Kognitif
Jurnal Riset HOTS Pendidikan Matematika
Volume- 5 No- 4 Page 1672 – 1683
ISSN 2776-9704 P-ISSN 2776-9984
https://doi.org/10.51574/kognitif.v5i4.4348

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How to cite: Anggeraini, N., Nasrullah, A., & Nugraha, Y. (2025). Deep Learning Approach and Students' Numeracy Skills: The Roles of Mathematical Disposition and Gender. *Kognitif: Jurnal Riset HOTS Pendidikan Matematika*, *5*(4), 1672–1683. https://doi.org/10.51574/kognitif.v5i4.4348

To link to this artcle: https://doi.org/10.51574/kognitif.v5i4.4348

Kognitif: Jurnal Riset HOTS Pendidikan Matematika
https://doi.org/10.51574/kognitif.v5i4.4348 Volume 5, No 4, October - December 2025, pp. 1672– 1683

Deep Learning Approach and Students' Numeracy Skills: The Roles of Mathematical Disposition and Gender

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Article Info

Article history:

Received Dec 02, 2025
Accepted Dec 13, 2025
Published Online Dec 15, 2025

Keywords:

Deep Learning
Numeracy Literacy
Mathematical Disposition
Gender

ABSTRACT

International and national assessments, including PISA 2022, indicate that Indonesian students' numeracy performance remains low. This situation highlights the need for instructional approaches that strengthen conceptual understanding and higher-order thinking. This study examined the effect of a deep-learning instructional approach on eighth-grade students' numeracy skills, while considering mathematical disposition and gender. We employed a non-equivalent control group quasi-experimental design with 62 Grade 8 students from a public junior high school in West Lombok, Indonesia. The experimental group (n = 31) received deep-learning instruction through concept exploration, context-based discussion, collaborative problem solving, and guided reflection, while the control group (n = 31) received regular instruction. Instruments included a numeracy test and a mathematical disposition questionnaire that underwent expert validation and met reliability criteria. We analyzed the data using descriptive statistics and ANCOVA, controlling for baseline ability (pretest). The results showed higher numeracy scores in the experimental group across disposition categories. ANCOVA indicated significant main effects of instructional approach, gender, and mathematical disposition, whereas several interaction effects were not significant. These findings support the use of deep-learning instruction as a promising strategy to strengthen numeracy within the Merdeka Curriculum implementation..

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Introduction

Numeracy literacy is a fundamental competency required by students to adapt to the demands of the 21st century. However, various national and international assessment results

still show weak mastery of this competency in Indonesia. The 2022 PISA report shows that Indonesia's mathematics literacy score decreased by 13 points compared to 2018, although this decline is still smaller than the global average of 21 points (Kemendikbudristek, 2023). Although Indonesia's ranking has improved by five positions, this achievement still indicates that students' numeracy literacy is low and requires serious attention (Fitriani, 2025). The 2023 Education Report Card data further confirms this condition, where only 40.63% of junior high school/MTs students and 41.14% of senior high school/vocational school students achieved a numeracy score above the minimum standard. Findings at SMPN 1 Gunungsari also show a similar condition, where only about 35% of eighth-grade students achieved mastery in context-based numeracy tests. The low quality of numeracy is not only influenced by limited mastery of the material but also by a learning approach that is still dominated by rote learning or surface learning. A learning model that emphasizes procedures without understanding the meaning makes students unable to transfer knowledge to new situations (Han et al., 2017; Arumdalu, 2021). As a result, reasoning skills, conceptual understanding, and context-based problem solving do not develop optimally (Suwandi et al., 2024; Herutomo, 2019).

As an alternative, the deep learning approach offers a more relevant solution to help students build critical, reflective, and applicable conceptual understanding. This approach is based on the principles of mindful learning, meaningful learning, and joyful learning, which encourage active engagement in concept exploration, contextual discussion, collaboration, and reflection. Recent research shows that deep learning can improve 21st-century skills, learning motivation, and meaningful understanding of mathematics (Wijaya, 2025; Hariyanti, 2024; Nelvia et al., 2019). However, most studies are descriptive and have not quantitatively tested its effectiveness on numeracy literacy. In addition to learning approaches, mathematical disposition and gender are also important factors in numeracy achievement. Mathematical disposition includes positive attitudes, self-confidence, perseverance, and logical thinking that influence students' ability to interpret and solve context-based problems (Kurniawati et al., 2023; Soemarmo, 2019). Research reveals that students with high dispositions tend to think more critically and are more resilient in facing numeracy problems (Wirawan, 2023). Gender also plays a role, with several studies showing differences in performance tendencies between male and female students in solving numeracy problems (Baubesy et al., 2025; Suryaprani et al., 2016).

Based on the above description, there is a gap in research related to the effectiveness of deep learning on numeracy literacy, taking into account mathematical disposition and gender simultaneously. To date, there has been little quantitative research testing the relationship between these three variables in the context of mathematics learning. Thus, this study aims to examine the effectiveness of the deep learning approach, taking into account differences in mathematical disposition and gender. The findings of this study are expected to assist in developing learning strategies that are more responsive to student characteristics in order to support the implementation of the Merdeka Curriculum.

Method

Type of Research

This study applies a quantitative approach through a quasi-experimental non-equivalent control group pretest-posttest. In this design, the two groups were formed without random selection at the individual level, but were still given a pretest to measure initial equivalence (Sugiyono, 2017). This study established the deep learning approach as the independent variable and numeracy literacy skills as the dependent variable, while mathematical disposition and gender were used as covariates and moderators in further analysis. This design was chosen

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https://doi.org/10.51574/kognitif.v5i4.4348 Volume 5, No 4, October - December 2025, pp. 1672– 1683

because it is suitable for testing the effect of treatment in field conditions that do not allow for full randomization and can be analyzed using Analysis of Covariance (ANCOVA) to control for the effect of initial differences between groups.

Population and Sample

This study focused on all eighth-grade students at SMPN 1 Gunungsari in the odd semester of the 2025/2026 academic year. Sampling was conducted using simple random sampling at the class level, so that all classes had an equal chance of being selected as the experimental or control group. Two classes were then selected as samples, namely class VIII A (31 students) as the experimental group and class VIII B (31 students) as the control group. This random selection between classes was intended to minimize bias in the sampling process.

Research Instruments

The research used instruments to observe and assess various natural and social events. The instruments used in this study consisted of:

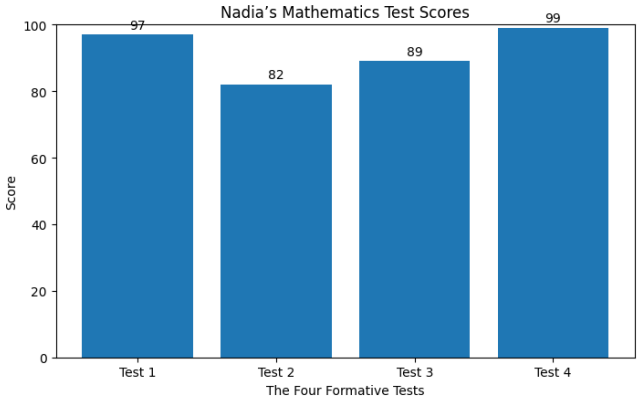
Test Questions

These test questions are context-based numeracy essay questions that measure students' competence in understanding, interpreting, and solving everyday problems using mathematical concepts. The questions are compiled based on numeracy literacy indicators according to Han et al. The test results are analyzed to determine the improvement in numeracy literacy after applying the deep learning approach. This study uses two essay questions that focus on single-variable linear inequality material.

Table 1. Numeracy Literacy Competency Indicators

No	Numeracy Literacy Indicators	Question Number	Question Type
1	The ability to apply symbols and numbers related to basic mathematical concepts to solve problems arising from various situations in everyday life.	1, 2	Description
2	The ability to understand and evaluate information presented in various forms of data presentation, such as charts, tables, graphs, and diagrams.	1, 2	
3	The ability to interpret the results of analyzing this information in order to make logical predictions and take appropriate decisions according to the context.	1, 2	

Table 2. Numeracy Literacy Test Questions

No	Problems
1	Look at the picture and paragraph below!  Nadia scored 97, 82, 89, and 99 on four formative tests in mathematics. To get an A, she must have a minimum average of 90. What score does Nadia need to achieve on the fifth formative test to get an A? Write the inequality shown in the illustration of Nadia above!
2	Look at the following table showing the number of photocopies at the school cooperative during the first three days of the week. **Day** / **Number of Photocopies** / **Price per Sheet** Monday / 12 / 200 Tuesday / 15 / 200 Wednesday / 10 / 200 On Thursday, the price per sheet remained at Rp200, as on previous days. The cooperative targeted a total income of at least Rp12,600 over four days. How many photocopies must be sold on Thursday to achieve this target? Write the inequality model!

Before the research was conducted, the test instruments were validated by two validators, namely a Mathematics Education lecturer and a junior high school mathematics teacher who had expertise in learning assessment. The validation was conducted to assess three main components, namely content accuracy, item construction quality, and language clarity. The assessment was given using a four-category scale, then analyzed using the Content Validity Index (CVI) at the item level (I-CVI) and instrument level (S-CVI). The validation results showed that validator 1 gave a score of 15 out of 16 and validator 2 gave a score of 16 out of 16. The average I-CVI and S-CVI scores were in the "very good" category, so all items were declared valid in terms of content and suitable for use in the trial phase.

Questionnaire Sheet

The questionnaire sheet was designed using a four-choice Likert scale (SS, S, TS, STS) which was developed based on mathematical disposition indicators, namely curiosity, self-confidence, perseverance, and a tendency to think reflectively.

Observation Sheet

The observation sheet was used to review the implementation of learning activities during the research process. This instrument served to record the teacher's activities during the application of the learning model so that the researcher could assess the suitability of the implementation with the predetermined learning design.

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Data Collection

The research data was obtained through four techniques, namely, pretest-posttest to measure the numeracy literacy level of students in the experimental and control groups, a mathematical disposition questionnaire compiled based on indicators of curiosity, self-confidence, perseverance, and reflective thinking tendencies, observation of learning implementation during the application of deep learning, and documentation in the form of a list of students, initial score data, learning schedules, and archives of research support activities.

Data Analysis

The data were analyzed using Analysis of Covariance (ANCOVA) to test the effectiveness of the deep learning approach on numeracy literacy skills while controlling for differences in initial abilities (pretest). In addition, ANCOVA was used to assess the influence of mathematical disposition, gender, and interactions between variables on posttest results. The prerequisite tests in this study included several stages. Data normality was tested using Kolmogorov-Smirnov because the number of samples per group was more than 30 (Ghozali, 2018). The data was declared normal if Sig. $\geq 0{,}05$. Next, homogeneity was tested using Levene's Test. The variance was considered homogeneous if Sig. $\geq 0{,}05$. Linearity was tested to ensure that the relationship between the covariate (pretest) and the dependent variable (posttest) was linear. The assumption is met if $> 0{,}05$ in the Deviation from Linearity row. In addition, the homogeneity of regression slopes was tested to ensure that the relationship between covariates and posttest scores was the same across all groups. The test was performed through group × covariate interaction. The assumption is met if Sig. $> 0{,}05$. Hypothesis testing in this study was conducted using ANCOVA to test several hypotheses, namely: H_{01} states that there is no difference in numeracy literacy ability based on mathematical disposition after controlling for the pretest, H_{02} states that there is no difference in numeracy literacy ability based on gender after controlling for the pretest, and H_{03} states that there is no interaction between mathematical disposition and gender after controlling for the pretest. Decisions were made based on the significance value (Sig.), where Ho was rejected if Sig. $\leq 0{,}05$, indicating a significant effect, and H_0 was accepted if Sig. $> 0{,}05$, meaning there was no significant effect.

Research Results

Two classes were involved in this study. Class VIII A was considered the experimental class, which used a deep learning approach, and the control class used a conventional learning approach. A pretest was conducted before the treatment was given to measure the students' initial numeracy literacy level and distribute a mathematical disposition questionnaire. After the learning process was carried out according to the design, a posttest was administered to see the changes in numeracy skills in both groups. The results of the normality test in this study are presented in Table 3.

Table 3. Normality Test Results in the Experimental Class and Control Class

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Experimental class pretest score	.191	31	.005	.933	31	.054
Control class pretest score	.169	31	.025	.934	31	.056

Experimental posttest score	.133	31	.173	.947	31	.132
Control posttest score	.178	31	.014	.933	31	.053

Table 3 shows that the normality test results produced different significance values for the two types of tests. In the Kolmogorov-Smirnov test, some of the data had a Sig. value $< 0,05$ (experimental class pretest $= 0,005$, control class pretest $= 0,025$, control class posttest 0.014), indicating that it was not normal. However, the Shapiro-Wilk test, which is more accurate for small to medium sample sizes, shows that all data have Sig. values of $> 0,05$ (experimental pretest $= 0,054$, control pretest $= 0,056$, experimental posttest $= 0,132$, control posttest 0.053). Thus, based on the Shapiro-Wilk test, the data are declared to be normally distributed and meet the assumptions of parametric statistics for ANCOVA analysis. The results of the homogeneity test are shown in Table 4.

Table 4. Homogeneity Test Results

Levene's Test of Equality of Error Variances[a]			
Dependent Variable: Skor Posttest Literasi Numerasi			
F	df1	df2	Sig.
2.361	5	56	.052

Table 4 identifies that the significance value of Levene's Test is 0,052, higher than $\alpha = 0,05$. Thus, the variance between groups is considered homogeneous, so the assumption of variance homogeneity for ANCOVA is fulfilled. Because this assumption, along with the assumption of normality, has been fulfilled, further analysis can be continued using ANCOVA to test the effect of treatment and moderator factors.

Table 5. Descriptive Statistics of Students' Numeracy Literacy Ability in Terms of Mathematical Disposition and Gender

Descriptive Statistics					
Dependent Variable: Total posttest					
Student grade	Gender	Mathematical disposition	Mean	Std. Deviation	N
VIII 1	Male	Low	10.33	.577	3
		Medium	10.75	.500	4
		Hign	12.00	1.225	5
		Total	11.17	1.115	12
	Female	Low	14.00	3.606	3
		Medium	17.40	.894	5
		Hign	18.64	.505	11
		Total	17.58	2.143	19
	Total	Low	12.17	3.061	6
		Medium	14.44	3.575	9
		Hign	16.56	3.265	16
		Total	15.10	3.646	31
VIII 2	Male	Low	5.50	.577	4
		Medium	8.00	.707	5
		Hign	10.60	1.342	5
		Total	8.21	2.293	14
	Female	Low	10.80	2.280	5
		Medium	11.67	2.733	6
		Tinggi	18.50	.548	6
		Hign	13.82	4.066	17
	Total	Low	8.44	3.245	9
		Medium	10.00	2.757	11
		Hign	14.91	4.230	11
		Total	11.29	4.376	31
Total	Male	Low	7.57	2.637	7

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	Medium	9.22	1.563	9
	Hign	11.30	1.418	10
	Total	9.58	2.352	26
Female	Low	12.00	3.071	8
	Medium	14.27	3.608	11
	Hign	18.59	.507	17
	Total	15.81	3.679	36
Total	Low	9.93	3.595	15
	Medium	12.00	3.811	20
	Hign	15.89	3.704	27
	Total	13.19	4.431	62

Table 6. Results of ANCOVA *(Analysis of Covariance)*

Tests of Between-Subjects Effects

Dependent Variable: Total posttest

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1123.786[a]	12	93.649	62.102	.000	.938
Intercept	139.391	1	139.391	92.435	.000	.654
Pre-test	35.104	1	35.104	23.279	.000	.322
grade	54.937	1	54.937	36.431	.000	.426
gender	128.880	1	128.880	85.465	.000	.636
disposition	59.607	2	29.803	19.764	.000	.446
grade * gender	.021	1	.021	.014	.907	.000
class * disposition	10.932	2	5.466	3.625	.034	.129
gender * disposition	20.081	2	10.040	6.658	.003	.214
class * gender * disposition	4.997	2	2.499	1.657	.201	.063
Error	73.891	49	1.508			
Total	11990.000	62				
Corrected Total	1197.677	61				

a. R Squared = .938 (Adjusted R Squared = .923)

The results of the ANCOVA test analysis in Table 6 show that the class factor has a significant impact on students' numeracy literacy skills, as indicated by the F value = 36,431 and Sig. = 0,000 ($p < 0{,}05$). From these results, it can be seen that after controlling for pretest scores, students in classes VIII 1 and VIII 2 have different numeracy literacy abilities. In addition, the gender factor also has a significant effect on numeracy literacy ability, as indicated by a value of F = 85,465 and Sig. = 0,000. These results indicate a difference in the level of numeracy literacy between female and male students. The mathematical disposition variable also showed a significant effect on the posttest results, with an F value of = 19,764 and Sig. = 0,000. It can be concluded that there is a correlation between students' mathematical disposition levels and variations in their numeracy skills.

Meanwhile, several interactions did not show a significant effect. The interaction between class and gender had an F value of = 0,014 with Sig. = 0,907 ($p > 0{,}05$), which showed that the difference in numeracy literacy between male and female students did not depend on the class they were studying in. The interaction between gender and mathematical disposition was also significant (F = 6,658; Sig. = 0,003), indicating that there were differences in the influence of mathematical disposition on each gender group. However, the three-way interaction between grade, gender, and mathematical disposition was not significant (F = 1,657; Sig. = 0,201). The results of the study concluded that the effects of these three variables were not simultaneously interdependent.

The descriptive statistics in Table 5 support these findings. In class VIII 1, in all categories of mathematical disposition, female students had better posttest scores than male students. Female students with high disposition achieved an average of 18,64, while male students in the same category had an average of 12,00. A similar pattern was seen in class VIII 2, where female students with high dispositions obtained an average of 18,50, higher than male students who only reached 10,60. In general, the group with high dispositions showed average scores that were superior to those with medium or low dispositions in both classes and both gender groups. These findings indicate that a tendency toward better mathematical disposition is associated with higher numeracy literacy scores.

Discussion

From the descriptive analysis results, it can be seen that the difference in numeracy literacy achievement between the experimental class and the control class shows that the deep learning approach provides stronger cognitive benefits than conventional learning. This advantage arises not only because of an increase in average scores, but also because deep learning shifts students' thinking patterns from simply following procedures to building conceptual understanding through analysis, reflection, and connections between concepts. This process is in line with Wijaya's (2025) explanation that deep learning-based learning strengthens the higher-order thinking skills that are essential in solving context-based numeracy problems. This approach also provides space for students to engage in meaningful and collaborative activities, as stated by Nelvia et al. (2019), resulting in a deeper understanding. This explains why students in the experimental class showed superior numeracy literacy after initial abilities were controlled, as confirmed by the ANCOVA test.

The effectiveness of this approach is also in line with Hariyanti's (2024) findings, which confirm that project-based learning within the framework of deep learning increases motivation and understanding of mathematical concepts. Furthermore, Natsir (2025) states that contextual and collaborative activities in the Merdeka Curriculum, which are synonymous with the principles of deep learning, encourage deep cognitive activities despite constraints in facilities and technological mastery. Thus, the superiority of students in the experimental class is not merely an increase in scores, but a reflection of changes in thinking patterns built through a more meaning-oriented learning process.

Gender factors show a significant influence in this study. Female students consistently achieve higher numeracy literacy scores. This pattern can be explained by the findings of Baubesy et al. (2025) that women tend to be more thorough and stable when working on context- based problems. In addition, Rokhimah (2015) states that gender achievement differences are largely influenced by social and cultural constructs that shape learning styles, rather than biological factors. Deep learning, which emphasizes reflection, structured work, and meticulousness, seems to be more in line with certain learning behavior tendencies that are more commonly exhibited by female students. This is reinforced by Wahyudi (2025), who shows that deep learning can increase self-confidence and mathematical reasoning, two aspects that contribute to numeracy performance and are more commonly exhibited by female students in the data from this study.

Mathematical disposition variables also have a significant effect. Students with high dispositions are better able to take advantage of exploratory activities in deep learning because they have a tendency to think reflectively, are persistent, and have self-confidence when facing problems. This is in line with the findings of Wirawan (2023), and Ningsih et al. (2024), that students with high dispositions are more consistent and make fewer mistakes in solving numeracy problems. However, the research data pattern shows that deep learning does not automatically close the gap between high- and low-disposition students. On the contrary, this

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learning model tends to widen the gap because high-disposition students are quicker to optimize deep cognitive activities. This condition is similar to the findings of Efendi et al. (2025), who found that the influence of disposition on numeracy literacy remains strong even when learning strategies have been intervened.

The interaction between gender and mathematical disposition in this study is significant. This shows that disposition provides different advantages for males and females. The data pattern shows that females with high disposition show the most consistent improvement, while males with low disposition show the lowest performance. These findings reinforce the idea that the greater precision, reflection, and consistency demonstrated by female students (Baubesy et al., 2025) are foundations that are highly compatible with the demands of deep learning. Thus, the effects of learning cannot be understood solely from disposition or gender alone, but from how the two reinforce or weaken each other. The three-way interaction between class, gender, and mathematical disposition was not significant. This shows that the effectiveness of deep learning does not depend on the simultaneous combination of these three factors. In other words, deep learning works primarily through the mechanism of increasing deep understanding (Wijaya, 2025; Hariyanti, 2024; Nelvia et al., 2019), but the final achievement is still influenced by individual characteristics such as disposition and socio-cultural factors such as gender. This finding reinforces the view of Suryaprani et al. (2016) that differences in mathematics achievement are more influenced by the learning environment than by biological differences.

From a practical standpoint, teachers need to ensure that students with low dispositions receive additional support, for example through reflective scaffolding, contextual examples, and structured collaborative activities. The deep learning approach remains effective for all categories of students, but its success is highly dependent on mathematical disposition readiness and a supportive classroom environment. Theoretically, these results confirm the importance of learning models that encourage deep conceptual understanding, as mentioned by Widoyo et al. (2024) and Mayratih et al. (2019), especially to overcome Indonesian students' weaknesses in reasoning and context-based questions. The principles of mindful, meaningful, and joyful learning (Rohim, 2021) make deep learning a potential approach in encouraging continuous improvement in numeracy literacy.

Conclusion

This study shows that, in the context of eighth-grade students at SMPN 1 Gunungsari, the deep learning approach is more efficient than conventional methods in improving numeracy literacy skills. The ANCOVA results show that after calculating the pretest scores, the posttest scores show a significant difference between the class that received deep learning and the control class. Learning that emphasizes deep thinking, reflection, collaboration, and linking concepts to real contexts helps students better understand and solve context-based numeracy problems. In addition, this study found that mathematical disposition and gender greatly influence numeracy skills. In various categories of mathematical disposition, female students in this study tended to achieve higher scores than male students. Students with high mathematical dispositions achieved better numeracy literacy results than students with moderate or low dispositions. The interaction between gender and mathematical disposition was significant, meaning that the influence of disposition on numeracy literacy differed between male and female students. Conversely, the interaction between class and gender, as well as the three-way interaction between class, gender, and mathematical disposition, was not significant. Overall, these results confirm that the deep learning approach can be used as an effective learning approach to improve the numeracy literacy of students with diverse gender

characteristics and levels of mathematical disposition, at least in the context of the schools studied. This approach has the potential to support the Merdeka Curriculum, particularly the in improving critical thinking, problem-solving, and understanding of context-based mathematical concepts.

Acknowledgements

The author would like to thank SMPN 1 Gunungsari for granting permission and providing support during the research process, as well as the mathematics teachers and all students in classes VIII A and VIII B who actively participated in the research activities. I would also like to express my gratitude to the State Islamic University of Mataram, the Faculty of Tarbiyah and Teacher Training, the Mathematics Education Study Program, and the supervising lecturers who provided guidance and input during the preparation of this article. Based on the research results, the author suggests that the deep learning approach be continuously applied in mathematics learning in schools as an effort to improve students' numeracy literacy skills. In addition, teachers are expected to continue to develop variations in context, learning activities, and supporting strategies that are in line with student characteristics so that the learning process becomes more in-depth, meaningful, and inclusive for all students.

Conflict of Interest

The authors declare that there is no conflict of interest.

Authors' Contributions

Author N.A. contributed to the development of instruments, research design, understanding of theoretical foundations, data collection and processing, data analysis, presentation of results and discussion, revision, and ensuring the consistency of the entire article. Author A.N. contributed to the development of theoretical studies and approved the final manuscript. Author Y.N. contributed to the development of the theory and approved the final version of the article. The total percentage of author contributions to the conceptualization, drafting, and correction of this article is: N.A.: 40%, A.N.: 30%, and Y.N.: 30%.

Data Availability Statement

The authors state that the data supporting the results of this study will be provided by the corresponding author, [N.A], upon reasonable request.

References

Arumdalu Tri Pangesti, S. S. (2021). *Analisis Kemampuan Pemecahan Masalah Matematis Siswa Pada Materi*. *05*(02), 1769–1781.

Aryanto, S. (2025). *Pembelajaran Literasi Dan Numerasi Melalui Deep Learning : Pendekatan Transformasional*. 49–57.

Baubesy, N., & Ramadhan, N. R. (2025). *Analisis Kemampuan Literasi Numerasi Matematika Siswa Kelas X SMA PGRI 2 Tamalate Ditinjau Dari Gender*. *1*(1), 21–29.

Efendi, R., Diana, Y., & Panjaitan, A. T. (2025). Analisis Disposisi Matematis, Kecemasan Matematika, dan Numerasi Siswa di Daerah 3T: Perbatasan RI-PNG. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, *9*(2), 498–511. https://doi.org/10.31004/cendekia.v9i2.3967

Fitriani, A. (2025). *Analisis Literatur : Pendekatan Pembelajaran Deep Learning Dalam*

Pendidikan. *2*(3), 50–57.

Ghozali, I. (2018). Aplikasi analisis multivariate dengan program IBM SPSS 25. Badan Penerbit Universitas Diponegoro.

Han, W., Susanto, D., Dewayani, S., Pandora, P., Hanifah, N., Miftahussururi., Nento, M. N., & Akbari, Q. S. (2017). "Materi Pendukung Literasi Numerasi." *Kementrian Pendidikan Dan Kebudayaan, Tim GLN Kemendikbud.*, *8*(9), 1–58. https://repositori.kemdikbud.go.id/11628/1/materi-pendukung-literasi-numerasi-rev.pdf

Hendrianty, B. J., Ibrahim, A., Iskandar, S., & Mulyasari, E. (2024). Membangun Pola Pikir Deep Learning Guru Sekolah Dasar. *Kalam Cendekia: Jurnal Ilmiah Kependidikan*, *12*(3). https://doi.org/10.20961/jkc.v12i3.96699

Izzati, N. (2017). Belajar Geometri Bidang Datar Mahasiswa Iain Syekh Nurjati Cirebon. *EduMa*, *6*(2).

Kemendikbudristek. (2023). Literasi Membaca, Peringkat Indonesia di PISA 2022. *Laporan Pisa Kemendikbudristek*, 1–25.

Khoirunnisa, S., & Adirakasiwi, A. G. (2023). Analisis Kemampuan Literasi Numerasi Siswa Smp Pada Era Merdeka Belajar. *Jurnal Pembelajaran Matematika Inovatif*, *6*(3), 925–936. https://doi.org/10.22460/jpmi.v6i3.17393

Kurniawati, I., Setiawan, A., Anwar, M. S., & Muhammad, I. (2023). Analisis Kemampuan Pemecahan Masalah Dan Disposisi Matematika Siswa Pada Materi SPLDV. *Jurnal Penelitian Tindakan Kelas*, *1*(2), 124–134. https://doi.org/10.61650/jptk.v1i2.200

Mayratih, G. E., Leton, S. I., & Uskono, I. V. (2019). Pengaruh Disposisi Matematis Terhadap Kemampuan Pemecahan Masalah Matematis Siswa. *Asimtot : Jurnal Kependidikan Matematika*, *1*(1), 41–49. https://doi.org/10.30822/asimtot.v1i1.97

Natsir, S. R. (2025). Implementasi Kurikulum Merdeka Dalam Pembelajaran Matematika Di Sekolah Dasar: Studi Deskriptif Pendekatan Deep Learning Dalam Kerangka Kurikulum Merdeka Belajar.

Nelvia, S. (2019). Implementasi Pendekatan Sosiolinguistik. *Bahasa Indonesia*, *17*, 87–98.

Ningsih, R. T. C., Utomo, R. B., & R, S. (2024). Analisis Kesalahan Siswa Dalam Menyelesaikan Matematis. *Jurnal Pendidikan Dan Pembelajaran Matematika Indonesia*, *13*(2), 92–102.

Rohim, D. C. (2021). Konsep Asesmen Kompetensi Minimum untuk Meningkatkan Kemampuan Literasi Numerasi Siswa Sekolah Dasar. *Jurnal VARIDIKA*, *33*(1), 54–62. https://doi.org/10.23917/varidika.v33i1.14993

Rokhimah, S. (2015). Patriarkhisme Dan Ketidakadilan Gender. *Muwazah*, *6*(1), 132–145. https://doi.org/10.28918/muwazah.v6i1.440

Soemarmo, H. &. (2019). Pengaruh Disposisi Matematis Terhadap Kemampuan Pemecahan Masalah Matematis Siswa. *Asimtot : Jurnal Kependidikan Matematika*, *1*(1), 41–49. https://doi.org/10.30822/asimtot.v1i1.97

Sugiono. *Metode Penelitian Kuantitatif, Kualitatif, Dan R&D*, 2017

Sukaryo, A. F., & Sari, R. M. M. (2024). Systematic Literature Review: Kemampuan Numerasi Siswa dalam Pembelajaran Matematika. *Jurnal THEOREMS (The Original Research of Mathematics)*, *8*(2), 461–472. https://doi.org/10.31949/th.v8i2.8212

Suryaprani, M. W., Suparta, I. N., & Suharta, I. G. P. (2016). Hubungan Jenis Kelamin, Literasi Matematika, dan Disposisi Matematika terhadap Prestasi Belajar Matematika Peserta Didik SMA Negeri di Denpasar. *Seminar Nasional FMIPA Undiksha*, 39–46.

Suwandi, Putri, R., & Sulastri. (2024). Inovasi Pendidikan dengan Menggunakan Model Deep Learning di Indonesia. *Jurnal Pendidikan Kewarganegaraan Dan Politik*, *2*(2), 69–77. https://doi.org/10.61476/186hvh28

Wahyudi, D. A., Medan, U. N., & Learning, D. (2025). *Pengaruh Pembelajaran Deep Learning Terhadap*. *1*(1), 9–17.

Widoyo, H., Rofi'i, A., Jahrir, A. S., Rasimin, R., Purhanudin, M. V., & Sitopu, J. W. (2023). Penerapan Model Pembelajaran Aktif Inovatif Kreatif Dan Menyenangkan Untuk Meningkatkan Hasil Belajar Siswa. *Journal on Education*, *6*(1), 1687–1699. https://doi.org/10.31004/joe.v6i1.3133

Wijaya, M. (2025). *Kurikulum Deep Learning di Indonesia ; Sebuah Harapan*. *1*(1), 10–15.

Wirawan, N., Yuhana, Y., & Fatah, A. (2023). Analisis Kemampuan Penalaran Matematis Bentuk Literasi Numerasi AKM pada Konten Bilangan Ditinjau dari Disposisi Matematis. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, *7*(3), 2715–2728. https://doi.org/10.31004/cendekia.v7i3.2623

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