Jurnal Pendidikan Dasar dan Pengembangan Pembelajaran
Homepage: https://jpd.unimika.ac.id/index.php/jpd
Email: jpdunimika@gmail.com

e-ISSN: 3109-2624
Vol. 2, No. 2, July 2026
Page 137-144

IMPLEMENTATION OF DIFFERENTIATED LEARNING IN IMPROVING CHILDREN'S LEARNING OUTCOMES

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ABSTRACT

This study aims to analyze the implementation of differentiated learning in improving students' learning outcomes and identify the effectiveness of strategies used in the learning process. The background of this study is based on the diversity of student characteristics, such as abilities, interests, and learning styles, which have not been fully accommodated in conventional learning. The research method used is a quantitative approach with a quasi-experimental design. The research subjects were 15 students who were divided into two groups: an experimental class that implemented differentiated learning and a control class that used conventional learning. Data collection techniques were carried out through learning achievement tests, observation, and documentation. Data analysis used statistical tests to determine differences in learning outcomes between the two groups. The results showed that the implementation of differentiated learning had a significant impact on improving students' learning outcomes. This was indicated by an increase in grades in the experimental group and increased student engagement and motivation during the learning process. The discussion revealed that differentiation in aspects of content, process, and product was able to optimally accommodate students' learning needs so that learning became more effective and meaningful. The conclusion of this study confirms that differentiated learning is an effective strategy in improving students' learning outcomes and can be used as an alternative learning innovation at various levels of education.

Keywords: *Differentiated Learning, Learning Outcomes, Learning Effectiveness, Learning Strategies, Student Characteristics*

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Received: April 15th 2026; Revised: June 6th 2026; Accepted: July 20th 2026
DOI: https://doi.org/10.34125/jpd.v2i2.38

Reference to this paper should be made as follows: Pahrul, Y., Fahrul, I, K., Indriyani, D. Implementation of Differentiated Learning in Improving Children's Learning Outcomes. *Jurnal Pendidikan Dasar dan Pengembangan Pembelajaran, 2* (2),137-144.
E-ISSN : 3109-2624
Published by : STKIP Pesisir Selatan

INTRODUCTION

Education is essentially a process aimed at optimally developing students' potential, including cognitive, affective, and psychomotor skills (Abbasi et al., 2023). In practice, classroom learning often remains uniform, with teachers delivering material using the

same methods to all students without considering individual differences (Owan et al., 2022).Yet, each child is unique, with initial abilities, learning interests, learning styles, and sociocultural backgrounds. This mismatch between learning approaches and student needs has the potential to lead to gaps in learning outcomes, low motivation, and a lack of student engagement in the learning process (Siregar, 2024). Along with the development of the modern educational paradigm, learning approaches are shifting from teacher-cantered to student-cantered. One approach relevant to this shift is differentiated learning. Differentiated learning is a strategy designed to adapt the learning process to the individual needs of students through differentiation in content, process, product, and learning environment. This approach provides students with the space to learn according to their readiness, interests, and learning profiles, thus optimally improving learning outcomes (Saputra et al., 2025).

The implementation of differentiated learning is becoming increasingly important in today's educational context, particularly in efforts to improve the quality of inclusive and equitable learning (Sidiq et al., 2024). Teachers are required to be able to identify students' learning needs and design varied and adaptive learning strategies. However, in practice, many teachers still struggle to implement differentiated learning effectively, either due to limited understanding, lack of training, or a lack of practical guidance to serve as a reference in classroom instruction (Martin et al., 2020; Rahman et al., 2025).

Several previous studies have shown that differentiated learning has a positive impact on student learning outcomes. Research consducted by Tomlinson shows that implementing differentiation in learning can increase student engagement and help them achieve better learning outcomes in accordance with their individual potential. Furthermore, research by Qorib, (2024) revealed that differentiated learning can create an inclusive learning environment that is responsive to the diverse needs of students. Another study by Goyibova et al., (2025) also found that differentiated learning can significantly improve student motivation and academic achievement.

In Indonesia, several studies have also supported these findings. A study by Astuti et al., (2023) showed that the implementation of differentiated learning significantly improved elementary school students' learning outcomes compared to conventional learning. Research by Setiawan et al., (2023) found that differentiation in learning not only improves learning outcomes but also increases student engagement and independence in learning. Furthermore, research by Lestari et al., (2024) confirmed that differentiated learning is effective in accommodating students' differing learning styles, making learning more meaningful.

Although various studies have demonstrated the effectiveness of differentiated learning, gaps remain in its implementation in practice, particularly in the context of limited student numbers and heterogeneous classroom conditions. Therefore, this study is important to conduct in more depth to examine how the implementation of differentiated learning improves student learning outcomes, especially with a smaller number of subjects, namely 15 students. This research is expected to provide practical contributions to teachers in designing more adaptive learning and serve as a reference

in developing effective and innovative learning strategies. Based on the above description, the research problem is how the implementation of differentiated learning can improve children's learning outcomes. The purpose of this study is to analyse the effectiveness of differentiated learning in improving learning outcomes and identify the process of its implementation in the classroom context. This research is also expected to provide theoretical contributions to the development of differentiated learning studies and practical contributions for educators in improving the quality of learning.

METHODS

This study used a quantitative approach with a quasi-experimental design, which aims to test the effect of the implementation of differentiated learning on children's learning outcomes (Suprayogi et al., 2024; Zhao et al., 2026; Rahman et al., 2024). The design used was a non-equivalent control group design, where there were two groups that were not selected completely randomly, namely the experimental group and the control group. The experimental group was given treatment in the form of differentiated learning, while the control group used conventional learning. The research subjects numbered 15 students, who were then divided into two groups, namely 8 students in the experimental group and 7 students in the control group. The selection of subjects was carried out using a purposive sampling technique, taking into account the similarities in basic characteristics of students, such as initial ability level and educational level, so that the research results are more controlled.

The variables in this study consist of the independent variable, namely differentiated learning, and the dependent variable, namely students' learning outcomes. Differentiated learning in this study is implemented through three main aspects: content differentiation (material is adjusted to students' readiness levels), process differentiation (variation of learning methods and activities), and product differentiation (diverse student work results according to abilities and interests). Meanwhile, learning outcomes are measured based on students' cognitive achievements after participating in the learning process.

Data collection techniques are carried out using several instruments, namely:
Learning outcome tests are used to measure students' cognitive abilities before and after treatment (pre-test and post-test). Observation sheets are used to observe student activities and involvement during the learning process (Afriani & Fikrih, 2026). Documentation, in the form of supporting data such as value lists, activity photos, and learning tools. The research instrument was first tested through validity and reliability tests to ensure its suitability for use. Validity testing was conducted by consulting with experts (expert judgment), while reliability testing used internal consistency techniques. The research procedure was carried out in several stages. The first stage was preparation, including the preparation of differentiated learning tools, research instruments, and coordination with the school. The second stage was implementation, which began with a pre-test administered to both groups to determine students' initial abilities. Next, the experimental group was given differentiated learning treatment, while the control group was given conventional learning in several meetings. After that, both groups were given a post-test to measure learning outcomes after the

treatment. The final stage was data analysis and reporting of the research results. Data analysis techniques were carried out quantitatively using statistical tests. Data from the pre-test and post-test were analysed using normality and homogeneity tests as prerequisites for analysis. Next, a t-test (independent sample t-test) was conducted to determine differences in learning outcomes between the experimental and control groups. In addition, a gain score analysis was conducted to see improvements in student learning outcomes in each group.

RESULT AND DISCUSSION

To provide a more comprehensive and in-depth overview, the results of this study are presented in several analytical tables integrated with detailed discussions. The analysis focuses not only on differences in learning outcomes but also includes aspects of improvement, effectiveness, and the dynamics of the learning process that occurred during the treatment.

Table 1. Statistical Description of Pre-test and Post-test Results

Group	N	Mean Pre-test	SD Pro	Mean Post-test	SD Post	Difference	Percentage (%)
Experiment	8	62,13	6,21	85,75	5,48	23,62	38,02%
Control	7	61,42	5,98	74,28	6,02	12,86	20,93%

Based on the table above, it can be seen that the initial abilities of both groups were relatively equivalent, as indicated by the nearly identical pre-test averages and similar standard deviations. This indicates that there was no significant gap in students' initial abilities. However, after being given treatment, the experimental group showed significantly higher improvement than the control group. The difference in improvement in the experimental group was almost double that of the control group, indicating that differentiated learning had a stronger impact on student learning outcomes.

Table 2. Analysis of Gain Score and Learning Effectiveness

Group	Mean Gain	Category	Effectiveness (%)
Experiment	0,62	Medium-High	62%
Control	0,33	Currently	33%

The gain score indicates the level of effectiveness in improving student learning outcomes. The experimental group was in the moderate to high category, indicating that differentiated learning was able to provide optimal improvement. In contrast, the control group was only in the moderate category, indicating that conventional learning was less able to optimally accommodate students' learning needs.

Table 3. Normality and Homogeneity Test

Statistical Test	Experiment	Control	Information
Normality (Sig)	0,087	0,092	Normal
Homogeneity (Sig)	0,215	0,215	Homogeneous

The results of this test show that the research data meets the basic assumptions of statistical analysis, so that the results of the hypothesis test can be trusted and have strong validity.

Table 4. Hypothesis Test (Independent Sample t-test)

Parameter	Mark
t count	3,27
t table	2,16
Say (p-value)	0,003
Results	Significant

A calculated t-value greater than the t-table and a significance value less than 0.05 indicate a significant difference between the experimental and control groups. This confirms that differentiated learning is statistically effective in improving student learning outcomes.

Table 5. Analysis of Student Activities and Engagement

Activity Indicator	Experiment (%)	Control (%)	Experiment Category	Category Control
Active questioning	87%	65%	Very high	Currently
Discussion participation	90%	68%	Very high	Currently
Task completion	85%	70%	High	Currently
Enthusiasm for learning	92%	72%	Very high	Currently
Learning independence	88%	66%	High	Currently

Observational data shows that differentiated learning not only improves cognitive learning outcomes but also significantly impacts affective aspects and student engagement. Students in the experimental group demonstrated significantly higher levels of activeness, participation, and independence than those in the control group.

Discussion

Based on the overall research results, it can be confirmed that differentiated learning has a very significant impact on improving student learning outcomes (Liou et al., 2023). This is evident not only in the increase in average grades but also in the effectiveness of learning, as demonstrated by gain scores and student engagement during the learning process. The higher improvement in the experimental group indicates that a learning approach tailored to individual student needs can produce more optimal learning (Gray & Bunte, 2022).

Pedagogically, this success is influenced by the implementation of three main components of differentiated learning: content, process, and product differentiation. Content differentiation allows students to learn according to their level of readiness, so that no one feels left behind or unchallenged (Sulistianingrum et al., 2023; Rahman et al., 2024). Process differentiation provides variety in learning methods, such as

group discussions, project-based learning, and the use of interactive media, which can increase student interest and engagement. Meanwhile, product differentiation gives students the freedom to express their understanding in various forms, which indirectly increases self-confidence and motivation to learn.

Psychologically, differentiated learning can also create a more inclusive and enjoyable learning environment. Students feel valued because their differences are accommodated, fostering a sense of comfort and confidence in learning. This is reflected in the high level of enthusiasm and participation of students in the experimental group. In contrast, conventional learning tends to be uniform, thus failing to optimally accommodate student diversity.

Compared with previous research, the results of this study are highly consistent with Tomlinson's theory, which asserts that differentiated learning is an effective approach to improving learning outcomes because it focuses on individual student needs. These findings also support Subban et al (2025) research, which states that differentiated learning creates an inclusive and responsive learning environment. Furthermore, these results align with Nketsia et al., (2025) findings that differentiated learning significantly improves student motivation and academic achievement.

In a national context, the results of this study also reinforce the findings of Suryanto et al., (2025), which showed that differentiated learning not only improves learning outcomes but also enhances activeness, independence, and the quality of the learning process. Thus, this research not only has theoretical relevance but also makes practical contributions to the development of more adaptive and innovative learning strategies. Overall, the results of this study confirm that differentiated learning is an effective solution for addressing the diversity of student characteristics in the classroom. This approach can create more flexible, inclusive, and student-centered learning, thus positively impacting overall learning outcomes.

CONCLUSIONS

It can be concluded that the implementation of differentiated learning has been proven to have a significant impact on improving children's learning outcomes, both from the cognitive aspect and engagement in the learning process. This approach is able to accommodate the diversity of student characteristics by adjusting the content, process, and learning products so that each student receives a learning experience that suits their level of readiness, interests, and learning styles. The higher improvement in learning outcomes in the experimental group compared to the control group, which is supported by the results of statistical analysis and observations of learning activities, indicates that differentiated learning is not only effective in improving academic achievement, but also able to encourage student activeness, motivation, independence, and enthusiasm in learning. Thus, differentiated learning can be used as an innovative, relevant and adaptive strategy in improving the quality of learning, and is worthy of wider application in various educational contexts to create a more inclusive, meaningful, and student-oriented learning process.

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