

# The Effectiveness of Differentiated Learning Strategies on Elementary Students' Mathematical Critical Thinking Ability

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## ABSTRACT

This study explores the effectiveness of differentiated learning strategies in improving elementary students' mathematical critical thinking skills. The independent variable is the application of differentiated learning strategies, while the dependent variable is the students' mathematical critical thinking ability. A quantitative approach was used, utilizing a quasi-experimental design with a non-equivalent control group. The sample included 30 fourth-grade students from Al-Falaah Islamic Elementary School and 30 from Jombang 01 Ciputat Elementary School, selected through purposive sampling. Data collection involved tests, questionnaires, observation sheets, and interview guides, and the analysis was conducted using independent sample t-tests and N-Gain tests with the help of SPSS IBM 22.0 software. The statistical analysis showed a significant effect of differentiated learning strategies on critical thinking skills, with a p-value of 0.000 and an N-Gain score of 74.56%. This indicates a notable improvement in students' abilities in interpretation, analysis, evaluation, and inference. Differentiated learning strategies accounted for 58% of the variation in outcomes, with the remaining 42% influenced by other factors. In conclusion, differentiated learning strategies significantly enhance elementary students' mathematical critical thinking, and educators are encouraged to adopt these methods to foster deeper cognitive engagement.

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## 1. INTRODUCTION

Mathematical critical thinking ability is the cognitive process (Popova et al., 2024) or mental action (Saputra, 2020) that enables individuals to use mathematical reasoning to solve problems ranging from simple to complex (Setiyani et al., 2024; Cahyaningsih & Nahdi, 2021). This process involves observation, analysis (Wale, 2020), and problem-solving strategies rooted in prior knowledge (Firdaus, 2020). In practice, students are expected to focus on goals, think reflectively, and demonstrate resilience and independence (O'Reilly et al., 2022) while reasoning carefully and drawing accountable conclusions (Ismayanti et al., 2022). Critical thinking is measured by several key indicators: interpretation, analysis, evaluation, inference, explanation, and self-regulation (Facione, 2020).

Critical thinking abilities are crucial for success in learning mathematics (Harijanto, 2018; Wulandari et al., 2018; Popova et al., 2024). These abilities enable students to communicate and collaborate effectively, and to develop other thinking abilities (Saputra, 2020) such as creative and innovative thinking (Ayu, 2019). Classified as high-level thinking abilities (Yuliasirin et al., 2023; Wicaksono, 2020), critical thinking can be fostered through meaningful learning experiences (Saputra, 2020), providing life abilities for the nation's future generations, equipping them to be globally competitive (Anggraeni et al., 2021; Afandi et al., 2021). Developing mathematics learning objectives from an early age (Fitria et al., 2023) is particularly important, as it builds abilities that are applicable in various fields of technology and science (Popova et al., 2024).

The application of critical thinking skills in elementary schools remains notably low, which is a significant concern given the emphasis on these abilities in 21st-century education (Suci et al., 2019; Lisbiyaningrum et al., 2019; Febrina & Airlanda, 2020). Research shows that current learning strategies do not adequately foster students' critical thinking and metacognitive skills (Rijal et al., 2021). This issue is evident in the performance of elementary students in mathematics, where students scored significantly below the international average in the 2022 PISA assessment, with a score of 366, placing them at level two out of six (P., 2019). Contributing factors include students' lack of confidence and the perception that mathematics is a difficult subject (Dalilan & Sofyan, 2022), leading to struggles with problem-solving (Kamalia & Ruli, 2022). Furthermore, conventional teaching methods—dominated by teacher-centered lectures and rote assignments—tend to disengage students, causing boredom and reducing opportunities for active learning (Ananda, 2019; Dewi & Sadjarto, 2019; Ridwan, 2021). This research seeks to address this problem by exploring strategies that can better promote critical thinking in elementary school students, particularly in mathematics.

To address the deficiencies in students' mathematical critical thinking abilities, differentiated learning strategies present a promising solution. These strategies tailor educational experiences to meet the diverse needs of students, fostering greater engagement and enhancing critical thinking skills (Pratiwi et al., 2022; Tomlinson, 2017). Differentiated learning involves designing activities that align with specific learning goals (Pratiwi et al., 2022; Wahyuni, 2022) while accommodating individual students' readiness, interests, and learning preferences (Tomlinson, 2017). By engaging students more actively, learning becomes both interesting and enjoyable (Aprima & Sari, 2022; Sulistyosari et al., 2022), allowing them to reach their full potential through personalized experiences and assessments (Anggoro et al., 2024). This approach has been shown to be effective in improving mathematics outcomes (Di & Merdeka, 2022), as it gives each student an opportunity to succeed by addressing their unique learning needs (Yavich & Rotnitsky, 2020).

The use of differentiated learning strategies is based on Howard Gardner's theory of multiple intelligences (Aghnia, 2023), which emphasizes the diversity of human intelligence, including critical thinking abilities. In this context, the teacher's role is to guide and facilitate learning by using strategies that suit students' unique abilities and needs (Zubairi, 2022). Additionally, Vygotsky's theory of the Zone of Proximal Development (ZPD) (1978) further supports this approach, suggesting that teachers should create meaningful learning environments that engage students according to their learning styles, while also providing timely and effective feedback (de Jager, 2017).

In practice, differentiated learning strategies encompass the content or teaching materials, the process of processing ideas and information, the products or outcomes students achieve, and the learning environment (Pane et al., 2022), all tailored to students' interests and abilities (Kahled Alshareef & Alshareef, 2019). The steps involved in this approach include: 1) defining learning objectives; 2) identifying learning needs based on students' readiness, interests, and profiles; 3) choosing appropriate strategies and assessments; and 4) providing feedback to monitor progress and address any learning challenges (Tomlinson, 2017).

Although previous studies have explored various elements of differentiated learning, there is a significant lack of research specifically focused on its effect on elementary students' mathematical critical thinking skills. This study fills that gap by evaluating the effectiveness of four differentiated learning

strategies—content, process, product, and learning environment—in enhancing students' abilities in interpretation, analysis, evaluation, and inference within fourth-grade mathematics. The research aims to determine how these strategies impact mathematical critical thinking, particularly in solving problems related to multiples and factors of numbers, which are essential parts of the fourth-grade curriculum. By implementing these strategies, the study seeks to provide new insights into how personalized learning can improve critical thinking in early education. Ultimately, this research contributes to the field by demonstrating the effectiveness of differentiated learning in developing critical thinking, a vital skill for 21st-century learners.

## 2. METHODS

This study employed a quantitative approach (Siyoto, 2015) and a quasi-experimental design with a non-equivalent control group, chosen to fit the study's objective of assessing the impact of differentiated learning strategies on students' mathematical critical thinking abilities. The quasi-experimental method was selected because it allows for the comparison of treatment effects in a real-world classroom setting, where randomization of classes was not feasible (Abraham & Supriyati, 2022).

The research population consisted of fourth-grade students from Gugus 03, Ciputat District, South Tangerang City, representing 10 schools. Purposive sampling was used to select two schools, Al-Falaah Islamic Elementary School and Jombang 01 Elementary School, based on several key factors: both schools had category A accreditation, medium-range numeracy values in the educational report, and comparable support capabilities, including similar teacher qualifications, student intake, and class sizes. These criteria were carefully considered to ensure that the sample reflected the broader population of students in the district and provided a valid basis for comparison.

The experimental group, consisting of 30 students from Al-Falaah Islamic Elementary School, received instruction using differentiated learning strategies, while the control group, consisting of 30 students from Jombang 01 Elementary School, followed conventional direct learning methods without any differentiated instruction (Isnawan et al., 2020). The study spanned four instructional meetings, excluding pretest and posttest sessions, to evaluate the effectiveness of the differentiated learning strategies in enhancing mathematical critical thinking.

Research data obtained directly by the researchers, or primary data (Nuryadi et al., 2017), was collected through the following procedure.

**Table 1.** Data Collection Procedures

Component	Procedure	Implementation	Source
Mathematical critical thinking abilities	1. Pretest and posttest	At the beginning and the end of learning	Student
Differentiated learning strategies	1. Observation of learning readiness	Before learning	Student
	2. Observation of learning implementation	Before and during learning	Teacher
	3. Filling out the questionnaire	At the end of learning	Teacher
	4. Interview	At the end of learning	Teacher

The research instrument underwent a content validation process facilitated by experts judgment within the field. The mathematical critical thinking ability test instrument was specifically piloted with 30 students outside the research sample. Next, the construct validity was tested, including a validity test based on the correlation coefficient value and a significance level of 5%. Reliability tests were conducted using by Alpha Cronbach values, with questions deemed reliable if exceeding 0.60. The construct validity was tested using the SPSS IBM 22.0 program, resulting in 12 questions to be used in research.

**Table 2.** Mathematical Critical Thinking Ability Instrument Grid

Basic competencies/ Learning objectives	Indicator	Number of Items	Question Number
Solving problems related to multiples and factors of number in everyday life.	Interpretation	3	1, 2, 3
	Analysis	3	4, 5, 6
	Evaluation	3	7, 8, 9,
	Inference	3	10, 11, 12
Total Question Items		12	

The learning instrument was differentiated using observation sheets, interview guides, and closed Likert- scale questionnaires with four answer choices. The observation sheet consisted of a lesson plan with a model teacher as the object. Question indicators included developing learning objectives according to student characteristics, and managing learning activity steps. The structured interview guide (Sahir, 2022) comprised three main components: 1) understanding of differentiated learning, including indicators of conceptual grasp and understanding of strategies (content, process, product, and learning environment; 2) the implementation of differentiated learning, including indicators such as student readiness strategies, preparation of teaching tools, learning process; and 3) differentiated learning evaluation, including evaluation and reflection indicators, and follow-up on learning outcomes. In addition, a questionnaire is administered to group students according to their readiness, interests, and learning profiles. The questions included attitude towards lessons, prior experience, proficiency in prerequisite abilities, misinterpretation of material, generalization, vocabulary, basic competence, understanding of material, communication, interest in various lessons (outdoor, scientific, persuasive, clerical), and preferred learning profile (auditory, visual, kinesthetic), along with the learning implementation questionnaire as follows.

**Table 3.** Differentiated Learning Questionnaire Instrument Grid

Component	Indicator	Number of Items	Question Number
Differentiated learning planning	1. Diagnostic assessment	3	1, 2, 3
	2. Grouping students' readiness, interests and profiles	3	4, 5, 6
	3. Preparation of learning tools	2	7, 8
Implementation of Differentiated Learning	1. Differentiation of Learning Content	10	9, 10, 11, 12, 13, 14, 15, 16, 17, 18
	2. Differentiation of Learning Processes	10	19, 20, 21, 22, 23, 24, 25, 26, 27, 28
	3. Learning Product Differentiation	10	29, 30, 31, 32, 33, 34, 35, 36, 37, 38
	4. Differentiated Learning Environments	9	39, 40, 41, 42, 43, 44, 45, 46, 47
Differentiated Learning Assessment	1. Preparation of assessment instruments	2	48, 49
	2. Assessment process	3	50, 51, 52
	3. Assessment follow-up	3	53, 54, 55
Total Question Items		55	

The analysis of the observation sheet results was interpreted based on the predicate categories described in (Arikunto, 2016).

**Table 4. Predicate Categories**

No	Interval	Category
1	80.1% - 100%	Very good
2	60.1% - 80%	Good
3	40.1% - 60%	Quite good
4	20.1% - 40%	Not good
5	0% - 20%	Not good

Meanwhile, the results obtained from the mathematics interest questionnaire were analyzed based on the rules (Azwar, 2022) as follows.

**Table 5. Predicate Categories**

No	Category Limits	Category
1	$M + 1 SD \leq X$	High
2	$M - 1 SD \leq X < M + 1 SD$	Medium
3	$X < M - 1 SD$	Low

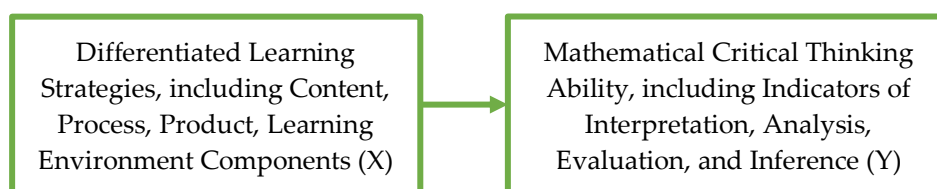
For data analysis, descriptive analysis was employed (Gani & Amalia, 2014), where the results of data processing were described without generalization, and inferential analysis of quantitative data (Sugiyono, 2016) utilized statistical tests, namely independent sample t-test, to answer the comparative hypothesis of two unpaired samples (Sahir, 2022), followed by calculating the N-gain value to answer the research question. Before conducting statistical analysis, normality prerequisite tests were performed using Lilliefors test on the Kolmogorov-Smirnov column, and the homogeneity test was assessed based on the mean values from Levene’s test. The researchers used the SPSS IBM 22.0 for the analysis, with a significance level of 0.05 ( $\alpha = 5\%$ ). If the significance value (sig) was less than 0.05 or tcount exceeded t-table, then  $H_0$  was rejected and  $H_1$  was accepted.

### 3. FINDINGS AND DISCUSSION

This section presents the findings on the effectiveness of differentiated learning strategies in enhancing elementary school students' mathematical critical thinking abilities. The analysis includes descriptive and statistical assessments of the key indicators: interpretation, analysis, evaluation, and inference.

#### 3.1. Descriptive Analysis of the Impact of Differentiated Learning on Students' Mathematical Critical Thinking

Mathematical critical thinking abilities in this research refer to a systematic and logical way of thinking based on facts with a variety of analytical abilities. The indicators to be measured include interpretation, analysis, evaluation, and inference. The effectiveness of implementing differentiated learning strategies on elementary school students' mathematical critical thinking ability was analyzed as follows.



**Figure 1.** Visualization of Influence and Effectiveness between Variables

Implementing differentiated learning strategies significantly improved students' mathematical critical thinking abilities compared to the control group. This conclusion is drawn from the analysis of data collected from 12 descriptive tests administered before and after instruction in both the experimental and control classes. Specifically, in the experimental class, 17 students scored highly on the analysis indicator, compared to only 7 students in the control group. Similar trends were observed

across other critical thinking indicators, where the experimental group consistently outperformed the control group. These results clearly demonstrate the positive impact of differentiated learning strategies on enhancing students' mathematical critical thinking abilities.

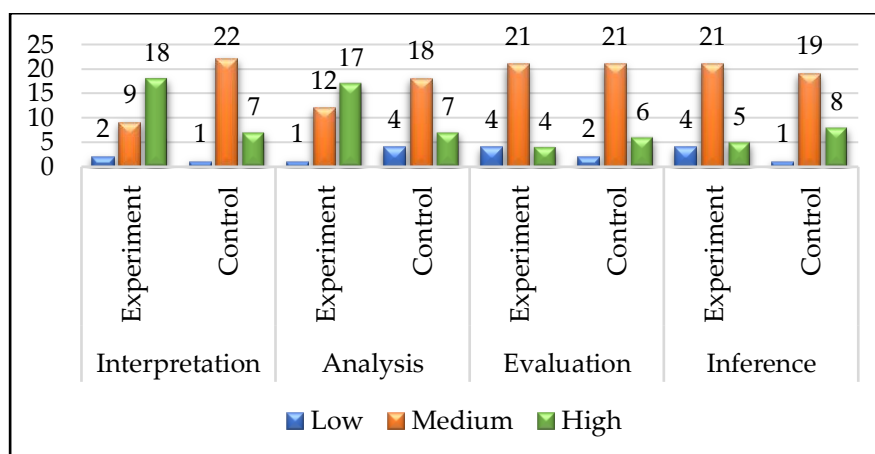


Figure 2. Recapitulation Diagram of the Mathematical Critical Thinking Ability Test

The diagram shows that the majority of students in both the experimental and control classes fall into the medium category for each indicator of mathematical critical thinking, indicating that further improvements are needed in the teaching methods used in both classes. In the interpretation indicator, students in the experimental class performed better overall, with 18 students scoring in the high category, 9 in the medium category, and 2 in the low category. In contrast, the control class mostly had medium scores, with 22 students in the medium category, 7 in the high category, and 1 in the low category. Both groups of students found question number 3, which required identifying factors of five random numbers, particularly challenging.

Additionally, the experimental class outperformed the control class in the analysis indicator, as proven by 17 students who achieved high category, 12 students achieved medium, and 1 student was in the low category. Meanwhile, in the control class, 7 students achieved the high category, 21 students achieved medium, and 4 students were in the low category. The challenge for students in the experimental class was answering the question of analyzing the potential vouchers from an amount of shopping costs. Meanwhile, in the control class, students struggled with using a systematic, precise, and complete method regarding questions about possible outcomes and determining who received the rice distribution from Mr. Mardi.

The control class demonstrated a strong grasp of evaluation indicator, as evidenced by high scores obtained by 6 students, medium scores by 21 students, and low scores by 2 students. Meanwhile, in the experimental class, 4 students achieved the high and low score categories, while 21 students fell into the medium category. Generally, control class students struggled to answer question number 9, which involved giving opinions and solving problems about multiples of numbers in daily life. Meanwhile, experimental class students found it challenging to answer question number 7, which involved giving opinions and solving problems about factors of numbers in daily life.

The control class also showed dominance in the inference indicators, with 8 students in the high category, 19 students in the medium category, and 1 student in the low category. Meanwhile, in the experimental class, 5 students achieved the high category, 21 students in the medium category, and 4 students in low category. Students encountered difficulties particularly in solving problems related to the least common multiple if time is known as a multiple number and determining overlapping times in different dates. Detailed descriptions of elementary school students' mathematical critical thinking ability are provided in the following table.

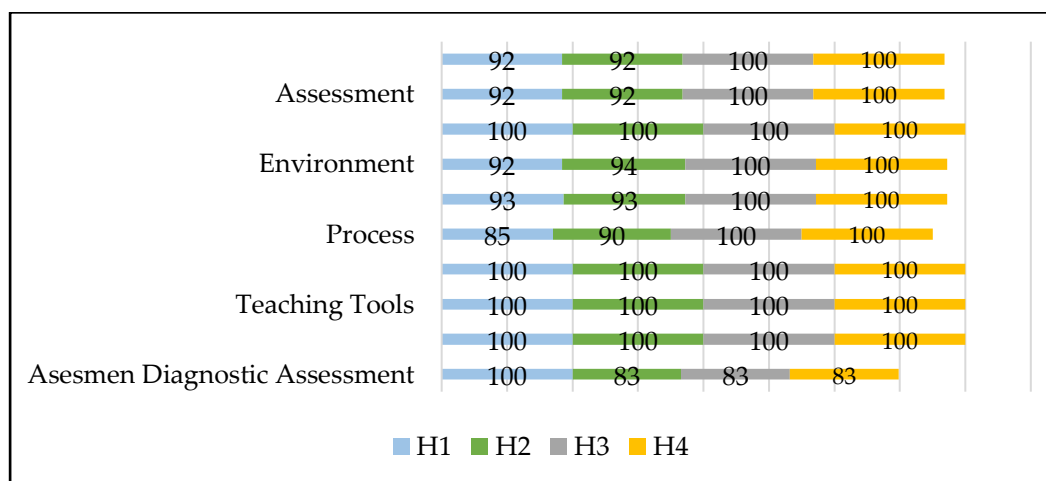
**Table 6.** Recapitulation of Posttest Results for Mathematical Critical Thinking Ability

Class		Statistic	Std. Error
Mathematical Critical Thinking Ability	Experiment	Mean	90.43
		Median	90.00
		Std. Deviation	5.550
		Minimum	79
		Maximum	98
Control	Mean	79.10	.753
	Median	79.00	
	Std. Deviation	4.122	
	Minimum	71	
	Maximum	88	

According to the table, the experimental class showed higher results in terms of average, median, maximum, minimum, and standard deviation values for mathematical critical thinking ability compared to the control class. In the experimental class, where differentiated learning strategies were applied, the average score was 90.43, which is 11.33 points higher than the control class's average of 79.10. The median scores were 90.00 for the experimental class and 79.00 for the control class. The maximum scores were 98 and 88, and the minimum scores were 79 and 71 for the experimental and control classes, respectively. The standard deviations were 5.550 for the experimental class and 4.122 for the control class. Additionally, students in the experimental class excelled in the interpretation and analysis indicators, while the control class performed better in the evaluation and inference indicators, as previously noted in the categorization discussion.

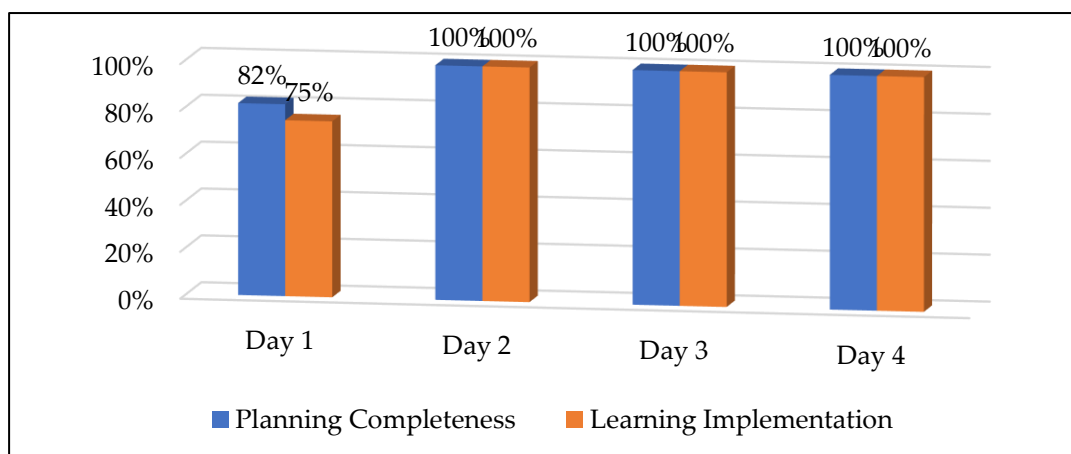
The improvement in mathematical critical thinking test scores in the experimental class demonstrates the effective use of differentiated learning strategies. This conclusion is further supported by data from student readiness questionnaires, including cognitive diagnostic assessment results, which show an average score of 82.22 for students on prerequisite material, with scores ranging from 60 to 100. The results of the non-cognitive assessment reveal that 16 students exhibit very good readiness for learning, 8 students are classified as good, and 6 students are less ready to learn. Student interest significantly contributes to the acquisition of material. In terms of learning profiles, 13 students have an auditory learning style, 9 students are visual learners, and 8 students are kinesthetic learners. Identifying students' readiness for learning is crucial for teachers in managing effective learning. This forms the basis for implementing differentiated learning strategies in experimental and control classes.

Based on observations compiled from the questionnaire on the implementation of differentiated learning strategies, it shows that:



**Figure 3.** Recapitulation of Differentiated Learning Strategies Questionnaire Results

Each component of the questionnaire results range from 80.1% - 100%, falling into the *very good* category. This suggests that the implementation of the differentiated learning strategies, which was carried out for four days in the experimental class, was effectively executed by the model teacher. The lowest score, 83%, was obtained in the initial cognitive assessment in the first meeting, conducted to map students' learning readiness with new material. Teachers are constantly adjusting their approach according to students' needs, particularly those with low cognitive assessment results. Learning strategies involving process, product, and learning environment components continue to evolve every day. Based on the results of learning observations, the following information was obtained:



**Figure 4.** Recapitulation of Observation Results of Differentiated Learning Strategies

The implementation of learning activities using differentiated strategies has generally been effectively conducted, signified by 80.1%-100% completion rate. However, on the first day, both the completeness and implementation of learning only scored 82% and 75%, respectively. This was due to teachers still adapting to time management, fostering active participation from students in reflection and follow up activities, and taking necessary steps to improve the learning process.

The results of interviews with the model teachers indicate that teachers understand and manage learning using differentiated strategies very well. According to them, mathematical critical thinking ability can improve with student readiness for the material being studied. This readiness starts from mapping learning needs, planning, implementation and assessment in favor of the students. Eventually, students feel valued in learning, increasing their interest in learning mathematics and positively influences their learning outcomes. This dispels student perception that mathematics is a difficult and boring subject.

### 3.2. Statistical Analysis of Differentiated Learning's Impact on Students' Mathematical Critical Thinking

The effectiveness of differentiated learning strategies on elementary school students' learning interest in mathematics subjects can be analyzed through data processing using independent sample t-test. To examine the influence of the two variables, the N-gain values are calculated to answer the research question. The calculation results can be seen via SPSS output as follows.

**Tabel 7.** Independent Samples Test

		Levene's Test for Equality of Variances				t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Mathematical Critical Thinking Ability	Equal variances assumed	2.156	.147	8.979	58	.000	11.333	1.262	8.807	13.860
	Equal variances not assumed			8.979	53.527	.000	11.333	1.262	8.802	13.864

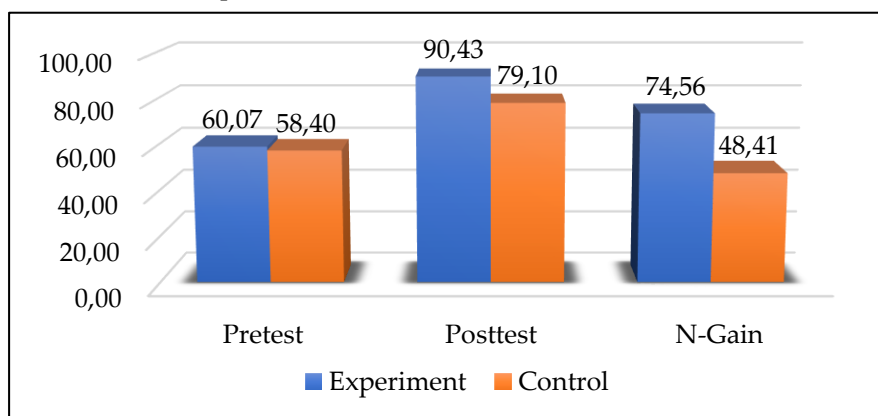
The statistical analysis results indicate a significant influence of differentiated learning strategies on elementary school students' mathematical critical thinking ability, as evidenced by the Sig. value (2-tailed, equal variance assumed due to homogeneous data following the assumption test). The obtained Sig value.  $0.000 < 0.05$ , thus it can be concluded that  $H_0$  is rejected while  $H_1$  is accepted, signifying a significant influence of the application of differentiated learning strategies on elementary school students' mathematical critical thinking ability. The influence contribution is 58% based on the determination test (R Squared). The remaining 42% ( $100\% - 58\%$ ) is attributed to other variables not included in this research, as detailed in the table below.

**Table 8.** Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.763a	.582	.574	4,889

a. Predictors: (Constant), Class

The next analysis was to test the effectiveness of differentiated learning strategies on elementary students' mathematical critical thinking ability through the N-Gain test [56]. The calculation results can be seen via SPSS output as follows.



**Figure 5.** Pretest, Posttest, and N-Gain for Mathematical Critical Thinking Ability

The N-Gain analysis further highlights the effectiveness of differentiated learning strategies in improving students' mathematical critical thinking abilities. The experimental group, which implemented these strategies, achieved a 74.56% increase in N-Gain, categorizing the improvement as

effective (Sukarelawan et al., 2024). In contrast, the control group, which used conventional teaching methods, showed a 48.41% increase in N-Gain, categorized as ineffective. This clear difference underscores the substantial impact of differentiated learning on enhancing critical thinking skills, as the experimental group demonstrated significantly higher gains in problem-solving and reasoning abilities compared to the control group.

### *Discussion*

The implementation of differentiated learning strategies has proven effective in enhancing elementary school students' mathematical critical thinking abilities. This conclusion is consistent with previous research, which shows that differentiated learning is more effective than conventional approaches in mathematics education (Cindyana et al., 2022). It has been found to positively influence students' critical thinking skills (Avandra & Desyandri, 2023), and aligns with broader trends in student-centered learning paradigms. For instance, Firdaus (2020) highlighted that student-centered learning and heightened learning interest significantly impact students' critical thinking abilities in mathematics, as observed in SMPN students in Tangerang City.

The comparative advantage of differentiated learning strategies over conventional methods stems from their ability to map students' readiness and learning profiles, allowing teachers to optimize classroom management and instructional techniques (Wilujeng & Sudihartinih, 2021). Teachers play a critical role in this process, acting as facilitators and mediators. Effective differentiated instruction requires teachers to meet the diverse needs of students by using clear language, guiding problem-solving processes, and helping students draw meaningful conclusions (Hendryawan et al., 2017). Additionally, fostering critical thinking through techniques like trigger questions and interactive modeling can further enhance students' engagement and reasoning abilities, as noted by Juraidah & Hartoyo (2022).

Furthermore, the use of interactive tools, such as Dakon Mathematics, has been shown to be particularly effective in enhancing mathematical critical thinking, especially in understanding complex concepts like multiples and number factors (Savriliana et al., 2020). These tools not only engage students but also provide hands-on experiences that cater to various learning styles, making abstract mathematical concepts more accessible. Additionally, interactive media fosters collaboration and communication among students, further enhancing their critical thinking abilities through peer discussions and problem-solving activities.

These findings demonstrate the overall effectiveness of differentiated learning strategies in fostering critical thinking skills, particularly when combined with interactive tools. However, one limitation of this study is the relatively small sample size, which may limit the generalizability of the results across different educational contexts. To strengthen the applicability of these findings, future research should explore larger, more diverse populations and include longitudinal studies to assess the long-term effects of differentiated learning on students' critical thinking skills.

In practice, educators can implement differentiated learning strategies by tailoring instruction to meet students' readiness and learning profiles, using interactive tools that promote engagement, and emphasizing student-centered learning environments. This approach, when coupled with regular formative assessments, allows teachers to monitor students' progress and adjust instruction accordingly. By doing so, educators can create a dynamic learning environment that not only improves mathematical critical thinking but also fosters deeper student engagement, ultimately enhancing overall academic achievement.

## **4. CONCLUSION**

This study highlights the significant impact of innovative, student-centered learning approaches on enhancing 21st-century skills, particularly in fostering mathematical critical thinking. Differentiated learning strategies, which cater to students' diverse abilities, preferences, and needs, prove to be more

effective than traditional teacher-centered methods. By reducing frustration and increasing engagement, these strategies help students reach their full potential. The data shows that students were more motivated and enjoyed the learning process, leading to better outcomes aligned with their goals and interests. The research reveals that differentiated learning is particularly effective in improving key critical thinking skills, such as interpretation, analysis, evaluation, and inference, with an N-Gain test indicating a significant improvement of 74.56%. Differentiated learning contributed to 58% of this improvement, with other factors accounting for the remaining 42%. The study recommends that teachers become proficient in these strategies, use creative teaching tools, manage class time effectively, and regularly assess student progress to tailor instruction. Additionally, school administrators should support teachers by providing continuous professional development and the necessary resources. This research contributes to the broader educational field by offering insights into how differentiated learning can enhance critical thinking, providing a foundation for future research and educational practices that aim to equip students with essential skills for the modern world.

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