The 4th International Conference on Education Innovation and Social Science, August 2025
ISSN (Online): 2961-9602

EXPLORING THE ROLE OF ASSESMENT IN SUPPORTING DEEP LEARNING IN MATHEMATIC: A QUALITATVE LITERATURE STUDY

Putri Alawiyah Lubis[1], Iin Kartini[2], Kania Utari[3], Lisa Rahmadani Pohan[4], Sischa Monika Lumban Toruan[5]

[1, 2,3,4,5]State University of Medan
[1]putrialawiyahaswarilubis@gmail.com, [2]kartiniiin@gmail.com, [3]kaniautari1405@gmail.com, [4]lisarahmadani2000@gmail.com, [5]monikasicha@gmail.com

Keyword

deep learning,assessment, mathematics education

Abstract

This study aims to examine the role of assessment in supporting deep learning in mathematics through a qualitative literature review method. Data were obtained from a systematic search on Google Scholar, DOAJ, and the national education repository using the keywords 'deep learning' and 'mathematics assessment,' focusing on articles published since 2022 that are relevant to primary and secondary education in Indonesia. Ten articles met the inclusion criteria and were analysed thematically to identify patterns of strategies, outcomes, and the relationship between assessment and deep learning. The results of the study indicate that assessment plays a role not only in measuring final outcomes but also in monitoring thinking processes, conceptual understanding, and the ability to connect material to real-world contexts. The implementation of continuous formative assessment, projects, portfolios, and instruments based on Higher Order Thinking Skills (HOTS) has proven effective in promoting student engagement, providing constructive feedback, and strengthening 21st-century skills. The integration of authentic assessment with innovative learning models such as Indonesian Realistic Mathematics Education (PMRI), Problem-Based Learning, Project-Based Learning, and interactive evaluation technology enriches the learning experience and supports the achievement of the Pancasila learner profile. Challenges include limitations in teacher understanding, learning resources, and a tendency for assessment to focus on final outcomes. This study recommends teacher training, the development of practical guidelines, and further research to optimise the integration of assessment and deep learning in the context of mathematics education.

INTRODUCTION

Education in the 21st century requires students to possess the ability to think critically, creatively, and collaboratively, as well as to solve complex problems. Amid constantly changing and uncertain global challenges, the learning process should not merely focus on memorizing information, but also direct students toward deeper understanding, or deep learning. This emphasizes the importance of conceptual comprehension, the interconnection between ideas, and the application of knowledge in real-life situations. In the context of mathematics learning, deep learning is crucial for developing logical thinking skills, problem-solving abilities, and the capacity to apply skills in new contexts.

One of the key elements influencing the success of deep learning is assessment. Effective assessment not only evaluates students' achievements but also supports the learning process through constructive feedback, monitoring of progress, and adjustments in teaching methods. The Academic Paper on Deep Learning published by the Ministry of Primary and Secondary

ISSN (Online): 2961-9602

Education (2025) emphasizes that assessment in the context of deep learning should be authentic, comprehensive, and balanced between formative and summative evaluations.

Furthermore, the successful implementation of deep learning cannot be separated from the application of education that meets students' needs (differentiated instruction). Every student has unique characteristics in terms of abilities, interests, learning styles, and prior knowledge; therefore, educators need to develop flexible, student-centered learning processes (Ashari, Hasudungan, & Nababan, 2024). This principle aligns with the concept of differentiated instruction introduced by Carol Ann Tomlinson, which includes differentiation in content, process, product, and learning environment (Tomlinson, 1999). By identifying students' readiness, interests, and learning profiles, educators can design relevant and contextual learning experiences that empower students, enabling assessment to be tailored for more authentic evaluation of understanding.

In mathematics learning, assessments tailored to student differences can address diverse needs, for example through varying levels of problem difficulty, multiple task options, or assessment methods that take into account each student's strengths (Anggraeni et al., 2024). This approach not only helps educators gain a clearer understanding of students' thinking processes but also fosters a mindful, meaningful, and joyful learning atmosphere principles that underpin deep learning.

Various global studies indicate that assessment systems integrating deep learning with differentiated instruction can enhance students' learning motivation, strengthen engagement in the learning process, and produce sustainable achievement. However, in practice, assessment in mathematics learning often remains focused on procedural mastery and memorization of formulas, thus failing to fully promote higher-order thinking skills.

Based on this context, this study aims to examine the contribution of assessment in supporting deep learning in mathematics through a qualitative literature analysis, taking into account the principles of learning that address students' needs. The findings of this study are expected to provide both theoretical and practical insights into effective assessment strategies, challenges in their implementation, and recommendations for educators to integrate assessment in facilitating deep, inclusive, and meaningful mathematics learning.

METHOD

This study uses a qualitative literature review method to examine the role of assessment in supporting deep learning in mathematics. This method involves reviewing, identifying, evaluating, and interpreting all available research. In line with Triandini et al. (2019), this method was used to conduct a systematic review and identification of journals in each process by following the predetermined steps. Triandini et al. (2019) explain the stages in SLR as follows: (1) Research Question. (2) Search Process. (3) Inclusion and Exclusion Criteria. (4) Quality Assessment. (5) Data collection. (6) Data analysis.

Data was collected through systematic searches on Google Scholar, DOAJ, and the national education repository, using keywords such as "deep learning," "assessment in mathematics education," and "education." Only articles published in 2022 or later that had undergone peer review, were relevant to primary and secondary education in Indonesia, and directly discussed the implementation of deep learning were included. Ten articles were selected based on specific inclusion criteria and analysed thematically to identify patterns of strategies, outcomes, and relationships in learning. This method provides a comprehensive synthesis of the practices and dynamics of deep learning integration in supporting national education reform (Kharisma et al., 2025).

RESULTS

Literature search was conducted through Google Scholar and Research Gate databases using the keywords 'Deep Learning' and 'mathematics assessment'. Various articles were obtained

ISSN (Online): 2961-9602

from the search results, which were then filtered based on predetermined criteria. The selection results produced a list of articles used, as shown in Table 1.

Table 1. Results of the *Deep Learning* dan Assemen in Mathematics Article Search

No.	Researcher (Year)	Journal Name (Year, Vol, No, Page)	Article Title
1	(Dalia et al., 2025)	*Journal of Educational Research, August, 22 (2), 2025, page. 202-210*	*Needs Analysis for Designing Deep Learning-Based Mathematics Instruction through the Traditional Congklak Game in Elementary Schools*
2	(Andayani & Madani, 2023)	Jurnal Educatio ISSN 2459-9522 (Print), 2548-6756 (Online) Vol. 9, No. 2, 2023, pp. 924-930	The Role of Learning Assessment in Improving Student Achievement in Primary Education
3	(Ansya et al., 2023)	Journal of Mathematics Education Innovation P-ISSN 2655-2752, E-ISSN 2655-2345 June 2024, Volume 6 No. 2 page. 173 - 184 DOI	The Role of Learning Evaluation in Grade V Mathematics Subjects in Elementary Schools
4	(Rosiyati et al., 2025)	Al-Irsyad Journal Of Mathematics Education E-ISSN : 2828-0857, P-ISSN : 2828-5478 Volume 4 No 2 July 2025	Deep Learning Approach in the Merdeka Curriculum
5	(Rahayu et al., 2025)	Lampung University Mathematics Education Journal Vol. 13, No. 1, pp. 9 – 25 e-ISSN: 2715–856X p-ISSN:2338-1183	Indonesian Realistic Mathematics Education in Deep Learning: A Literature Review
6	(Sity Rahmy Maulidya et al., 2025)	Journal of Community Service and Educational Research Volume 4 No. 1, Juli-September 2025, pp 1274-1278	Deep Learning to Support Deep Understanding in Mathematics Learning
7	(Mustapa, 2025)	Journal of Primary Education, ISSN Cetak : 2477-2143 ISSN Online : 2548-6950 Volume 10 Nomor 02, Juni 2025	Implementation of the Independent Curriculum Learning Approach: Understanding by Design, Differentiation, and Deep Learning
8	(Hafidzni et al., 2025)	Journal of Mandalika Literature, Vol. 6, No. 3, 2025, e-ISSN: 2745-5963	Literature Review on the Application of Pedagogical Deep Learning and Hots to Improve Literacy and Numeracy Towards Indonesia Emas 2045

ISSN (Online): 2961-9602

9	(Kharisma et al., 2025)	Al-Zayn Journal of Social Sciences & Law: Journal of Social Sciences & Law e-ISSN 3026-2917 p-ISSN 3026-2925 Volume 3 Nomor 3, 2025	Meaningful Learning Transformation through Deep Learning: A Literature Review within the Framework of the Merdeka Curriculum
10	(Engelina Nababan et al., 2025)	Katalis Pendidikan: Journal of Education and Mathematics Volume. 2, Nomor. 3 September 2025 e-ISSN: 3046-5699; p-ISSN: 3046-6156, page. 14-20	The Application of Deep Learning Approaches to Support Mathematics Learning in Primary Schools

DISCUSSION

The articles identified in the previous stage were then analyzed in depth to examine the content and identify the relationship between deep learning concepts and assessment in mathematics learning. The findings of this analysis were then summarized and presented in Table 2.

Table 2. Review Results of Articles Related to Deep Learning and Assessment in Mathematics

No	Author	Title	Discussion	Relation
1	(Dalia et al., 2025)	*Needs Analysis for Designing Deep Learning-Based Mathematics Instruction through the Traditional Congklak Game in Elementary Schools*	This study examines the needs of elementary school teachers in designing deep learning-based mathematics lessons through the congklak game. The results show that teachers understand the concept in general but have not yet applied it systematically; the use of congklak is still sporadic, and there are obstacles regarding media, lesson plans (RPP), and guidelines. The study emphasizes the need for a structured deep learning design based on congklak to enhance students' mathematical understanding and socio-emotional skills.	In deep learning for mathematics, assessment plays a role in monitoring students' conceptual understanding and process, not just the final result. This article emphasizes the need for integrated formative assessment, such as thru congklak activities, to identify difficulties, provide timely feedback, and measure social-emotional skills like cooperation and responsibility, making learning more meaningful and holistic.
2	(Andayani & Madani, 2023)	The Role of Learning Assessment in Improving Student Achievement in Primary Education	This study examines the role of assessment in improving student achievement in primary education through a qualitative study at SDIT Darul Hikam Insani. The results show that effective assessment, especially formative and integrated into learning, can provide constructive feedback, motivate students, and help teachers adjust teaching	Assessment plays an important role in promoting deep learning in mathematics by providing meaningful and constructive feedback so that students not only memorize concepts but also understand, connect, and apply knowledge critically. Through formative assessment

ISSN (Online): 2961-9602

			strategies. Assessment plays an important role not only as a benchmark for achievement but also as a basis for lesson planning, remedial programs, and curriculum evaluation, positively impacting student achievement and motivation.	conducted during the learning process, teachers can monitor students' mathematical conceptual understanding, identify difficulties, and adjust teaching strategies to strengthen deep understanding. Assessment also helps students reflect on their thinking process, develop problem-solving skills, and build connections between mathematical concepts.
3	(Ansya et al., 2023)	The Role of Learning Evaluation in Grade V Mathematics Subjects in Elementary Schools	This study examines the role of mathematics learning evaluation in 5th-grade elementary school and the instruments used by teachers. Using a qualitative method, it was found that evaluation serves to measure learning achievement, provide feedback, and identify students' strengths and weaknesses. The instruments used include written tests, assignments, and portfolios, which are consistently applied to support the improvement of mathematics learning quality.	This study examines the role of mathematics learning evaluation in 5th grade elementary school and the instruments used by teachers. Using a qualitative method, it was found that evaluation serves to measure learning achievement, provide feedback, and identify students' strengths and weaknesses. The instruments used include written tests, assignments, and portfolios, which are consistently applied to support the improvement of mathematics learning quality. Based on the article, assessment plays an important role in supporting deep learning in mathematics by providing a complete picture of students' understanding and skills, rather than simply measuring final results. Thru written tests, assignments, and portfolios, teachers can assess students' thinking processes, problem-solving abilities, and

ISSN (Online): 2961-9602

				application of concepts in real-world contexts. This consistent and diverse assessment helps students reflect on their learning, correct mistakes, and develop a stronger conceptual understanding, making mathematics learning more meaningful and sustainable.
4	(Rosiyati et al., 2025)	Deep Learning Approach in the Merdeka Curriculum	This article discusses the connection between the Merdeka Curriculum and deep learning in mathematics education, where both emphasize contextual, student-centered learning and a deep understanding of concepts. Deep learning, thru the pillars of mindful, meaningful, and joyful learning, encourages students to think critically, creatively, and solve problems, while also connecting mathematics to real life thru models like PBL or PjBL. This approach also strengthens process-based, project-based, and portfolio-based assessments, ensuring that evaluations more accurately reflect students' competencies, aligning with the Merdeka Curriculum's goal of developing academic abilities, character, and collaboration. .	In mathematics learning, assessment plays an important role in supporting deep learning by evaluating the thinking process, conceptual understanding, and the ability to apply knowledge in real-world contexts, not just the final result. Assessment is conducted continuously thru formative assessments, projects, portfolios, and self-reflection so that teachers can comprehensively monitor learning progress and provide appropriate feedback. Thus, assessment helps students identify their strengths and weaknesses, deepen their understanding of concepts, and develop critical, creative, and collaborative thinking skills, which are the goals of in-depth learning according to the Merdeka Curriculum.
5	(Rahayu et al., 2025)	Indonesian Realistic Mathematics Education in Deep Learning: A Literature Review	Indonesian Realistic Mathematics Education in Deep Learning: A Literature Review This article reviews the relationship between Indonesian Realistic Mathematics Education (PMRI) and Deep Learning thru a literature review of 15 studies.	The role of assessment in supporting deep learning in mathematics within the context of PMRI is to monitor and evaluate students' thinking processes, not merely to measure final outcomes. Assessment is used to

ISSN (Online): 2961-9602

			The results show that PMRI, which emphasizes real-world context-based learning, progressive mathematization, and interactivity, aligns with the principles of Deep Learning, which prioritizes conceptual understanding, reflection, and the application of knowledge in daily life. PMRI has proven effective in improving problem-solving abilities, numeracy literacy, creative thinking, mathematical representation, and learning independence, especially when integrated with innovative learning models such as Flipped Classroom, Problem-Based Learning, and Game-Based Learning. Integrating PMRI with Deep Learning results in more meaningful, reflective, and applicable mathematics learning, although the literature discussing the connection between the two is still limited.	identify the extent to which students understand concepts, connect knowledge to real-life situations, and creatively apply problem-solving strategies. In PMRI-based learning, formative assessments such as observation, discussion, portfolios, and reflection are important because they provide constructive feedback, help teachers adjust their teaching strategies, and encourage students to think critically, reflect on mistakes, and improve their understanding. Thus, assessment plays an active role in shaping meaningful, sustainable learning experiences that are aligned with deep learning objectives
6	(Sity Rahmy Maulidya et al., 2025)	Deep Learning to Support Deep Understanding in Mathematics Learning	This research discusses the PKM activities at SDN 024 Tarai Bangun, which aim to improve elementary school teachers' understanding of applying deep learning in mathematics instruction and using Quizizz as an interactive evaluation medium. The activities include material delivery, quiz creation practice, and discussions on implementation strategies. Deep learning is introduced with the mindful, meaningful, and joyful principles to encourage active student engagement, connect material to real-world contexts, and create enjoyable learning. As a result, teachers' understanding significantly increased, their ability to create interactive evaluations improved, and a commitment emerged to integrate this method to	In the article, assessment plays an important role in supporting deep learning in mathematics by utilizing interactive evaluation media such as Quizizz, which is based on technology and artificial intelligence. Assessment is not only used to measure final results, but also serves as a fun and motivating tool for students thru interactive quizzes, instant feedback, and a positive competitive atmosphere. With this approach, evaluation helps teachers monitor students' thinking processes, quickly identify misconceptions, and provide mindful, meaningful, and joyful learning experiences. This

ISSN (Online): 2961-9602

			support students' 21st-century skills.	encourages a deep understanding of concepts and the development of 21st-century skills such as critical thinking, creativity, communication, and collaboration.
7	(Mustapa, 2025)	Implementation of the Independent Curriculum Learning Approach: Understanding by Design, Differentiation, and Deep Learning	This article examines the application of Understanding by Design (UbD), differentiated instruction, and deep learning in the Merdeka Curriculum thru 30 literature sources. As a result, differentiated learning is applied more frequently than UbD and deep learning. UbD emphasizes backward design and differentiated learning based on diagnostic assessments, while deep learning focuses on higher-order thinking skills but is limited by facilities. All three are effective if the teacher fully understands and masters their application.	In the context of the article, assessment plays an important role in supporting deep learning in mathematics by providing diagnostic assessments to identify students' needs, interests, and readiness, allowing for differentiated instruction. Additionally, assessment is designed from the outset thru the UbD approach to ensure alignment between learning objectives, processes, and outcomes. Thru targeted formative and summative assessments, teachers can monitor the development of higher-order thinking skills, problem-solving abilities, and student reflection, which are at the heart of deep learning.
8	(Hafidzni et al., 2025)	Literature Review on the Application of Pedagogical Deep Learning and Hots to Improve Literacy and Numeracy Towards Indonesia Emas 2045	This research examines the integration of deep learning and Higher Order Thinking Skills (HOTS) to improve literacy and numeracy in support of the "Indonesia Emas 2045" vision. Based on an analysis of five articles (2020–2025), the combination of the two has proven effective in promoting deep learning, critical, creative, and reflective thinking, and is relevant for mathematics, teacher training, and inclusive education. The main challenges include limited infrastructure and teacher readiness,	Based on the article, assessment plays an important role in supporting deep learning in mathematics by measuring students' conceptual understanding thru Higher Order Thinking Skills (HOTS)-based questions. This assessment not only evaluates memorization but also assesses the ability to analyze, evaluate, and apply concepts in real-world contexts, while providing

ISSN (Online): 2961-9602

			necessitating contextual, inclusive, evidence-based learning strategies, as well as further empirical research. .	constructive feedback for learning improvement. With questions that demand complex reasoning and non-routine problem-solving, the assessment encourages critical, creative, and reflective thinking, making learning more meaningful and inclusive.
9	(Kharisma et al., 2025)	Meaningful Learning Transformation through Deep Learning: A Literature Review within the Framework of the Merdeka Curriculum	This research examines the role of deep learning in meaningful learning according to the Merdeka Curriculum thru a review of 10 recent articles. The results show that deep learning is effective in improving concept understanding, motivation, critical thinking, and student character at various levels. The strategy includes project-based learning, reflective discussions, and contextual simulations. The challenges faced include limited teacher understanding, resources, and suboptimal assessment. The success of deep learning requires system support, ongoing teacher training, and curriculum innovation.	Assessment in mathematics learning plays a role in supporting in-depth learning by evaluating thinking processes, problem-solving, and concept application, not just correct answers. Continuous formative assessment helps teachers monitor progress, provide feedback, and adjust strategies so that students understand concepts, think critically, and connect material to real life. .
10	(Engelina Nababan et al., 2025)	The Application of Deep Learning Approaches to Support Mathematics Learning in Primary Schools	This research discusses the application of deep learning to support mathematics learning in elementary school thru a literature review. The results show that this approach improves student understanding, encourages active engagement thru simulations, experiments, and discussions, and can be implemented using AI technology to personalize the material. The challenges that arise include time constraints, the digital divide, and teacher readiness. Overall, deep learning helps students	Based on the article, assessment plays an important role in supporting deep learning of mathematics in elementary school. Assessment is not only used to measure students' memorization abilities, but also emphasizes conceptual understanding, critical thinking skills, and the application of mathematics in real-life situations. With assessments designed to evaluate students'

ISSN (Online): 2961-9602

	understand the material in depth, think critically, and connect learning to everyday life.	understanding and skills holistically, teachers can identify students' difficulties, adjust learning materials and strategies, and provide appropriate feedback. This assessment also encourages students to be reflective about their learning process, increases active engagement, and ensures that learning mathematics becomes more meaningful, contextual, and relevant to everyday life.

Based on a study of ten analyzed articles, it is evident that assessment plays a central role in supporting deep learning in mathematics. Assessment is no longer positioned solely as a tool to measure final outcomes, but rather as a means to monitor students' thinking processes, conceptual understanding, and ability to connect material to real-life situations. The implementation of continuous formative assessment, portfolios, projects, and Higher Order Thinking Skills (HOTS)-based instruments is considered effective in providing a complete picture of students' learning development and facilitating constructive feedback.

The integration of innovative learning approaches with authentic assessment is the common thread running thru these various studies. Models such as Indonesian Realistic Mathematics Education (PMRI), Problem-Based Learning, Project-Based Learning, Flipped Classroom, and educational games like congklak have been proven to increase student engagement and understanding when supported by appropriate assessment. The use of technology, such as Quizizz and artificial intelligence, also enriches the assessment process by providing interactive, instant evaluations and motivating students to actively engage in the learning process.

The Merdeka Curriculum, which emphasizes contextual, student-centered, and competency-based learning, aligns closely with the principles of deep learning. Assessment within this curriculum framework emphasizes the achievement of the Pancasila Student Profile thru process assessments, projects, self-reflection, and authentic assessments. With the right assessment strategies, teachers can help students develop 21st-century skills, such as critical thinking, creativity, collaboration, and communication, while also fostering sustainable learning motivation.

Nevertheless, the identified challenges include limited teacher understanding of deep learning and process-based assessment concepts, limited learning facilities and media, and a tendency for assessment instruments to still focus on final results. Therefore, sustained efforts are needed in the form of teacher training, practical guide development, and further empirical research to test the effectiveness of combining HOTS assessment, learning technology, and innovative learning models on students' long-term learning outcomes.

CONCLUSION

Based on a review of ten articles, it can be concluded that assessment plays a central role in supporting deep learning in mathematics. Effective assessment not only evaluates final outcomes but also monitors the thinking process, conceptual understanding, and students' ability to apply knowledge in real-world contexts. Formative assessment strategies, portfolios, projects,

and Higher Order Thinking Skills (HOTS) are key to providing a comprehensive overview of students' learning progress and facilitating constructive feedback. Integrating authentic assessment with innovative learning models and technology can enhance students' engagement, motivation, and 21st-century skills. The Merdeka Curriculum provides a foundation aligned with the principles of deep learning, but its successful implementation requires support in the form of enhanced teacher competencies, adequate facilities, and assessment tools focused on the process. Efforts to strengthen teacher capacity and further research are essential to ensure that assessment can serve as the primary driver for meaningful, sustainable, and relevant mathematics learning that meets the demands of the times.

ACKNOWLEDGEMENT

The authors would like to express their sincere gratitude to the lecturers and colleagues at the State University of Medan for their valuable guidance, constructive feedback, and continuous encouragement throughout the completion of this study. Appreciation is also extended to the researchers and authors whose works were reviewed in this study, as their contributions have provided essential insights into the topic. Finally, the authors thank their families and peers for their unwavering support and motivation during the research and writing process.

REFERENCES

Andayani, T., & Madani, F. (2023). Peran penilaian pembelajaran dalam meningkatkan prestasi siswa di pendidikan dasar. *Jurnal Educatio FKIP UNMA, 9*(2), 924–930. https://doi.org/10.31949/educatio.v9i2.4402

Anggraeni, S. D., Anggraini, L., Indah, N., Rahmawati, S. L., Alyyani, N. R., & Benu, V. B. (2024). Analisis kebutuhan penilaian dan media pembelajaran berbasis digital pada mata pelajaran matematika. *JKIP: Jurnal Keguruan dan Ilmu Pendidikan, 2*(1), 1–7.*

Ansya, Y. A., Alfianita, A., Syahkira, H. P., & Syahrial, S. (2023). Peran evaluasi pembelajaran pada mata pelajaran matematika kelas V sekolah dasar. *Indiktika: Jurnal Inovasi Pendidikan Matematika, 6*(2), 173–184. https://doi.org/10.31851/indiktika.v6i2.15030

Ashari, H., Hasudungan, A. N., & Nababan, S. A. (2024). Pembelajaran berdiferensiasi perspektif Ki Hajar Dewantara dan implementasinya. *TOGA: Jurnal Keguruan dan Ilmu Pendidikan, 1*(3), 85–92.*

Dalia, A., Muslihin, H. Y., & Nur, L. (2025). Analisis kebutuhan desain pembelajaran mendalam (deep learning) matematika berbasis permainan congklak di sekolah dasar. *Jurnal Pendidikan Dasar, 22*(2), 202–210.*

Engelina Nababan, E., Hasibuan, S. H. M., Mika, S., Putri, T. A., Mailani, E., & Rarastika, N. (2025). Penerapan pendekatan deep learning untuk mendukung pembelajaran matematika di sekolah dasar. *Katalis Pendidikan: Jurnal Ilmu Pendidikan dan Matematika, 2*(3), 14–20. https://doi.org/10.62383/katalis.v2i3.1865

Hafidzni, N., Putri Yasmine, N., & Yasin, M. (2025). Kajian literatur penerapan deep learning pedagogis dan HOTS untuk meningkatkan literasi dan numerasi menuju Indonesia Emas 2045. *Journal of Mandalika Literature, 6*(3), 752–765.*

Kharisma, N., Septiani, D. E., Suryaningsih, F., Mahdum, & Erlisnawati. (2025). Transformasi pembelajaran bermakna melalui deep learning: Kajian literatur dalam kerangka kurikulum merdeka. *Al-Zayn: Jurnal Ilmu Sosial & Hukum, 3*(3), 1895–1905. https://ejournal.yayasanpendidikandzurriyatulquran.id/index.php/AlZayn/article/view/1462

Mustapa, A. K. R., et al. (2025). Implementasi pendekatan pembelajaran kurikulum merdeka: *Understanding by design*, berdiferensiasi, dan deep learning. *Jurnal Ilmiah Pendidikan Dasar, 10*(2), 427–441. https://journal.unpas.ac.id/index.php/pendas/article/download/25134/12767/100750

Rahayu, C., Setiani, W. R., Yulindra, D., & Azzahra, L. (2025). Pendidikan matematika realistik Indonesia dalam pembelajaran mendalam (deep learning): Tinjauan literatur. *Jurnal Pendidikan Matematika Universitas Lampung, 13*(1), 9–25. https://doi.org/10.23960/mtk/v13i1.pp9-25

Rosiyati, D., Erviana, R., Fadilla, U., Sholihah, U., & Pascasarjana Tadris Matematika UIN Sayyid Ali Rahmatullah Tulungagung. (2025). Pendekatan deep learning dalam kurikulum merdeka. *Journal of Mathematics Education, 4*(1), 131–143.*

Sity Rahmy Maulidya, S. R., Insani, S. U., & Zulfah. (2025). Deep learning untuk mendukung pemahaman mendalam dalam pembelajaran matematika. *Jurnal Pengabdian Masyarakat dan Riset Pendidikan, 4*(1), 1274–1278. https://doi.org/10.31004/jerkin.v4i1.1729

Tomlinson, C. (1999). *The differentiated classroom*. Association for Supervision and Curriculum Development.

Triandini, E., Jayanatha, S., Indrawan, A., Werla Putra, G., & Iswara, B. (2019). Metode systematic literature review untuk identifikasi platform dan metode pengembangan sistem informasi di Indonesia. *Indonesian Journal of Information Systems, 1*(2), 63–76.*