Potential and Challenges of Differentiated Learning: Systematic Literature Review

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Abstract
Low student learning outcomes can be caused by learning that is not tailored to the requirements and characteristics of the students. Learning must be tailored to the features and uniqueness of pupils to meet learning objectives. The goal of this study was to identify the possibilities and obstacles of individualized learning for pupils. This study used a comprehensive literature review as its research approach. The study included 15 research publications. The articles were found using Science Direct and Google Scholar. The publications analyzed in this study met the following criteria: they were research articles published between 2019 and 2024, had a comprehensive structure, were open access, and utilized English and Indonesian. Thematic analysis was used to investigate the link between the discovered ideas. This study found that differentiated learning has the potential to improve efficiency and minimize inequity in the educational system. Differentiated learning can also help pupils improve their curiosity and inventiveness. This learning can satisfy the demands of students since its execution is tailored to their specific needs. Differentiated learning can also boost computational capabilities, problem-solving abilities, and student learning outcomes. Implementing varied learning presents problems such as a shortage of time, classroom management, and suitable learning methodologies. Furthermore, the lack of instructional resources is a difficulty. Differentiated learning, as a whole, can improve students' abilities and learning results by adapting to their requirements. The findings of this study may help to improve student's skills and learning outcomes through differentiated learning.
Keywords: *Differentiated learning, potential, systematic literature review, challenges*

Abstrak
Hasil belajar peserta didik yang rendah dapat disebabkan karena pembelajaran yang dilakukan belum disesuaikan dengan kebutuhan dan karakterisik peserta didik. Pembelajaran yang dilakukan perlu disesuaikan dengan karakteristik dan keunikan peserta didik agar mencapai tujuan pembelajaran. Tujuan penelitian ini adalah untuk mengetahui potensi dan tantangan pembelajaran berdiferensiasi bagi peserta didik. Metode penelitian yang dikaji dalam penelitian ini adalah *systematik literature review*. Jumlah artikel penelitian yang diteliti berjumlah 15 artikel. Artikel tersebut diperoleh dari *Science direct* dan *Google scholar*. Kriteria artikel yang diteliti daam penelitian ini adalah tipe *reseacrh article* yang diterbitkan pada tahun 2019-2024, memiliki struktur yang lengkap, *open acces* serta menggunakan bahasa Inggris dan Indonesia. Analisis data dilakukan dengan menggunakan analisis tematik untuk secara sistematis mengeksplorasi hubungan antara konsep yang diidentifikasi. Hasil penelitian ini adalah pembelajaran berdiferensiasi berpotensi meningkatkan efisiensi dan mengurangi ketimpangan dalam sistem pendidikan. Pembelajaran berdiferensiasi juga mampu mengembangkan keingintahuan atau kreativitas peserta didik. Pembelajaran tersebut dapat memenuhi kebutuhan peserta didik karena pelaksanaanya menyesuaikan kebutuhan individu peserta didik. Pembelajaran berdiferensiasi juga dapat meningkatkan kemampuan komputasional, penyelesaian masalah, dan hasil belajar peserta didik. Tantangan yang dihadapi dalam melaksanakan pembelajaran berdiferensiasi adalah kurangnya waktu yang diperlukan, manajemen kelas, dan strategi pembelajaran yang tepat dalam penerapan pembelajaran berdiferensiasi. Selain itu, tantangan yang perlu dihadapi adalah bahan ajar yang masih minim. Pembelajaran berdiferensiasi secara keseluruhan dapat mengembangkan keterampilan dan hasil belajar peserta didik dengan menyesuaikan kebutuhan peserta didik. Hasil penelitian ini dapat berkontribusi dalam peningkatan kemampuan dan hasil belajar peserta didik melalui pembelajaran berdiferensiasi.
Kata kunci: *Pembelajaran berdiferensias, potensi, systematic literature review, tantangan*

INTRODUCTION

Learning outcomes are changes in individual behavior that involve cognitive, emotional, and psychomotor components (Iskandar, 2021). Cognitive learning outcomes are one of the learning outputs in the form of knowledge that students must possess (Lestari & Irawati, 2020). Cognitive learning outcomes seek to determine the success of learning and whether or not students' learning capacities are enough (Rijal & Bachtiar, 2015). Cognitive learning outcomes are also utilized to evaluate students' progress in the learning process over time (Nabillah & Abadi, 2019). As a result, understanding learning outcomes is critical as a measure of the success of teaching and learning activities, as well as the success of a learning program.

However, Indonesian pupils' learning outcomes remain low (Nabillah & Abadi, 2019). According to data from the 2023 Indonesian Education Report Card, the literacy skills of elementary school students/equivalent are in the moderate category (61.53%), numeracy skills are in the moderate category (46.67%), in terms of character, they are in a good category (53.17%), the school safety climate is in a good category (68.18%), the school diversity climate is in a good category (67.64%), and the school inclusive climate is in the good category (55.39%). As a result, Indonesian education remains of relatively poor quality. Furthermore, based on the findings of prior research, it indicated that the results of a preliminary study of primary school children's scientific learning outcomes were low and below the Minimum Completion Criteria (KKM) (Khofifah Indra Sukma & Trisni Handayani, 2022). Then, further studies found that certain students' social studies learning results remained low (Kartika et al., 2021).

To address this issue, this research suggests introducing differentiated learning. Differentiated learning focuses on addressing students' advantages and learning requirements through autonomous learning methodologies (Solehudin & Rochmiyati, 2023). Differentiated learning can take place in both inclusive and traditional primary schools. To help pupils reach their full potential, teachers must employ differentiated learning (Mulyawati et al., 2022). Differentiated learning is consistent with the progressivism ideology, which encourages students to explore their full potential by adapting to their strengths and interests (Yunaini et al., 2022). The notion of Independent Learning in the Independent Curriculum is quite similar to the ideology of progressivism, which advocates for more freedom in the field of education and emphasizes that the education curriculum should not be overly dense (Pande et al., 2023). Furthermore, differentiated learning characteristics include teachers' efforts to ensure that students adjust the learning process by paying attention to each student's specific learning needs concerning the student's learning interests, the Pancasila learner profile, and the ability to improve learning outcomes (Puteri & Alfiansyah, 2023). Another advantage of differentiated learning is that it is tailored to the unique qualities of each learner, bringing the learning model closer to the student's own experiences (Asteria et al., 2022).

Previous research on differentiated learning has included the use of differentiated learning to increase young children's capacity to recognize pattern ideas (Putri et al., 2023). The study's findings demonstrated that varied learning model activities can help young children understand pattern notions. Second, a study on the use of differentiated learning to meet learning objectives (Fauziyah & Rofiki, 2024). The study's findings indicated that the differentiated learning implementation technique improves the criteria for meeting learning objectives. Third, the use of differentiated learning to enhance learning outcomes (Iskandar, 2021). The study found that classroom action research on differentiated learning improved student learning outcomes by 90.91%. However, this study differs from past investigations. This study uses the Systematic Literature Review approach to gather in-depth information from a variety of sources about the benefits and obstacles of differentiated learning for improving student learning

outcomes. Furthermore, differentiated learning aligns with the Merdeka Curriculum policy (Halimah et al., 2023).

This research is urgent because it will determine the impact of differentiated learning on students' learning outcomes, as well as the problems that differentiated learning faces. Differentiated learning optimizes students' learning results by meeting their needs based on their interests and learning profiles (Herwina, 2021). Differentiated learning is a solution to the problem of student ability variation in one class, which includes a pleasant learning environment, speaking practice, collaborative learning, and content and learning method selection (Handiyani & Muhtar, 2022). Furthermore, this study is necessary because classroom adaptation attempts to fulfill students' learning needs are changes connected to student profile interests and willingness to reach better learning outcomes (Rosiyani et al., 2024). Furthermore, this study is significant since it investigates diversified learning as an efficient method of accommodating students' learning styles (Nurzaki Alhafiz, 2022).

Previous studies have demonstrated that differentiated learning tactics improve student learning results (Istiqomah et al., 2024). The student's learning outcomes can be utilized as an assessment and reflection tool for teachers to enhance future learning (Sudarsana, 2021). The goal of this study is to determine the potential and challenges of differentiated learning for students.

METHOD

This study employed the Systematic Literature Review (SLR) research approach. SLR research will identify, assess, and understand the effects and limitations of differentiated learning in increasing student learning outcomes. This SLR followed the Preferred Reporting Items for Systematic Reviews (PRISMA) standards (Cabrera et al., 2023). The following is a picture of the process of the articles selected in this study in Figure 1.
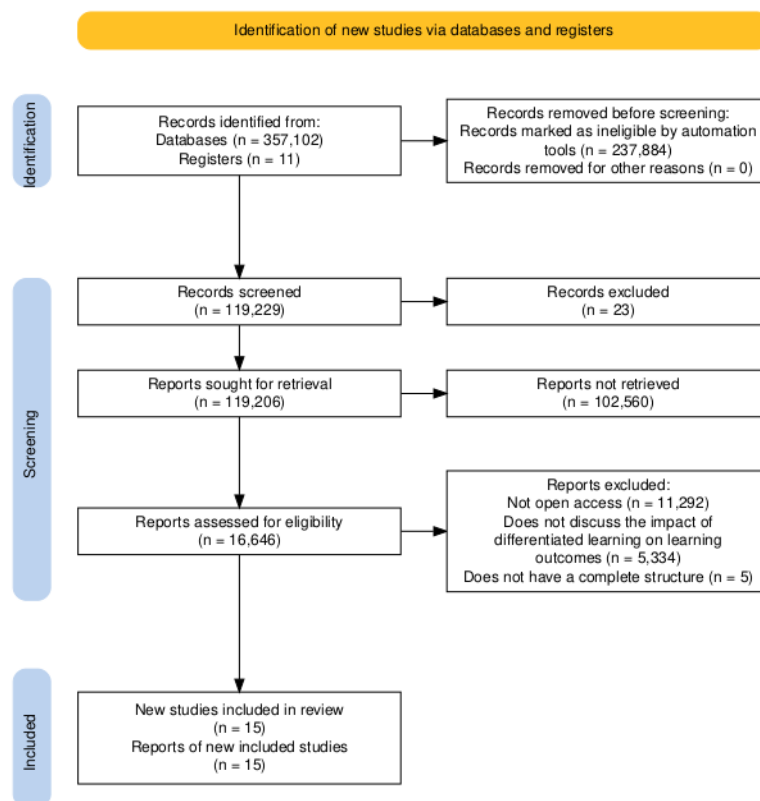

Figure 1. PRISMA Flowchart

According to Figure 1, the process of choosing 15 articles for evaluation involved searching for articles in the specified database and then identifying appropriate inclusion and exclusion criteria. Table 1 shows the following inclusion and exclusion criteria.

Table 1. Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
1. Research article types published between 2019 and 2024.	1. The research findings do not reflect empirical research results
2. Have a comprehensive structure	2. Not open access and cannot be downloaded (are not open access)
3. Open access and can be downloaded.	3. Do not contain an incomplete article structure, such as merely an abstract in the article
4. Employ both English and Indonesian	
5. The publications were retrieved from Google Scholar and Science Direct, which are Scopus indexed in Q1-Q4.	4. Doesn't discuss the impact of differentiated learning on learning outcomes.
6. The selected papers cover differentiated learning, its effects, and problems for students.	

The article selection procedure was done in two steps. First, papers were reviewed based on their title and abstract to determine their relevance to the inclusion and exclusion criteria. Second, the articles that passed the initial screening were reviewed in their entirety to establish eligibility. The two researchers selected articles separately, and disagreements were resolved through conversations until a consensus was established. Each article's data extraction comprised the following: author, year of publication, study aims, research methodologies, sample characteristics, implementation of differentiated learning, student creativity findings, and challenges and impediments to adopting differentiated learning. The retrieved data was then narratively synthesized to address the study questions. Each article's findings were categorized by theme and examined descriptively using the research questions that had been established.

Based on the article selection findings, 15 research papers were identified as related to the specified research topic of the impact and difficulties of differentiated learning on student learning outcomes. The research methodologies utilized in the examined publications were 53% quantitative and 47% qualitative. The following diagram shows the types of research methods for the articles reviewed.
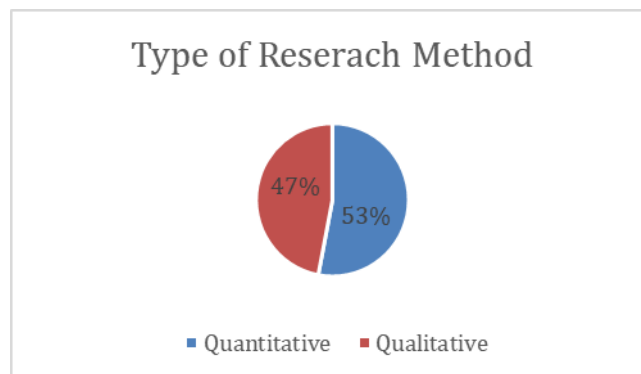

Figure 2. Type of Research

The research samples or subjects in the evaluated studies were primarily elementary school pupils and instructors. However, students and teachers in secondary school used a variety of study themes. Thematic analysis was used to investigate the links between the discovered ideas. The following is the article data reviewed in this study:

Table 2. List of Reviewed Articles

ID	Authors, Years	Title	Country	Type of Research
1.	(Lim & Park, 2022)	Who have fallen behind? The educational reform toward differentiated learning opportunities and growing educational inequality in South Korea	South Korea	Kuantitatif
2.	(Kahmann et al., 2024)	Dutch elementary school teachers' differentiation practices during Science and Technology lessons	Dutch	Kualitatif
3.	(Hammad et al., 2024)	Exploring the link between principal instructional leadership and differentiated instruction in an understudied context: the role of teacher collaboration and self-efficacy	Oman	Kuantitatif
4.	(L. de Jong et al., 2019)	School-based teacher collaboration: Different learning opportunities across various contexts	Dutch	Kualitatif
5.	(Ardiawan et al., 2024)	The impact of differentiated learning materials on students' understanding of nationalism and global diversity	Indonesia	Kuantitatif
6.	(Pozas et al., 2020)	Teachers and differentiated instruction: exploring differentiation practices to address student diversity	German	Kuantitatif
7.	(Dalila et al., 2022)	Effect of Differentiated Learning in Problem Based Learning on Cognitive Learning Outcomes of High School Students	Indonesia	Kuantitatif
8.	(Febriana et al., 2023)	Analysis of the Implementation of Differentiated Learning in the Implementation of the Independent Curriculum in Middle School Mathematics Lessons	Indonesia	Kualiattif
9.	(Afifah & Fatmawati, 2024)	Student Reasoning Based on Mathematical Ability in Solving HOTS Problems through Differentiated Learning	Indonesia	Kualitatif
10.	(Aguanda et al., 2023)	The Effect of Differentiated Learning on Improving Student Learning Outcomes	Indonesia	Kuantitatif
11.	(Setyo Adji Wahyudi et al., 2023)	Analisis Pembelajaran IPAS dengan Penerapan Pendekatan Pembelajaran Berdiferensiasi dalam Kurikulum Merdeka	Indonesia	Kualitatif
12.	(Hidayat et al., 2023)	Improving Student Learning Outcomes through Differentiated	Indonesia	Kuantiattif

		Learning and Adversity Intelligence		
13.	(Rosiyani et al., 2024)	Penerapan Pembelajaran Berdiferensiasi dalam Kurikulum Merdeka pada Pembelajaran Ipas Sekolah Dasar	Indonesia	Kualitatif
14.	(Miqwati et al., 2023)	Implementasi Pembelajaran Berdiferensiasi Untuk Meningkatkan Hasil Belajar Ilmu Pengetahuan Alam Di Sekolah Dasar	Indonesia	Kualitatif
15.	(Noviyanti et al., 2023)	Pengaruh Pembelajaran Berdiferensiasi Terhadap Kemampuan Computational Thinking Siswa Sekolah Dasar	Indonesia	Kualitatif

RESULT AND DISCUSSION

Based on the results of the research and literature review that has been conducted, the following results were obtained:

The Impact of Differentiated Learning in Improving Student Learning Outcomes

The study's findings demonstrated that differentiated learning had a substantial impact on increasing student learning outcomes because learning was handled following the demands of the best method to recall instructional materials, with instructor support (Hidayat et al., 2023). Previous studies have also shown that combining differentiated learning with RME-based teaching materials helps increase students' mathematical reasoning skills (Aguanda et al., 2023). This is because differentiated learning is tailored to the requirements of the students and the educational environment (Febriana et al., 2023). Differentiated learning involves differentiating material, procedure, and product. Previous studies have also shown that differentiated learning improves students' cognitive learning results (Dalila et al., 2022). This is supported by previous research which revealed that in addition to improving learning outcomes, differentiated learning is also able to increase students' learning motivation because the products they produce are following their learning style and interests (Herwina, 2021).

Differentiated learning also helps to solve the problem of student variety by grouping students based on their learning styles, which include aural, visual, and kinesthetic (Setyo Adji Wahyudi et al., 2023). Students can better follow the learning when they are grouped based on their learning styles and requirements, resulting in more effective learning and achievement of learning objectives. If learning objectives are met, pupils' learning results will match expectations. Differentiated learning may also be accomplished by teachers delivering instruction depending on students' learning styles, interests, and learning preparedness, thus influencing their learning outcomes (Rosiyani et al., 2024).

The preceding article's classroom action study results revealed that, in addition to increasing learning outcomes, varied learning might increase student participation and allow them to voice their viewpoints effectively (Miqwati et al., 2023). Differentiated learning may also help students develop their computing abilities, and it is advocated by the Independent Curriculum as a more engaging learning strategy that can increase student learning results (Noviyanti et al., 2023). This is consistent with the reviewed paper, which states that differentiated learning options, whether through more school choice or a broad curriculum that meets kids' requirements, are an essential aim that should not be overlooked by modern education systems (Lim & Park, 2022).

Previous research has shown that one-size-fits-all learning for teacher professional development does not meet the diverse learning needs of teachers in schools, and this learning approach is particularly inappropriate because teachers have autonomy in their professional development and typically engage in learning activities when they are interested and motivated to do so (W. A. de Jong et al., 2022). Research in the Netherlands on differentiated learning revealed that teachers implemented differentiated learning environments and/or lesson processes more appropriately to support children's learning (Kahmann et al., 2024). Meanwhile, differentiated product and content learning is less popular and focuses on developing children's curiosity or inventiveness.

Furthermore, varied learning can help pupils enhance their reasoning and high-level thinking (HOTS) skills (Afifah & Fatmawati, 2024). Other studies have also shown that differentiated learning in terms of material can improve learning outcomes and have a major impact on students' understanding of nationalism and global diversity (Ardiawan et al., 2024). Other studies have also found that the introduction of differentiated learning in Germany had a greater beneficial influence on teachers' constructivist attitudes (Pozas et al., 2020).

Another conclusion is that the principal's instructional leadership has an indirect impact on differentiated learning by mediating teacher cooperation and self-efficacy (Hammad et al., 2024). To accomplish differentiated learning, instructors must collaborate and set goals. According to the study, differentiated learning is an effective teaching technique that may meet students' academic variety and is a contemporary educational focus that promotes inclusion and learning experience features to increase student performance. This study's findings are consistent with previous research, which found that differentiated learning can improve student learning outcomes by accommodating students' interests, profiles, learning styles, and learning readiness (Ayu Sri Wahyuni, 2022).

The findings of this study on differentiated learning are consistent with the Humanism learning theory, which holds that the learning process strives to humanize humans by emphasizing what is learned above the learning process itself (Prasetyo & Suciptaningsih, 2022). This school of thought contends that the learning process must accommodate student variety, with instructors serving solely as facilitators, encouraging students to reach their full potential (Wahyudi & Darmawan, 2024). The humanistic school of thinking encourages pupils to appreciate studying an object or subject connected to the human component (Qodir, 2017).

Challenges of Differentiated Learning in Improving Student Learning Outcomes

The challenge of implementing differentiated learning is the need for collaboration between teachers in differentiated learning because the most intensive collaboration that occurs in groups of teachers is the collective design of teaching materials, so it requires activities outside of planned meetings such as visiting colleagues' lessons or recording and preparing video clips to be shared in differentiated learning (L. de Jong et al., 2019). In addition, the implementation of differentiated learning is a challenge from the perspective of the education system to balance individualization and educational choice and standardization and equality of learning (Lim & Park, 2022). Another issue is to give more personalized agendas for students in the form of to-do lists, modify the amount of time students have to accomplish chores, and provide diverse activities. (Miqwati et al., 2023).

Another issue in adopting differentiated learning is the restricted capacity to analyze student characteristics and resources, such as time, space, and instructional materials (Setyo Adji Wahyudi et al., 2023). This is because pupils have varying skills, making it challenging for teachers to manage each student's learning with the limited resources available.

The next challenge is how the principal can help increase teacher self-efficacy by encouraging them to actively participate in discussions, providing constructive feedback to their colleagues, and encouraging meaningful conversations about the challenges of differentiated learning (Hammad et al., 2024). Another barrier to adopting varied learning is the limited time to prepare differentiated learning that must suit the uniqueness of students, classroom management, and the necessity for instructors to receive and employ tools that enable (Febriana et al., 2023).

Previous studies have also found that the availability of facilities and infrastructure is a significant barrier to the adoption of differentiated learning (Wawan Hermansyah, 2023). This is regarded as complex since the diversified learning process must accommodate at least three elements: process differentiation, content differentiation, and product differentiation. Another problem in implementing differentiated learning, according to the study, is that teachers must prepare multi-methods, multimedia, and multi-sources to ensure that learning changes to fit diverse student learning styles. Teachers require extra time to assemble all of this, which is a difficulty because each school has time set aside for each instructor and their specific courses. Strategies to face these challenges include continuing to learn and share experiences with other colleagues who have the same problems as us (forming a learning community), supporting and encouraging each other with colleagues, applying what has been obtained and can be applied even if it is not optimal, and continuing to try to evaluate and improve the learning process that has been implemented (Fitriyah & Bisri, 2023).

Based on the problems and constraints listed above, teamwork across all aspects of the school is required to ensure that the implementation of differentiated learning runs smoothly and effectively, resulting in improved student learning outcomes. The findings of this study can help to improve the quality and skills of students through a differentiated learning strategy. More study is needed to investigate or assess the benefits of differentiated learning on 21st-century abilities.

CONCLUSION

Based on the study's findings and discussions, differentiated learning has the potential to increase learning outcomes, and efficiency, and eliminate inequality in the educational system. Differentiated learning can also help pupils improve their curiosity, creativity, and other skills. This learning can suit the demands of pupils since its execution is tailored to their specific needs. Differentiated learning can also help students enhance their computational abilities, problem-solving ability, and learning outcomes. The problems in adopting varied learning include a shortage of time, classroom management, and the use of suitable learning tools. Furthermore, the instructional resources are still limited, which presents a problem. The findings of this study can help to improve the quality and skills of students through a differentiated learning strategy. Moreover, the findings of this study may offer a solution for meeting the demands and characteristics of various pupils. This has the potential to greatly improve student learning results. More research is needed to evaluate or analyze the benefits of differentiated learning for 21st-century skills. In addition, further study is needed to investigate the creation of differentiated learning models to improve student skills.

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