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Education for Sustainable Development and Inclusive Education with particular consideration of learners with special needs: a scoping literature review

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To date, Education for Sustainable Development (ESD) and Inclusive Education have largely been treated as separate pedagogical approaches. Inclusion-oriented ESD, in particular, has not been widely adopted in formal education settings. As this is a relatively new area of research, we started by providing an understanding of inclusion-oriented ESD focusing on learners with special needs. Subsequently, we conducted a scoping literature review to explore how inclusion-oriented ESD is addressed in peer-reviewed journals, focusing on school-related education. Limiting the review to articles in English and German contributed to a predominant focus on European contexts, introducing potential language and database selection biases. We analyzed 20 peer-reviewed articles using quantitative and qualitative content analysis with MAXQDA software. The findings suggest that inclusion-oriented ESD constitutes an emerging yet insufficiently explored area of research. Most contributions examine the normative connection between ESD and Inclusive Education, with an emphasis on shared ethical principles such as empowerment and social justice. However, concrete examples and actionable guidance for implementation are largely absent. While only a limited number of studies specifically address the needs of learners with disabilities, those that do underscore the significance of structured learning environments and the professional competencies of educators. The review concludes that a comprehensive approach to inclusion-oriented ESD—integrating pedagogical frameworks, institutional support structures, and an inclusive school culture—is urgently required.

KEYWORDS

Inclusive Education, Education for Sustainable Development (ESD), diversity, disability, inclusion-oriented ESD, scoping literature review

1 Introduction

Current global challenges, such as the climate crisis, the loss of biodiversity, conflicts, wars, and the rise of populism, significantly impact the security of societies worldwide. Addressing these challenges requires cohesive strategies at global, regional, and local levels. The 17 Sustainable Development Goals (SDGs), adopted by the United Nations in September 2015, provide a framework to tackle these critical development challenges by 2030 ([United Nations, 2015](#)). Achieving these global goals and ensuring environmental compatibility and social justice for current and future generations requires comprehensive, global transformation ([WBGU, 2011](#)). Education plays a crucial role in effecting the paradigm shift required to secure

a sustainable and equitable future (UNESCO, 2017b). The SDGs encompass specific targets to promote inclusive, high-quality, and equitable education, most notably in SDG 4: Quality education—Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all (UNESCO, 2009, 2017a,b).

1.1 Education for Sustainable Development (ESD)

Within the framework of SDG 4, Education for Sustainable Development (ESD) can be understood as the pedagogical approach required to equip learners to address the complex global challenges of the twenty-first century. ESD is expected both to make people more aware and better qualified in shaping future developments responsibly. As a pedagogical response to global challenges, ESD aims to develop competencies that enable individuals to actively engage in sustainable development and societal transformation (Böhme, 2019; Michelsen et al., 2013; Michelsen and Fischer, 2015; Vierbuchen and Rieckmann, 2020). This includes fostering key competencies like system thinking and critical analysis, bridging the gap between knowledge and action (Rieckmann, 2016, 2018; Vare and Scott, 2007). Ultimately, ESD emphasizes transformative learning, encouraging critical engagement with sustainability dilemmas and promoting active participation in shaping a more sustainable future (Rieckmann, 2021; UNESCO, 2019). We acknowledge significant overlap between ESD and concepts such as global learning, global citizenship education, environmental education, peace education, and cultural education.

1.2 Inclusion-oriented ESD

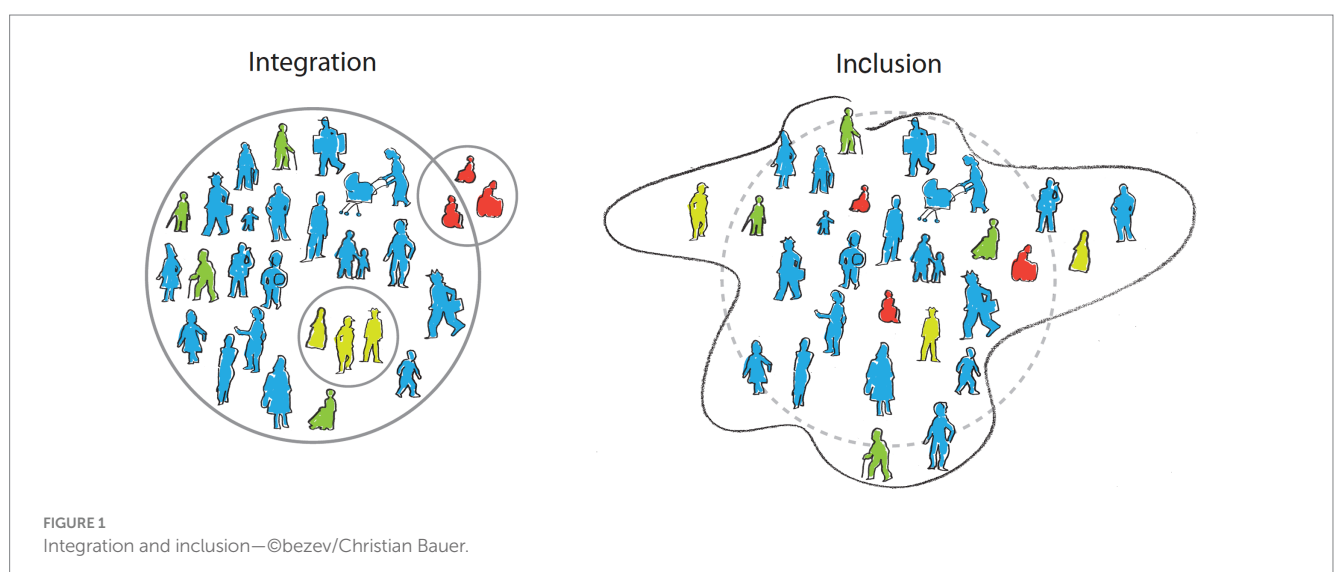
SDG 4: Quality education encompasses both ESD and Inclusive Education. While ESD focuses on equipping learners for global challenges, Inclusive Education aims to ensure that all individuals can participate fully in education and society. Given these inherent links, we utilize the term “inclusion-oriented ESD.” This approach seeks to

promote participation and engagement in a globalized and equitable world (Böhme, 2019). We consider inclusion and Inclusive Education to be essential components of ESD, underscoring the importance of implementing ESD through the consistent integration of inclusive practices.

Inclusion-oriented ESD places a strong emphasis on human rights, social justice, and empowerment, aiming to equip all learners with the competencies required for active participation in society. It highlights the importance of inclusive practices within diverse educational settings that are responsive to the individual needs of each learner (Rončević and Rieckmann, 2024). According to Stavrianos (2016), there is a strong connection between the pedagogy for inclusion and environmental education pedagogy, with environmental educational programs potentially fostering inclusivity. Anderson (2019) further highlights the role of global citizenship education (GCE) in promoting a social model of disability, advocating for the value of inclusion for children and families.

Inclusion can be understood as a process through which society adapts to the diversity of individuals, making diversity a core principle of inclusion (Bezev, 2019). Every person—regardless of age, religion, skin color, gender, sexual orientation, or cultural and social background—has the right to equal access and participation in all areas of social life, including justice, education, healthcare, and voting rights. Figure 1 illustrates the distinction between inclusion and integration. In integration, individuals are expected to conform to societal norms, whereas inclusion requires society to adapt to individual needs: The central message is simple: every learner matters and matters equally (UNESCO, 2024).

Inclusive Education is based on the principle that all individuals—regardless of gender, religion, cultural or social background, cognitive, physical, or psychological needs—have an equal right to access high-quality education. This requires removing existing barriers (Schreiber and Siege, 2016). According to UNESCO (2003), Inclusive Education is a process of aligning and strengthening the competencies of the education system to meet the specific needs of all learners, necessitating fundamental shifts in content, teaching and learning approaches, structures, and strategies. The resolution



adopted by the 77th Annual General Meeting of the German UNESCO Commission ([Deutsche UNESCO-Kommission, 2017](#)) further emphasizes the importance of Inclusive Education in achieving the SDGs.

However, the concept of inclusion-oriented education has also sparked controversy. Empirical research often limits inclusion to teaching children with and without special educational needs together ([Grosche, 2015](#)). This narrow understanding has been criticized for overlooking a broader understanding of inclusion, which seeks to prevent stigmatization by avoiding the categorization of learners based on disabilities ([Ainscow, 2007](#); [Göransson and Nilholm, 2014](#); [Grosche, 2015](#); [Hinz, 2002](#); [Wocken, 2010, 2014](#)). Instead, some argue that a differentiated diagnostic approach can enhance inclusive pedagogical initiatives by providing targeted support ([Lindmeier and Lütje-Klose, 2018](#); [Neumann and Lütje-Klose, 2020](#); [Ricken and Schuck, 2011](#); [Rončević and Rieckmann, 2024](#)). A more comprehensive perspective highlights the importance of adopting an individualized approach that prioritizes process-oriented and support-focused diagnostics in inclusive schools ([Lindmeier and Lütje-Klose, 2018](#)). This perspective emphasizes the need to carefully balance inclusive and special needs education, ensuring that learners with special needs receive appropriate support within the inclusive learning environment ([Rončević and Rieckmann, 2024](#)). Consequently, inclusion-oriented ESD goes beyond standardized pedagogy, prioritizing personalized and context-specific learning strategies.

1.3 Special needs education in the context of ESD

While Inclusive Education broadly addresses the participation of all individuals, the UN Convention on the Rights of Persons with Disabilities (UNCRP) has often led to the concept of “inclusion” being primarily associated with individuals with disabilities in school contexts ([United Nations, 2006](#)). However, the UNCRPD emphasizes inclusion as a universal human right, not limited to people with disabilities. This leads to a critical focus on special needs populations within the larger concept of Inclusive Education.

According to the [World Health Organization \(2011\)](#), children with disabilities represent one of the most marginalized groups in terms of access to education. It is important to note that “not every person with disabilities necessarily has a special education need” ([World Health Organization, 2011](#), p. 209). Learners with special needs form a highly diverse group. [Bezev \(2019\)](#) identifies several subgroups while also drawing attention to the high degree of variation within them, including individuals with different levels of cognitive ability and complexity, those who are deaf or hard of hearing, individuals with vision or visual perceptual challenges, and second-language learners. With the adoption of the UNCRPD ([United Nations, 2006](#)) and the subsequent focus on Inclusive Education rights, schools that were previously not inclusive or only marginally inclusive—now face the complex task of implementation. Integrating Inclusive Education into systems that lack experience, adequately trained teachers, appropriate teaching materials, and inclusive pedagogical and methodological approaches presents significant challenges. These challenges are further compounded by the demands of ESD, which must also be addressed in this context. The justification

for narrowing our focus to special needs populations stems from this significant, yet often overlooked, challenge: ensuring that ESD effectively reaches and empowers one of the most marginalized groups in education.

Very little research currently addresses the implementation of inclusion-oriented ESD in educational settings, particularly concerning learners with special needs. Consequently, this scoping review examines inclusive pedagogical and methodological approaches within the field of ESD and explores how these approaches are represented and discussed in the scientific literature.

Accordingly, this scoping literature review addresses the following research questions:

- Are there any studies available on inclusion-oriented ESD?
- How is inclusion approached in ESD?
- How have learners with disabilities or special needs been integrated into ESD?
- Does the scientific literature address teaching and learning methods for inclusion-oriented ESD?

2 Methods

Combining Inclusive Education and ESD to develop an “inclusion-oriented ESD” approach represents an emerging and innovative area of research. We chose to conduct a scoping review rather than a systematic review because our primary aim was to provide a broad overview of the topic. As [Gutierrez-Bucheli et al. \(2022, p. 652\)](#) note, “scoping reviews tend to be more modest in their claims, in that they tend to establish an initial point for scoping a topic that has not been investigated in-depth (yet).” This approach allowed us to survey the available literature in the field and also serves an exploratory purpose by examining the breadth and depth of available evidence. Its wide scope includes various study types—quantitative, qualitative, and mixed methods—offering a comprehensive perspective. Furthermore, we sought to identify knowledge gaps, highlight key research areas, and assess the extent of existing evidence to inform practice and policy decisions ([Munn et al., 2018](#)). We followed the PRISMA Extension for scoping reviews (PRISMA-ScR) guidelines throughout the process. A review protocol has been developed and is available upon request. This review aimed to map international evidence on inclusion-oriented ESD and identify key gaps in research, policy, and practice ([Aromataris and Munn, 2020](#); [Munn et al., 2018](#)).

2.1 Search strategy and article selection

We collaborated to develop search terms and establish inclusion and exclusion criteria for the review. For the screening process, a single reviewer conducted the initial screening of titles, keywords, and abstracts. This approach was selected to maintain consistency when applying the predefined criteria. Both reviewers then discussed the screening results to generate a representative sample. This collaborative process helped mitigate biases and ensure a comprehensive and representative sample. Content analysis was selected as the appropriate method to address the research questions 2, 3, and 4.

Our exploration of inclusion-oriented ESD was specifically anchored in the German context, influencing our data processing to include both German and English articles for comprehensive coverage. Therefore, we included both German and English articles in the scoping literature review. A direct search for “inclusive ESD” yielded no relevant results, prompting us to broaden our search by incorporating a wider range of ESD-related terms. As ESD encompasses various educational approaches, such as environmental education, we also included these terms alongside “inclusion” and “Inclusive Education.”

To generate a sample, we chose four major databases—ERIC, Web of Science, Fachportal Pädagogik, and peDOCS—based on their comprehensive coverage of education-related topics, including ESD and inclusion-oriented education. While it was not possible to apply the search terms uniformly across all databases due to varying search functionalities and results volume, we adjusted the search terms to balance the results (see Table 1). This decision ensured a manageable number of articles while still capturing the broad scope of relevant literature. The search yielded 576 results in ERIC, 22 in Fachportal Pädagogik, 36 in peDOCS, and 422 in WoS, with some overlap.

Table 1 shows the number of hits per search term, database, and articles selected from each search.

We screened search results based on predefined criteria, considering only peer-reviewed articles that focused on school-related education (excluding higher education and early childhood education). We included all articles published up to June 2025, as the manageable search volume allowed us to forgo publication date restrictions. The primary search was completed in January 2024, followed by a refined search in June 2025 specifically for terms related to disability and special needs.

The titles, keywords, and abstracts of 1,095 articles were screened to identify references to inclusion-oriented ESD. We then conducted a qualitative screening to ensure the articles focused on pedagogical and methodological approaches to inclusion-oriented ESD. We excluded grey literature, dissertations (unless written in German or English), conference proceedings, reports, and book chapters (see Figure 2). This screening yielded a preliminary sample of 44 articles, which still contained some articles despite the initial filter settings. From these, we included 20 in the final sample after excluding articles not focused on formal school education (specifically higher education, outdoor education, and early childhood education). Additionally, articles lacking explicit reference to inclusive practices, such as inclusive teaching/learning methods or addressing accessibility for diverse learners, were also excluded. Figure 2 illustrates the data collection and process across the phases of the scoping review.

2.2 Data analysis

We created a database of the final sample of 20 articles using MAXQDA software, which included all relevant bibliographic data, titles, keywords, and abstracts. To facilitate content analysis, we added variables such as author name(s), author location(s), keywords, journal, and year of publication as coding parameters.

The analysis unfolded in two stages. First, we performed a qualitative content analysis of the 20 articles using Kuckartz’s (2022) inductive category application method. After the initial coding, we categorized the articles according to the three research questions:

TABLE 1 Search terms English and German.

Search string	Hits
ERIC	
(ESD OR “education for sustainable development” OR “sustainability education” OR “education for sustainability”) AND (“inclusion” OR “inclusive education”)	344
“environmental education” AND (“inclusion” OR “inclusive education”)	232
(“education for sustainable development” OR “sustainability education” OR “education for sustainability”) AND (“disability” OR “special needs education”)	40
WoS	
(“education for sustainable development” OR “sustainability education” OR “education for sustainability”) AND (“inclusion” OR “inclusive education”)	143
“environmental education” AND “inclusion”	141
“environmental education” AND “inclusive education”	6
(“education for sustainable development” OR “sustainability education” OR “education for sustainability”) AND (“disability” OR “special needs education”)	131
peDOCS	
(“Bildung für nachhaltige Entwicklung” ODER “BNE”) UND (“Inklusive Bildung” ODER “Inklusion”)	9
(“Bildung fuer nachhaltige Entwicklung” ODER “BNE”) UND (“Behinderung” ODER “Sonderpädagogik”)	27
Fachportal Pädagogik	
(“Bildung für nachhaltige Entwicklung” ODER “BNE”) UND (“Inklusive Bildung” ODER “Inklusion”)	6
(“Bildung für nachhaltige Entwicklung” ODER “BNE”) UND (“Behinderung” ODER “Sonderpädagogik”)	16

(RQ2) How is inclusion approached in ESD? (RQ3) How have learners with disabilities or special needs been integrated into ESD? (RQ4) Does the scientific literature address teaching and learning methods for inclusion-oriented ESD?

To conduct the content analysis, we applied an inductive approach, which led to the emergence of the following codes:

>> (RQ2) How is inclusion approached in ESD?

- Descriptive elements (e.g., normative perspectives)
- Conceptual frameworks and pedagogical approaches

>> (RQ3) How have learners with disabilities or special needs been integrated into ESD?

- Special needs education/inclusive learning environments
- Teacher competencies

>> (RQ4) Does the scientific literature address teaching and learning methods for inclusion-oriented ESD?

- Good practice examples

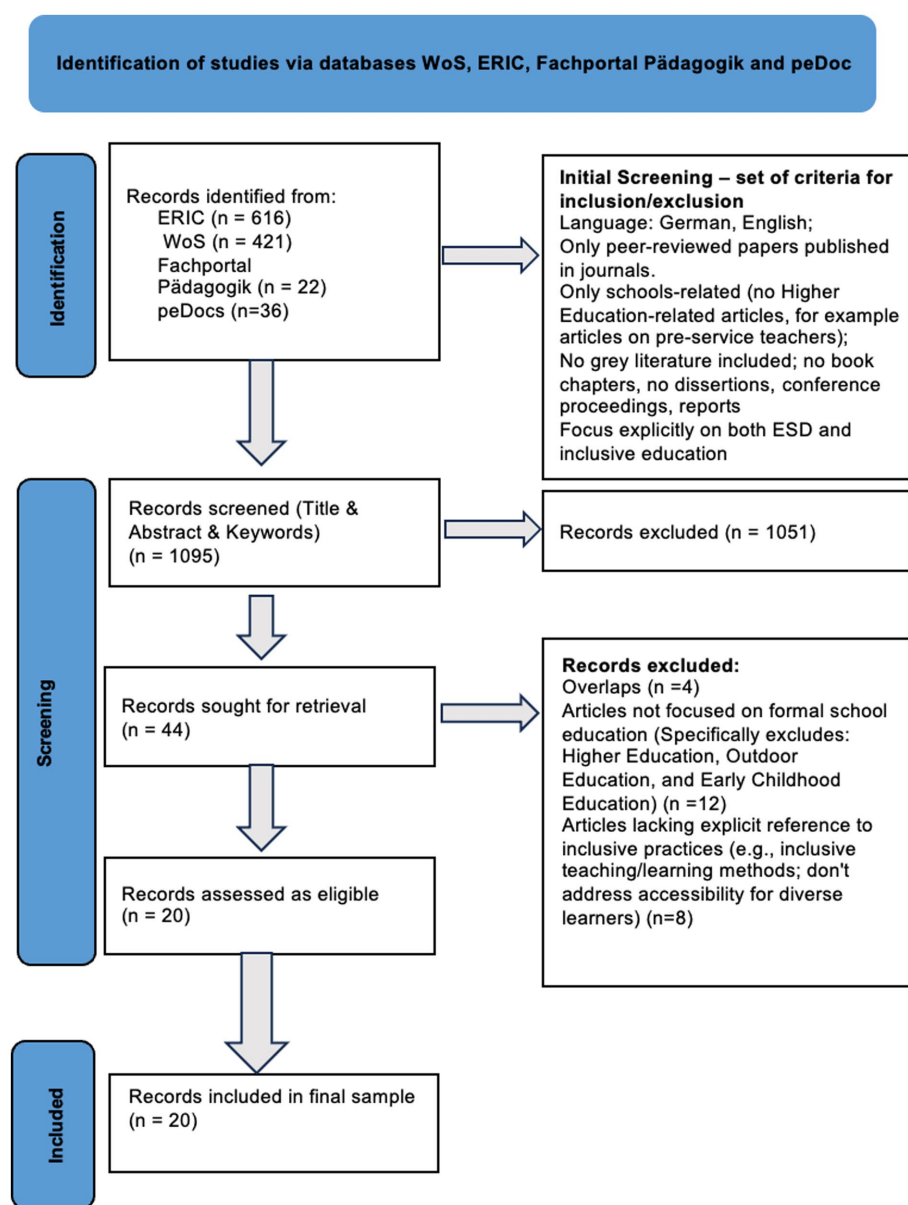


FIGURE 2

Data collection and process throughout the phases of the scoping review were modified according to [Page et al. \(2020\)](#) and [Moher et al. \(2010\)](#), and the PRISMA guidelines.

3 Findings

3.1 Quantitative analysis (bibliometric variables)

The 20 articles were published in 15 journals (see [Table 2](#)). *Behinderung und internationale Entwicklung* (INIE) published four articles, and *Zeitschrift für internationale Bildungsforschung und Entwicklungspädagogik* (ZEP) published two. Both INIE and ZEP had published special issues dedicated to ESD and Inclusive Education, which included these seven articles. Both journals are German publications. Two articles were published in *Sustainability*. The remaining seven journals each published one article related to inclusion-oriented ESD.

An analysis of the journals that published the articles revealed a clear trend. Only four journals had a specific focus on inclusion: *Journal Disability and International Development*, *International Journal of Inclusive Education*, *Journal of Science Education for Students with Disabilities*, and *British Journal of Special Education*. In contrast, four other journals were dedicated to sustainability-related topics. The remaining journals did not explicitly address inclusion or sustainability but instead focused on broader issues in education and pedagogy.

Two journals—*Zeitschrift für internationale Bildungsforschung und Entwicklung* and *Journal Disability and International Development*—stood out due to their special issues on ESD and inclusion. A brief review of other issues of these two journals revealed that they had not published any additional special issues or articles on inclusion-oriented ESD. This finding further supports the observation that ESD

TABLE 2 Number of articles per journal.

Journals	No
Disability and International Development (Behinderung und internationale Entwicklung)	4
International Journal of Inclusive Education	1
SAGE open	1
British Journal of Special Education	1
Education Research Environmental	1
Critical Studies in Education	1
Policy Futures in Education	1
Sustainability	2
International Education Studies	1
Teaching and Teacher Education	1
Journal of science education für students with disability	1
The Electronic Journal of e-Learning (EJEL)	1
The Journal of Environmental education	1
Zeitschrift für internationale Bildungsforschung und Entwicklungspädagogik	2
Brazilian Journal of Education, Technology and Society	1
Total	20

and inclusion are often treated as separate topics. For example, *Zeitschrift für internationale Bildungsforschung und Entwicklung* published an issue in 2016 titled *Inclusive Education: Global Diffusion and Local Translation*, which made no direct reference to ESD. Similarly, the 2020 (1) issue of *the Journal Disability and International Development* dedicated to *Inclusive Education* did not include any articles that mentioned ESD or related concepts.¹ Out of the articles included, one is a review, and the remaining nineteen are conceptual papers.

A total of 38 authors from 11 countries across four continents contributed to the 20 articles, with only one author (Rončević) contributing to two different publications. Eleven authors—one of whom co-authored two articles—were based in Germany and contributed to seven articles. Five authors from Croatia collaborated on a single article. Two authors from the UK contributed to one article each. Five authors from Ukraine contributed also to a single article. Four authors from Canada contributed to two articles. One author from South Africa co-authored an article with a German-based author; this article appeared in the German journal *ZEP*. Three authors from India contributed to two articles, one of which was co-written with a German author; both appeared in the German publication *Journal Disability and International Development*. Additional authors came from Sweden, Ukraine, the UK, and the USA, mostly as co-authors on individual articles. Lastly, one author from Spain published a single-authored article. The predominance of

1 The editorial in this issue of the *Journal Disability and International Development* (2020, 1) focuses on the COVID-19 pandemic and its impact on people with disabilities. In this context, the absence of any mention of sustainability issues in education is particularly striking.

studies from European contexts may be attributed to several factors, including the selection of databases and the language restrictions of this review. As the review was limited to English and German publications, relevant work from other regions may not have been captured. [Figure 3](#) illustrates the authors' locations: 74% (28 authors from seven countries) were based in Europe, while the remaining 26% (10 authors from four countries) were spread across four continents.

Although we did not limit the publication period and considered all articles published before June 2025, the earliest articles in the sample appeared in 2011. Publication activity peaked in 2015, with five articles, and again in 2019, with four. In all other years, no more than three articles were published per year. Notably, no publications from the sample were published in 2017, 2018, or 2021 (see [Figure 4](#)).

3.2 Qualitative analysis

The scoping literature review enabled us to explore the following research questions through qualitative analysis: How is inclusion approached in ESD? How have learners with disabilities or special needs been integrated into ESD? Does the scientific literature address teaching and learning methods for inclusion-oriented ESD?

3.2.1 How is inclusion approached in ESD?

Our qualitative analysis focuses on how inclusion is integrated into ESD, assessing the extent to which the concept is conveyed, whether it is addressed in depth, and the approaches to inclusion presented in the articles.

The analysis revealed that the articles in the sample rarely provide detailed explanations of how ESD can be conceptually linked to Inclusive Education or how ESD can be implemented inclusively (see, for example, [Böhme, 2015](#); [Chekan et al., 2023](#); [O'Donoghue and Rončević, 2020](#); [Vierbuchen and Rieckmann, 2020](#); [Westermeier, 2015](#)). [Vierbuchen and Rieckmann \(2020\)](#) argue that ESD and Inclusive Education share a normative foundation centered on empowerment, human development, and social justice, referencing [Böhme \(2015\)](#). They suggest that this shared normative core justifies a theoretical connection between ESD and inclusion.

[Vierbuchen and Rieckmann \(2020\)](#) examine how ESD and Inclusive Education can complement each other by addressing several key questions: How can these concepts reinforce one another? Do they share a common normative foundation? How can ESD be implemented inclusively in teaching? Additionally, how does Inclusive Education foster high-level sustainability competencies in individuals? They also discuss the competencies educators need to effectively deliver inclusion-oriented ESD. Their findings suggest that ESD and Inclusive Education share a normative core centered on empowerment, with significant potential for mutual enrichment. This is supported by [Chekan et al. \(2023\)](#); this study also emphasizes on the common normative aspect on ESD and Inclusive Education.

The article highlights key considerations for implementing inclusion-oriented ESD, noting that learners with cognitive impairments require a more structured approach compared to ESD's typically open and solution-oriented approach. It proposes principles for the effective implementation of inclusion-oriented ESD and uniquely addresses the teacher competencies required for this approach.

[Anderson \(2019\)](#), [Böhme \(2015\)](#), [Chekan et al. \(2023\)](#), [O'Donoghue and Rončević \(2020\)](#) [Stavrianos \(2016\)](#), and [Vierbuchen](#)

Authors per Country



FIGURE 3
Authors per country.

No of articles per year

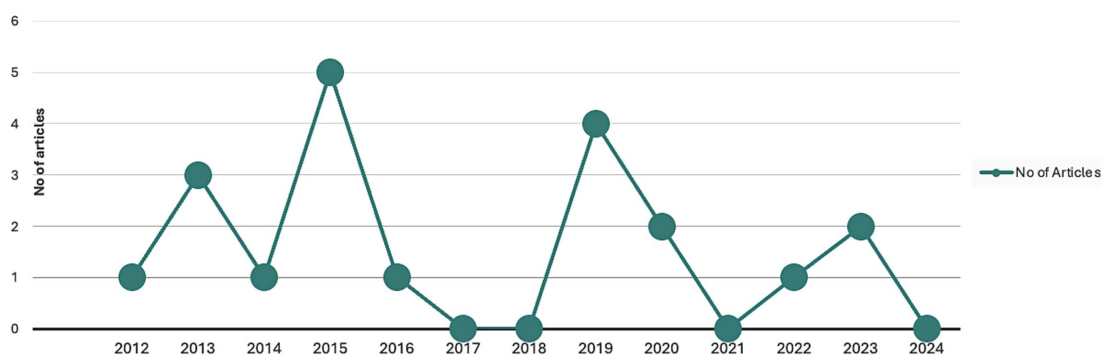


FIGURE 4
Number of articles per year.

and Rieckmann (2020) all highlight a strong link between the pedagogy of ESD and Inclusive Education.² Stavrianos (2016) emphasizes the importance of biophilia and concludes that environmental education can promote inclusion. Johnson (2012) and Anderson (2019) express similar views: Johnson (2012) highlights that ESD can promote Inclusive Education through school gardening, while Anderson (2019) incorporates critical theory and disability perspectives into the ESD context, arguing that global competence can foster inclusion.

According to O'Donoghue and Rončević (2020) and Bhatia and Singh (2015), inclusion is rooted in prior exclusion. Bhatia and Singh (2015, p. 33) argue that "inclusion firmly believes that the first step in making ESD inclusive is by recognizing the existence of those who are excluded." Thus, analyzing the ongoing target group for specific ESD activities is essential in meeting learners' individual needs (Vierbuchen and Rieckmann, 2020). In summary, the arguments presented by Bhatia and Singh (2015), O'Donoghue and Rončević (2020), Vierbuchen and Rieckmann (2020) collectively emphasize that inclusion goes beyond mere recognition of diversity. It requires

proactively dismantling exclusionary practices and committing to reshaping educational environments to meet the individual needs of all learners. This nuanced perspective underscores the transformative power of inclusion-oriented ESD and provides a compelling rationale for continually assessing and adjusting educational practices to ensure equitable opportunities for all.

We identified that some authors have different focuses or approaches to inclusion and emphasize these perspectives, such as Blanchet-Cohen and Reilly (2013) and Evans (2023). According to Blanchet-Cohen and Reilly (2013) referencing Entwistle and Smith (2002), ESD³ in multicultural contexts gains effectiveness when educators and learners engage in a dynamic, co-authorship process of curriculum development, thereby optimizing learning outcomes. Further, the authors, referencing Grass (1995), present three arguments in support of culturally responsive ESD: It adapts an inclusive approach that addresses the different needs of learners based upon and shaped by how and where they live; it includes family and community institutions directly in the development of curricula and programs and it emphasizes that the health of ecosystems, communities, and individuals are inextricably linked, striving for a

² Stavrianos refers to environmental education; Anderson to citizenship education.

³ The authors refer to environmental education.

society at peace both with nature and with itself (Blanchet-Cohen and Reilly, 2013; referencing Grass, 1995).

Evans (2023) approaches inclusion within ESD by integrating trauma-informed education (TI-EE) practices and argues that this method addresses the widespread impact of trauma, which disproportionately affects marginalized groups such as BIPOC (Black, Indigenous, People of Color), women, LGBTQ+ individuals, and low-income populations. Although environmental education (EE) literature has not extensively covered trauma-informed approaches, they are becoming more prevalent in educational and healthcare settings. Drawing on insights from psychology, education, and healthcare, Evans emphasizes that interdisciplinary collaboration is essential for effectively implementing trauma-informed practices in EE and for ensuring inclusivity within ESD. Evans (2023) offers suggestions for implementing trauma-sensitive ESD and highlights the potential of transformative education as a core goal of ESD. The author stresses the importance of considering feelings and emotions in learning processes. This approach promotes critical thinking and sensory engagement with nature, moving beyond factual learning. It includes activities such as journaling, group discussions, and mindfulness practices to help learners process their emotions and experiences. Educators use techniques such as co-regulation and mindful breathing to help learners manage stress and foster calmness, thereby strengthening their connection with the environment (Evans, 2023).

Wolbring and Burke (2013) argues that persons with disabilities are often invisible in both formal and informal ESD discourse, and their inclusion is frequently lacking, yet their inclusion is a necessary step forward. A pedagogical approach to inclusion is evident in the sample. For instance, Westermeier (2015) and Vierbuchen and Rieckmann (2020) highlight the importance of pedagogical criteria, such as effective classroom management and adapting learning materials and objectives, which are essential for implementing inclusion-oriented ESD in heterogeneous learning groups. Vierbuchen and Rieckmann (2020) and Böhme (2015) also address the clear challenges posed by ESD methods in the context of inclusivity. ESD typically employs open learning approaches, which can be challenging for learners with special needs who require clear and structured learning environments and close teacher supervision. These differences can result in tensions between the pedagogical requirements of ESD and those of Inclusive Education. A co-teaching environment—one of the criteria for Inclusive Education—may provide a viable solution.

Our sample revealed limited examples of specific adaptations to promote inclusive learning. Most articles emphasized the need for inclusive implementation of ESD, highlighting the shortcomings of non-inclusive ESD activities at various levels. The articles rarely addressed inclusive practices, such as adapting learning materials or teaching in heterogeneous classrooms. In the few articles that did, there was a clear focus on diversity (e.g., Boldermo and Ødegaard, 2019; Burnett and McArdle, 2011; Engel, 2019). Kater-Wettstädt and Terhart (2019) examine how ESD⁴ can promote a good life for all by offering a theoretical framework that supports its practical application in schools. When situated within an inclusive normative framework,

their approach encourages critical reflection on teaching methods and educational environments. This reflection focuses on the perception of differences and the opportunities for participation it creates.

The Whole School Approach (WSA) can strengthen both ESD and Inclusive Education. Similarly, mainstreaming learners with special needs into individual schools can foster a culture of inclusion and sustainability. O'Donoghue and Rončević (2020, p. 26) argue that “it is not enough to make provision for an inclusive mainstreaming of students with special needs, but there is a need to expand and reconceptualize the educational enterprise if we are to meet the challenges of cohesion and change necessary for constituting sustainable futures on a global scale.”

Pegalajar-Palomino (2022, p. 538) discusses the potential of mobile learning as a pedagogical strategy for “promoting a teaching-learning environment that is committed to equity and equal opportunities among students in response to the provisions of the 2030 Agenda.” This strategy encourages classroom participation and peer collaboration, considering the diverse characteristics, needs, and expectations of all learners. Pegalajar-Palomino (2022) emphasizes that mobile learning can help overcome various barriers faced by learners with disabilities, which may otherwise limit both their learning and participation in the teaching and learning process.

However, Chekan et al. (2023) posits that inclusion is the optimal approach for guaranteeing access to quality education and combating discrimination within the context of ESD. It is viewed as a fundamental human right that celebrates diversity as an asset, closely aligned with SDG 4 and the UN Convention on the Rights of Persons with Disabilities.

The articles analyzed are primarily conceptual and offer some critical perspectives on inclusion-oriented ESD. However, the sample notably lacks action-oriented, practice-based, or empirical research on its implementation in everyday teaching and learning settings.

3.2.2 How are learners with disabilities or special needs integrated into ESD?

Only nine articles explicitly address learners with special needs in the context of learning environments and ESD teaching and learning materials. In contrast, other articles mention special needs only in passing, if at all. Böhme (2015), Vierbuchen and Rieckmann (2020), Westermeier (2015), and Wolbring and Burke (2013) critically discuss criteria for inclusive learning environments in ESD, considering diverse learning needs. Wolbring and Burke (2013) observes that although equality is sometimes mentioned in curricula, it remains unclear how the topic of equality for disabled people is actually taught and what its boundaries are within that narrative, further noting that while access to education is a prerequisite for integration, persons with disabilities often lack the same access to education as non-disabled individuals. Access and individualized support for all learners are stated as necessary prerequisites for developing ESD competencies (Chekan et al., 2023). Key factors identified include classroom management, lesson planning, and adapting teaching methods to meet the diverse needs of all learners. Vierbuchen and Rieckmann (2020) and Böhme (2015) also highlight the importance of addressing structural aspects of formal education to enable the successful implementation of inclusion-oriented ESD in schools.

Kater-Wettstädt and Terhart (2019) argue that participation and inclusion are inherently interconnected, as they define and reinforce

⁴ Kater-Wettstädt and Terhart refer to both ESD and Global Learning.

each other and are considered central components of ESD. The importance of Inclusive Education as part of ESD is increasingly emphasized at all levels of practice (Kater-Wettstädt and Terhart, 2019). The authors suggest that Inclusive Education should involve active participation, with teaching practices that acknowledge differences and create opportunities for all learners to engage. Additionally, they highlight the increasing complexity of global social integration, noting that inclusive norms can help address the challenges and opportunities related to participation for learners regardless of their individual needs.

Pegalajar-Palomino (2022) focuses on mobile learning as a tool for inclusion-oriented ESD and its potential for learners with disabilities. The author highlights the need to reorganize the pedagogical process by integrating technology into teaching and learning to facilitate the active participation of learners with functional diversity.

In the context of teacher education, Čepić et al. (2015, p. 7) argue that “it is crucial to examine the relation between competences and the motivational factors, activities, and the environment which is supportive of the self-regulation of behavior and the competences for Education for Sustainable Development with diverse learners, and the moderating effect of the teachers’ personality.” O’Donoghue and Rončević (2020) identify specific special needs, such as those of blind, hard-of-hearing, or deaf learners. Inclusive teaching and learning materials have been developed to address these needs. These six articles provide a brief overview and insights into Inclusive Education from the perspective of special needs education. Only Anderson (2019, p. 2) includes a critical theory and disability perspective, shedding light on “policies and practices as they engage discourse about what is truly inclusive and how is it operationalized in the next section.”

3.2.3 Does the scientific literature address teaching and learning materials for inclusion-oriented ESD?

Five articles in the sample (Ideland and Malmberg, 2014; O’Donoghue and Rončević, 2020; Pegalajar-Palomino, 2022; Rebbert and Wilmanns, 2013; Westermeier, 2015) explicitly address teaching and learning resources in the context of inclusion-oriented ESD. Westermeier (2015) presents two resources developed by the German NGO *bezev*, which specializes in inclusion and international development Bezev (2012); Bezev (2014),⁵ and provides a brief analysis based on inclusion-oriented ESD criteria, referring to the concept of global learning as part of ESD. Rebbert and Wilmanns (2013) also analyze *bezev*’s *Unser Klima – Unser Leben*. A shortage of scientific research and publications specifically addressing inclusion-oriented ESD—methodology is noted by Chekan et al. (2023). Yet, their work sketches out potential teaching principles, indicating a clear need for further study in this field.

O’Donoghue and Rončević (2020) provide two examples of inclusion-oriented ESD resources from South Africa. The first is *Cashew*, an ESD resource for ninth- and tenth-grade learners produced by *bezev*, which is designed to foster social cohesion and addresses special learning needs in mainstream classroom settings. According to O’Donoghue and Rončević (2020), who were involved in developing the *Cashew*-material, this resource aims to mainstream

Inclusive Education in ESD practices “by supporting activation of the social–emotional capabilities for assessing the matters of concern and enable learners-led responses through a developing capability to act towards sustainability based on the individual learning ability” (O’Donoghue and Rončević, 2020, p. 23). Their article also highlights the principles of Inclusive Education in lesson planning, emphasizing inquiry-based learning and a transformative learning environment-driven pedagogical approach. The second example is the “Handprint CARE” concept, which proposes ethics-led action learning in various subject areas. O’Donoghue and Rončević (2020) highlight the inclusion of indigenous knowledge in this concept. Building on these two examples of inclusion-oriented ESD, the article examines sustainability competencies within the frameworks of inclusion and Inclusive Education.

Pegalajar-Palomino (2022, p. 548) emphasizes mobile learning as “a new educational paradigm” that can “implement benefits for the agents involved at a quantitative and qualitative level for the implementation of an Inclusive Education that caters to learners with functional diversity and [is] committed to improving Education for Sustainable Development.”

Ideland and Malmberg’s (2014) study of teaching materials presents a broad understanding of inclusion, but often lacks explicit references to disability or adaptations of teaching and learning materials to promote inclusivity. A critical examination of ESD reveals how it can inadvertently reinforce “us vs. them” dynamics and perpetuate stereotypes through textbook content.

In addition to individual elements, such as teaching materials and classroom management, it becomes clear that these can only support inclusion-oriented ESD effectively when embedded in a holistic school approach. Lesson planning and classroom management should incorporate varied methods that address the diverse needs of learners, enabling them to engage with the same topic simultaneously. Open forms of learning and solution-oriented teaching can enhance learning outcomes and promote the development of future competencies by allowing learners to choose how they engage with the material, with individualized support provided as needed.

Using solution-oriented approaches in lesson planning can bolster learners’ self-efficacy and may help address the need for methodological diversity needed in inclusion-oriented ESD (Böhme, 2015; Vierbuchen and Rieckmann, 2020). Mobile learning can benefit diverse learners by improving access to learning content. Ultimately, successful inclusion depends on the presence of appropriate structural conditions within formal education systems. These include adequate human and financial resources, relevant teaching materials, and comprehensive teacher training at all levels. Finally, the school community’s attitude towards inclusion and sustainability can significantly influence the development and advancement of an inclusive school culture.

4 Discussion

This scoping literature review provides an overview of the current state of research on inclusion-oriented ESD. Although we conducted a systematic search, some relevant articles may still be missing from the sample. Only abstracts in German and English were included, and the review considered only articles available online. The authorship in our sample indicates a predominance of research conducted in

⁵ Translation: Our Climate—Our Lives; Blue Wonder.

European countries. We identified a potential bias in using German and English search terms, as they are not always directly comparable—for example, when where a search term exists in one language but has no equivalent in the other. Furthermore, the selected databases differ significantly in volume, with ERIC and WoS being much more extensive and offering more articles than the two German databases. The exclusion of Scopus may have limited the breadth of the literature identified. We acknowledge this as a limitation of our review.

It is important to note that our focus on English and German articles may have resulted in a skewed global representation. We acknowledge that relevant literature on inclusion-oriented ESD published in other languages, such as Spanish or French, could have provided additional insights and potentially increased the number of relevant findings. Articles from the Global South, particularly those addressing ESD and inclusion in the context of Latin America, may also offer valuable insights. Concepts such as *buen vivir*⁶ and broader understandings of inclusion rooted in traditional and Indigenous knowledge are more prevalent. Such perspectives could enrich the Global North's understanding of ESD and inclusion. Moreover, our review focused exclusively on articles related to school education. A broader scope might have yielded additional results and more best practice examples.

We would like to point out that using different search terms could have yielded a wider range of findings, depending on the current ESD policy discourse. For instance, we did not include search terms such as “transformative education” or “diversity,” which appear to be gaining traction in ESD discussions. This raises questions about the scope and validity of the term “inclusion,” particularly if it is applied narrowly to specific groups, such as individuals with disabilities. Given the wide diversity of learners in special needs education and their complex requirements for inclusive teaching, our review only begins to explore concrete approaches and practical insights for inclusion-oriented ESD. A closer examination of special education would support a deeper understanding and critical evaluation of ESD. This could offer fresh insights and new perspectives on adopting a learner-centered approach to education.

We would also like to mention that by excluding dissertations, conference proceedings, reports, grey literature, and book chapters, we may have overlooked sources “that meet quality thresholds but also further aspects of representation and redress marginalization in an international and internationalized field” (Gutierrez-Bucheli et al., 2022, p. 658).

Another limitation of this review is the potential for selection bias. While inclusion criteria were predefined and discussed collaboratively by the authors, the screening process was not conducted independently or blinded. Furthermore, the review includes prior work by the authors, which, although selected based on relevance and inclusion criteria, may introduce bias. Future reviews should consider independent double screening to minimize this risk.

Our scoping literature review identified only 20 articles, indicating that inclusion-oriented ESD is not yet a prominent topic in international ESD discourse. It is important to acknowledge that some researchers may not explicitly associate their work with ESD or inclusion but may be exploring related pedagogical approaches not included in our scoping review. Another possible reason for the low number of results is that the connection between the two concepts—ESD and inclusion—has only been established recently, perhaps since the adoption of the 2030 Agenda in 2015 or the entry into force of the UN Convention on the Rights of Persons with Disabilities in 2006. The primary factor contributing to this situation appears to be that “scientific discourses on ESD and Inclusive Education have tended to be conducted separately” (Vierbuchen and Rieckmann, 2020, p. 4), suggesting that Inclusive Education has yet to become a mainstream aspect of ESD.

Despite the limitations of our scoping literature review, we were able to answer the four research questions: (1) Are there any studies available on inclusion-oriented ESD? (2) How is inclusion approached in ESD? (3) How have learners with disabilities or special needs been integrated into ESD? (4) Does the scientific literature address teaching and learning methods for inclusion-oriented ESD? Our scoping literature review reveals that only a small number of articles address inclusion within ESD, although this number has increased in recent years.

Our analysis revealed that, although inclusion is referenced in the context of ESD, ESD and Inclusive Education are generally addressed separately. This suggests that, while inclusion is acknowledged at a normative level within ESD, Inclusive Education is not widely integrated into ESD—and vice versa. The review also indicates that ESD rarely considers individuals with disabilities, as evidenced by the limited discussion of inclusion-oriented teaching methods and materials in the analyzed articles.

Current international frameworks and programs, such as the Berlin Declaration on Education for Sustainable Development 2021 and UNESCO's ESD for 2030 program, emphasize inclusive approaches and the inclusion of marginalized groups—such as persons with disabilities—as key commitments for advancing innovative ESD policies and firmly embedding inclusion-oriented ESD in educational discourse.

Three factors may explain the higher number of publications in 2015 and 2019. First, the adoption of the 2030 Agenda and the 17 Sustainable Development Goals in 2015 placed Inclusive Education at the forefront, through SDG 4, with Target 4.7 specifically highlighting ESD and global citizenship. Second, two journals published special issues on ESD and inclusion in both years. Third, although possibly coincidental, it is noteworthy that major UN education initiatives were launched in those years: the Global Action Program (GAP) on ESD (2015–2019) and the UNESCO ESD for 2030 framework (2020–2030), both of which address inclusion.

This raises the question of how ESD can achieve its goals of contributing to sustainable development if its inclusive approaches are not widely adopted in educational practice. Only one article (Vierbuchen and Rieckmann, 2020) provides a differentiated perspective on potential conflicts within inclusion-oriented ESD. For example, while ESD often encourages open-ended discovery-based learning, individuals with cognitive impairments generally benefit from more structured approaches. To meet individual learning needs

6 *Buen vivir* (good living) is a concept where the collective is prioritized above the individual, ancestral knowledge and the influence of spirits are respected, and the environment is protected (Palacios and Hidalgo, 2021).

in heterogeneous classrooms, educators require a range of differentiated approaches and, more importantly, flexible options for individual adaptation to support inclusion-oriented ESD lesson planning. Implementing a Whole School Approach may be key to embedding inclusive and sustainable values and culture while also addressing other future-relevant aspects, such as digitalization in the context of inclusion and ESD. However, schools need adequate support to meet these challenges. Inclusion and sustainability are both major societal responsibilities.

The sample provides insights into the challenges and opportunities of integrating learners with disabilities or special needs into ESD. Overall, the synthesis of insights underscores the multifaceted nature of this integration and the need to bridge theoretical discourse with practical implementation and institutional reform. The reviewed studies underscore that building an Inclusive Educational landscape necessitates collaborative efforts, encompassing pedagogical innovation, policy adaptation, and the development of a supportive educational ecosystem. The following key points summarize essential aspects of this integration and outline implications for policy and practice:

- The successful implementation of inclusive policies depends on teachers' positive attitudes toward learners with special educational needs and their ability to adapt teaching methods to meet diverse learner needs. Therefore, concrete measures to establish inclusive and sustainable school structures are crucial, as they also help promote and shape teacher attitudes.
- Learners with special educational needs, particularly those with learning disabilities, may struggle with the open-ended learning opportunities typical of ESD. These challenges include difficulties monitoring their learning processes, limited time spent on tasks, and infrequent use of consistent strategies. This implies that teachers require concrete guidance on teaching in heterogeneous settings to improve their competencies in inclusion-oriented ESD. State training institutes could incorporate this guidance into teacher training programs.
- Incorporating this expertise into (pre-service) teacher training would be beneficial. Moreover, fostering ongoing sharing and development of this expertise through collegial exchange within schools could create a growing pool of skills accessible to all teachers. Such an approach would positively impact school culture by promoting open exchanges between colleagues, ultimately benefiting learners and ensuring optimal learning outcomes for all.
- Both Inclusive Educational materials and the implementation of ESD must be appropriately tailored to heterogeneous learning groups. Inclusion-oriented ESD can be challenging as it deals with complex issues. Strategies for reducing complexity, such as practical, hands-on activities, multisensory approaches, and real-life connections, are essential to making content accessible to all learners.
- A Whole School Approach is essential for fully integrating inclusion-oriented ESD. This requires a comprehensive transformation of the entire school organization and culture to embrace inclusive practices, making inclusion-oriented ESD an integral part of the educational system. Appropriate policies can support schools in adopting this approach by providing the necessary resources (human and

financial) and offering individualized support throughout the school development process.

In summary, integrating learners with disabilities into ESD requires teachers with accepting and flexible attitudes, differentiated teaching methods, strategies for reducing complexity, and a comprehensive approach that involves the entire school community. By implementing these strategies, learners with disabilities can actively engage in sustainable development education alongside their peers. The literature emphasizes the importance of anchoring ESD within a Whole School Approach to facilitate the practical implementation of action-oriented teaching and promote holistic school development. Inclusion-oriented ESD seeks to empower all learners by involving them in sustainable development while emphasizing the core values of empowerment, human rights, and social justice.

5 Conclusion

This scoping literature review aimed to assess the extent to which inclusion-oriented ESD has been addressed in the scientific literature. We analyzed 20 peer-reviewed articles using both quantitative and qualitative content methods. The findings indicate that inclusion-oriented ESD remains an emerging and under-researched field. While most articles discuss the normative connection between ESD and inclusive education, highlighting shared ethical principles such as empowerment and social justice, there is a notable lack of practical applications and comprehensive implementation guidelines. Although some studies explore specific approaches, such as trauma-informed education, culturally responsive pedagogy, and mobile learning, empirical research and concrete case studies are largely absent, particularly regarding appropriate learning materials, teaching methods, and classroom management for diverse learners. Furthermore, only a few studies specifically address the educational needs of learners with disabilities, highlighting the importance of structured learning environments and the competencies required of educators. In conclusion, this review underscores the urgent need for a holistic approach to inclusion-oriented ESD—one that incorporates diverse pedagogical methods and robust structural support and fosters a school culture that promotes both sustainability and inclusion. Addressing these gaps is essential for effectively integrating inclusive practices within the ESD framework and ensuring equitable educational opportunities for all learners.

We conducted a qualitative analysis of 20 peer-reviewed articles on inclusion-oriented ESD. Our review focused on three main aspects: how inclusion is addressed within ESD; the integration of learners with disabilities or special needs, and inclusion-oriented ESD teaching and learning methods.

The findings suggest a modest but growing interest in inclusion-oriented ESD, likely influenced by key policy developments such as the 2030 Agenda and its SDG 4 (particularly Target 4.7), UNESCO's ESD initiatives (e.g., *ESD for 2020*), and the UN Convention on the Rights of Persons with Disabilities (2006). In light of these developments—and in pursuit of the goal to make ESD accessible to all learners while engaging them with global, socially relevant, and future-oriented issues—it is essential to mainstream Inclusive

Education within ESD. Based on this review, we recommend that future research and pedagogical practice focus on the following areas:

- Further research and development of best practices in inclusion-oriented ESD are needed to bridge the gap between ESD implementation and Inclusive Education. Such efforts would offer valuable insights into addressing complex global challenges in inclusive learning environments.
- The current discourse on inclusion-oriented ESD is largely dominated by research from the Global North. Expanding research efforts in the Global South would broaden the scope of the field and deepen understanding of inclusion by incorporating diverse perspectives, such as *Buen Vivir* and critical disability theory.
- The Whole School Approach is gaining prominence in ESD, yet more research is required to explore how it can be leveraged to promote inclusive school cultures, practices, and structures.
- The COVID-19 pandemic challenged education systems worldwide, exposing systemic weaknesses, particularly in relation to digitalization and learning in a digital world. Limited access to appropriate devices for learners and teachers, along with a lack of suitable digital teaching resources, posed significant challenges. There is currently little evidence of digital learning materials for inclusion-oriented ESD (or for ESD in general). Greater use of digital tools could enhance inclusive education, and we see a substantial need for research into how digitalization can enrich inclusion-oriented ESD.
- This review was limited to journal articles. Future studies should also include other academic sources, such as master's theses, dissertations, conference proceedings, and book chapters—and make greater use of databases like Google Scholar, as recommended by [Gutierrez-Bucheli et al. \(2022\)](#). This broader approach could provide more comprehensive insights into the emerging field of inclusion-oriented ESD.

A critical examination of the climate crisis also raises important questions about climate justice. People with disabilities are among the groups most affected by the impacts of the climate crisis worldwide. Yet, opportunities for their active participation in climate action remain limited. Inclusion-oriented ESD has the potential to address these disparities, promote climate justice, and foster equal participation in social processes. To strengthen the case for inclusion-oriented ESD, further research is needed on the discourse surrounding ESD and the intersections between climate justice and inclusion. Such research could underscore the importance of embedding inclusive approaches within ESD frameworks.

In this context, inclusion-oriented ESD presents a significant opportunity for change. Integrating the principles of inclusion within the framework of ESD provides a powerful tool to address disparities, advance educational equity, and contribute to the broader goals of climate justice. Inclusion-oriented ESD is not only about providing equal educational opportunities; it also fosters broader societal participation by enabling individuals with disabilities to engage meaningfully in sustainability-related efforts, ensuring their voices are heard and their needs addressed.

Viewed through the lens of inclusion-oriented ESD, the path toward sustainability becomes more clearly defined. This approach

extends beyond environmental education by empowering learners to become agents of change, equipped with the knowledge, skills, and perspectives necessary to address complex issues holistically. By fostering a culture of equal participation, inclusion-oriented ESD contributes to dismantling barriers and eliminating marginalization.

However, further research is essential to build a compelling case for the integration of inclusion-oriented ESD. Future studies should examine the intersections between ESD and Inclusive Education in greater depth. Such insights will help illuminate the urgency of adopting inclusive methodologies and provide a stronger rationale for embedding them within educational frameworks. Rigorous research can enhance our understanding of the critical link between equitable education, climate justice, and the holistic improvement of society.

Ultimately, merging inclusion-oriented ESD and climate justice reflects vision in which education serves as a key driver of both personal and planetary transformation. This vision ensures that every learner, regardless of ability, has the opportunity to become an empowered advocate for climate action, demonstrating resilience in the face of adversity. By advancing this vision through research-informed strategies, we can pave the way toward a more just, inclusive, and sustainable world for all.

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