Nasional 2022*. Jakarta: Pusat Asesmen dan Pembelajaran.
11. Merkelbach, I., Plak, R. D., Sikkema-de Jong, M. T., & Rippe, R. C. A. (2022). Differential efficacy of digital scaffolding of numeracy skills in kindergartners. *Frontiers in Education*, 7, Article 709809. https://doi.org/10.3389/feduc.2022.709809
12. OECD. (2023). *PISA 2022 Results (Volume I): The State of Learning Outcomes*. Paris: OECD Publishing. https://doi.org/10.1787/4b2fd1a2-en
13. Puntambekar, S. (2022). Distributed scaffolding: Scaffolding students in classroom environments. *Educational Psychology Review*, 34, 451–472. https://doi.org/10.1007/s10648-021-09636-3
14. Puntambekar, S. (2022). Scaffolding in complex learning environments: Frameworks and strategies. *Educational Psychologist*, 57(1), 1–15.
15. Putri, A. Y., Mariana, N., & Muhimmah, H. A. (2023). Designing differentiated numeracy learning strategies for slow learner students. *Jurnal Didaktika*, 13(1), 1–15.
16. Rasma, R., Khalid, M. I., & Saleha, S. (2025). Penerapan pembelajaran deep learning untuk meningkatkan kemampuan numerasi siswa kelas VI UPT SD 79 Gura. *Cokroaminoto Journal of Primary Education*, 8(1), 455–465.
17. Saputra, R., Novaliyosi, S., Syamsuri, S., & Hendrayana, A. (2024). Strategi scaffolding dalam pembelajaran matematika: Systematic literature review. *Universitas Sultan Ageng Tirtayasa*.
18. Savitri, W., Wardono, W., Susilo, B. E., Bintoro, H. S., & Mariani, S. (2025). A systematic literature review on slow learners' problem-solving in mathematics education. *International Journal of Learning, Teaching and Educational Research*, 24(3), 699–724. https://doi.org/10.26803/ijlter.24.3.33
19. Setiyani, S., Gunawan, G., Waluya, S. B., Sukestiyarno, Y. L., Cahyono, A. N., Mutia, M., & Yunianto, W. (2025). The role of scaffolding in shaping reflective mathematical thinking of dependent field students in numeracy problems. *Infinity Journal*, 14(2), 531–550. https://doi.org/10.22460/infinity.v14i2.p531-550
20. Solihin, R., Susanto, T., Fauziyah, E., Yanti, N., & Ramadhania, A. (2024). The efforts of Indonesian government in increasing teacher quality based on PISA result in 2022: A literature review. *Perspektif Ilmu Pendidikan*, 38(1), Article 6. https://doi.org/10.21009/pip.381.6
21. Susilo, C. Y., & Prihatnani, E. (2022). Scaffolding for slow learner children on integer operations. *Kreano: Jurnal Matematika Kreatif-Inovatif*, 13(1), 1–10.
22. Talino, J. O. (2024). Intervention strategies to improve numeracy skills of Grade 6 learners. *International Journal of Novel Research in Education*, 3(6), 122–137.
23. Van den Heuvel-Panhuizen, M. (2003). The Didactical Use of Models in Realistic Mathematics Education: An Example from a Longitudinal Trajectory on Percentage. *Educational Studies in Mathematics*, 54(1), 9–35. https://doi.org/10.1023/B:EDUC.0000005212.03219.dc
24. Verenikina, I., Chinnappan, M., & Foxwell, A. (2024). The development of pre-service teachers' conceptual understanding of scaffolding numeracy. *Australian Teacher Education Association Conference Proceedings*, 585–595.
25. Verenikina, I., Kervin, L., & Murphy, C. (2024). Scaffolding and the zone of proximal development: A review of the literature. *Journal of Educational Psychology and Practice*, 12(1), 45–62.
26. Vygotsky, L. S. (1978). *Mind in Society: The Development of Higher Psychological Processes*. Cambridge, MA: Harvard University Press.
27. Widodo, S. A., & Wahyudin, D. (2018). Development of Mathematical Literacy through Realistic Mathematics Education. *Journal of Physics: Conference Series*, 948(1), 012037. https://doi.org/10.1088/1742-6596/948/1/012037
28. Wijaya, T., Hidayat, W., Hermita, N., Alim, J., & Talib, C. (2024). Exploring contributing factors to PISA 2022 mathematics achievement: Insights from Indonesian teachers. *Infinity Journal*, 13(1), 139–156. https://doi.org/10.22460/infinity.v13i1.p139-156
29. Wood, D., Bruner, J. S., & Ross, G. (1976). The Role of Tutoring in Problem Solving. *Journal of Child Psychology and Psychiatry*, 17(2), 89–100. https://doi.org/10.1111/j.1469-7610.1976.tb00381.x
30. Zulkardi, B., & Sabon, S. S. (2023). Realistic mathematics education for inclusive classrooms: Bridging context and cognition. *Journal on Mathematics Education*, 14(4), 701–720.