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Differentiated instruction in reading in elementary schools: a systematic review

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ABSTRACT

Increasingly diverse learners in today's classroom might require teachers to implement differentiated instruction (DI) to create an effective learning process. This systematic review provides an overview of how DI was implemented in reading instruction in elementary education. For this purpose, the researchers systematically searched five databases (APA PsycINFO, Education Research Complete, ERIC, Scopus, and Web of Science). Based on the inclusion criteria, 28 empirical studies from 2002 to 2022 were selected for review. To be included in the review, the studies should be empirical, written in English, peer-reviewed, focusing on reading in elementary education, and include students with or without disabilities. The researchers created content coding in Microsoft Excel spreadsheet to extract relevant information from the selected studies. The findings indicated that implementing DI in reading instruction to elementary school students includes differentiation in content, process, and product, increased quality and quantity of explicit reading instruction, assessments informed instructions, and integrating DI with other instructional models. This emphasizes that although differentiation might seem complex, it is possible to implement it in reading instruction.

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1. INTRODUCTION

Every child is a unique individual that needs a responsive learning environment. Regardless of being the same age and grade level, students may present their teachers with a variety of cognitive capacities, prior knowledge, interests, and talents [1], [2]. Although whole-class instruction plays an essential role in classroom practices, teachers should be aware that students enter elementary and middle grades at very different levels; thus, differentiation is crucial to meet their learning needs [3]. Particularly in this post-pandemic period, students may perform academically differently due to their diverse online learning experiences. There might be students who perform below average, perform above average, and fall somewhere in the middle [4]. This calls for teachers to provide instructional practices that meet students' characteristics [5].

Differentiation might have long been recognized as a teaching approach. Since 2004, differentiated instruction has gained more and more attention when the individuals with disabilities education act (IDEA) was authorized and response to intervention (RTI) was introduced [6]. Yet, although differentiated instruction (DI) was initially developed to respond to the gifted students' learning needs, it has developed into a set of strategies to facilitate learning for all students [4].

Differentiated instruction can be considered teachers' thoughtful decisions to teach diverse learners. Deunk *et al.* [7] introduced the term differentiated instruction and defined it as "an organized yet flexible way of proactively adjusting teaching and learning to meet kids where they are and help them achieve maximum growth as learners." Teachers use various teaching strategies to match learning content, process, and product to the level of students' preparedness, interest, and talent [2]. Instead of being described as a single teaching strategy, differentiated instruction is a varied set of teaching strategies and initiatives that give students various learning and meaning-construction opportunities [8]. It can be a way of thinking (lens) teachers should have when planning, implementing, and reflecting on their classroom teaching and learning to provide inclusive education for all learners.

The 21st-century learning challenges teachers to provide inclusion and equity in the educational system. The primary message of inclusion and equity in educational policy, "every learner matters and matters equally", demanded adjustments at all levels of education, from teachers to those in charge of national policy [9]. Differentiated instruction can be one of the approaches that helps drive teaching and learning based on the mindsets of students as individuals and teaching as a responsive practice. With increasingly diverse learners in today's classroom, the "one-size-fits-all" instructional practice neglects essential insights about how learners learn best within their zone of proximal development [1]. Despite the importance of DI in the classrooms, many researchers investigating teachers' perceptions in differentiating their instruction found that DI was considered complex, challenging, and stressful practices [5], [10], [11]. Regardless of the teachers' familiarity with the DI approach, they might struggle and have little freedom to implement it in their classrooms. Therefore, conducting a systematic review of the implementation of DI in reading instruction to elementary school students might help teachers identify ways to differentiate their reading instruction to meet the learners' needs.

Differentiation is grounded in the constructivist theory of learning, which views that learners learn through interaction and their ability to make meaning by connecting what is learned with what they know and experience. Vygotsky and Cole [12] asserted that students construct knowledge by mediating and internalizing inputs from meaningful interactions with people or objects around them if the inputs are within their zone of proximal development, a gap between their actual and potential development. Differentiation resulted from teachers' proactive and purposeful plan to maximize learning by providing instructional support by considering each student's zone of proximal development [13]. When differentiating, the teachers seem to orchestrate their knowledge of their students and their capacity to adapt the instructional materials, activities, and products to facilitate learning. Smale-Jacobse *et al.* [14] asserted that although the learning objectives may be the same, teachers tailor learning trajectories to meet each student's needs.

Researchers have conducted research reviews to examine the effectiveness of differentiated instruction on students' learning outcomes in general education classrooms [7], [9], [14]. Several literatures provided evidence on the implementation, barriers, and conceptualization of DI as a pedagogical approach in various content areas [15]–[17]. Ziernwald *et al.* [18] for example, examined the use of DI to support high-achieving students. Their findings showed the effects of DI on high-achieving students' academic achievement and motivation. However, the researchers put forward that although perceived as effective practice to motivate high achievers, DI was not used regularly. Although numerous studies have reviewed DI, there have been few reviews of DI's implementation in reading and literacy. A recent meta-analysis has been conducted by Puzio *et al.* [8] to investigate the effects of DI on general classroom students in elementary education. They found that it was evident that DI could improve students' literacy, particularly for letter-word and writing outcomes. Differentiated instruction in reading instruction can be critical because elementary school students' reading skills might vary. Baron *et al.* [19] classified elementary students into four reader profiles (poor decoder, poor comprehended, mixed deficit, and typical reader) using a progress monitoring tool. Through the DI approach in reading instruction, teachers could actively identify and address students' learning needs by providing effective instruction.

The objective of this systematic review was to investigate the implementation of DI in reading instruction for elementary school students. The research explored the research question: How is DI conducted in reading instruction in elementary education? This review differed from the previous systematic review and meta-analysis of DI because it overviewed the use of DI in reading instruction to elementary school students. In contrast, the previous reviews examined the effectiveness of DI in literacy teaching in elementary classrooms and its role in supporting high-achieving students [8], [18]. Puzio *et al.* [8] reported that one of the limitations of their meta-analysis was their inability to elaborate on literacy differentiation and decision-making used to differentiate because the selected studies were restricted to studies using experimental designs. In addition, Ziernwald *et al.* [18] did a systematic review to investigate how DI benefited high achievers in reading and other subjects (math and science).

2. RESEARCH METHOD

This systematic review gathered, summarized, and synthesized empirical research published from 2002 to 2022 to explore the implementation of DI in reading instruction for elementary school students. The time frame was chosen because we consider research conducted within the past 20 years to be current. Moreover, 2002 was not long after International Reading Association [20] claimed that differentiation in literacy instruction upholds students' right to excellent instruction. We first searched studies in five databases (APA PsycINFO, Education Research Complete, ERIC, Scopus, and Web of Science). The search terms were differentiated instruction, differentiation, individualized instruction, targeted instruction, reading, elementary school, elementary education, and K-6 grades. For the inclusion criteria, we chose studies that focused on reading instruction in elementary school, were written in English, had undergone peer review, were empirical, and included students with and without disabilities. Numerous DI studies were excluded from the review because they were conducted in middle or high schools, lacked peer review, were comparative, were integrated with other subjects, and involved English language learners.

The title and abstract were read in the initial screening to check if the studies met the inclusion and exclusion criteria. The research conducted full-text reviews of studies that passed the initial screening because some exclusion and inclusion criteria were not all mentioned in the abstracts. The studies which met the inclusion criteria were then thoroughly read and coded. After that, we created Excel spreadsheets and coded the studies based on the characteristics such as year, participants, method, country, school information, DI implementation, and result.

3. RESULTS

Using the search strategies, we screened the titles and abstracts of 1,053 articles from APA PsycINFO, Education Research Complete, ERIC, Scopus, and Web of Science databases. The initial screening resulted in 42 studies. We checked some references from previous reviews and found two additional studies; thus, we conducted full-text reviews of 44 studies. After conducting a full-text review, we eliminated 16 studies identified to have one and more exclusion criteria. There were 28 studies which met the inclusion criteria were then read and coded.

3.1. Description of included studies

The researchers provided the characteristics of the studies based on the location, research method, participants' grades, and the number of participants in Table 1. First, it appeared that most studies of DI (N=20) took place in the United States. Four studies were conducted in German, two were performed in Canada, and the other two were in Mexico and France. From the initial search, we found some studies of DI from other countries (i.e., China, Turkey, and Jordan). Yet, we excluded them because they involved English learners, which was one of the exclusion criteria.

Second, all selected studies were conducted in elementary school settings, and the locations fell into three groups: urban, rural, and suburban. Approximately seven studies took place in urban elementary schools [21]–[27], two studies were in rural [28], [29], and one study included these three areas [30]. Other researchers administered their studies in elementary schools identified as Title I school, high-poverty school, program improvement school (schools that failed to meet the standardized test for two consecutive years), state school for the deaf, and a school with multitiered service. Most students involved in the studies were in general education classrooms. The students came from various socioeconomic backgrounds and were categorized as at-risk students with and without disabilities.

Third, most studies (N=24) used a quantitative approach to determine the effectiveness of the DI approach on students' reading growth. The rest of the researchers employed qualitative methods in their studies [21], [29] and mixed methods [22]. The studies included the implementation of schoolwide enrichment model-reading (N=6), assessment-based differentiated instruction (i.e., learning progress assessment and child characteristic x instruction) (N=4), computer-assisted differentiation (N=3), and individualized reading instruction (N=6). Other studies (N=9) examined the effect of DI integrated with other instructional models or strategies such as DI shared reading program, enhanced core reading instruction (ECRI), differentiated repeated readings, universal instruction, guided reading, targeted reading intervention, and reading workshops.

Finally, most studies involved students and teachers, yet the researchers of five studies excluded teachers as their participants [24], [26], [31]–[33]. The student's grades ranged from kindergarten to sixth grade. The maximum number of participants reached 1346 students and 264 teachers, while the least was five students and one teacher [26], [34].

Table 1. Characteristics of included studies

| No | Study | Country | Method | Participants' grade | Number of participants | |
|----|---|---------|-------------------------------------|---------------------|------------------------|---------|
| | | | | | Student | Teacher |
| 1 | Silva-Maceda and Camarillo-Salazar (2020) | Mexico | Experimental study | First | 27 | 0 |
| 2 | Reis <i>et al.</i> (2011) | US | Experimental study | Second-fifth | 1192 | 63 |
| 3 | Forster <i>et al.</i> (2018) | German | Experimental study | Third | 619 | 28 |
| 4 | Forster and Souvignier (2014) | German | Quasi experimental study | Fourth | 900 | 41 |
| 5 | Peters <i>et al.</i> (2022) | German | Quasi experimental study | Second | 619 | 33 |
| 6 | Jefferson <i>et al.</i> (2017) | US | Quasi experimental study | Third | 83 | 6 |
| 7 | Shaunessy-Dedrick (2015) | US | Cluster randomized controlled trial | Third | 786 | 33 |
| 8 | Reis <i>et al.</i> (2008) | US | Experimental study | Third-fifth | 558 | 31 |
| 9 | Reis <i>et al.</i> (2007) | US | Experimental study | Third-sixth | 226 | 14 |
| 10 | Connor <i>et al.</i> (2011) | US | Randomized control group | Third | 448 | 33 |
| 11 | Partanen <i>et al.</i> (2018) | Canada | Effectiveness study design | Third | 97 | 0 |
| 12 | Fehr <i>et al.</i> (2011) | US | Experimental study | Second-fifth | 43 | 0 |
| 13 | Connor <i>et al.</i> (2009) | US | Cluster randomized controlled trial | First | 461 | 47 |
| 14 | Schirmer and Schaffer (2010) | US | Experimental study | First-fifth | 19 | 1 |
| 15 | Varghese <i>et al.</i> (2021) | US | Randomized control trial | K-1 | 298 | 66 |
| 16 | Connor <i>et al.</i> (2014) | US | Randomized control study | First | 315 | 27 |
| 17 | Reis and Boeve (2009) | US | Mixes-methods | Third-fifth | 500 | 0 |
| 18 | Gilson <i>et al.</i> (2014) | US | Quantitative study | Third-fifth | 9 | 3 |
| 19 | Debe <i>et al.</i> (2013) | Canada | Quantitative study | Third-fourth | 76 | 2 |
| 20 | Regan <i>et al.</i> (2014) | US | Multiple-probe design | Fourth-sixth | 5 | 0 |
| 21 | Ecalte <i>et al.</i> (2022) | France | Experimental study | First | 1197 | 60 |
| 22 | Al Otaiba <i>et al.</i> (2014) | US | Randomized control experiment | Third | 522 | 34 |
| 23 | Connor <i>et al.</i> (2014) | US | Randomized control study | First | 315 | 27 |
| 24 | Mathes <i>et al.</i> (2005) | US | Quantitative study | First | 399 | 30 |
| 25 | Kim <i>et al.</i> (2010) | US | Quantitative study | Fourth-sixth | 294 | 20 |
| 26 | Ankrum <i>et al.</i> (2014) | US | Single-case study | Kindergarten | 23 | 1 |
| 27 | Peters <i>et al.</i> (2021) | German | Quasi experimental study | Second-fourth | 1346 | 264 |
| 28 | Young (2019) | US | Quasi experimental study | Second | 79 | 2 |

3.2. The implementation of DI in reading instruction

The selected studies might fall into some categories regarding the use of differentiation in the classroom. Like the previous reviews of DI in the classrooms, the categories include differentiation as part of classroom instructional practices, organizational aspects, and a part of a broader program [7], [14]. In this systematic review, implementing DI in reading instruction for elementary school students can be classified into some themes. They are i) differentiating reading instruction covering the content, process, and product differentiation; ii) increasing the quality and quantity of explicit reading instruction; iii) assessments to inform instruction; and iv) DI integrated with other models/school programs.

3.2.1. Content, process, and product differentiation

Some studies appeared to provide differentiation in content, process, and product in reading instruction. First, content differentiation was reflected in the teachers' efforts to provide students with code-focused and meaning-focused instruction based on the student's need [33], [35]. Förster *et al.* [35] differentiated the content by deciding whether to provide code-focused or meaning-focused instruction using repeated reading and reciprocal teaching based on the "Reading Sportsman" framework. Second, process differentiation was depicted as teachers adapt specific instructional time for reading (SITR) based on student characteristics [36], assigning students to routine comprehension activities developed based on student's interests and targeted reading levels [28], conducting guided reading and targeted reading instruction (TRI) to the students [37], [38], and engaging students with computer-assisted instruction for the independent practice of reading skills such as vocabulary and decoding skills [24], [31]. Finally, product differentiation can be seen from the use of differentiated graphic organizers for students' reading comprehension [28] and choices of projects such as student-written reports or student-led research based on their readiness and interest [39].

3.2.2. Increasing the quality and quantity of reading instruction

Some studies focused on increasing the quality and quantity of reading instruction. To begin with, Young [40] examined the impact of increased frequency and planning on guided reading. The teachers in this study spent most of the language arts block (90 minutes) in guided reading which was more than the regular guided reading time. Partanen *et al.* [32] investigated the impact of individualized and intensive reading

intervention for third graders. After assessing students' reading needs, the intensive program was given for three months. Of five hours of instructional time, 3.75 hours were allocated for literacy instruction, with a minimum of 40 minutes of one-to-one instruction with the teacher and educational assistant.

Connor *et al.* [41] investigated the quality of instruction and classroom learning environment (CLE) during literacy block, while Ankrum *et al.* [21] examined teachers' scaffolding in small-group instruction. Connor *et al.* [41] found that synergizing a good classroom learning environment with more whole-class and small-group comprehension instruction using questioning and graphic organizers could support students' vocabulary and reading comprehension. The CLE conducted by the teachers included giving feedback, providing explicit instruction, allocating adequate time to vocabulary instruction, and being supportive and responsive to students' needs. Finally, some researchers used the A2i software, which helped teachers interpret students' data and offered recommended proportions of teacher-child-managed code-focused and child-managed meaning-focused instruction [42], [43].

3.2.3. Assessment to inform instruction

Some studies focused on the students' assessments to develop effective reading instruction. Some researchers studied the effects of using learning progress assessment (LPA) and reading sportsman on students' reading fluency and comprehension [34], [35], [44], [45]. In one study, students took an online reading test once every three weeks, lasting for 10 minutes. The assessments provided data on students' reading accuracy, comprehension, and speed which the teachers used to decide students' groups, learning activities, and difficulty level of learning material. Other researchers described using follow-up questions to facilitate higher-level thinking based on students' readiness levels during individual reading conferences [22].

3.2.4. Differentiation integrated with other models/school programs

Several studies show the integration of differentiated instruction with other models and school programs. In a study by Jefferson *et al.* [28], teachers provided students with core curriculum instruction, evidence-based reading comprehension instruction, and differentiated repeated readings. Five experimental studies explored differentiation in school enrichment model-reading (SEM-R). SEM-R consisted of three phases, and differentiation was embedded in all phases to provide enrichment that facilitated learning experiences through choices of texts, individual conferences, small groups, and learning centers [22], [25]–[27], [46]. Finally, Al Otaiba *et al.* [47] examined the impact of giving dynamic response to intervention (RTI) models, while Mathes *et al.* [23] investigated the impact of proactive and responsive reading for students at risk for reading difficulties.

4. DISCUSSION

This systematic review sought to summarize how DI is implemented in reading instruction in elementary classrooms. There were 28 studies selected based on the inclusion criteria. The research found that the DI implementation was depicted in the content, process, and product differentiation, increased quality and quantity of explicit reading instruction, assessment to inform instruction, and integration with other models/school programs. Implementing DI in the classrooms can be crucial because children generate knowledge by making sense of the inputs as long as they are in their zone of proximal development [12]. Aligning with the concept of DI as teachers' ongoing efforts to provide optimal learning opportunities for every student, the teachers in the studies appeared to evaluate students' progress and adapt the curriculum, teaching practice, learning process, and product based on their learning needs [48].

Previous reviews have shown the effectiveness of DI on students' learning achievement, either with or without discipline-specific. While some reviews did not specifically address the implementation of DI in a particular discipline [17], [18], others examined the effectiveness of DI on literacy, language, and math performance [7], [8]. However, understanding the effects of DI might not be enough. Teachers might be aware of the impacts and benefits of differentiating instructions in the classroom, yet they continue to perceive that DI is a complex, challenging, and stressful practice [5], [10], [11]. Thus, more reviews should be conducted to study how DI can be implemented in a particular subject.

This current review potentially offers insights into ways to incorporate DI in elementary classrooms, aiming to support young students in developing their reading skills. Despite the importance of reading instruction in elementary education which can support children's journey in learning to read and reading to learn, elementary school teachers might face some challenges in teaching reading due to the children's varied exposure to reading-related activities in their early childhood. This emphasizes the importance of knowing how to differentiate to meet the learners' various reading level, interest, and barriers.

The selected studies show that adapting learning content, process, and product might help teachers address students' reading levels and interests. Some examples of content and product differentiation from the studies were by providing diverse books, giving code-focused and meaning-focused instruction based on the

students' reading assessments, and allowing students to choose projects in reading instruction [28], [33], [35], [39]. On the other hand, process differentiation can be given by allocating specific instructional time and providing guided reading and individualized instruction in classrooms [36]–[38]. Some researchers recommended increasing the quality and quantity of explicit instruction, such as lengthening and improving the frequency of guided reading and individualized instruction for students [32], [40]. To differentiate does not necessarily mean giving different tasks or materials to every student. Defined by Tomlinson as an organized and flexible way of proactive adjustment of instruction to meet the learners [2], teachers who implement this approach should be able to orchestrate their knowledge of their students and their pedagogical and content knowledge to make instructional decisions. In terms of students' reading ability, for example, teachers could provide grade level instruction for students who read at grade reading level and also recognize students who read above and below grade level and adjust their instructions. Thus, it can be an approach that might prevent teachers from implementing a one size fits all approach in the classrooms.

Across the previous studies, assessments such as learning progress assessment, diagnostic tests, running records, grade-appropriate subtests, oral reading fluency, reading comprehension subtests, and other online reading tests were used to obtain students' data [34], [35], [44], [45]. These assessments were given not only to students at risk for reading disabilities but to all students, including those talented students. Indeed, differentiation might occur when student assessment and instructional adaptation are interconnected. Reading instruction in elementary schools, particularly in lower-grade classrooms, might require teachers to make decisions to accommodate the needs of the students who are reading above, below, and at their current grade level.

In addition, some studies integrated DI with other models and school programs such as SEM-R, response to intervention (RTI) models, and proactive and responsive reading [22], [23], [25]–[27], [30], [47]. Integrating DI with school programs might imply that differentiation cannot be done solely by the teachers. Its implementation requires collaboration with other school staff to ensure the sustainability of this approach. According to Lindner and Schwab [17], incorporating DI into a comprehensive educational program can be beneficial as it enables the implementation of DI by facilitating changes in various aspects, including staff development, resource allocation, and adaptation of the school's mission statement.

Overall, the findings of this review extend the discussion to the important points made by the previous review that DI is not a single teaching strategy [8], and grouping alone is insufficient for differentiation unless it is supplemented with differentiated teaching practices [7]. These practices might include adaptation, grouping, individualizing, and increasing direct instruction in reading instruction. Teachers might start small by including this approach in their instructional decision-making and selecting the types of differentiation they could provide. In addition, the previous review by Puzio *et al.* [8] mentioned that there was no single experimental or quasi-experimental study of DI on guided reading and a study on DI related to vocabulary. In our review, we include two studies of DI related to guided reading and three studies on vocabulary.

5. CONCLUSION

In conclusion, this systematic review might shed light on the implementation of DI approach in elementary classrooms, specifically on reading instruction. The findings highlight various aspects of DI, including content, process, and product differentiation, explicit instruction, assessment for instructional purposes, and integration with other models of school programs. Implementing DI in classrooms can be crucial to address the diverse needs of students and optimizing their learning opportunities. This review might provide valuable insights for incorporating DI into reading instruction in elementary classrooms and supporting young students in developing their reading skills. This systematic review had some limitations and recommendations for research and practice. Regarding its drawback, this review did not consider the impact of DI on reading achievement, although most of the included studies investigated the effect of differentiation. We did not include studies that involved English language learners; thus, the research review might not align with second/foreign language learning.

Since the research review was conducted without additional assistance from other persons, the results might not be thorough. Since there was an alarming lack of qualitative studies on the DI in reading instruction, it is recommended that more and more qualitative studies are conducted to investigate the use of DI in reading instruction. It is essential to understand the effectiveness of DI in reading. Still, a thick description of its implementation could help cast misconceptions about DI as a complex practice regardless of its benefits. Ongoing professional development on DI is also recommended because teachers' knowledge of their students as readers and the ways to differentiate reading instruction might help facilitate responsive learning to every student. Finally, teachers, reading specialists, principals, and school districts should collaborate to provide differentiated instruction to help every reader in elementary classrooms.





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