



THE EFFECT OF DIFFERENTIATED INSTRUCTION ON STUDENTS' CRITICAL THINKING SKILLS

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Abstract

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The effect of differentiated learning on students' critical thinking skills at Tugu Harum elementary school in the subject of Natural and Social Sciences (IPAS) is the aim of this study. This study employs a quantitative approach, with the Quasi-Experimental Design method being used as a type of non-equivalent control group design. A total of 30 fifth-grade students at elementary school Tugu Harum were selected as the sample for this study. Data collection methods included a 15-item essay test, which was evaluated for validity and credibility. The results showed a very high Cronbach's Alpha value for the categories. Normality, homogeneity, and hypothesis tests were conducted to analyze the data. The findings indicated that there was a significant difference between the posttest results of the experimental group and the control group. This discovery suggests that the implementation of differentiated learning significantly affects the improvement of students' critical thinking skills. By providing treatments that align with students' readiness, interests, and learning styles, differentiated learning can foster a more active, meaningful, and effective learning process. Therefore, this approach can serve as a creative alternative to enhance the quality of learning in elementary schools, with a particular emphasis on developing critical thinking skills relevant to the 21st century.

Keywords: Critical Thinking Skills; Differentiated Learning; IPAS

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INTRODUCTION

To achieve the development of each individual's intelligence, education is the most important aspect that must be received by everyone. This is supported by the explanation of education provided by the National Education System Law (UU SISDIKNAS) No. 20 of 2003, which emphasizes that education is a basic right of every Indonesian citizen and must be provided fairly and evenly to improve the quality of human resources. The implementation of the educational process can be carried out through the learning process in schools, where students and teachers play the roles of learning participants and implementers, respectively (Gemnafle & Batlolona, 2021; Nofriansyah et al., 2025).

The implementation of learning is not always smooth. For example, in the learning process, each class consists of students with varying levels of knowledge, different learning styles, and diverse learning interests (Nofriansyah et al., 2024; Nofriansyah et al., 2022). These differences create individual characteristics in how students learn, meaning their ability to understand also varies according to their learning style (Nofriansyah et al., 2024). The differences in students' backgrounds pose challenges for

educators in delivering effective lessons to students (Nurharirah et al., 2025; Rahayu et al., 2025a; Rahayu et al., 2025b; Nofriansyah et al., 2024).

Differentiated learning is an educational method that educators can use to provide lesson content tailored to the context and differences in students' learning assimilation. According to Suwartiningsih (2021), this concept is recognized as the formation of a diverse classroom aimed at giving students the opportunity to improve their learning outcomes and make effective use of their learning time. It includes various techniques to acquire content, process, build, formulate ideas, restate, and create learning products, ensuring that all students with different needs and abilities can learn effectively (Subhan et al., 2025). Febrianti & Dafit (2023) state that learning is one of the key components in the field of education, and its implementation is closely linked to the curriculum. The government has made various efforts to improve the quality of educators, one of which is through the implementation of the Merdeka Curriculum. Ramadhan et al. (2023) describe the Merdeka Belajar curriculum as a curriculum that emphasizes the freedom to learn creatively and independently. This curriculum will help students develop their unique personalities in line with the principles of Ki Hajar Dewantara, a national figure in Indonesian education. As mentioned in Government Regulation (PP) No. 57 of 2021 on the National Education Standards (SNP).

One of the educational policies in Indonesia is the Merdeka Curriculum, which provides primary schools with more freedom to choose content and teaching methods that align with students' needs. The Merdeka Curriculum is a new curriculum introduced by the Indonesian government in 2021 with the goal of helping students become more independent and competitive in the era of globalization (Syia & Khairina, 2024). The Merdeka Curriculum also emphasizes the idea that every student has unique interests, talents, and abilities, and therefore, teachers must collaborate and organize students in diverse ways to cater to these differences.

One of the most relevant learning strategies to implement in today's educational world is the differentiated learning approach. The philosophy of Ki Hajar Dewantara is closely related to differentiated learning, where he argued that the educational process should support the natural development of children to achieve safety and happiness, both as individuals and as members of society (Purwowidodo & Zaini, 2023). This implies that every child has unique opportunities and potential that require the guidance of a teacher to help students realize their potential and self-identity. To enhance the quality of student learning, the teacher's role is crucial in achieving educational goals. One of the ways they can achieve this is by selecting engaging learning models and preparing the right learning media to support students (Aida, 2024). This can be realized through differentiated learning, where teachers can facilitate the differences among students according to their learning readiness, learning styles, talents, skills, abilities, cultures, and social backgrounds by applying strategies such as creating diverse content/material, processes, products, and learning environments.

Differentiated learning is an approach where teachers take into account the differences in learning styles, learning interests, and abilities of students (Falabiba, 2019). Differentiated learning is a motoric learning model that is varied according to the needs of the students (Adi et al., 2025). Therefore, the basic concept of differentiated learning is to implement teaching methods that accommodate the varying capacities of students in a single class. Educators or teachers play a crucial role in analyzing the needs and abilities of each student, ensuring that every student receives instruction that is appropriate to their individual skill levels (Wahyudi et al., 2023).

The results of observations at elementary school Tugu Harum show that students' critical thinking skills in the subject of IPAS are still low. This was evident when the

teacher gave HOTS (Higher Order Thinking Skills) questions, where students' work was still very inconsistent. This situation occurred because the learning process is still teacher-centered. As a result, students are not accustomed to voicing their opinions or ideas. Students tend to simply follow the teacher's instructions without thinking independently. Additionally, based on interviews with the fourth-grade homeroom teacher regarding the implementation of differentiated learning, it was found that students are not yet accustomed to analyzing problems or actively expressing their opinions. Therefore, the implementation of differentiated learning, particularly in enhancing students' critical thinking skills in the IPAS subject, needs to be improved.

It is crucial for elementary school (SD) students to develop critical thinking skills. Critical thinking helps students evaluate, analyze, and make sound decisions (Huda & Abduh, 2021). As stated by Wulandari et al. (2023), each student's critical thinking skills are unique, and therefore, it is essential to provide teaching and development from an early age, particularly during elementary education. Cognitive, moral, spiritual, and social development are influenced by critical thinking. According to Ariyanto et al. (2018), critical thinking skills are defined as an active process in learning that involves thoroughly understanding information, leading to the formation of beliefs about the truth of the information or opinions presented. A previous study by Avandra (2022) found that the application of differentiated learning can improve students' critical thinking skills.

METHODS

A quasi-experimental method was used in this study to measure the impact of differentiated learning on students' critical thinking skills. Two groups were involved in the study design: the experimental group and the control group. The differentiated learning method was applied in the experimental group, while the control group used conventional pedagogy that was not tailored to the students' learning styles or unique needs. A non-equivalent control group design was used to compare the two groups. This design was chosen because it allows for a comparison between two different groups while considering factors that may influence students' learning outcomes. However, similar to stricter experimental designs, it cannot control all external variables comprehensively.

All fifth-grade students at elementary school Tugu Harum from the 2025–2026 academic year were involved in this study. A total of 50 students participated, with 25 students selected purposively to join the experimental group and the remaining 25 students assigned to the control group. This sampling method was used due to the relevant characteristics of the students, such as comparable readiness and academic background, which allowed the study's findings to be generalized to a larger population. All students in the study were given the same instrument to measure their critical thinking skills both before and after the learning sessions. The aim of this study was to gather accurate information on the effects of differentiated learning compared to conventional learning.

RESULTS & DISCUSSION

Results

The normality test of the pretest data was conducted to determine whether the data in this study follows a normal distribution. This test is used as a basis for selecting the

appropriate statistical test. The normality test was performed using the Kolmogorov-Smirnov (Liliefors) test, as it is suitable for relatively small sample sizes. The data being tested were the pretest scores of students' critical thinking skills in the fifth grade at elementary school Tugu Harum before they were given the differentiated learning treatment in the IPAS subject.

Table 1.
Normality Test Results

Variable	Sig	Result
Post-Control	0,05	0,111
Post-Experiment	0,05	0,183

Source: Primary data processed (2025)

The results of the one-sample normality test using the Kolmogorov-Smirnov test showed that the posttest data from both groups the group receiving the differentiated learning treatment and the group receiving the conventional learning treatment follow a normal distribution. The significance value for the differentiated learning group was 0.183, and for the conventional learning group, it was 0.111, both of which are higher than the normality threshold. Therefore, the data obtained from this study meet the criteria for further analysis using parametric statistical tests.

If there is a significant difference between the experimental and control groups, the homogeneity test is used. Due to its significance, this test is one of the requirements for using parametric tests, particularly the t-test. A significance value of 0.05 or higher indicates that the data exhibit homogeneous variation. Conversely, a significance value of 0.05 or lower indicates that the variation is not homogeneous.

Tabel 2.
Homogeneity Test Results

Variable	Sig	Result
Result	0,05	0,075

Source: Primary data processed (2025)

The results of the homogeneity of variance test show that the calculation for Based on Mean has a significance value of 0.036, Based on Median is 0.059, Based on Median with adjusted df is 0.059, and Based on Trimmed Mean is 0.075. Of these four results, the significance value for Based on Mean is less than 0.05, while the significance values for the other three tests are greater than 0.05.

The hypothesis was tested using an independent t-test with a significance level of 0.05. The decision criteria indicate that if the significance value is less than 0.05, there is an effect of differentiated learning on students' critical thinking skills in the IPAS subject; if the significance value is greater than 0.05, there is no effect.

Table 3.
Results of the Difference Test of the Posttest Means of the Control Class and the Experimental Class

Group	N	Mean	Std. Deviation
Control	30	7.3000	2.00258
Experiment	30	8.4667	1.33218

Source: Primary data processed (2025)

According to Table 3, the average posttest critical thinking skills score was 7.30 with a standard deviation of 2.00258, while the experimental group had an average score of 8.47 with a standard deviation of 1.3318. These results indicate that the average critical thinking skills of students in the experimental group were better than those in the control group.

Table 4.
Independent Samples Test Results

Variable	Sig	Result
Result	0,05	0,010

Source: Primary data processed (2025)

In addition, Table 4 presents the results of the independent sample t-test, which shows a significance value (Sig. 2-tailed) of 0.010, which is less than 0.05. This indicates that the critical thinking skills of students in the experimental group differ significantly from those in the control group, which used conventional teaching methods. Therefore, it can be concluded that H_a is accepted and H_0 is rejected. This suggests that differentiated learning has a significant impact on students' critical thinking skills in the IPAS subject at elementary school Tugu Harum.

Discussion

The results of the study found that students' critical thinking skills in the IPAS subject are significantly influenced by differentiated learning. This is demonstrated by the t-test results from the independent sample test, which yielded a significance value of 0.010, less than 0.05, indicating that the alternative hypothesis (H_a) is accepted and the null hypothesis (H_0) is rejected. Differentiated learning improves students' critical thinking skills. The difference in the average posttest scores between the experimental group (8.47) and the control group (7.30) highlights this. These findings suggest that an instructional approach tailored to the needs and characteristics of students can lead to better outcomes compared to conventional teaching methods.

Before delivering content, activities, and learning products that are tailored to students' needs, teachers must first assess students' readiness, interests, and learning styles. This stage is crucial because it allows teachers to adapt their teaching approach to engage and motivate students more effectively. Learning that is customized to individual needs encourages students to participate actively and enhances their critical thinking abilities. When the content and activities align with how students learn, they are better able to analyze, evaluate, and make decisions based on evidence. This method aligns with the perspective of Fitriyah & Bisri (2023), who state that differentiated learning enables students to gain a deeper understanding based on their learning styles and preferences. Therefore, students not only acquire knowledge but also critical thinking skills, which are essential for tackling real-life challenges. Providing students with the opportunity to learn in the most effective way for them will help them develop more reflective, analytical, and evaluative thinking skills. This ensures that differentiated learning not only enhances students' understanding of the material but also strengthens their confidence in what they have learned.

In addition, a study by Elviya et al. (2023) found that differentiated learning has a positive effect on both students and educators, supporting the findings of this study. Differentiated learning not only helps students but also assists teachers in making education more engaging. With this strategy, students become more motivated to learn. It

also allows teachers to create more creative and tailored learning materials that meet students' needs, making it easier for educators. The enthusiasm generated through this technique fosters a fun learning environment. As a result, students have a greater desire to study the concepts being taught and enhance their critical thinking skills. Moreover, a study by Budi et al. (2025) found that differentiated learning improves students' learning outcomes, both in process skills and cognitive skills. Learning that is tailored to individual needs increases students' understanding of the material and enhances their ability to think critically, such as in analysis, synthesis, and evaluation. Consequently, differentiated learning has proven to be beneficial.

Based on the results and support from theories and previous studies, it can be concluded that the synergy between differentiated learning enhances students' critical thinking skills in the IPAS subject. By applying differentiation to the content and learning products, students not only become more creative, critical, and analytical, but they also gain a better understanding of the material. Therefore, differentiated learning has proven to be a creative approach capable of addressing the educational challenges faced in this century. This will produce students who not only have a solid foundation of knowledge but are also capable of thinking critically.

CONCLUSION

Based on the results of the study, it can be concluded that differentiated learning, tailored to the needs, interests, and learning styles of each student, has a significant impact on the development of their critical thinking skills. The study also found that the differentiated learning approach encourages students to participate more actively in the learning process. These findings indicate that teaching strategies that are customized to students' characteristics are crucial for enhancing the effectiveness of learning and helping students learn in a better way.

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