Differentiated Learning Activities: How Does It Impact Students' Literacy?

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Abstract: Literacy skills are one of the 21st-century abilities which have an essential function in preparing students to face various global demands and challenges characterized by advances in technology and information, which are developing very rapidly and affecting all areas of human life. However, the literacy skills of elementary school students in Indonesia were still in the low category. This research aims to analyze the impact and activities of differentiated learning on elementary school students' literacy abilities. This research used mixed methods. The research design used was a sequential explanatory design. This design was implemented by collecting and analyzing quantitative data through survey techniques and then collecting and analyzing qualitative data through observation and in-depth interview techniques. The data analysis technique used in this research involved statistical techniques for quantitative data, while for qualitative data used three steps namely a) selecting and grouping, b) presenting, and c) concluding the data. The research results showed that differentiated learning activities significantly affect elementary school students' literacy skills. This approach allows learning activities relevant to student's needs and interests, thereby creating a more optimal learning environment and supporting the development of literacy skills at the elementary school level.
Keywords: differentiated learning activities, literacy, elementary school

Introduction

The world is currently struggling to restore learning conditions after the closure of the learning process in schools due to the Covid-19 pandemic. Most educational institutions are adjusting to the "new normal" by implementing distance learning, and teachers are also adjusting teaching methods (Chertoff et al., 2020; Flores & Swennen, 2020). The spread of the COVID-19 outbreak was responded to by implementing emergency learning protocols by transitioning face-to-face learning to online learning (Murphy, 2020; (Kidd & Murray, 2020; Song et al., 2021). Each country has made many efforts and interventions to catch up due to school closures and online learning. Indonesia is struggling with learning loss and learning gaps due to the pandemic and facing challenges concerning learning outcomes before the pandemic. In order to recover learning loss that occurs in special conditions, educational units or groups of educational units need to develop a curriculum with the principle of diversification following the conditions of the educational unit, regional potential and students. The independent curriculum is one of the policies implemented by the Indonesian Government in education. The independent curriculum has the principle of providing space for independent learning for students and teachers. Differentiated learning is a component of this curriculum (Mustadi et al., 2024; Wibowo & Sujarwo, 2022).

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One form of curriculum diversification is differentiated learning. Differentiation is an approach to curriculum and teaching that systematically considers student differences in designing opportunities for each student to engage with information and ideas and develop important skills (Coubergs et al., 2017; Resti & Wibowo, 2024; Wibowo et al., 2022). Through this learning approach, we will be able to create a flexible learning environment, a flexible assessment process and be able to create challenging assignments for individuals and groups through cooperative learning (Brevik et al., 2018; Çoban, 2022; Harokah et al., 2024; Awaliyah et al., 2024; Toding & Wibowo, 2024). Personalization and differentiation are important to implement to accommodate the interests and needs of different students (Lindner et al., 2019; Griful-Freixenet et al., 2020). The principles and differentiated learning are rooted in years of teaching practice, research, and theory according to Vygotsky's Zone of Proximal Development (ZPD) theory. ZPD shows that effective teaching and learning occurs when learning activities are adapted to each student's learning style (de Jager, 2017; Nurhikmah & Wibowo, 2024; Wibowo et al., 2023; Griful-Freixenet et al., 2021; Eysink & Schildkamp, 2021).

Differentiation is an overall teaching approach and can include a combination of many practices, such as flexible grouping (heterogeneous or homogeneous), detailed progress monitoring, adaptive use of computer programs or learning materials, modifying learning content, adapting teaching for weaker students, and providing opportunities to learn, acceleration for stronger students (Deunk et al., 2018). Differentiation involves adapting to individual differences, including content, pace, preferences, and environment, to help students achieve maximum growth (Johnsen et al., 2020). Differentiated learning allows teachers to build confidence in teaching with differentiated interventions for students, leading to more inclusive practices and improved student learning outcomes (Porta et al., 2022). However, research results show that even though teachers are aware of the relevance of differentiated learning to the needs of student learning, teachers still rarely apply differentiated learning (Pozas et al., 2020). Even though many studies have concluded that differentiated learning can improve student competence (Guay et al., 2017). Through differentiated learning, a teacher can teach concepts to students according to their level of ability in knowledge, both from a low level (remembering), understanding, applying, analyzing, synthesizing and creating.

The research results of VanTassel-Baska et al., (2020) and Palieraki & Koutrouba (2021) concluded that teachers who use differentiated learning are successful in implementing learning effectively and, on average, have good practices in creating learning processes, improve learning outcomes, increase student activity, and improve the quality of assessment of learning outcomes. Differentiated learning is an effort to respond to the various needs of students in a group, including various kinds of competencies to be developed, including numeracy and literacy. Efforts to achieve these competencies are carried out in different ways, such as considering content, material coverage, and teaching as adaptations of inclusive teaching (Lindner & Schwab, 2020).

Based on the effectiveness of differentiated learning on learning processes and outcomes according to the explanation, the application of differentiated learning is very important to improve the literacy skills of elementary school students. Literacy is also important when facing global challenges such as climate change, economic crisis, and social change (Alifah et al., 2024; Wibowo, 2024). Students can understand and respond to these problems better with good literacy and numeracy. However, elementary school students' literacy and numeracy skills in Indonesia are still quite low. The Ministry of Education and Culture reported that Indonesia is experiencing a learning crisis. As many as 46.83% of Indonesian children are unable to understand simple reading, 73.61% lack mastery of science, and 77.13% cannot apply basic mathematical concepts. When compared with other countries, Indonesia experiences a learning lag. Based on PISA (Program for International Student Assessment) data, Indonesia ranks 74th out of 79 countries in mathematics and literacy.

Current literacy activities are still focused on the habit of reading alone. This condition differs from the literacy pathway map, which emphasizes the importance of developing basic literacy, including literacy, numeracy, science, finance, media and culture, which are not yet fully developed. Implementing literacy activities is still not optimal, with limited media as one of the main obstacles. Apart from that, numeracy literacy has not yet become part of literacy activities in Indonesia. As a result, students do not fully access basic literacy in literacy activities at school (Rakhmawati & Mustadi, 2022; Wibowo, 2020). Many studies try to study literacy and the principle of differentiation in learning. One of the studies on differentiated learning is research conducted by Schwab et al. (2022), which discusses middle school

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students' perceptions of differentiated subject teachers' use of inclusive teaching practices. Another research conducted by (VanTassel-Baska et al., 2020) focused on research findings from various evaluation studies on teachers' use of differentiated practices for gifted students, which have implications for international best practices in gifted education. Other research focuses on the differentiation of cluster teachers in their classroom teaching practices in urban settings (Johnsen et al., 2020). Most research on the topic of differentiated learning focuses on inclusive education.

In implementing the independent curriculum in Indonesia, teachers are expected to be able to meet the learning needs of each student who has various characteristics. Differentiated learning is an appropriate approach to achieve the desired learning goals. However, the reality in the field shows that there are still many teachers who are reluctant to implement it due to a lack of in-depth understanding of the concept (Sukmawati, 2022). In differentiated learning, teachers need to consider the needs of each student by identifying diverse abilities, interests and learning styles, and determining appropriate teaching strategies for each individual. Teachers must also provide a variety of choices in learning activities and assessments, allowing students to choose appropriate ways of learning and carry out independent assessments. The results of this research show that the application of the differentiation learning model in the independent learning curriculum is based on the principles of individuality, holistic learning achievement, motivation, context or student background, interests and needs, normalization, assessment and integration (Sarnoto, 2024).

Meanwhile, research that focuses on literacy is conducted by (Pastore & Andrade, 2019), this research examines the latest and expanded literacy assessment model, which represents the three main aspects of literacy assessment in context. Another research conducted by (Lam, 2019) explored how secondary school teachers in Hong Kong understand and implement classroom-based writing assessments as part of literacy skills. Similar research was carried out by (Coombe et al., 2020; Wibowo & Rosalina, 2019), who outlined the nature of literacy, language assessment, conceptual framework, studies related to literacy assessment, and various components of teacher-assessed literacy assessment and their interrelationships (Wibowo et al., 2024). These studies focus more on literacy assessment, while other studies examine the development of digital literacy.

Reflecting on these studies, there is still very limited research that explores the impact of differentiated learning activities, especially in elementary schools. Although differentiated learning has been widely studied in the context of inclusive education and high-ability-based learning, research that explicitly explores its impact on the literacy skills of elementary school students in Indonesia is still very limited. Most previous studies have focused on student populations at the secondary level or in special education, so there is a research gap regarding implementing these strategies at the elementary level in the context of an independent curriculum. This research aims to answer this gap by comprehensively analyzing the impact of differentiated learning activities on elementary school students' literacy skills.

Based on this explanation, an in-depth and comprehensive analysis is needed regarding the application of differentiated learning to increase the literacy of elementary school students. The results of the analysis of the impact of differentiated learning will be the basis for providing training, instruments and learning processes that teachers will provide to their students to develop literacy and numeracy skills that can develop 21st Century skills. This research was conducted on elementary school students who were in a learning environment with diverse social and economic backgrounds. By using a mixed methods approach, this research will collect quantitative data through learning outcomes surveys and qualitative data through interviews, observations, and documentation of differentiated learning processes. It is hoped that the results of this research will not only provide theoretical contributions to educational literature but also produce practical guidance for teachers in implementing differentiated learning strategies to improve students' literacy skills.

Methods

The research method used was a mixed method. Quantitative research was conducted to determine the survey results of the impact of differentiated learning activities on increasing elementary school students' literacy, while qualitative research was conducted to determine the results of interviews and observations of differentiated learning processes and activities on increasing elementary school

students' literacy. The research design used was a sequential explanatory design. This design was implemented by collecting and analyzing quantitative data through survey techniques and then collecting and analyzing qualitative data through observation and in-depth interview techniques. Mixing data in this design occurred when quantitative results informed the qualitative data collection process. That was why these two types of data were separate but still related. An explicit theory might or might not have been presented to form the overall procedure.

The data sources used in this research were elementary school teachers in Indonesia who had implemented differentiated learning, with the object of study being literacy in elementary schools. Research informants were selected using purposive sampling techniques with the criteria of elementary school teachers who had implemented differentiated learning. The school sample was used to cross-check the survey results through a questionnaire. Nine elementary schools were selected and spread across West Java Province, Yogyakarta Special Region Province, and East Java Province.

This research used several data collection techniques such as surveys, tests, observations, in-depth interviews, and documentation. The data analysis technique used in this research involved statistical techniques for quantitative data, while for qualitative data, the following data analysis steps were used:

1. Selecting and grouping: In this stage, the data that had been collected was selected according to the focus of the problem, and then the data was organized according to the hypothesis or research question. In this stage, the researcher collected all the research instruments used to collect data and then grouped them based on the focus of the problem or hypothesis.
2. Presenting or describing the data: In this stage, the data that had been organized was then described so that the data became meaningful. Describing the data could be done in narrative form, making graphs, or arranging it in table form.
3. Concluding or giving meaning: In this stage, conclusions were drawn based on the explanation or description made in the previous stage. These conclusions were made in the form of short statements or formulas that could answer all the questions in the research problem formulation.

Results and Discussion

Results

Normality test was conducted to determine whether the research data was normally distributed. The results of the normality test will determine the type of hypothesis test applied, whether using a parametric or non-parametric test. The normality test was carried out using Kolmogorov-Smirnov. The normality test results for elementary school students' literacy abilities are as follows.

Table 1. The Normality Test Results

Data	Asymp. Sig. (2-tailed)	Interpretation
Pretest	0.039	0.039 < 0.05 = abnormal
Posttest	0.000	0.000 < 0.05 = abnormal

Based on the normality test results for elementary school students' literacy skills, it is known that the data is not normally distributed. This is reflected in the pretest score of $0.039 < 0.005$ and the posttest score of $0.000 < 0.005$. Because the pretest and posttest scores are smaller than 0.005, the hypothesis test used is the non-parametric test, namely Wilcoxon.

This study aims to analyze the impact of differentiated learning activities on the literacy abilities of elementary school students so that the hypothesis formulated in this research is that there are differences in the literacy abilities of elementary school students through differentiated learning activities. The results of the hypothesis test can be seen in the following Table 2.

Table 2. Hypothesis Test Results

		N	Mean Rank	Sum of Rank
	Negative Ranks	19	38.50	731.50
	Positive Ranks	93	60.18	5596.50
Pretest-Posttest	Ties	2		
	Total	114		
	Z	-7.063		
	Asymp. Sig. (2-tailed)	0.000		

The results of the hypothesis test show that there was no decrease in pretest to posttest scores. Positive ranks indicate that 114 respondents experienced increased literacy skills based on pretest and posttest scores. In addition, the Asymp.Sig (2-tailed) value is smaller than 0.05, which indicates a difference between the pretest and posttest results of students' literacy abilities, so it can be concluded that the hypothesis is accepted. From these results, it is known that differentiated learning activities have a significant impact on increasing the literacy of elementary school students. This change is influenced by student activities, which vary according to each student's interests.

This is reinforced based on the results of interviews and observations, which show that the literacy habituation stage focuses on reading, discussion, and learning activities. The following are the interview results with respondent one as a Sokowaten 1 Elementary School teacher.

> "So far, literacy skills have improved through getting used to reading story texts accompanied by interesting pictures, which is done through reading activities 15 minutes before learning takes place. Reading activities are related to textbooks, story textbooks, and general science. Apart from that, there is also a reading corner in the corner of the classroom".

The initial stage in developing a literacy culture in schools is to get students used to reading for 15 minutes before the learning process occurs. Literacy activities are part of learning activities with a time allocation of around 15 minutes before and after learning activities (Rahayu & Mustadi, 2022). Every morning before starting learning, students are accustomed to reading story texts accompanied by interesting pictures in an effort to encourage them to read actively. When literacy activities take place, students look serious and focused in carrying out literacy activities. Students are also trained to analyze and retell what they have read. So that students are encouraged to understand the reading carefully. This is also supported by building a literacy-rich classroom environment. There is a literacy corner in the corner of the classroom, so that students can read during breaks or looking for additional reading sources without having to go to the library. There they have also implemented differentiated learning in accordance with the recommendations in the independent curriculum.

> "I use differentiated learning so that all students have the opportunity to learn according to their individual abilities and needs. So that students who need audio, visual and kinesthetic learning can be met. The way we find out students' interests and learning styles is when I carry out an MPLS non-diagnostic cognitive assessment. Where we ask several questions related to subjects and preferred learning styles".

In an effort to ensure that students have the opportunity to learn according to their abilities, teachers have used differentiated learning. This learning aims to ensure that students receive learning according to their needs. In implementing learning, the teacher forms students into several groups according to various abilities and learning styles, test results, and non-cognitive diagnostics carried out during the School Environment Introduction Period (MPLS) activities. Discussions are held to communicate with each other about the material being studied. Students seem to collaborate well with their group friends. They share opinions, refute each other, and try to solve the problems in the questions.

Furthermore, differentiated learning at Muhammadiyah Danunegaraan Elementary School also impacts students' literacy skills because in learning, students are free to look for learning resources according to their wishes.

> "In our learning, we free students to learn from a variety of learning sources. So it can be from books or the internet. So they learn to read more and understand various sources of information".

Furthermore, based on interviews conducted with respondent 2, information was obtained that differentiated learning can improve students' literacy skills. This can be seen from students' interest in knowledge through learning from various sources of information. During observation, students also seemed happy and enjoyed learning because learning aligned with their interest in the desired reading.

Similar to the differentiated learning at Pertiwi Elementary School, according to respondent three, this learning can improve student literacy.

> "Differentiated learning creates comfortable learning. Apart from that, creating a reading space in the classroom by providing word cards, pictures and story texts".

Based on these interviews, it is known that differentiated learning can increase students' literacy because the habit of reading in learning is equipped with word cards, pictures and story texts. Big Book is a teaching medium suitable for implementation in literacy learning (Zainuddin et al., 2023). Picture storybooks can also improve students' critical thinking skills (Gunawan et al., 2023); (Rindengan, 2023). This is also adapted to the characteristics of 4th-grade elementary school students, who like learning using interesting media. So that it can motivate students to participate in learning and understand learning more easily.

Peer tutoring is also used in group learning activities. As explained by respondent 4.

> "Some learning can indeed be grouped into peer tutoring. For students who already understand, they can teach students who do not understand. And maybe children who do not understand will really be guided by the learning they have mastered."

Peer tutoring also implements this differentiated learning so students who understand the material quickly can pass on their knowledge to their friends. For students who do not yet understand the material, the teacher will guide them from the material they have mastered so that the student can catch up and understand the material thoroughly. This fact is confirmed by research by (Miller et al., 2010), which shows that the application of peer tutoring in reading learning increases self-esteem in elementary schools. Another study by (Van Keer & Verhaeghe, 2005) showed that explicit reading strategy instruction and peer tutoring affected elementary school students' self-efficacy perceptions. Implementing differentiated learning can raise students' motivation to learn so that it can improve students' literacy skills.

This research is expected to provide a comprehensive picture of the influence of differentiated learning on the literacy abilities of elementary school students in Indonesia. Hopefully, the research results will show how learning activities designed based on students' interests and needs can improve their literacy skills. In addition, this research is expected to provide practical insight for teachers to implement differentiated learning strategies effectively in the independent curriculum so that they can overcome learning challenges, including students' low literacy skills, which has long been one of the fundamental problems in education in Indonesia.

The results of this research have the potential to significantly impact educational practice, especially in the development of learning strategies. Teachers can adopt a differentiated learning approach to meet diverse learning needs, creating a more inclusive and effective learning environment. Apart from that, this research opens up opportunities for further exploration regarding learning approaches based on individual student needs in the context of basic education

Discussion

Based on classroom observations, learning activities also appear active. Students are very enthusiastic and confident in expressing opinions on the results of the work of other groups in class. Apart from that, students also have the courage to appreciate other groups and provide input. Based on interviews and observation evidence, it indicates that differentiated learning activities have an impact on increasing the literacy skills of elementary school students. This fact is supported by the results of research conducted by (Reis et al., 2011) which found that differentiated learning was able to improve language skills in elementary schools, especially reading skills (Yudianto & Wibowo, 2024; Viantorus et al., 2024). Differentiated learning allows students to increase their potential following student learning needs. There is research that supports this claim. Valiandes (2015) revealed that differentiated learning impacts learning, which can improve the quality and effectiveness of learning and lead to student

achievement. There are at least three student learning needs: learning readiness, interests, and learning profile.

In differentiated learning, the teacher carries out learning and gives assignments according to the students' previous skills and understanding of knowledge (readiness to learn) (Toding & Wibowo, 2024; Harokah et al., 2024). Before starting learning, the teacher will conduct a diagnostic assessment using questions regarding students' learning styles, interests, and abilities. The goal is for students' learning needs to be met according to their interests and abilities. Based on observations made, students appear enthusiastic and have a high curiosity in participating in learning. This shows the students' interest in learning. When the teacher gives assignments, students seem to like and enjoy activities in collaborating with groups. Furthermore, teachers who adapt their content and teaching to students' learning readiness and interests will succeed in achieving positive results. Students are also interested in completing assignments and solving problems given (problem-based learning) (Nurhikmah & Wibowo, 2024; Awaliyah et al., 2024). This means that aspects of the students' learning profile can be met.

This form of differentiated learning focuses on the product and pays attention to variations in the process and content/material presented. Varying content in learning, the teacher has prepared material that is interesting and in line with students' needs. Learning designed by integrating media can help students more easily understand the subject matter being studied (Artobatama et al., 2023). As stated by (Finkelstein et al., 2021), teachers' efforts to eliminate educational obstacles for students through teaching practices can be made by organizing didactic content, which includes differentiated teaching and participatory learning. Various media are also provided, such as video and audio, to support students' kinesthetic needs. The results of research conducted by (Dayu & Setyaningsih, 2022) show that reading literacy learning needs to be supported by innovative learning media because each student has a variety of characters. Process variations by optimizing learning models and methods. Meanwhile, for product variations, students are given the freedom to make products according to their interests. Apart from that, teachers also apply individual student-centred learning so that students appear active during learning. The results of research conducted by (Sayekti et al., 2023) show that increasing students' interest in reading requires planned and serious efforts. This is caused by various factors influencing reading interest, such as a less conducive reading environment and a lack of suitable reading materials for students' needs.

Based on classroom observations, students become happier in learning by applying variations in content, processes, and products. This is in line with the results of observations made during learning; students were very enthusiastic when participating. Students are also very active in asking questions, discussing and working in groups. When studying in groups, teachers also encourage students to engage in peer tutoring. Through peer tutoring, students are trained to have a sense of sharing and responsibility in transmitting their knowledge. Based on this, it can be concluded that the more learning opportunities provided according to students' needs and interests, the more opportunities students will have to improve their literacy skills. This fact is relevant to the research results of (Kang & Keinonen, 2018), which state that applying various student-centered approaches, including relevant topic-based, open and guided inquiry-based, and discussion-based approaches, positively impact interest and achievement in scientific literacy.

Utilization of varied learning environments can also be done as a form of process differentiation that has an impact on student learning output. The results of research conducted by Rahayu & Mustadi (2022) show that Read-Aloud activities carried out in Education Parks can increase students' reading literacy, especially in the aspects of fluency and understanding. In fluency, students demonstrate the ability to read with clear intonation, correct pronunciation, and appropriate use of punctuation. Meanwhile, in the aspect of understanding, students can identify the main idea, answer questions based on the reading and summarize the content of the text they read. This is in line with (Wuryandani et al., 2022) that strengthening the environment has a role in increasing students' learning potential. This is very important because the environment is anything that can stimulate a person so that he experiences changes or developments in behavior.

Conclusion

Differentiated learning activities have a positive impact on increasing elementary school students' literacy. This is marked by significant changes in students' literacy abilities. This is seen based on test statistics output, known as Asymp.Sig (2-tailed) has a value of 0.000. Because the value of 0.000 is smaller than < 0.05, it can be concluded that there is a difference in student literacy test results for the pretest and posttest. This change is influenced by student activities, which vary according to each student's interests. Teachers play a key role in differentiated learning activities, and teachers need to design activities that accommodate students' various characteristics, needs, interests, and potential. Based on these results, educational practitioners can consider differentiated activities as one solution to increasing the literacy of elementary school students. This research basically evaluates the dimensions of literacy in general so that further research can examine aspects in more detail. Furthermore, further research can expand the data coverage with larger amounts to obtain more comprehensive data.

Teachers can use the results of this research to design more focused differentiation-based learning activities, such as picture story media, reading corners, and peer tutoring approaches. This supports increasing student literacy through activities relevant to students' needs and interests, as proven effective in several elementary schools that were the object of research. This research could be expanded to focus on specific dimensions of literacy, such as critical reading skills or the ability to comprehend digital texts, to provide deeper insight into improving student literacy.

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