

The Differences in Differentiated Instruction for Students with an Auditory and/or Communicative Impairment in Special and Regular Education: a Systematic Review and Expert Appraisal

Summary

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Introduction

Differentiated instruction (DI) is crucial for successful education (Parsons et al., 2017), as it involves using diverse teaching methods to tailor material, techniques, and goals based on the unique learning needs of a diverse group of students (Tomlinson, 1995). In regular education, this approach has been thoroughly studied (Keuning et al., 2017; Keuning & Van Geel, 2021; Meutstege et al., 2023; Vreman, 2019; Vrielink, 2018). (Keuning et al., 2017; Keuning & Van Geel, 2021; Meutstege et al., 2023; Vreman, 2019; Vrielink, 2018). However, there is a gap in literature about DI in special education (Bowen & Probst, 2023). In this study an investigation was done about how differentiated instruction (DI) is used in Dutch special education, concentrating on students who have communicative and/or auditory impairments (Cluster 2).

The field of special education places a strong emphasis on interprofessional collaboration among teachers, assistants, speech therapists, and others, such as ambulant workers, in order to address students' diverse needs (Bowen & Probst, 2023; De Waal, 2018). However, internal audits have indicated that there is a lack of clarity and suboptimal collaboration in differentiation efforts among professionals. The aim of this study is to ascertain the extent to which principles derived from research in primary education are applied in theory and practice in special primary education for students with an auditory and/or communicative impairment. This will enhance the knowledge base and improve DI practices through a systematic review and expert appraisal.

DI caters to diverse learning styles and disabilities, fostering creativity, deeper understanding, and higher-order thinking (De Jesus, 2012). DI improves reading achievement (Koeze, 2007) and boosts student motivation, enjoyment, autonomy, collaboration, and engagement in learning (Melek & Mede, 2022). Special education involves interdisciplinary teams of teachers, speech therapists, and other specialists to support students with disabilities (Guardino & Cannon, 2022; Bowen & Probst, 2023). Internal audits reveal teacher uncertainty and suboptimal collaboration in DI (Inspectie van het Onderwijs, 2023).

DI is a process encompassing four stages: planning, organizing, executing, and assessing lessons (Van Geel et al., 2018). Additionally, teachers are responsible for managing three key components: content, process, and product (Tomlinson, 2001). In a study by Keuning and Van Geel (2021), five principles of DI were identified: clear goals, continuous monitoring, provide challenges to each student, aligning instruction and processing methods, and stimulating self-regulation. Literature indicates significant differences between regular

and special education in terms of student learning needs and teaching approaches. For instance, regular education often involves a single teacher, whereas special education typically employs an interprofessional team. This raises the critical question:

“What are the characteristics of (interprofessional collaboration for) differentiation for students with auditory and/or communicative impairments within special education schools?”

“To what extent are these characteristics for differentiation comparable to those in regular education?”

For the comparison of characteristics of (interprofessional collaboration for) differentiation for students with auditory and/or communicative impairments in special education, the five principles of Keuning & Van Geel (2021) will be used as a framework.

Methods

The study uses a qualitative research design that incorporates expert appraisal and a systematic review. A thorough search of the literature was done using specialized journal databases, Web of Science, PubMed, and Scopus. Snowballing techniques and inquiries within the researchers' network were also used. An example of a search strategy is as follows:

(TITLE-ABS-KEY (("differentiation") OR ("differentiated instruction") OR ("adaptive instruction") OR ("adaptive education") OR ("adaptive teaching") OR ("inclusive education") OR ("inclusive instruction") OR ("inclusive teaching") OR ("responsive teaching")) AND TITLE-ABS-KEY ((deaf) OR (deafness) OR (hard-hearing) OR ("hard hearing") OR ("developmental language disorder") OR ("DLD") OR ("hearing impairment") OR ("multiple communicative disabilities") OR ("MCD")) AND TITLE-ABS-KEY ((teacher) OR ("teaching assistant") OR ("teacher's aide") OR (ta) OR ("education assistant") OR (ea) OR ("team teacher") OR (tt) OR ("speech therapist") OR ("academic coach") OR ("educationalist") OR ("education generalist") OR ("internal support coordinator") OR ("support coordinator") OR (interprofessional))) AND PUBYEAR > 2013

Publications about interprofessional collaboration and differentiation for students with auditory and/or communicative impairments in special and general education were the focus of the search. The literature was screened based on inclusion criteria, and relevant articles were categorized and documented using Zotero. The following (preliminary) inclusion criteria were formulated for the inclusion of publications in the overview study:

- Written in Dutch or English.
- Focused on education or support within the education of students with hearing impairments and/or DLD and/or MCD.
- Emphasis on supporting the (general) cognitive development of students.
- Targeted at supporting the development of students within the educational context (special education or mainstream education).
- Focused on students in primary school and secondary school (ages 4-18 years).
- Published from 2014 to 2023 (because the Dutch Law on Inclusive Education was introduced in 2014).

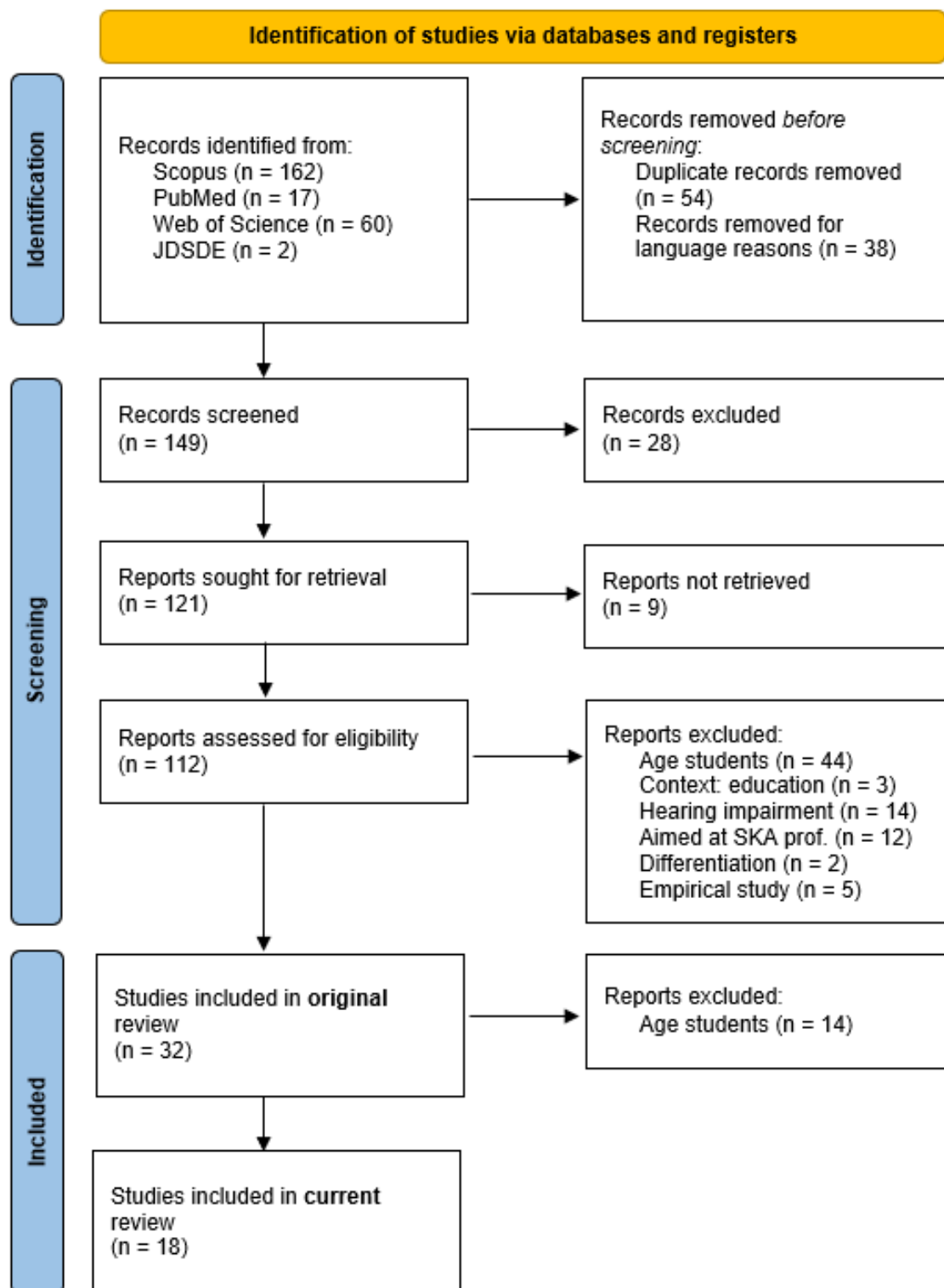
Finally, the articles that met the inclusion criteria were subjected to a series of checks, with each criterion being meticulously examined. Those that did not meet the requisite criteria were excluded.

1. Aimed at students in primary school and/or secondary school (ages 4-18 years).
2. Geared towards supporting the development of students within an educational setting (special education or mainstream education).
3. Tailored to education or support within the educational realm for students with auditory impairments and/or DLD and/or MCD.
4. The paper should focus on the skills, knowledge, or attitudes of a professional.
5. Concentration on aiding the (overall) cognitive growth of students.
6. The article should be an empirical study.

For a comprehensive overview of the methodology employed in screening and including the literature identified, please refer to the PRISMA in Figure 1.

Figure 1

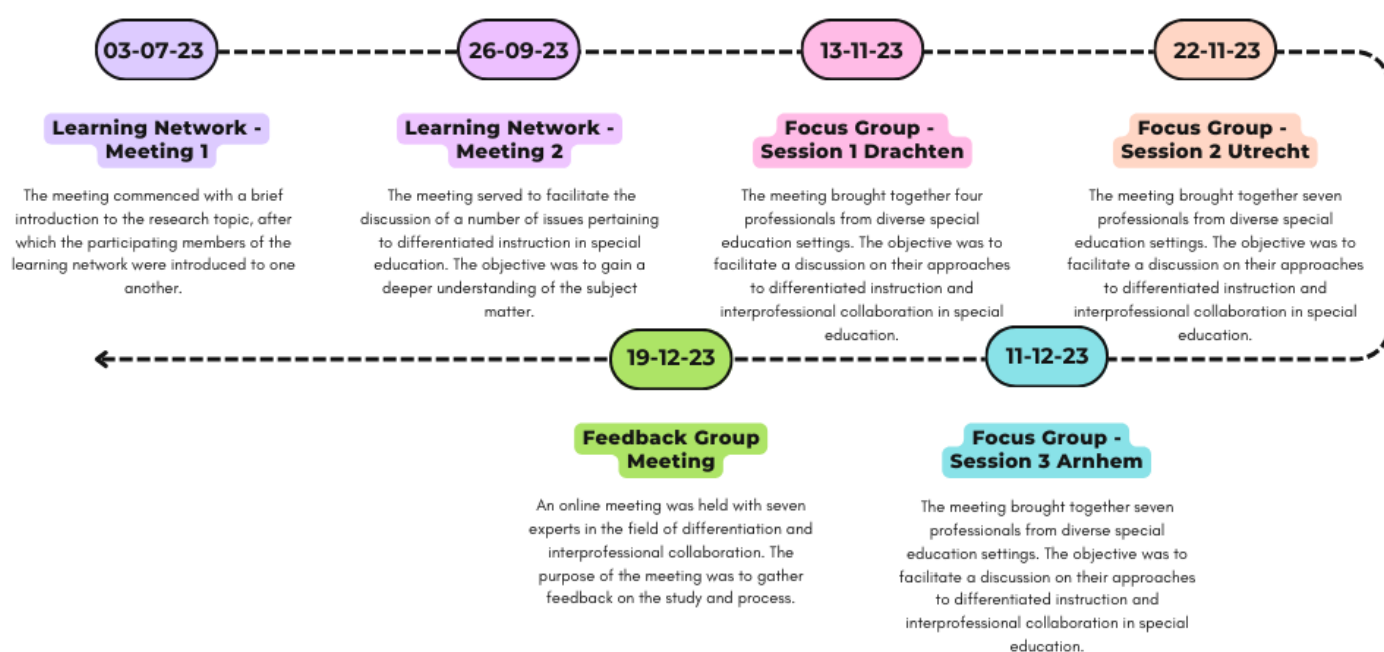
Prisma Flowchart (Page et al., 2021)



The expert appraisal involved three groups: a learning network, focus groups, and a feedback group. The learning network consisted of teachers and special education professionals. Focus groups were divided into three smaller groups because of logistic reasons and included professionals from various fields. The feedback group consisted of seven subject matter experts who provided additional validation and perspectives. A synopsis of the meetings and sessions held with the learning network, the focus groups, and the feedback group can be found in Figure 2, which presents the events in a chronological order.

Figure 2

Timeline of the different meetings and sessions with the different participating groups.



The search terms were entered into Atlas, and articles were coded based on predefined categories from the five principles. Codings were analyzed systematically, and inter-rater reliability was ensured through iterative discussion and coding adjustments. The coded texts were exported to Excel, and subthemes were identified. The feedback group verified initial findings, and recorded sessions were transcribed and analyzed using the same principles.

Results

The procedure of inclusion and exclusion has resulted in the inclusion of 18 studies in this literature review. Table 1 provides an overview of all the included studies and their characteristics.

Table 1

Overview of the included studies.

Authors	Geographical setting	Participants	Type of disability	School context**
Akmeşe & Kayhan (2023)	Turkey	Teachers (in education) (n = 16)	DHH	R
Alasim (2020)	Saudi Arabia	Teachers (n = 120)	DHH	R + S
Borges & Nogueira (2019)	Brazil	Sign language interpreters (n = 2) *	DHH	R
Catalano et al. (2022)	USA	Teachers (n = 3), students (n = 19)	DHH	S
Chan et al. (2022)	Mauritius	Teachers (n = 2), students (n = 14), parents (n = 14)	DHH	S
Donne & Briley (2015)	USA	Speech therapists (n = 3), students (n = 7)	DHH	S
González-Reyes et al. (2021)	Chile	Students (n = 5)	DHH	R
Gupta (2022)	USA	Diagnosticians (n = 93)	DHH	S
Khairuddin & Miles (2019)	Malaysia	Teachers (n = 10), teaching assistants (n = 3), school leaders	DHH	R

		(n = 5), parents (n = 7)		
Lederberg et al. (2022)	Canada	Teachers (n=8), students (n=32)	DHH	R
Musenyente et al. (2022)	Uganda	Teachers (n = 4), principals (n = 2)	DHH	R + S
Nikolarazi et al. (2021)	Greece	Teachers (n = 5), researchers (n = 2), students (n = 34) *	DHH	R + S
Oppong et al. (2023)	Ghana	Teachers (n = 15), clinicians (n = 9)	DHH	S
Phiri (2021)	Malawi	Teachers (n = 7)	DHH	R + S
Ralli et al. (2022)	Greece	Teachers (n = 122)	DLD	R
Tarjiah (2017)	Indonesia	Academics, teachers, and bureaucracy (numbers not specified)	DHH	R
Tuli et al. (2018)	India	Teachers (n = 71)	DHH	R
Wong et al. (2022)	Hong Kong	Teacher (n = 6), students (n = 12), parents (n = 11)	DHH	R

*This constitutes the segment of participants pertinent to this study. The overall participant count in the research was higher.

** R = regular education, S = special education.

The included studies come from diverse geographical regions, including Europe, North America, South America, Asia, and Africa. There are six studies from Western countries like the USA, Canada, and Greece, and twelve studies from non-Western countries such as Saudi Arabia, Brazil, and Mauritius. These studies cover a wide range of educational

settings. Some (e.g., Borges & Nogueira, 2019; Chan et al., 2022; Phiri, 2021; Tarjiah, 2017; Wong et al., 2022) focus on inclusive education where students with disabilities, including those who are DHH, are integrated into general classrooms. Other studies examine self-contained classrooms within regular education (e.g., Alasim, 2020; Catalano et al., 2022; Musenyente et al., 2022), tailored specifically for students with similar disabilities like DHH. Additionally, there are studies (e.g., Donne & Briley, 2015; Gupta, 2022; Nikolarazi et al., 2021; Oppong et al., 2023; Ralli et al., 2022) that explore special educational environments dedicated exclusively to students with auditory and/or communicative impairments, such as schools for the Deaf.

In this results section, a comprehensive analysis will be provided on the prevalence and applications of each principle identified in both literature and practice. The analysis will emphasize the evidence for the principles across the sources reviewed, showcasing findings and examples, and will be based on the five principles for DI from Keuning and Van Geel (2021).

Work goal-oriented

The literature emphasizes the importance of aligning instructional content with students' learning objectives (Catalano et al., 2022; Lederberg et al., 2022), although evidence on the impact of this alignment on student outcomes is limited. The essence of setting goals in practice is more clearer. Collaborative planning for goal setting is an important aspect in both inclusive and special educational settings, involving educators, speech therapists, and other professionals. In special education, a variety of professionals can work together towards different goals. Although each professional has their own focus, there is often cooperation to combine these goals. In mainstream education, it is customary for ambulatory attendants to contribute significantly by providing guidance and working with teachers to set goals.

Monitor

The literature provided lacks in-depth discussion on how teachers can effectively monitor students' understanding and progress throughout various stages, such as preparation, lesson delivery, and evaluation. However, a study conducted by Chan et al. (2022) suggests that teachers may also have the ability to recognize students' emotions. Also the use of co-teaching was demonstrated as an example teachers can utilise to monitor their students (Nikolarazi et al., 2021). Practitioners emphasized that co-teaching and regular evaluations play a key role in monitoring student development, with a focus on overall well-being and understanding among students with disabilities. For example, students with DLD may find it difficult to assess their own understanding, requiring a professional to ask a lot of questions.

The practitioners also highlighted the need of monitoring student well-being as a prerequisite for effective learning.

Challenge All Students

Maintaining high expectations for all students is essential, although challenges in meeting these expectations are noted in literature. Students were allowed to retake classes in some circumstances, especially if they needed more time to get used to the school setting (Musenyente, 2022). Retaking a class was seen by certain educational institutions as a sign of failure, usually connected to a student's "failure to meet expectations" or inability to achieve the standards. Balancing the needs of both strong and weak students remains a challenge according to practitioners, with efforts to ensure that all students are appropriately challenged and supported.

Adapt Instructions and Processing

Adjusting instruction methods, such as language modifications and the use of visual aids, is highlighted as beneficial for students with diverse learning needs in literature (Chan et al., 2022; González-Reyes et al., 2021; Musenyente, 2022; Nikolarazi et al., 2021). Practical application includes flexible instructional groups and personalized instruction, tailored to the specific needs of students with disabilities. Not only is cognitive performance taken into account when creating instructional groups, but also the amount of support and supervision that students require while processing information. Additionally, the teacher assistant and speech therapist schedule pre-teaching sessions to meet the requirements of the weaker students, providing extra assistance prior to the start of normal instruction.

Stimulate Self-Regulation

Promoting student self-regulation is recognized as important, although specific strategies and their effectiveness are less explored. In a study of Wong et al. (2022) it was noted that DHH students showed more initiative by asking questions and participating in conversations. This increase in student participation in the classroom demonstrates the benefits of creating a welcoming environment where students feel encouraged to ask for help and take an active role in their education. Teachers actively foster self-regulation through structured evaluations, choices in learning tasks, and supporting emotional expression among students, according to the practitioners.

Interprofessional Collaboration

According to the literature, effective collaboration among educators, therapists, and support professionals is crucial in addressing the diverse needs of students in special education. Teachers reported that they could work with different specialists to address the

different learning needs of their students (Ralli et al., 2022). In regular education, effective collaboration includes contact with specialists, dynamic partnerships, and guidance from these ambulant specialists (Ralli et al., 2022). Teachers often work with sign language interpreters, but the degree of collaboration varies, with some teachers only verifying responses while leaving further follow-up to interpreters (Borges & Nogueira, 2019). In special education, collaboration focuses on establishing connections with mainstream and other special schools to enhance social and communicative development (Oppong et al., 2023). Teachers use various communication tools to share resources and strategies effectively (Oppong et al., 2023). The distinction between professionals in regular and special education is also highlighted in focus group sessions, particularly regarding access to speech therapists. Special education often has on-site therapists, facilitating better coordination with teachers, whereas in regular education, therapists work externally, requiring scheduled and paid meetings. This disparity affects the integration of speech therapy objectives into lessons.

Discussion

Theoretical and practical studies show that differentiation principles can benefit students with auditory and/or communicative impairments, though implementation varies. Educators face challenges in applying these principles effectively (Dixon et al., 2014). Literature underscores the importance of aligning instruction with Individualized Education Programs (IEPs), yet lacks practical details on outcomes (Poppes et al., 2002). In practice, collaborative efforts and regular evaluation in special education enhance goal-setting effectiveness. Monitoring student progress is crucial and mandated under the Individuals with Disabilities Education Act (IDEA) (Etscheidt, 2006; Wolfe & Harriott, 1998).

Maintaining high expectations for all students, including those with disabilities, is advocated (Fitzpatrick & Knowlton, 2007), with emphasis on balanced expectations and enriched learning opportunities (Lindeman & Magiera, 2014). While literature discusses adapting instruction, practical strategies such as flexible groups and language adjustments are crucial in meeting diverse student needs (Cockcroft et al., 2010). Strategies for fostering student autonomy in special education, such as differentiated groups and tailored choices, are highlighted, contrasting with challenges in teacher communication with deaf students (Cawthon, 2001; Marschark & Knoors, 2012).

Theoretical benefits of interprofessional collaboration in special education are noted, yet practical applications often lack detail, with legal constraints limiting professional involvement (Inspectie van het Onderwijs, 2024). Concerns over the impact of multiple

professionals on student independence and the need for cohesive team efforts are evident (Giangreco et al., 1991). Distinctions in training needs between special and regular education emphasize skills in managing cognitive differences versus foundational adjustments (Musenyente, 2022).

Limitations

The study on differentiation principles in specific educational settings has limitations that impact the interpretation and broader application of its findings. Firstly, the study's narrow search strategy focusing primarily on the term 'differentiation' may have led to an underrepresentation of the broader range of principles and practices relevant to supporting students with auditory and/or communicative impairments in special education. This could result in biased conclusions favoring certain aspects over others, such as the principle of 'adapting instructions' which appeared more frequently due to specific search terms.

Additionally, there is complexity in categorizing findings according to differentiation principles, as many statements may overlap, complicating analysis and potentially leading to varying interpretations. Moreover, the variability introduced by different individuals conducting literature coding could affect the reliability of results, despite efforts to maintain consistency. Personal subjectivity in coding may influence systematic reviews, impacting the study's reliability (Belur et al., 2018).

The study also acknowledges the disparity in research sample sizes, methodologies, and quality, which can skew overall conclusions. Studies with larger and more diverse samples are likely to provide more reliable data than those focusing on smaller or less diverse groups. Furthermore, the scarcity of literature on specific learning needs like Developmental Language Disorder (DLD) and Multiple Communication Disorders (MCD) limits the study's ability to draw robust conclusions about the effectiveness of differentiation principles for these groups.

Lastly, the study highlights a focus primarily on inclusive education within regular classroom settings, with less emphasis on differentiation practices to address diverse needs across all learners. This suggests a gap in research regarding the implementation and necessity of differentiation in both regular and special education contexts.

Conclusion

The study addresses the under-researched area of differentiation practices in special education for students with auditory and/or communicative impairments, contrasting it with established research in regular education. It explores how differentiation principles—such as goal-oriented work, monitoring, instructional adjustments, processing adaptations, and promoting self-regulation—are applied in both special and regular primary education settings. The research emphasizes the importance of interprofessional collaboration involving teachers, speech therapists, teaching assistants, and ambulant workers to effectively implement these strategies.

While highlighting the benefits of inclusive education, the study identifies challenges in interprofessional collaboration and calls for further research to deepen understanding of differentiation practices specific to students with diverse support needs. It underscores the potential for tailored support tools and collaborative training initiatives to enhance educators' confidence and effectiveness in supporting these students, thereby improving educational outcomes in special educational settings.

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* These articles are included in the literature review.