Enhancing Numeracy Skills and Learning Resilience Through a Differentiated Instruction Approach Viewed from Student's Learning Styles

Eka Elia Robiah Adawiah[1], Eka Firmansyah[2*]

[1,2*]Pasundan University, Bandung, indonesia
*Correspondence: eka_firmansyah@unpas.ac.id

Abstract

This study aims to improve student's numeracy skills and learning resilience through the implementation of differentiated instruction and to analyze the influence of learning styles on learning outcomes. A mixed-method approach with a pretest–posttest design was employed involving Grade XI students of SMKN 1 Binong Subang, assigned to an experimental class and a control class. The experimental class received differentiated instruction based on visual and kinesthetic learning styles, while the control class received conventional instruction. Research instruments included a numeracy test on arithmetic sequences and series as well as a learning resilience questionnaire. Data were analyzed using descriptive statistics, two-way ANOVA, and Pearson correlation. The findings indicate that differentiated instruction significantly improved student's numeracy skills and learning resilience, whereas learning styles did not exert a meaningful effect either independently or in interaction with the instructional method. These results affirm that differentiated instruction effectively accommodates student diversity while supporting both cognitive and non-cognitive outcomes. Teachers are advised to implement differentiated instruction consistently by emphasizing student's readiness and learning needs rather than relying solely on learning styles. Further research is suggested to examine the effectiveness of this instructional approach across different subjects or educational levels to strengthen the generalizability of the findings.

Keywords: Arithmetic Sequences, Differentiated Instruction, Learning Resilience, Learning Styles, Numeracy Skills.

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INTRODUCTION

Numeracy skills constitute a fundamental competency and serve as an important indicator of educational quality across various levels. Numeracy does not merely refer to the ability to perform mathematical procedures but also encompasses the capacity to use mathematical reasoning flexibly and adaptively in everyday situations (Peni et al., 2024; Reyna & Brainerd, 2023). In other words, numeracy functions as a foundation for learners to think critically and make data-informed decisions. Modern definitions conceptualize numeracy as the ability to use, interpret, and apply mathematical concepts across diverse life contexts, including at home, in the workplace, and within society (Getenet, 2023; Megawati & Sutarto, 2021).

Numeracy is an intellectual ability involving systematic and logical thinking in performing numerical operations. Numeracy equips learners with foundational knowledge and skills to apply number concepts,

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computational operations, encompassing knowledge, skills, and attitudes in everyday life as well as the ability to interpret quantitative information in one's surroundings. Thus, numeracy is a basic individual competency essential in mathematics, daily life, and in solving complex problems emerging in modern society (Nasrullah, 2023).

Numeracy is one of the competencies assessed in the Minimum Competency Assessment (AKM), which is part of the National Assessment (AN). One of the major educational reforms introduced by the Indonesian Ministry of Education in the 21st century was the transformation of the National Examination into the National Assessment. The National Assessment includes three components: the Minimum Competency Assessment (AKM), the Character Survey, and the Learning Environment Survey (Kemendikbud, 2021). AKM measures student's literacy and numeracy competencies. The numeracy content areas include algebra, numbers, geometry, measurement, data, and uncertainty. AKM test items apply higher-order thinking skills using real-world contexts. However, in mathematics learning, students frequently encounter difficulties when translating real-life situations into mathematical models, interpreting real-world contexts mathematically, and understanding mathematical structures involving order, relationships, and patterns in problem-solving (Syawahid, 2019).

At the national level, results from assessments such as AKM and the Programme for International Student Assessment (PISA) indicate that Indonesian student's numeracy performance remains unsatisfactory. Low numeracy achievement is closely related to several factors, including teacher competence, instructional methods, and learning approaches that insufficiently encourage higher-order thinking and meaningful learning (Alfaruqi & Nurwahidah, 2025; Kertayasa & Herman, 2023).

In addition to numeracy, learning resilience is a critical factor influencing student's academic success. Learning resilience refers to student's ability to face challenges, persist in the learning process, and demonstrate a willingness to continue trying despite experiencing failure (Yang & Wang, 2022; Almulla, 2024; Arsini et al., 2023; Thorsen et al., 2021; Hunsu et al., 2023). As learning materials grow increasingly complex and curricular demands intensify, students require resilience to manage academic pressure, adapt effective learning strategies, and maintain active engagement in classroom activities (Paslan, 2025; Liu & Cao, 2022; Mulati & Purwandari, 2022). In educational psychology, learning resilience is considered an essential mediator between learning processes and academic outcomes. Nonetheless, many schools continue to emphasize cognitive aspects alone without integrating instruction designed to foster resilience (Okocha, 2025; Melaku et al., 2025; García, 2022; Sun & Liu, 2023).

Empirically, previous studies have examined various instructional models aimed at improving numeracy or student's character attributes. First, most studies have focused solely on numeracy improvement without examining its relationship to non-cognitive factors such as learning resilience (Fitriana & Maarif, 2022; Chen et al., 2024; Ringo, 2025), even though both aspects influence each other and should be developed simultaneously. Second, research investigating learning styles as moderating variables in assessing the effectiveness of instructional models remains limited. Learning styles influence how learners receive information, process learning materials, and develop deep conceptual understanding. Misalignment between instructional approaches and student's learning styles can negatively affect motivation and learning effectiveness. Third, studies specifically examining differentiated instruction in developing numeracy and learning resilience among Indonesian students remain scarce, despite the diversity of learners in Indonesian schools requiring flexible and adaptive teaching approaches (Arni et al., 2024; Nurlaela et al., 2018).

To address these research gaps, differentiated instruction was selected as a relevant and promising pedagogical approach. Differentiated instruction emphasizes the need for teachers to design learning experiences that respond to student's needs, interests, readiness levels, and learning styles. Rather than applying a one-size-fits-all approach, teachers tailor instructional strategies so that each learner can experience optimal learning. Adjustments may be made through differentiating content, process, and product, enabling learners to study in ways best suited to their learning conditions. In numeracy learning, differentiated instruction allows students with varying readiness levels to engage in problem-solving tasks matched to appropriate levels of complexity, enabling concept mastery to develop gradually and systematically. Through providing choices, appropriate challenges, and emotional support, differentiated instruction also facilitates the growth of learning resilience as students feel valued, capable, and in control of their learning process (Fitriyana et al., 2024; Aguhayon et al., 2023).

Differentiated instruction has been widely developed and studied internationally as an effective approach for addressing classroom diversity (Prast et al., 2018; Alsalhi et al., 2021). Several studies emphasize that differentiated instruction helps learners move from their comfort zone toward the zone of proximal development through appropriately challenging tasks. Global research shows that differentiated instruction, when supported by strong formative assessment, accurate mapping of learning needs, and instructional flexibility can improve literacy, numeracy, and learning motivation (Puzio et al., 2020; Karst, 2022; Akbar, 2025; Aust et al., 2023). Some studies also demonstrate that differentiation can reduce achievement gaps between low- and high-ability students by providing targeted support according to their needs (Kotob & Abadi, 2019; Goyibova et al., 2025).

However, the implementation and study of differentiated instruction in Indonesia remain limited, especially in mathematics learning, which directly relates to numeracy (Putranto et al., 2024; Suprayogi et al., 2017). Research examining the relationship among learning styles, the success of differentiated instruction, numeracy achievement, and learning resilience is also scarce. Therefore, this study holds academic and practical significance in addressing these gaps and contributing to the development of more inclusive and effective instructional approaches. This research is expected to provide deeper insights into how differentiated instruction can be optimized to improve numeracy skills and foster learning resilience, particularly when viewed from the perspective of diverse student learning styles. The findings are also expected to offer practical recommendations for teachers to design responsive learning and contribute to the improvement of overall educational quality in Indonesia.

METHODS

The subjects of this study consisted of 41 students of SMKN 1 Binong Subang. Based on the 2023/2024 School Quality Report of SMKN 1 Binong Subang, student's numeracy skills were categorized as moderate, with an average achievement score of 46.67%. When disaggregated by domain, the numeracy achievements were as follows: number domain at 51.42% (a decrease of 1% from the previous year), algebra domain at 53.22% (an increase of 5%), geometry domain at 50.9% (a decrease of 6%), and data and uncertainty domain at 50.72% (a decrease of 3%) (Kemendikbud, 2024).

The sample was determined using a random class sampling technique. The experimental class consisted of Grade XI TEI students (20 learners) who received differentiated instruction using the Problem-Based Learning model. Meanwhile, the control class consisted of Grade XI PPLG students (21 learners) who received conventional instruction typically implemented at the school. The division into experimental and control groups aimed to compare the effectiveness of the two instructional approaches in improving numeracy skills and learning resilience across students with different learning styles. This design was intended to provide a more comprehensive understanding of the contribution of differentiated instruction in enhancing the quality of mathematics learning in vocational schools.

Data collection utilized several main instruments: a numeracy skills test, a learning resilience questionnaire, an online learning style test complemented by a learning style confirmation questionnaire, and observation sheets. The study applied a Mixed-Methods approach using a Convergent Parallel Design, wherein qualitative and quantitative data were analyzed concurrently. Quantitative data were obtained from numeracy tests and learning resilience questionnaires and were used to test hypotheses related to improvements in numeracy skills, learning resilience, and correlations among variables. Meanwhile, qualitative data were obtained from observation sheets and field notes, which served to provide deeper explanations for the quantitative findings.

Quantitative data analysis included descriptive statistics, N-Gain analysis, two-way ANOVA, and Pearson correlation analysis. Descriptive statistical analysis provided an overview of the study data concerning both numeracy skills and learning resilience. According to Sugiyono (2019), descriptive analysis includes calculations of mean, minimum and maximum values, and standard deviation. Thus, descriptive analysis in this study aimed to provide an overview of improvements in student's numeracy skills and learning resilience in both the differentiated instruction group and the conventional instruction group, as well as across visual and kinesthetic learning styles.

RESULTS AND DISCUSSION

Implementation of Differentiated Instruction

This study implemented differentiated instruction in the Grade XI Industrial Electronics Engineering class by taking into account student's visual and kinesthetic learning styles. In accordance with Tomlinson's (2001) framework, differentiation was carried out by adjusting content, process, and product. The initial meeting of the differentiated instruction implementation covered the topic of arithmetic sequences and series. Before beginning the core activities, the teacher administered a learning style test to the students. Based on the results of the online "Aku Pintar" learning style test and a confirmation questionnaire, students demonstrated diverse learning styles. The use of these two instruments served as a form of data triangulation to ensure higher validity (Denzin, 1978). The distribution of learning styles is presented in Table 1.

Table 1. Learning Style Test Results

Learning Style	Number of Students	Percentage
Visual	11	55%
Kinesthetic	9	45%
Total	**20**	**100%**

Content Differentiation

Content differentiantion was designed according to student's learning styles so that the concepts of sequences and series could be more easily understood. Visual learners were provided with worksheets containing illustrations, tables, and images that displayed numerical patterns. In contrast, kinesthetic learners engaged in hands-on exploration activities, such as arranging marbles, performing handshake simulations, and building plastic cup pyramids.The material was presented through contextual problems, such as calculating the number of handshakes at an event, the number of seats in a theater, and deriving the formula for the sum of the first *n* terms of an arithmetic series. At the end of the learning sequence, all students completed application problems connecting sequences and series to real-life contexts, such as production quantities, market prices, or saving money at the bank.

This strategy enabled each learning style group to access learning through modalities aligned with their characteristics, visual representation for visual learners and direct physical experience for kinesthetic learners. Differentiated content incorporating visual and kinesthetic elements, accompanied by contextual problems, proved highly effective for conceptual understanding (Andzin et al., 2024; Choirudin et al., 2024).

Qualitative data also showed that differentiated content generated more meaningful learning experiences. Visual learners benefited from illustrations, while kinesthetic learners better grasped the concepts through concrete activities. These findings align with Tomlinson (2001) and Astuti (2020), who reported that differentiated content enhances student's engagement and conceptual mastery.

Process Differentiation

Differentiation in the learning process was evident when students demonstrated behaviors consistent with their learning styles. Kinesthetic learners were more active when arranging marbles to form number patterns, practicing handshake simulations, or constructing cup pyramids, as physical manipulation helped them identify patterns more easily (Wijayanti et al., 2023; Maulida et al., 2024). Visual learners, in contrast, focused on observing illustrations, marking patterns, taking notes, and analyzing problem-solving steps systematically (Lamowa et al., 2022; Rosyada & Wibowo, 2023).

When tackling contextual problems, kinesthetic groups showed enthusiasm through role-play activities such as simulated bank transactions, while visual learners preferred analyzing production-related problems using diagrammatic aids. Throughout these activities, the teacher acted as a facilitator, providing guidance, prompting questions, and ensuring that both hands-on and visual experiences remained aligned with the conceptual objectives of sequences and series (Prihandono et al., 2023).

These dynamics indicate that process differentiation accommodates different ways of thinking. Visual groups excelled in analyzing and documenting patterns, while kinesthetic groups thrived in performing physical tasks and group discussions. This supports the findings of Susanti (2021), who noted that process-based differentiated instruction improves participation and independent learning.


(a)


(b)

(c) (d)

Figure 1. Differentiated Processes for Visual and Kinesthetic Learning Styles

Product Differentiation

Product differentiation was evident from the diverse outputs generated by students in completing the worksheets. Visual learners produced written notes in the form of tables, structured calculations, and systematic conclusions. Kinesthetic learners produced work derived from hands-on activities such as handshake simulations, chair arrangements, or cup pyramids, often presented orally with demonstrations (Hapsari et al., 2018; Azizah et al., 2023).

Despite variations in format, both groups arrived at the same conceptual understanding: sequences represent patterned numerical arrangements, while series represent the sum of the terms in a sequence. Student work analysis also showed improved numeracy skills, particularly in linking contextual problems with appropriate mathematical models, for example, representing savings as an arithmetic series or modeling price patterns as arithmetic sequences (Melinia et al., 2025; Amalia & Nuriadin, 2023). The presence of learning resilience was also observed when students revised errors after receiving feedback (Rijal et al., 2017; Hapsari & Dahlan, 2018).

These results align with Fitriyani & Hidayat (2019), who found that product differentiation allows students to demonstrate understanding through varied yet equally valid outputs.

Figure 2. Products Differentiation in Student Presentations

The product aspect of learning also demonstrated outcomes that differed in form yet were equivalent in quality. Visual learners produced systematic written notes in the form of tables and structured conclusions, whereas kinesthetic learners generated notes derived from hands-on experimentation and oral presentations using concrete media. These results support the findings of Fitriyani and Hidayat (2019), who stated that product differentiation enables students to demonstrate their understanding in ways aligned with their learning characteristics without diminishing the depth of learning outcomes. Thus, differentiated instruction has been proven to promote equitable achievement through different pathways. For further analysis regarding the effectiveness of the differentiated instructional approach, descriptive calculations of student's numeracy skills were carried out using the following data:

Table 2. Average Numeracy Scores of Experimental and Control Classes

Stage	Class	N	Ideal Score	Max	Min	Mean
Pretest	Experimental	20	100	55	20	38.45
	Control	21	100	50	20	34.29
Posttest	Experimental	20	100	100	70	86.25
	Control	21	100	90	60	80.00

Based on Table 2, the initial numeracy ability of students in the experimental class had an average score of 38.45, while the control class showed an average of 34.29. This indicates that both classes were in the relatively low initial ability category, although the experimental class was slightly higher than the control class (Suryatama et al., 2024; Indrawatiningsih et al., 2024; Fitriyana et al., 2024; Prasetyo et al., 2024). After the treatment was administered, the posttest results revealed a substantial improvement in both classes, with the experimental class achieving an average score of 86.25 and the control class reaching 80.00.

The increase from pretest to posttest in the experimental class was 47.80 points, which is greater than the 45.71-point increase observed in the control class. This indicates that the learning intervention in the experimental class had a stronger impact on improving student's numeracy skills compared with the instruction received by the control class. Furthermore, the posttest difference of 6.25 points between the experimental and control classes further reinforces the advantage of the learning outcomes in the class that received the differentiated instruction treatment.

Overall, these results suggest that the differentiated instructional approach implemented in the experimental class was effective in more optimally enhancing student's numeracy skills. These findings underscore the importance of applying differentiated instruction to achieve optimal numeracy learning outcomes. For further clarification, Table 3 is presented below.

Table 3. N-Gain of Numeracy Skills (Experimental Class)

Calculation	Pretes	Postes	Ideal Score-Pre	Post-Pre	*N-Gain*
Mean	38,45	86,0	61,55	47,55	0,77
Standard Deviation	9,97	9,68	4,89	9,97	0,13

Based on Table 3, the N-Gain score of 0.77 indicates that the numeracy skills of students in the experimental class experienced a high level of improvement. This means that the differentiated instruction implemented was highly effective in enhancing student's numeracy abilities from the initial to the final condition. This value demonstrates that most of the potential improvement in student's numeracy skills was successfully achieved through the treatment provided, resulting not only in statistically significant changes but also in practically meaningful gains in student's conceptual understanding and numeracy competencies (Cahyani et al., 2025; Dinipatriany et al., 2024; Susilawati et al., 2024).

Observations and field notes further revealed that students were able to recognize number patterns, calculate the number of terms, and derive formulas for arithmetic series. These findings reinforce Nugraha's (2021) conclusion that problem-based learning combined with differentiation can improve senior high school student's numeracy literacy. Additionally, the results support Rahayu (2020), who found that differentiation in mathematics instruction promotes the development of logical and systematic thinking skills.

Table 4. Two-Way ANOVA for Numeracy Skills

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	.079[a]	3	.026	2.052	.123	.143
Intercept	22.430	1	22.430	1753.232	.000	.979
Kelas	.068	1	.068	5.341	.026	.126
Gaya	.001	1	.001	.042	.839	.001
Kelas * Gaya	.005	1	.005	.367	.548	.010
Error	.473	37	.013			
Total	23.289	41				
Corrected Total	.552	40				

a. R Squared = .143 (Adjusted R Squared = .073)

Based on Table 4, the results of the two-way ANOVA analysis for the class factor show a significance value of 0.026, which is smaller than the significance level of 0.05. Since the sig. value of 0.026 < 0.05, H0 is rejected. This means that there is a significant improvement in numeracy skills among students who received differentiated instruction compared to those who received conventional instruction. Furthermore, Table 4 also shows a significance value of 0.839 for learning style, which is greater than the significance level of 0.05. Because the sig. value of 0.839 > 0.05, H0 is accepted. This indicates that there is no significant difference in numeracy improvement between students with visual learning styles and those with kinesthetic learning styles; therefore, the difference in learning styles does not influence numeracy improvement.

Next, the interaction analysis between instructional method and learning style shows a significance value of 0.548, which is also greater than the significance level of 0.05. Since the sig. value of 0.548 > 0.05, H0 is accepted. This means that there is no interaction effect between instructional method and learning style on numeracy improvement. The ANOVA results indicate that differentiated instruction contributes to enhancing numeracy performance, allowing us to conclude that this approach is more effective than conventional methods. This finding can be explained through Tomlinson's (2001) theoretical framework, which states that differentiated instruction enables teachers to adapt learning content, processes, and products to student's needs, interests, and readiness. These adjustments make it easier for students to understand material and build connections between concepts. Numeracy skills, as competencies involving logical and mathematical thinking, can develop more effectively when instructional processes are aligned with student's characteristics. This is consistent with Yuliani and Sukardi (2021), who reported that differentiated instruction improves numeracy literacy among elementary school students because it provides space for active participation. Prasetyo (2020) also found that instructional approaches responsive to learner differences significantly enhance numeracy achievement compared to uniform instructional methods.

Further analysis shows that learning style (visual or kinesthetic) does not significantly affect numeracy ability. This means that differences in student's learning preferences are not strong predictors of numeracy achievement. This finding is in line with Coffield et al. (2004), who found that the impact of learning styles on academic performance is often inconsistent. Similarly, Rochmawati (2019) reported no significant differences in student's mathematics performance across visual, auditory, and kinesthetic learning styles. Therefore, numeracy achievement is more strongly influenced by the quality of instructional strategies rather than individual learning preferences.

Moreover, the interaction analysis shows that instructional method and learning style do not have a significant interaction effect on numeracy performance. This finding is consistent with the research of Nasution (2020), who noted that the effectiveness of instructional methods is not always influenced by learning styles, but rather by the quality of teachers' strategies in facilitating learning. Thus, differentiated instruction can be applied universally without requiring extreme adjustments based solely on specific learning styles.

In the non-cognitive domain, the findings demonstrate that differentiated instruction significantly affects learning resilience. Students who learned through differentiated instruction were more resilient, more confident, and less likely to give up when facing academic challenges. This supports Dweck's (2006) growth mindset theory, which states that appropriate learning experiences can shape student's perseverance. These findings are consistent with Wulandari (2022), who reported that differentiated instruction enhances student's motivation and endurance in completing tasks. Sari and Hidayat (2021) also found that instruction aligned with student's interests and needs fosters higher levels of academic resilience.

Additionally, the results of this study show that learning style significantly influences learning resilience. Learning style affects how students respond to academic difficulties. Furthermore, there is a significant interaction between instructional method and learning style on learning resilience. This indicates that the effectiveness of differentiated instruction in enhancing resilience depends greatly on the alignment between instructional strategies and student's learning styles. This aligns with the findings of Hapsari (2020), who reported that kinesthetic learners tend to be more resilient when supported with hands-on activities, while visual learners show greater resilience when provided with visual media. Thus, the combination of appropriate differentiation and matching learning styles results in higher levels of learning resilience. This is shown in the following table:

Table 5. Average Learning Resilience Scores

	Kelas	Jumlah Peserta Didik	Skor Ideal	Nilai `Max	Nilai Min	Rata-Rata
Pretes	Eksperimen	20	150	138	99	114,95
	Kontrol	21	150	133	89	112,33
Postes	Eksperimen	20	150	148	111	131,40
	Kontrol	21	150	148	110	125,43

Based on Table 5, the learning resilience of students in the experimental class had an average score of 114.95, while the control class had an average of 112.33. This indicates that the initial resilience levels of both classes were relatively comparable, with only a small difference of 2.62 points. After the instructional process was carried out, the posttest results showed an increase in both classes, with the experimental class achieving an average score of 131.40 and the control class reaching 125.43.

The increase in learning resilience in the experimental class was 16.45 points, which is higher than the 13.10-point increase observed in the control class. In addition, the posttest difference of 5.97 points between the two classes shows that students in the experimental class demonstrated higher levels of learning resilience than those in the control class after the treatment was administered. These findings indicate that the differentiated instructional approach implemented in the experimental class not only significantly enhanced student's learning resilience but was also more effective than the control class's instructional approach in fostering persistence, the ability to withstand academic challenges, and consistency in the learning process (Taş & Minaz, 2024; Aguhayon et al., 2023; Hidayati et al., 2025).

To further clarify the effectiveness of the differentiated instructional approach, a two-way ANOVA analysis of student's learning resilience was conducted, as shown in the following table:

Table 6. Two-Way ANOVA for Learning Resilience

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1.264[a]	3	.421	17.480	.000	.586
Intercept	6.868	1	6.868	285.054	.000	.885
Kelas	.344	1	.344	14.286	.001	.279
Gaya	.781	1	.781	32.424	.000	.467
Kelas * Gaya	.199	1	.199	8.260	.007	.183
Error	.892	37	.024			
Total	9.700	41				
Corrected Total	2.155	40				

a. R Squared = .586 (Adjusted R Squared = .553)

Based on Table 6, the two-way ANOVA analysis for the class factor shows a significance value of 0.001, which is smaller than the significance level of 0.05. Since the sig. value of 0.001 < 0.05, the null hypothesis (H_0) for the fourth hypothesis is rejected. This means that there is a significant effect of differentiated instruction on improving student's learning resilience, and students who received differentiated instruction demonstrated greater improvement compared to those who received conventional instruction.

Furthermore, Table 6 shows that the significance value for the learning style factor is 0.000, which is smaller than the significance level of 0.05. Because the sig. value of 0.000 < 0.05, H_0 is rejected. This indicates that there is a significant effect of learning style on learning resilience, meaning that students with visual learning styles experienced greater improvement in learning resilience compared with kinesthetic learners. Thus, the difference in learning styles (visual or kinesthetic) influences the improvement of student's learning resilience.

Next, the interaction analysis between instructional method and learning style shows a significance value of 0.007, which is also smaller than the significance level of 0.05. Since the sig. value of 0.007 < 0.05, H_0 is rejected. This means that there is an interaction effect between instructional method and learning style on the improvement of learning resilience.

To examine the relationship between numeracy skills and learning resilience among students who received differentiated instruction, a correlation analysis was conducted, as presented in the following table:

Table 7. Pearson Correlation

		N-Gain Kemampuan Numerasi	*N-Gain* Ketangguhan Belajar
N-Gain Kemampuan Numerasi	Pearson Correlation	1	.231
	Sig. (2-tailed)		.147
	N	41	41
N-Gain Ketangguhan Belajar	Pearson Correlation	.231	1
	Sig. (2-tailed)	.147	
	N	41	41

Based on the results of the analysis in Table 7, the correlation value between the N-Gain of numeracy skills and the N-Gain of learning resilience is 0.231. This indicates that an increase in learning resilience tends to be followed by an increase in numeracy ability; however, the relationship is not strong, suggesting that the correlation between learning resilience and numeracy skills is weak yet positive. Furthermore, since the significance value of 0.147 is greater than the significance level of 0.05, H_0 is accepted. This means that there is no statistically significant positive relationship between student's learning resilience and their numeracy skills among those who received differentiated instruction. Thus, the relationship is not statistically significant.

The Pearson correlation analysis shows that although the relationship is weak, there is a positive association between the increase in numeracy skills and the increase in learning resilience. Students with higher resilience levels tend to demonstrate better numeracy skills. This supports Bandura's (1997) self-efficacy theory, which asserts that confidence and perseverance encourage students to be diligent, motivated, and confident when facing academic challenges. These findings are consistent with Lestari (2021), who found a positive relationship between learning resilience and mathematics achievement, although the correlation was not strong. Therefore, it can be concluded that learning resilience contributes to cognitive achievement, particularly numeracy skills even though it is not the dominant factor. Resilience remains an important aspect that strengthens student's motivation, confidence, and strategies in dealing with academic challenges.

CONCLUSION

Based on the results and discussion, it can be concluded that differentiated instruction is proven to be effective in improving student's numeracy skills while simultaneously fostering their learning resilience. The strength of this instructional approach lies in its flexibility to adjust the content, process, and product of learning in accordance with student's needs, readiness, and characteristics, ensuring that each learner receives equitable and optimal learning opportunities. Although learning styles did not show a significant correlation with numeracy skills, they still played an important role in shaping student's learning resilience. Thus, differentiated instruction not only influences cognitive outcomes but also makes a meaningful contribution to strengthening non-cognitive aspects that support long-term academic success. Based on these findings, it is recommended that educators further optimize the implementation of differentiated instruction in daily teaching practices, particularly to enhance student's numeracy skills and learning resilience. Teachers need to be equipped with ongoing professional development on designing and implementing effective differentiated instruction in the classroom. Additionally, schools are encouraged to support the implementation of this instructional approach through flexible academic policies and the provision of adequate learning resources. For future researchers, it is recommended to explore differentiated instruction across different educational levels, other affective variables, or by employing broader research designs to obtain a more comprehensive picture of its impact in educational settings.

REFERENCES

Aguhayon, H., Tingson, R., & Pentang, J. (2023). Addressing Students Learning Gaps in Mathematics through Differentiated Instruction. International Journal of Educational Management and Development Studies. https://doi.org/10.53378/352967

Akbar, R. (2025). The Role of Formative Assessment in Enhancing Student's Numeracy Literacy: A Qualitative Evaluation. Jurnal Penelitian Pendidikan IPA. https://doi.org/10.29303/jppipa.v11i7.11905.

Alfaruqi, A., Nurwahidah, N. (2025). Reflection on Indonesia's PISA Scores and the 2024 Madrasah Teacher Competency Assessment Results: Challenges in Enhancing Teacher Competence. *Jurnal Pendidikan IPS*, 15(1), https://doi.org/10.37630/jpi.v15i1.2559.

Alsalhi, N., Abdelrahman, R., Abdelkader, A., Al-Yatim, S., Habboush, M., & Qawasmi, A. (2021). Impact of Using the Differentiated Instruction (DI) Strategy on Student Achievement in an Intermediate Stage Science Course. Int. J. Emerg. Technol. Learn., 16. https://doi.org/10.3991/ijet.v16i11.22303

Almulla, M. (2024). Academic Resilience and its Relationships With Academic Achievement Among Students of King Faisal University in Saudi Arabia. Revista de Gestão Social e Ambiental. https://doi.org/10.24857/rgsa.v18n9-134.

Amalia, K., & Nuriadin, I. (2023). Analysis of Student's Mathematical Literacy Ability on Sequences and Series Material Through The Application of Problem Based Learning. Mathline : Jurnal Matematika dan Pendidikan Matematika. https://doi.org/10.31943/mathline.v8i3.478

Andzin, N., Sari, P., Widodo, R., Sukowati, D., Indriastuti, S., & Nursyahidah, F. (2024). Arithmetic Sequences and Series Learning Using Realistic Mathematics Education Assisted by Augmented Reality. Jurnal Pendidikan Matematika. https://doi.org/10.22342/jpm.v18i1.pp139-148

Anggraini, K., & Setianingsih, R. (2022). Analisis kemampuan numerasi siswa SMA dalam menyelesaikan soal asesmen kompetensi minimum (AKM). *Mathedunesa*, 11(3).

Arni, K., Kosim, K., & Verawati, N. (2024). The Effect of Problem-Based Learning Model on Student's Learning Outcomes Viewed from Learning Styles. Hydrogen: Jurnal Kependidikan Kimia. https://doi.org/10.33394/hjkk.v12i2.11788

Arsini, Y., Ahman, A., & Rusmana, N. (2023). The Role of Locus of Control and Resilience in Student Academic Achievement. International Journal of Learning, Teaching and Educational Research. https://doi.org/10.26803/ijlter.22.3.24

Asrijanty, A. (2020). *AKM dan implikasinya pada pembelajaran*. Pusat Asesmen dan Pembelajaran, Badan Penelitian dan Pengembangan, Kementerian Pendidikan dan Kebudayaan.

Astuti, S. (2020). Pengaruh pembelajaran diferensiasi terhadap hasil belajar siswa sekolah dasar. Jurnal *Pendidikan* Dasar Indonesia*, 5*(2), 112–123.

Aust, L., Schütze, B., Hochweber, J., & Souvignier, E. (2023). Effects of formative assessment on intrinsic motivation in primary school mathematics instruction. European Journal of Psychology of Education. https://doi.org/10.1007/s10212-023-00768-4

Bandura, A. (1997). *Self-efficacy: The exercise of control*. W. H. Freeman.

Cahyani, A., Nuriyatin, S., & Kusumawati, I. (2025). Analysis of TPS Learning (Think, Pair, Share) Based on Differentiation Process on Student's Numeration Abilities. MATHEMA: Jurnal Pendidikan Matematika. https://doi.org/10.33365/jm.v7i1.4814

Chen, D., Ertac, S., Evgeniou, T., Miao, X., Nadaf, A., & Yilmaz, E. (2024). Grit and academic resilience during the COVID-19 pandemic. NPJ Science of Learning, 9. https://doi.org/10.1038/s41539-024-00265-3.

Choirudin, C., Astuti, P., & Hazarika, A. (2024). Visual Analysis and Interactivity of Board Games as an Innovation in Sequence and Series Learning: A Phenomenological Study of Junior High School Students. Delta-Phi: Jurnal Pendidikan Matematika. https://doi.org/10.61650/dpjpm.v2i3.146

Coffield, F., Moseley, D., Hall, E., & Ecclestone, K. (2004). *Learning styles and pedagogy in post-16 learning: A systematic and critical review*. Learning and Skills Research Centre.

Delima, N., dkk. (2022). *PISA dan AKM literasi matematika dan kompetensi numerasi*. Unsub Press.

Dimyati, A. (2022). Hubungan antara kemandirian dan ketangguhan belajar matematika dalam menyelesaikan permasalahan matematika. *AL-IDRAK: Jurnal Pendidikan Islam dan Budaya*, 2(3).

Dinipatriany, A., Daud, F., & Arsyad, M. (2024). Development of Differentiated Learning Devices to Enhance Numeracy Skills of Students at UPT SMA Negeri 9 Bone. Jurnal Ilmiah Kanderang Tingang. https://doi.org/10.37304/jikt.v15i2.366

Fatimah, A. E., & Purba, A. (2025). Meningkatkan resiliensi matematis mahasiswa pada mata kuliah matematika dasar melalui pendekatan differentiated instruction. *Journal of Didactic Mathematics*, 2(1). https://doi.org/10.34007/jdm.v2i1.617

Farid, I., dkk. (2022). Strategi pembelajaran diferensiasi dalam memenuhi kebutuhan belajar peserta didik di sekolah dasar. *Jurnal Pendidikan dan Konseling Universitas Pahlawan Tuanku Tambusai*, 4(6).

Firmansyah, E., Mutiara, N., & Mubarika, M. P. (2021). Modul komunikatif pembelajaran matematika dengan pendekatan kontekstual. Jurnal PRISMA, *10*(2), 45–56. https://jurnal.unsur.ac.id/prisma/article/view/1824

Firmansyah, E., Sari, N. M., & Mubarika, M. P. (2021). Analisis instrumen kemampuan matematisasi siswa dalam menggunakan modul komunikatif. Pasundan Journal of Mathematics Education, *11*(2), 123–134. https://journal.unpas.ac.id/index.php/pjme/article/view/...

Fitriana, A., & Maarif, S. (2022). Analysis of Learning Obstacle to Numeracy Ability Based on Mathematical Resilience of Elementary Students. (JIML) JOURNAL OF INNOVATIVE MATHEMATICS LEARNING. https://doi.org/10.22460/jiml.v5i2.11202.

Fitriyana, I., Juhana, J., & Nirmala, S. (2024). Pengaruh Strategi Pembelajaran Berdiferensiasi Terhadap Literasi dan Numerasi Siswa Sekolah Dasar. Jurnal Studi Guru dan Pembelajaran. https://doi.org/10.30605/jsgp.7.1.2024.4275

García-Martínez, I., Augusto-Landa, J., Quijano-López, R., & León, S. (2022). Self-Concept as a Mediator of the Relation Between University Student's Resilience and Academic Achievement. Frontiers in Psychology, 12. https://doi.org/10.3389/fpsyg.2021.747168

Getenet, S. (2023). The influence of student's prior numeracy achievement on later numeracy achievement as a function of gender and year levels. Mathematics Education Research Journal. https://doi.org/10.1007/s13394-023-00469-7

Hasanah, E. (2023). *Model pembelajaran diferensiasi berbasis digital*. K-Media.

Hapsari, D. (2019). Implementasi pembelajaran diferensiasi dalam meningkatkan hasil belajar matematika siswa SMP. *Jurnal Pendidikan Matematika*, 8(1), 45–56.

Hapsari, D. (2020). Diferensiasi proses pembelajaran untuk meningkatkan ketangguhan belajar siswa. *Jurnal Inovasi Pendidikan*, 11(2), 88–97.

Hidayati, E., Triwahyuni, E., & Emyus, A. (2025). Impact of Differentiated Learning Strategies on Student Resilience and Academic Performance at State Junior High School. Jurnal Penelitian Pendidikan IPA. https://doi.org/10.29303/jppipa.v11i4.10612

Hunsu, N., Oje, A., Tanner-Smith, E., & Adesope, O. (2023). Relationships between risk factors, protective factors and achievement outcomes in academic resilience research: A meta-analytic review. Educational Research Review. https://doi.org/10.1016/j.edurev.2023.100548

Imi, M. B. N. (2023). The effect of differentiated learning on improving student's numeracy skills: An experimental study. *Indonesian Journal of Curriculum and Educational Technology Studies*, 11(2), 123–135. https://doi.org/10.15294/ijcets.v11i2.75189

Indarawan, R., & Yaniawati, R. P. (2017). *Metodologi penelitian kuantitatif, kualitatif, dan campuran untuk manajemen, pembangunan, dan pendidikan*. PT Refika Aditama.

Indrawatiningsih, N., Qomariyah, S., Nubita, A., & Muarofah, L. (2024). Effectiveness of Differentiated Learning in Improving Literacy and Numeracy of Primary School Students. Asian Journal of Education and Social Studies. https://doi.org/10.9734/ajess/2024/v50i51337

Karst, K., Bonefeld, M., Dotzel, S., Fehringer, B., & Steinwascher, M. (2022). Data-based differentiated instruction: The impact of standardized assessment and aligned teaching material on student's reading comprehension. Learning and Instruction. https://doi.org/10.1016/j.learninstruc.2022.101597.

Kertayasa, K., & Herman, T. (2023). Analisis kemampuan mahasiswa dalam menyelesaikan masalah numerasi berbasis online. AKSIOMA: Jurnal Program Studi Pendidikan Matematika. https://doi.org/10.24127/ajpm.v12i2.6652.

Khulissoh. (2022). *Penerapan* pembelajaran berdiferensiasi pada Kurikulum Merdeka di SD. *Social, Humanities, and Education Studies (SHEs): Conference Series*, 5(5), 1150–1158.

Kristiani, H., dkk. (2021). *Model pengembangan pembelajaran berdiferensiasi (*Differentiated *Instruction)*. Pusat Kurikulum dan Pembelajaran, Badan Standar, Kurikulum, dan Asesmen Pendidikan Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi.

Lamowa, R., Irawati, S., & Subanji, S. (2022). Proses metakognitif siswa dalam menyelesaikan masalah matematika berdasarkan gaya belajar VAK (visual, auditori, dan kinestetik). Jurnal Kajian Pembelajaran Matematika. https://doi.org/10.17977/um076v6i12022p38-47

Liliawati, W., dkk. (*2022*). Pendekatan pembelajaran diferensiasi dalam model inkuiri terhadap kemampuan numerasi siswa. *Jurnal Ilmiah Pendidikan dan Pembelajaran*, 6(2).

Lindra L. F., & Ratnaningsih, N. (2022). Analisis problematika dan pencapaian siswa dalam pelaksanaan *AKM* pada PTM terbatas. *Jurnal Pendidikan Guru*, 3(1), 1–7.

Liu, Y., & Cao, Z. (2022). The impact of social support and stress on academic burnout among medical students in online learning: The mediating role of resilience. Frontiers in Public Health, 10. https://doi.org/10.3389/fpubh.2022.938132

Marlina. (2019). *Panduan pelaksanaan model pembelajaran berdiferensiasi di sekolah inklusif*. Repository.unp.ac.id.

Maulida, F., Fitriani, A., & Darmayanti, M. (2024). Development of Teaching Materials Based on Differentiated Learning to Improve Critical Thinking Dimensions of The Pancasila Learner Profile. Jurnal Kependidikan: Jurnal Hasil Penelitian dan Kajian Kepustakaan di Bidang Pendidikan, Pengajaran dan Pembelajaran. https://doi.org/10.33394/jk.v10i1.10420

Megawati, L., & Sutarto, H. (2021). Analysis numeracy literacy skills in terms of standardized math problem on a minimum competency assessment. Unnes Journal of Mathematics Education. https://doi.org/10.15294/ujme.v10i2.49540.

Melinia, E., Mulyono, B., & Desiani, A. (2025). Design Of Student Live Worksheet to Support Student's Computational Thinking Skills Through Differentiation Learning. Kreano, Jurnal Matematika Kreatif-Inovatif. https://doi.org/10.15294/kreano.v16i1.16368

Melaku, B., Negasi, R., & Tolla, T. (2025). Perceived academic support and academic achievement among Ethiopian first-year university students: the serial mediating roles of academic motivation and resilience. Frontiers in Psychology, 16. https://doi.org/10.3389/fpsyg.2025.1605550

Mertayasa, I. W. (2021). Aplikasi model pembelajaran kooperatif tipe team assisted individualization (TAI) dengan tutor sebaya untuk meningkatkan prestasi belajar matematika. *Journal of Education Action Research*, 5(3), 308–310.

MS, Mahfudz. (2022). Pembelajaran berdiferensiasi dan penerapannya. *SENTRI: Jurnal Riset Ilmiah*, 2(2).

Mulati, Y., & Purwandari, E. (2022). The Role of Resilience in Coping with Academic Stress (A Meta-analysis Study). KnE Social Sciences. https://doi.org/10.18502/kss.v7i18.12387

Mumpuniarti, Mahabbati, A., & Roos Handoyo, R. (2023). *Diferensiasi pembelajaran (Pengelolaan pembelajaran untuk siswa yang beragam)*. UNY Press.

Muslimin, dkk. (2022). Peningkatan hasil belajar matematika siswa melalui pembelajaran berdiferensiasi dalam mewujudkan Merdeka Belajar. *Jurnal Pendidikan Matematika RAFA*, 8(2), 22–32.

Nasrullah, N. (2023). Deskripsi Pengaitan Konteks dan Pengetahuan Matematika: Tinjauan Kemampuan Literasi Numerasi. *Al asma: Journal of Islamic Education,* 5(2), 185-193.

Nugraha, A. (2021). Pembelajaran berdiferensiasi dalam kurikulum merdeka: Studi pada peningkatan numerasi siswa sekolah dasar. Jurnal Ilmiah Pendidikan Dasar, *6*(3), 211–220.

Nurdina, T., Yaniawati, R. P., & Al-Tamar, J. (2024). Blended learning in improving student's mathematical critical thinking and mathematical communication ability. Pasundan Journal of Mathematics Education*, 14*(1), 12–25. https://doi.org/10.23969/pjme.v14i1.9759

Nurlaela, L., Samani, M., Asto, I., & Wibawa, S. (2018). The effect of thematic learning model, learning style, and reading ability on the student's learning outcomes. IOP Conference Series: Materials Science and Engineering, 296. https://doi.org/10.1088/1757-899x/296/1/012039

Okocha, S., Osiesi, M., Oriola, B., Olayiwola-Adedoja, T., Okunade, A., Fadiya, A., Odinko, M., & Oladele, B. (2025). Effects of resilience, emotional support and self-regulation on undergraduates' academic success: a moderating and mediating analysis. Journal of Applied Research in Higher Education. https://doi.org/10.1108/jarhe-11-2024-0609

Paslan, N. (2025). Self resiliency: element of academic excellence among university students. International Journal of Education, Psychology and Counseling. https://doi.org/10.35631/ijepc.1058010

Peni, N., Pratiwi, S., & Prabowo, A. (2024). Number talks: Comparative insight into undergraduate and graduate student literacy. Journal of Honai Math. https://doi.org/10.30862/jhm.v7i3.614.

Prasetyo, B. (2020). Strategi pembelajaran diferensiasi untuk meningkatkan motivasi dan prestasi belajar matematika. Jurnal Penelitian Pendidikan*, 20*(1), 56–67.

Prasetyo, A., Nuvitalia, D., Setyaningsih, A., & Nugroho, A. (2024). Penerapan Pembelajaran Berdiferensiasi dengan Model PBL untuk Meningkatkan Kemampuan Numerasi Matematika Kelas V-B SD Supriyadi. Indo-MathEdu Intellectuals Journal. https://doi.org/10.54373/imeij.v5i4.1710.

Prast, E., Weijer-Bergsma, E., Kroesbergen, E., & Luit, J. (2018). Differentiated instruction in primary mathematics: Effects of teacher professional development on student achievement. Learning and Instruction, 54, 22-34. https://doi.org/10.1016/j.learninstruc.2018.01.009

Prihandono, T., Supriyono, A., Abdillah, U., & Sudarti, S. (2023). Analysis of Differentiate Learning with Classroom Action Research to Improve Physics Activities and Outcomes. Jurnal Penelitian Pendidikan IPA. https://doi.org/10.29303/jppipa.v9i9.3426

Putranto, S., , M., Arliani, E., & Ratnasari, G. (2024). Differentiated Mathematics Instruction: Perception, Readiness, and Practice of Indonesian Teachers. Aula de Encuentro. https://doi.org/10.17561/ae.v26n1.8790

Puzio, K., Colby, G., & Algeo-Nichols, D. (2020). Differentiated Literacy Instruction: Boondoggle or Best Practice?. Review of Educational Research, 90, 459 - 498. https://doi.org/10.3102/0034654320933536

Rahayu, S. (2020). Pengaruh pembelajaran berdiferensiasi terhadap kemampuan numerasi siswa kelas V sekolah dasar. Jurnal Cakrawala Pendidikan Dasar*,* *12*(1), 77–85.

Reyna, V., & Brainerd, C. (2023). Numeracy, gist, literal thinking and the value of nothing in decision making. Nature Reviews Psychology, 1 - 19. https://doi.org/10.1038/s44159-023-00188-7.

Ringo, S. (2025). Systematic Literature Review dengan Metode Prisma: Pembelajaran Berdiferensiasi pada Pendidikan Dasar. Jurnal Didaktika Pendidikan Dasar. https://doi.org/10.26811/didaktika.v9i1.1760

Rochmawati, E. (2019). Implementasi pembelajaran berdiferensiasi dalam meningkatkan hasil belajar siswa SD. Jurnal Didaktika Pendidikan Dasar*,* *4*(2), 99–108.

Rosyada, M., & Wibowo, S. (2023). Analysis Of Mathematics Problem-Solving Ability Based On Ideal Problem-Solving Steps Given Student Learning Styles. AKSIOMA: Jurnal Program Studi Pendidikan Matematika. https://doi.org/10.24127/ajpm.v12i1.6880

Sari, M., & Hidayat, R. (2021). Pembelajaran diferensiasi dan dampaknya terhadap hasil belajar matematika. Jurnal Matematika dan Pembelajarannya, *7*(1), 55–64.

Sari, N. M., Yaniawati, R. P., Supianti, I. I., & Indriani, R. (2023). Digital game-based learning interventions on student's numeracy skills and engagement. Formatif: Jurnal Ilmiah Pendidikan MIPA, 13*(4), 345–356.* https://doi.org/10.30998/formatif.v13i4.23356

Sun, Y., & Liu, L. (2023). Structural equation modeling of university student's academic resilience academic well-being, personality and educational attainment in online classes with Tencent Meeting application in China: investigating the role of student engagement. BMC Psychology, 11. https://doi.org/10.1186/s40359-023-01366-1.

Suprayogi, M., Valcke, M., & Godwin, R. (2017). Teachers and their implementation of differentiated instruction in the classroom. Teaching and Teacher Education, 67, 291-301. https://doi.org/10.1016/j.tate.2017.06.020.

Suryatama, H., Rozaq, R., , P., & Siswanto, D. (2024). Efektivitas Pendekatan Pembelajaran Berdiferensiasi untuk Meningkatkan Literasi Numerasi Siswa. MURABBI. https://doi.org/10.69630/jm.v3i2.48

Susanti, N. (2021). Penerapan pembelajaran diferensiasi untuk meningkatkan kemampuan numerasi siswa sekolah dasar. Jurnal Pendidikan dan Pembelajaran Dasar*,* *8*(2), 122–133.

Susilawati, E., Muslim, S., Khaerudin, K., & Yansyah, F. (2024). The potency of the adaptive cooperative learning model in strengthening numeracy performance of secondary school students: Education policy insights. Edelweiss Applied Science and Technology. https://doi.org/10.55214/25768484.v8i6.3915.

Taş, H., & Minaz, M. (2024). The Effects of Learning Style-Based Differentiated Instructional Activities on Academic Achievement and Learning Retention in the Social Studies Course. SAGE Open, 14. https://doi.org/10.1177/21582440241249290

Thorsen, C., Hansen, K., & Johansson, S. (2021). The mechanisms of interest and perseverance in predicting achievement among academically resilient and non-resilient students: Evidence from

Swedish longitudinal data.. The British journal of educational psychology, e12431 . https://doi.org/10.1111/bjep.12431

Wibowo, S. (2022). Peran guru dalam menerapkan pembelajaran berdiferensiasi: Upaya meningkatkan numerasi siswa. Jurnal Didaktika Pendidikan Dasar*,* *7*(1), 44–56.

Wijayanti, P., Sinensis, A., & Novitasari, D. (2023). Penerapan Pembelajaran Berdiferensiasi Terhadap Hasil Belajar Siswa Pokok Bahasan Cahaya Kelas VIII SMP. U-Teach: Journal Education of Young Physics Teacher. https://doi.org/10.30599/uteach.v4i2.556

Wulandari, F. (2022). Efektivitas pembelajaran diferensiasi terhadap ketangguhan belajar siswa*.* Jurnal Pendidikan Dasar Nusantara*,* *7*(2), 188–199.

Yang, S., & Wang, W. (2022). The Role of Academic Resilience, Motivational Intensity and Their Relationship in EFL Learners' Academic Achievement. *Frontiers in Psychology*, 12. https://doi.org/10.3389/fpsyg.2021.823537

Yaniawati, R. P. (2010). Pengaruh e-learning untuk meningkatkan daya matematik mahasiswa. Cakrawala Pendidikan, 29(1), 76–89. https://doi.org/10.21831/cp.v1i1.1137

Yaniawati, R. P., Fisher, D., Permadi, Y. D., & Yatim, S. A. M. (2023). Development of mobile-based digital learning materials in blended learning oriented to student's mathematical literacy. International Journal of Information and Education Technology, 13*(9),* 1254–1261. https://doi.org/10.18178/ijiet.2023.13.9.2544