Journal of ICSAR
ISSN (print): 2548-8619; ISSN (online): 2548-8600
Volume 10, Number 1; DOI: http://dx.doi.org/10.17977/um005v10i12026p148-163

Differentiated Learning in Elementary Schools: A Systematic Literature Review from an Inclusive Education Perspective

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Abstract: Differentiated learning is a pedagogical approach that is gaining attention in the context of basic education, particularly in efforts to respond to the diversity of student characteristics in the classroom. This study aims to systematically examine how differentiated learning is implemented in elementary schools and the extent to which this approach is linked to the principles of inclusive education and student diversity. This study uses a Systematic Literature Review (SLR) approach with reference to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework. Literature searches were conducted on the Scopus, Web of Science, ERIC, and Google Scholar databases for reputable journal articles published between 2019 and 2024. The results of the study show that differentiated learning is generally applied to respond to variations in learners' readiness, interests, and academic abilities. However, most studies still interpret learner variability in general terms and have not consistently linked it to the framework of inclusive education, especially in relation to learners with disabilities or special educational needs. These findings indicate that although differentiated learning has the potential to support inclusive practices, the existing literature still tends to focus on the context of regular classrooms without in-depth analysis of issues such as disability, learning difficulties, giftedness, and language diversity. This study concludes that there is a gap between the discourse on differentiated learning and disability-based inclusive education practices in elementary schools. Therefore, further research needs to explicitly integrate the perspectives of inclusive education and disability studies, both in the design of differentiated learning and in basic education policies and practices.

Keywords: Differentiated learning; systematic literature review; elementary school.

INTRODUCTION

The diversity of students in elementary schools is a pedagogical reality that is inseparable from contemporary educational practices. Differences in academic abilities, socio-cultural backgrounds, languages and learning interests, as well as disabilities and special educational needs, require teachers to develop adaptive and equitable learning strategies (Deunk et al., 2018a). In this context, differentiated learning is often positioned as a professional competency of teachers to respond more effectively to the varying characteristics of students in the classroom (Arhinza, 2023; Haque Insani & Munandar, 2023; Kuway et al., 2023).

Within the framework of education policy in Indonesia, the implementation of differentiated learning has gained strong legitimacy through the Merdeka Curriculum, which emphasizes learner-centered learning, strengthening the Pancasila student profile, and fulfilling the right to education for every child (Amalia et al., 2023; Rachmadhani, & Kamalia, 2023; Balgan et al., 2022; Fitra, 2022). This policy is also in line with the commitment to inclusive education that encourages the full participation of all learners, including learners with disabilities, in regular school environments. Thus, differentiated learning is not only relevant as a pedagogical approach but also has the potential to be an important instrument in realizing fair and inclusive education (Heitink et al., 2016; Prast et al., 2015; Roy et al., 2013).

However, the literature on differentiated learning at the elementary school level still tends to frame inclusion in a limited way, mainly through differences in learning readiness, cognitive abilities, and learning styles of students (Tomlinson et al., 2003). This approach reflects a pedagogical understanding that focuses on instructional adjustments but does not yet fully depart from a rights-based approach as emphasized in the framework of inclusive education and disability studies (Amalia et al., 2023; Marlina & Aini, 2023; Nawati et al., n.d.; Awofala & Lawani, 2020). In many studies, disability and special educational needs are only mentioned implicitly or assumed to be covered in the category of "student diversity," without adequate theoretical discussion of structural barriers, accessibility, and educational equity.

Differentiated learning also raises conceptual issues (Ratnaya, Novianti, & Wibowo, 2024). Although the concept of learning styles is popular in educational practice, its empirical status is still debated in educational and psychological research. A number of studies show that classifying learners based on specific learning styles does not always have a significant impact on improving learning outcomes and has the potential to simplify the complexity of learners' learning needs, especially for learners with disabilities. Over-reliance on learning styles as the primary lens also risks obscuring issues of accessibility, individual support, and universally inclusive learning design (Deunk et al., 2018b).

As a conceptual alternative, inclusive education frameworks such as inclusive pedagogy and Universal Design for Learning (UDL) offer a more comprehensive perspective on student diversity (Naeemy & Yoneda, 2024; Morgan, 2014). This approach emphasizes flexible learning design from the outset, the removal of learning barriers, and the provision of various representations, engagement, and expressions of learning that are accessible to all learners, including those with disabilities. Within this framework, differentiated learning is not understood solely as individual adjustments based on specific categories but rather as part of a systemic strategy to create an inclusive and equitable learning environment (Tomlinson et al., 2003).

Based on these conditions, a critical study is needed to examine how differentiated learning is implemented in elementary schools and the extent to which this approach is truly linked to the principles of inclusive education and the perspective of disability studies. Therefore, this study aims to conduct a Systematic Literature Review of the implementation of differentiated learning in elementary schools, focusing on the meaning of student diversity, the position of disability and special educational needs, and the gap between pedagogical discourse and inclusive education practices in the existing literature.

METHOD

This study uses a Systematic Literature Review (SLR) approach to comprehensively examine the implementation of differentiated learning in elementary schools, with a particular focus on its relationship with inclusive education and student diversity. The review process was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure transparency, methodological rigor, and consistency in reporting.

Literature Search Strategy

The literature search was conducted through international academic databases, namely Scopus, Web of Science, ERIC, and Google Scholar. The articles searched were peer-reviewed journal articles published between 2019 and 2024. Keywords were used in various combinations with Boolean operators, including "differentiated learning," "elementary school," "inclusive education," "student diversity," and "special educational needs."

Inclusion and Exclusion Criteria

To avoid ambiguity in the selection of studies, this research established clearly operationalized inclusion and exclusion criteria.

Inclusion criteria include articles that:

1. Focus on the implementation of differentiated learning at the elementary school or primary education level;
2. Use empirical research designs (qualitative, quantitative, or mixed methods) or systematic reviews;
3. Discuss student diversity, either explicitly or implicitly, including differences in academic ability, learning readiness, special educational needs, disabilities, giftedness, or language diversity;
4. Relevant to the context of inclusive education, in terms of learning practices, policies, and conceptual frameworks;
5. Published in reputable English-language journals.

Exclusion criteria include articles that:

1. Focus on secondary or higher education;
2. Are purely conceptual without empirical or systematic analysis;
3. Are not relevant to classroom learning practices or the context of inclusion;
4. Are from conference proceedings, books, or non-peer-reviewed publications.

It should be emphasized that although inclusive education and disability were the main analytical lenses, not all of the articles included explicitly discussed students with disabilities. This condition reflects the limitations of the available literature and is part of the study findings, not a result of narrow criteria set by the researchers.

Study Selection Process

The initial search yielded 127 articles. After removing duplicates, the titles and abstracts were screened, resulting in 42 articles for full-text review. Based on the application of inclusion and exclusion criteria, 19 articles were found to meet the criteria and were comprehensively analyzed. From these 19 articles, a further thematic analysis was conducted to identify studies that explicitly discussed the relationship between differentiated learning and inclusive education and/or disability. This process yielded 13 articles that were conceptually relevant to the issue of inclusion and 4 articles that specifically placed disability or special educational needs as the main focus of analysis. This narrowing was not intended to exclude other studies, but rather to highlight the depth and variety of approaches in the literature to the issue of inclusivity.

All stages of selection and study narrowing were documented using PRISMA flowcharts to ensure consistency and transparency of reporting.

Data Extraction and Analysis

Data extraction was performed using a structured coding framework that included year of publication, country of origin, research design, participant characteristics, differentiated learning concepts, and approaches to student diversity and disability. Data analysis was conducted thematically to identify dominant patterns, research gaps, and conceptual limitations in the reviewed literature, particularly regarding the application of differentiated learning in the context of rights-based inclusive education.

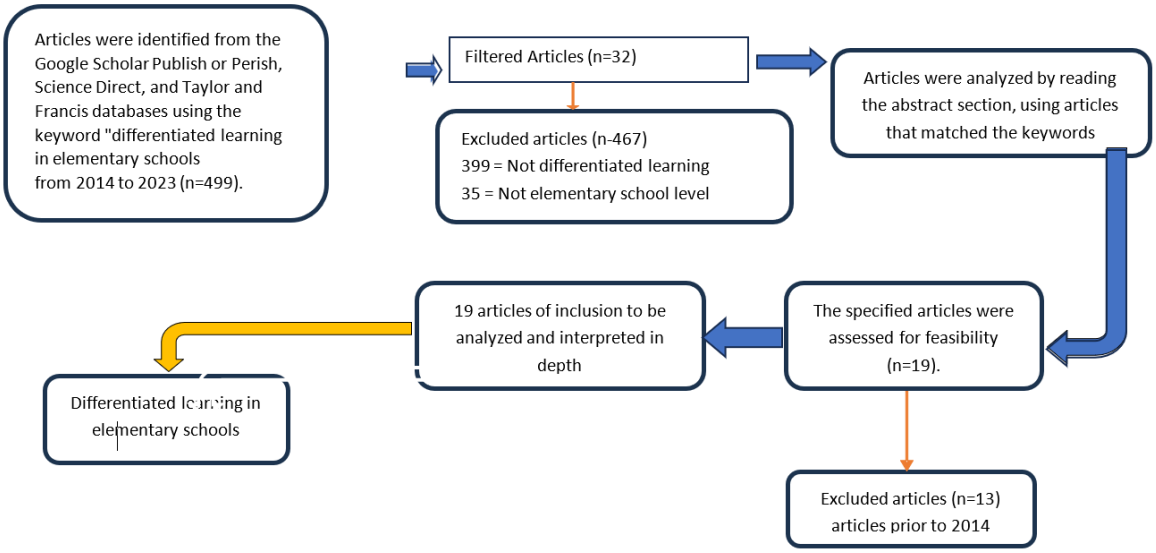

Figure 1. PRISMA article database

FINDING AND DISCUSSION

Finding(s)

The results of the research data included in this literature review are an analysis and summary of articles related to differentiation learning in elementary schools.

Table 1. Result of research data

No	Title	Writer	Country and Year of Publication	Subjects	Variables Studied
1	Differentiation of Instruction for Gifted Learners: Collated Evaluative Studies of Teacher Classroom Practices	Joyce VanTassel-Baska, Gail Fischer Hubbard, Janice I. Robbins	USA, 2020	Various subjects	Best differentiation learning, strategy, critical thinking, creative thinking.
2	Analyzing Student Learning Gains: Science Classroom	Matthew Ryan Lavery, Joyce Nutta, Alison Youngblood	USA, 2018	All subjects	Academic ability
3	Supporting Primary School Teachers in Differentiating in the Regular Classroom	Tessa HS Eysink, Manon Hulsbeek, Hannie Gijlers	Netherlands, 2017	Science	Differentiation in Task, Content, and Process; Teacher Self-efficacy
4	A Formative Evaluation of Differentiation Practices in Elementary Cluster Classrooms	Susan K. Johnsen, Danielle Fearon-Drake, Lynn W. Wisely	USA, 2020	Literacy and Mathematics	Differentiation of Instructional Practices, Learning Environment, Gifted Education, Professional Development Needs
5	Teachers and Their Implementation of Differentiated Instruction in the Classroom	Muhamad Nanang Suprayogi Martin Valcke a, Raymond Godwin	Belgium, 2017	Not subject specific	Differentiated Instruction, self-efficacy
6	The importance of job resources and self-efficacy for beginning teachers' professional learning in differentiated instruction.	Debbie De Neve*, Geert Devos, Melissa Tuytens	Belgium, 2015	Not subject specific	Job Resources, Self-Efficacy, Professional Development, Vitality

No	Title	Writer	Country and Year of Publication	Subjects	Variables Studied
7	Increasing Inclusion through Differentiated Instruction in a Technology-Rich Primary School Classroom in Norway	Minttu Johler & Runes Johan Krumsvik	Norway, 2022	Not subject specific	Differentiated Instruction, Inclusion, Technology Integration
8	Differentiating Instruction in Primary and Middle Schools: Does Variation in Students' Learning Attributes Matter?	Tadesse Melesse & Sinatayehu Belay	Ethiopia, 2022	Various subjects	student attributes; content differentiation; process differentiation; product differentiation; differentiation of learning environments
9	Effects of learning style based differentiated activities on gifted students' creativity	Serkan Demir	Türkiye, 2021	Science	learning style, development of creative thinking abilities, creativity of talented students.
10	Differentiated Learning for Students with Special Needs in Inclusive Schools	Marlina, Elsa Efrina, Grahita Kusumastuti	Indonesia, 2019	Inclusive education for students with special needs	Teachers' perceptions of differentiated learning and its application in inclusive education.
11	Implementation of differentiated learning in elementary schools	Faigawati, Mazda Leva Okta Safitri*, Faradita Dwi Indriani, Fairus Sabrina, Kinanti, Halim Mursid, Apit Fathurohman	Indonesia 2023	Not specific, assumed to cover various subjects in elementary school	Application of differentiated learning in elementary schools in the form of content, learning models, evaluation,
12	The Effect of the Differentiated Teaching Approach in the Algebraic Learning Field on Students' Academic Achievements	Ayten Pinar BAL	Türkiye, 2016	Mathematics, especially algebra	Cognitive and affective student academic achievement
13	Implementation of Differentiated Learning in Elementary Schools	Ricky Avandra, Desyandri	Indonesia 2023	IPA	Critical thinking skills
14	Analysis of Student Learning Styles for Differentiated Learning	Fakinatul Izzun Himmah, Nursiwi Nugraheni	Indonesia 2023	Not specific,	Analysis of student learning styles and their implementation in differentiated learning
15	Increasing students' interest in science and science subjects through differentiated learning using digital teaching materials	Novia Petronela Kuway, Muhajir, Abdul Wahid	Indonesia 2023	IPAS	Learning achievement
16	Analysis of P5-Based Differentiated Learning in Class IV Elementary School Science Subjects	Anis Arhinza, Sukardi, Murjainah	Indonesia 2023	IPAS	The Project for Strengthening the Profile of Pancasila Students includes piety, noble character, mutual cooperation, critical reasoning, creativity
17	Analysis of Science and Technology Learning with the Application of a Differentiated Learning Approach in the Independent Curriculum	Setyo Adji Wahyudi, Mohammad Siddik1, Erna Suhartini	Indonesia 2023	IPAS	Fulfilling student needs in terms of learning styles, interests and creativity through content, processes and products.

No	Title	Writer	Country and Year of Publication	Subjects	Variables Studied
18	Implementation of a Differentiated Learning Model in Improving Primary School Students' Collaboration Skills	Adila Putri Kurnia Sari, Mawardi	Indonesia 2023	Not specifically stated	Collaboration ability, academic achievement
19	Differentiated Learning in Fine Arts Subjects for Class V Elementary School Woven Materials	Indri Kusuma Wardani, Insanul Qisty Bariyyah	Indonesia	Art	Product differentiation, Interest in learning

The results of a systematic literature review of 19 articles show that research on differentiated learning in elementary schools is spread across various country contexts and educational domains. In general, the reviewed literature places differentiated learning as a pedagogical strategy to respond to student diversity. However, thematic analysis shows that the approaches and assumptions regarding this diversity vary greatly, depending on the student population that is the focus of the research. Therefore, the findings of this study are reorganized into several main themes based on the groups of students prioritized in the implementation of differentiated learning.

Discussion

1. Differentiated Instruction for Gifted and High-Ability Students

Most articles in the reviewed literature focus on differentiated learning in the context of gifted students or those with high academic abilities. In these studies, differentiation is understood as a strategy to enrich content, accelerate the pace of learning, or provide more cognitively challenging tasks. This approach stems from the assumption that diversity among students is primarily related to differences in academic ability and intellectual potential. Findings show that in this context, differentiated learning is often reported to have a positive impact on increasing learning motivation, student engagement, and academic achievement. However, a strong focus on gifted students also indicates that differentiation practices tend to prioritize learners who already have strong academic capital, while the needs of learners with learning barriers or disabilities receive relatively less attention.

2. Differentiated Instruction in Diverse Regular Classrooms

The second dominant theme was the implementation of differentiated learning in regular heterogeneous classrooms. In this study group, student diversity was generally understood in terms of differences in learning readiness, interests, and learning styles. Differentiation was achieved through a variety of teaching methods, assignments, and assessments to suit the individual needs of students. Although this approach aims to create more responsive learning, analysis shows that most studies still place differentiation as an effort to improve the effectiveness of teacher teaching and student learning outcomes in general. Issues such as learning accessibility, structural barriers, and power relations in inclusive classrooms are rarely discussed explicitly. As a result, differentiated learning practices in regular classrooms tend to be pedagogically adaptive, but not yet fully transformative within the framework of equity-based inclusive education.

3. Differentiated Learning and Inclusive Education for Students with Disabilities

The results of the study show that only a small number of articles explicitly link differentiated learning with inclusive education for students with disabilities or special educational needs. In these studies, differentiation is positioned as one of the strategies to support the participation and involvement of students with special needs in regular classes.

However, the number of studies that deeply discuss the learning experiences of students with disabilities, accessibility needs, or systemic curriculum adaptations is still very limited. Most studies do not examine how differentiated learning interacts with structural factors, such as policy support, resource availability, or school capacity to provide an inclusive learning environment. This suggests that disability is often treated as an implicit part of "student diversity" rather than as a category of analysis with specific pedagogical and ethical implications.

4. Gaps in the Literature: Accessibility and Marginalized Groups

Thematic analysis also revealed significant gaps in the literature on differentiated learning in elementary schools. Aspects such as linguistic diversity, socioeconomic background, and other forms of educational marginalization are still rarely discussed in depth. In addition, attention to learning accessibility and power relations between teachers and students in inclusive classrooms is almost absent in most of the studies reviewed.These findings indicate that although differentiated learning is often promoted as an inclusive approach, its practice and academic study still tend to prioritize certain groups of learners, particularly high-achieving students and regular classes, while the needs of learners with disabilities and other vulnerable groups remain relatively marginalized.

A review of the literature shows that differentiated learning is consistently promoted as a pedagogical approach that is responsive to the diversity of students in elementary schools. However, this discussion needs to go beyond reproducing the positive claims in the literature and take a critical stance on how differentiated learning is practiced and who benefits or is marginalized in its implementation. Predominantly, the reviewed literature interprets student diversity through differences in academic ability, learning readiness, and learning styles. This approach contributes to improving teaching effectiveness and student performance within existing classroom structures. However, from the perspective of inclusive pedagogy and disability studies, this focus has the potential to reinforce the normative logic of the "ideal student" and ignore the structural barriers faced by students with disabilities. In this context, differentiated learning risks functioning as a strategy for optimizing performance in an exclusive education system, rather than as a tool for transformation towards educational justice. One of the main risks that emerges in the literature is the practice of ability grouping and labeling of students. Although intended to tailor learning to individual needs, this grouping can reinforce academic hierarchies and produce harmful social consequences, especially for students with learning difficulties or disabilities. From a disability studies perspective, such practices can reproduce stigma and narrow opportunities for students to participate fully in meaningful learning.

Explicit engagement with disability issues in differentiated learning literature is also still very limited. Only a few studies have thoroughly examined how differentiation can support accessibility, participation, and agency for students with disabilities in regular classrooms. Even when disability is mentioned, the approaches used tend to be compensatory rather than transformative, and have not fully adopted a rights-based perspective that views disability as the result of interactions between individuals and their learning environment (Anggraini & Subasno, 2024). Within the framework of inclusive pedagogy and Universal Design for Learning (UDL), differentiated learning should not

solely focus on individual adjustments after barriers arise, but rather on designing flexible and accessible learning from the outset (Febriyanti et al., n.d.). This approach challenges the assumption that learner diversity is a problem that must be "overcome" through differentiation, and instead emphasizes the importance of changing learning design and classroom structure to accommodate all learners without harmful labeling. Thus, the findings of this study indicate that differentiated learning has the potential to contribute to inclusive education, but this potential has not been fully realized in existing practices and literature. Without critical engagement with disability studies perspectives, differentiated learning risks reinforcing exclusionary practices that are veiled in narratives of inclusion. Therefore, a paradigm shift is needed from performance-oriented differentiation to differentiation oriented towards equity, accessibility, and meaningful participation for all learners.

Research results by VanTassel-Baska et al. (2020) shows that various evaluation studies on teachers' use of differentiated learning for gifted students that have implications for best learning in gifted education internationally. The research questions centered on what specific differentiation practices were implemented with gifted students and the differences found between instructional levels and content areas. Using the Classroom Observation Scale-Revised (COS-R) with 329 teachers in six different school districts in four states in the Eastern United States. There are 6 aspects evaluated, namely curriculum planning, material and strategy use, accommodation of individual differences, critical thinking, creative thinking and investigative analysis. Based on the observed aspects, effective results were obtained for all aspects, however there were several findings indicating that secondary school classrooms were less effective in using differentiation for gifted children compared to elementary schools. Comparison of results by subject showed that mathematics classrooms were the most successful in implementing differentiation practices for gifted children. Overall, this research indicates that differentiated learning is underutilized at most gifted program sites studied.

Results This study compared pre/post-class assessment scores of n = 8,326 K-12 students taught by n = 288 pre-service teachers to determine whether different teacher education programs prepared them to support the achievement of English language (EL) learners in the classroom including native speakers and not a native English speaker. English. Candidates in Group 1 consisted of prospective academic subject teachers (secondary math, science, and social studies), who completed six teacher preparation courses with 15 major assignments that included a focus on EL. Meanwhile, for Group 2 candidates, it includes language arts teaching (elementary, early childhood, and secondary English language arts). Group 2 candidates complete 12 to 15 courses with 41 to 50 major assignments that include a focus on EL. The results showed that teacher candidates in both groups helped narrow the gap between ELs and non-ELs from pretest to posttest. EL performance did not differ when taught by candidates from either group. Implications for teacher preparation are discussed (Lavery et al., 2019).

Many elementary school teachers have difficulty differentiating effectively in the regular classroom (Eysink et al., 2017). This research investigates the influence of the STIP approach on differentiation activities and teacher self-efficacy, as well as children's learning outcomes and learning values. Teachers who use the STIP approach in science learning are compared with teachers who use the regular program. 16 teachers and 306 children were observed and received questionnaires at four different times. The results showed that the use of the STIP approach resulted in more differentiation in tasks, content, and processes. Apart from that, children of STIP teachers who show many types of differentiation activities learn

more than children of STIP teachers who do less differentiation. Thus, this approach directly expands the list of practical differentiation methods that teachers can choose from. Additionally, it is an approach where children gain domain knowledge through teaching with a strong focus on 21st century skills. The combination of the two makes it an interesting approach to contemporary education.

Cluster teachers' differentiation in their classroom teaching practices in an urban setting (Johnsen et al., 2020). Data was collected from classroom observations of learning tasks, questioning, and the classroom environment; rating observations using the Classroom Learning Practice Scale; and interviews with teachers, parents, and students. Ten observers assessed the differentiation of classroom teaching practices in literacy and mathematics from 79 cluster classrooms in 18 different elementary/middle schools. The research results show that most cluster teachers use standard guidelines in developing their curriculum, creating a positive learning environment, and varying their learning activities. Teachers appear to need permission for flexibility and professional development to implement acceleration, vary activities for individual students in small groups, vary time for learning, manage the behavior of multiple groups and independent learning, make connections between subjects with learning outside of school, and understand characteristics and role of gifted students in the classroom.

Cultivating student diversity in today's classrooms requires appropriate teaching strategies. Differentiated learning (DI) is proposed as a primary solution but appears challenging. In this study, teachers' actual implementation of DI was associated with a complex set of variables: teachers' DI self-efficacy, teaching beliefs, teaching experience, professional development, teacher certification, and class size. The findings show that DI implementation appears high, but is still below critical standards. The results of the regression analysis showed that 39% of the variation in DI implementation could be significantly attributed to DI self-efficacy beliefs, higher constructivist beliefs, and higher class size. Research implications are discussed (Suprayogi et al., 2017).

The results of the study by Johler & Krumsvik (2022) aimed to investigate how primary school teachers in a leading primary school in Norway use digital technology to differentiate teaching to foster a more inclusive learning environment in academically diverse classrooms. Seven teachers teaching grades 1 and 5 were observed and interviewed to collect data regarding their beliefs and practices regarding differentiation. Afterward, 20 teachers at the same school answered a survey about teaching in highly digital learning environments. The results show that teachers find a lot of potential and possibilities in using digital technology to differentiate teaching to create inclusive learning environments. However, students' digital products indicate that they need more guidance in leveraging teacher intent and flexible curricula.

Research Results This research seeks to determine the significant relationship between student attributes (background knowledge, readiness, interests, and learning profile) and the use of DI elements (differentiation of content, process, product, and learning environment) by teachers in elementary schools and schools. Enjibara and Chagni city administrative secondary schools in Awi zone, Ethiopia. A total of 364 teachers who were randomly selected were part of this research. The measurement scale had 27 items, and Cronbach's alpha estimates for internal consistency reliability ranged from 0.80 to 0.93. Convergent and discriminant validity of the constructs was established. Standardized factor loadings of the CFA ranged from 0.65 to 0.81. This study confirms that variations in student attributes have a strong direct influence on content differentiation and learning environments. Differentiating content has a stronger direct influence on process differentiation. Likewise, process differentiation and learning environment have a stronger direct influence on product

differentiation. In addition, mediation analysis shows that variations in student attributes have an indirect influence on product differentiation through process differentiation and the learning environment. In addition, process differentiation has completely mediated the influence of content differentiation and partially mediated the influence of learning environment (Melesse & Belay, 2022).

Professional learning in differentiated learning (DI) is a challenging learning process for novice teachers. This study investigates the interplay between work (i.e., teacher autonomy and professional learning community (PLC) characteristics) and personal resources (i.e., teacher self-efficacy) as hypothesized determinants of professionalization in DI. The samples taken were 227 novice teachers from 65 elementary schools. Path analysis indicated that 'reflective dialogue' characteristic of PLCs, teacher self-efficacy and autonomy directly predicted self-reported change in DI practice (i.e., a measure of professional learning). Additionally, the autonomy and 'collective responsibility' that are characteristics of PLCs indirectly predicted self-reported changes in DI practice through self-efficacy. Implications for educational practice are discussed (De Neve et al., 2015).

The research results aim to find out how effective differentiation and enrichment of learning designs are in revealing and improving the creative thinking skills of talented students (Demir, 2021). A quasi-experimental design of pre-test and post-test experimental-control groups was used in this research. The study subjects consisted of 72 students aged 10 to 11 years, identified as gifted and talented and currently attending the same Science and Arts Center (SAC) in Istanbul province. When these findings are interpreted, it can be concluded that learning designs that are differentiated and enriched through Kolb's Bloom's taxonomy learning styles have a positive effect in revealing and improving the creative thinking skills of gifted and talented students. Based on the findings obtained in this research, we can recommend that teachers who want to support and develop their students' creative thinking skills should start by identifying their students' potential, interests and learning styles; then provide a learning environment where students can show their creativity, defend their ideas freely, and produce unique solutions to the problems they face; and finally using approaches, methods, or techniques that enhance creative thinking and whose effectiveness is scientifically proven in the literature.

Results This study compared pre/post-class assessment scores of n = 8,326 K-12 students taught by n = 288 pre-service teachers to determine whether different teacher education programs prepared them to support the achievement of English language (EL) learners in the classroom including native speakers and not a native English speaker. English. Candidates in Group 1 consisted of prospective academic subject teachers (secondary math, science, and social studies), who completed six teacher preparation courses with 15 major assignments that included a focus on EL. Certification areas for Group 2 candidates include language arts teaching (elementary, early childhood, and secondary English language arts). Group 2 candidates complete 12 to 15 courses with 41 to 50 major assignments that include a focus on EL. The results showed that teacher candidates in both groups helped narrow the gap between ELs and non-ELs from pretest to posttest. EL performance did not differ when taught by candidates from either group. Implications for teacher preparation are discussed (Lavery et al., 2019).

The research results stated that teachers had difficulty implementing P5 (Strengthening Pancasila Student Profile Project) (Arhinza, 2023). The method used in this research is a qualitative descriptive method. The results of the research show that in the P5 dimension indicator, faith and devotion to God Almighty and noble morals in class IV are categorized as good. This is proven by the results of the percentage of questionnaires filled out by

students. 100% of students always pray when starting the learning process. Furthermore, the global diversity indicator is 37% of students who always respect friends who do not understand the lesson. Next, the indicator of mutual cooperation is 33.3% of students always work together in group work. Furthermore, the independent indicator is 55.5% of students who always take tests independently according to their abilities. Next, the critical reasoning indicator was 37% of students able to answer questions asked by the teacher. And finally, the creative indicator was 40.7% of students who were able to change unused used items into used items. Based on the results of the analysis, it can be concluded that P5-based differentiation learning in class IV science and science learning at SD Negeri 222 Palembang is categorized as good. By implementing an independent curriculum in science and science subjects, students can improve academics and character.

Marlina's research results (2019) This research aims to examine how teachers understand and feel the influence of differentiation on learning practices. This qualitative research aims to explore a teacher's perception in implementing differentiated learning for students with special needs in inclusive schools. This study interviewed 32 teachers (including high school, middle school, and elementary school teachers) using observation and interview questions to encourage conversational dialogue. Interview questions provide teachers with an opportunity to share their thoughts, feelings, and experiences regarding teaching different student learning profiles. Data analysis revealed the following aspects: (1) learning that provides opportunities for students to learn naturally and efficiently, (2) learning that provides opportunities for students to work independently and in groups, and (3) providing a conducive learning climate with diverse learning preferences. Research finds that teachers do not understand and teach students based on student learning profiles. Therefore, the results of this research are the basis for developing differentiated learning models for students with special needs in inclusive classes. This study supports training for regular teachers and special educators, especially regarding the application of differentiated learning (Marlina et al., 2019).

The research results by Bal (2016) show that the differentiation teaching approach in sixth grade algebra learning increases student success, and during this period students show positive cognitive and affective development. Differentiated teaching approaches implemented in sixth grade algebra increase students' academic success, and during this period, they provide positive cognitive and affective development. Since this research is limited to the student dimension, further research should be carried out on different subjects and at grade level where teachers' opinions about implementation stages can also be investigated. In addition, this study tested several teaching methods of different teaching.

The Independent Curriculum is intended to give students freedom to develop their learning activities. The aim of this research is to find out how the implementation of differentiated learning has been carried out by teachers in elementary schools. This research uses a qualitative descriptive approach using the Miles and Huberman model which includes three components, namely data reduction, data presentation, and drawing conclusions. Data collection was carried out through questionnaires and in-depth interviews with 20 elementary school teachers in South Sumatra. The validity of this research data uses data triangulation. Diagnostic assessments take the form of short questions that can be written down or in the form of direct questions before starting learning. The characteristics of students who require differentiated learning are students who have diverse learning styles. The differentiating content is reading material, pictures and learning videos related to the subject matter. The most appropriate differentiated learning model is the PJBL/PBL learning model. An effective and constructive learning environment greatly influences the process of developing the quality of teachers and students in the school environment. An indicator of

the success of differentiated learning is when students can express a sense of comfort. Differentiated learning carried out by teachers first uses diagnostic assessments, content is adapted to learning styles, the learning process tends to be problem or project based, products are adapted to students' abilities and the learning environment requires collaboration with parents (Faigawati et al., 2023).

Research results by Kuway et al. (2023) shows the use of digital teaching materials through the Google Sites platform as a differentiated learning method is proven to be able to increase students' interest in Social Natural Sciences (IPAS) subjects. This increase in interest can be seen from the comparison between students' interest levels before and after using digital teaching materials. The success of this method does not only depend on technological sophistication, but is more due to the teaching abilities possessed by educators. These effective digital teaching materials cover a variety of learning styles, including visual, auditory, and kinesthetic. Therefore, educators need to continue to follow the latest developments and think creatively to adapt this technology in the teaching and learning process.

Research results on differentiated learning at State Elementary School 09 Balai Satu District. Lubuk Basung can improve critical thinking skills. To improve critical thinking skills by paying attention to students' readiness, interests and profile. The increase in students' critical thinking skills obtained through observation activities, based on the results of the analysis in cycle II actions, can be seen that there was an increase in students' critical thinking skills from cycle I actions, namely 40% to 87.5% in cycle II. The learning design is well structured to improve the critical thinking skills of students at State Elementary School 09 Balai Satu District. Lubuk Basung in learning uses differentiated learning (Ricky Avandra & Desyandri, 2023).

The research by Himmah & Nugraheni (2023) looked at the learning styles of fourth grade students. This research focuses on visual, audio and kinesthetic learning styles using questionnaire instruments, observation sheets and interviews. The research results show that sixth grade students have diverse learning styles. It is proven that students' learning styles show 47% visual, 31% auditory, and 21% kinesthetic. This difference is a challenge for teachers to implement differentiated learning strategies. Differentiated learning aims to facilitate students to fulfill their learning needs. Differences in student learning styles so that their needs are met, teachers apply differentiated learning during the learning process in class. Differentiation in learning does not mean teaching all students using different methods, nor does it mean making study groups of smart students with smart ones or vice versa.

Differentiated learning research is a learning that adapts to students' interests, learning preferences, readiness in order to achieve learning goals. In implementing differentiated learning, there are 3 different aspects, namely, content differentiation, process differentiation, and product differentiation (Wahyudi et al., 2023). The aim of this research is to find out whether differentiated learning can address the diversity of student needs and the impact of differentiated learning. The type of research used is qualitative with a descriptive qualitative research approach. Data collection techniques in this research consisted of observation, interviews and documentation. The data analysis technique in this research consists of data reduction, data presentation and drawing conclusions. The application of differentiated learning in science and science learning for class VD SDN 008 Samarinda Seberang resulted in the application of differentiated learning being able to address the diversity of students' diverse needs. Students are divided into groups according to learning styles, including audio, visual and kinesthetic. By grouping students according

to their learning styles and needs, students can participate in learning well so that learning is effective and learning goals can be achieved.

Based on research conducted regarding the implementation of differentiated learning models in improving collaboration skills and student learning outcomes, researchers can draw the following conclusions: 1) Student collaboration skills have increased from 40.9% in cycle I to 72.71% in cycle II; 2) student learning outcomes increased in cycle I by 72.72% achieving completeness, then increased in cycle II, the percentage of student completion reached 90.90%. Based on the researchers' conclusions, the researchers suggest the following to improve the learning process in the future: 1) for teachers, in learning activities they can consider using differentiated learning models so that students' collaboration abilities and learning outcomes are as expected; 2) develop learning resources according to the differentiated learning model so that they can accommodate the needs and characteristics of diverse students.

This research aims to determine the application of differentiated learning in the Selni Rupa woven material subject to students. The data source comes from researchers and 20 fifth grade students at SD N Kalisari, Kulon Progol. The research results showed that the implementation of differentiated learning in the Selni Rupa woven material subject using three important elements, namely differentiated content, process and product using the project based learning model was "very good". This success was supported by the results of teacher observations carrying out the learning syntax, getting 89.5 with the "very good" criteria and the results of woven products with various motifs according to students' interests, getting a result of 95.5 with the "very good" category.

Research on differentiated learning has often been used to assess various student competencies. Differentiated learning can provide sufficient space for initiative, creativity and independence in accordance with students' talents, interests and physical and psychological development (Marlina et al., 2019). Through differentiated learning, all students' learning needs can be accommodated according to their interests or learning profile. Differentiated learning helps teachers to recognize and design appropriate learning by paying attention to the differentiation of content, processes and products. Content differentiation carried out by teachers aims to modify the curriculum and learning materials according to students' learning styles and learning profiles. Process differentiation by paying attention to readiness and learning styles, helps students process ideas, information and interact with material in science learning. The product differentiation provided by the teacher is able to help students demonstrate what they have learned. Students have the opportunity to demonstrate understanding according to their preferences, for example through posters, writing, songs, poetry or videos. A comfortable learning environment also influences students in the learning process, so that they are able to achieve optimal learning outcomes.

CONCLUSION

This study shows that differentiated learning is widely positioned in the literature as a relevant pedagogical approach to respond to the diversity of students in elementary schools. Through a Systematic Literature Review, the research findings indicate that differentiated learning is often associated with increased teacher teaching effectiveness, student learning engagement, and academic achievement in the context of regular classrooms. The practical implications of these findings emphasize the importance of teachers' professional capacity in designing learning that is adaptive to the different characteristics of students. However, this study also reveals excessive generalization in claims of differentiated learning inclusivity. Most studies still interpret student diversity in general terms, particularly through differences in learning readiness, cognitive abilities, and learning styles. The rights-based

perspective of inclusive education, particularly in relation to disability, educational equity, and systemic inclusion, is still not a major focus in the reviewed literature. Only a few studies explicitly discuss the needs of learners with disabilities, issues of learning accessibility, and structural barriers that affect learning participation in inclusive classrooms.

Thus, although differentiated learning has the potential to support inclusive education, this potential has not been fully realized in existing practices and research. Without stronger engagement with inclusive pedagogical frameworks, Universal Design for Learning, and disability studies, differentiated learning risks functioning primarily as a performance optimization strategy within established educational structures, rather than as a transformative approach to addressing educational injustice and exclusion. Based on these findings, future research should explicitly prioritize inclusive, equitable, and accessible differentiated learning practices for students with disabilities. In addition, further studies are recommended to integrate analysis of education policy, the implementation of inclusive education at the school level, and the systemic impact of differentiated learning on the participation, agency, and learning experiences of students with disabilities. This approach is expected to strengthen the contribution of differentiated learning not only as a pedagogical strategy, but also as part of efforts to realize an inclusive, equitable, and sustainable basic education system.

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