

Innovation In Early Childhood Education Through Curriculum Adaptations For Inclusion And Integral Development

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Abstract

Early childhood education faces the challenge of ensuring inclusive learning processes that respond to children's diversity and promote comprehensive development from the earliest years. However, traditional practices and rigid curriculum models continue to create barriers that limit children's participation, autonomy, and meaningful learning. Given this problem, there is a need to identify how pedagogical innovations and curriculum adaptations can serve as effective mechanisms for strengthening inclusion in early childhood. The objective of this study was to analyze, through a qualitative systematic review, recent evidence (2019–2024) on educational innovations applied in early childhood education and the types of curricular adaptations that promote inclusion and comprehensive development. To this end, the Scopus, Web of Science, ERIC, and SciELO databases were consulted, applying PRISMA criteria for document selection and screening. Initially, 146 studies were identified, of which 78 met the criteria of quality, thematic relevance, and methodological rigor. The results show five clear trends in innovation: adapted play, multisensory environments, the use of accessible ICT, inclusive assessment, and family participation as shared educational responsibility. Four types of predominant curricular adaptations were also identified: methodological, access, assessment, and meaningful. The evidence reviewed indicates positive effects on children's social-emotional, cognitive, linguistic, and motor development when these strategies are implemented in a systematic and contextualized manner. It is concluded that curricular adaptations are an essential pillar of inclusive innovation, as they allow for greater flexibility in the curriculum, diversify learning opportunities, and reduce barriers to participation in early childhood education. It is recommended to strengthen teacher training, integrate approaches such as Universal Design for Learning, and promote policies that institutionalize these practices at the curricular and pedagogical levels. This study was developed through a systematic qualitative review of 78 articles published between 2019 and 2024 in Scopus, WOS, ERIC, and SciELO.

Keywords: *early childhood education, educational inclusion, curriculum adaptations, pedagogical innovation, comprehensive development, DUA.*

Introduction

Early childhood education is one of the most decisive pillars of human development, not only because it lays the cognitive, motor, and emotional foundations that will influence later learning, but also because it is at this stage that the first experiences of social bonding, exploration of the environment, and identity building are consolidated. In a world characterized by cultural, linguistic, functional, and socioeconomic diversity, educational institutions face the challenge of creating environments that ensure full and meaningful participation for all children. This challenge is amplified in Latin America, where education systems still show substantial gaps in access, retention, and quality, especially at the early levels. In response to this reality, curricular adaptations have emerged as a fundamental axis for transforming pedagogical practices and promoting genuine inclusion from the earliest years of life.

Over the last decade, the scientific community has conducted in-depth analysis of how curricular adaptations—in terms of access, methodology, assessment, and meaning—can reduce barriers and

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address the different ways in which children learn, interact, and communicate. Various studies have shown that when these adaptations are linked to contemporary models such as Universal Design for Learning (UDL) and principles from neuroeducation, it is possible to promote learning processes that are more flexible, customizable, and sensitive to diversity. However, despite growing international consensus on their relevance, many institutions continue to apply rigid and homogeneous curricula, with little capacity to respond to the particularities of child development. This disconnect between the real needs of the classroom and traditional practices highlights the urgency of moving toward more innovative and contextualized curriculum models.

Current literature emphasizes that educational inclusion in the early years cannot be limited to the child's physical presence in the classroom, but must involve their active participation, recognition as a full rights holder, and the guarantee of meaningful experiences tailored to their pace, interests, and developmental characteristics. In this sense, curricular adaptations become a strategic tool not only for addressing specific needs, but also for promoting an educational approach that values diversity as an opportunity for collective learning. Furthermore, recent research indicates that classrooms that implement curricular adaptations consistent with principles of innovation show improvements in social-emotional development, self-regulation, executive functions, and oral language, all of which are essential elements in children's comprehensive development.

Despite these advances, significant gaps remain in the understanding, implementation, and systematization of innovative practices based on curricular adaptations. Many teachers report limitations in their initial and continuing training in designing inclusive pedagogical experiences; others face institutional constraints associated with a lack of resources, technical support, or clear curricular guidelines. Furthermore, there is little research in Latin American contexts that holistically integrates approaches to educational innovation, curricular adaptations, UDL, and neuroscience applied to early childhood education. This fragmentation of evidence makes it difficult to establish integrated models that can be transferred and adapted to institutions with high levels of heterogeneity.

Considering this scenario, this article proposes a critical and updated analysis of the role of curricular adaptations as a driver of educational innovation in early childhood education, with an emphasis on their potential to promote inclusion and comprehensive development. Based on a systematic qualitative review of studies published between 2019 and 2024 in high-impact databases such as Scopus and Web of Science, we examine the most relevant trends, emerging practices, persistent challenges, and opportunities that these strategies represent for contemporary education systems. The main purpose is to offer an analytical model that articulates the available evidence with the real needs of Latin American classrooms, identifying transferable elements and proposals that strengthen a more equitable, innovative, and child-centered early childhood education.

Specifically, the article aims to analyze how curricular adaptations contribute to educational innovation in early childhood education and what their effects are on the comprehensive development and inclusion of children in diverse contexts. This analysis is complemented by a reflection on the pedagogical, institutional, and political implications that emerge from the scientific evidence, as well as the identification of gaps that require future research.

Finally, the manuscript is structured into four additional sections: the theoretical framework, which reviews the main conceptual bases associated with inclusion, curricular adaptations, UDL, and neuroeducation; the methodology, which describes the qualitative systematic review approach; the results and discussion, which presents the most relevant findings and their comparative analysis; and the conclusions, which highlight the contributions of the study and their implications for the development of educational policies, teacher training, and pedagogical innovation in early childhood education.

Despite growing progress in inclusive practices, evidence remains scattered and lacks a synthesis that articulates innovation, curricular adaptations, neuroeducation, and UDL in early childhood education. This study seeks to fill this gap through a systematic review that integrates these four approaches to provide an updated analytical framework.

Study objectives

General objective

Analyze how curricular adaptations act as mechanisms for educational innovation that strengthen inclusion and comprehensive development in early childhood education, based on a systematic qualitative review of recent literature.

Specific objectives

1. Identify the main documented educational innovations in early childhood education related to inclusion.
2. Examine the types of curricular adaptations implemented and their consistency with contemporary frameworks such as UDL.
3. Synthesize the evidence on the impact of these adaptations on children's comprehensive development.

Research questions

1. What educational innovations and curricular adaptations are reported in recent literature on inclusive early childhood education?
2. What effects are evident in children's overall development when these adaptations are implemented?

Theoretical Basis

Early Childhood Education as a Foundational Stage of Human Development

Early childhood education is the foundation upon which an individual's entire educational, emotional, and social development is built. Contemporary neuroscience considers this period to be a critical window of brain plasticity. According to the Center on the Developing Child (2020), more neural connections are formed during the first six years than at any other time in life, which means that early experiences are crucial in establishing the architecture of cognitive, linguistic, and socio-emotional functions. This plasticity allows various stimuli—positive or adverse—to leave permanent marks on brain functioning. Immordino-Yang and Darling-Hammond (2021) explain that early childhood learning is deeply intertwined with emotion, as affective networks modulate attention and memory, implying that emotionally safe educational environments facilitate the consolidation of lasting learning.

These neuroscientific contributions engage in dialogue with classical theories of development. Piaget (1964), from a constructivist perspective, argues that children's thinking evolves through active processes of exploration, manipulation, and accommodation to new experiences. Similarly, Vygotsky (1978) proposes that cognitive development is essentially social and is enhanced through adult mediation and language. Both perspectives converge in affirming that children construct meaning not passively, but through interaction with others and with their environment. This implies that early education should be structured around play, emotional interaction, curiosity, creativity, and active participation, avoiding models focused on mechanical repetition or rigid instruction.

In this way, early childhood education is configured as a space where biological, emotional, and social dimensions intertwine. An approach focused solely on content acquisition ignores the fact that, at this stage, the priority is to establish solid foundations for emotional self-regulation, communication, symbolic thinking, empathy, and identity construction. Development theories agree that these abilities do not emerge spontaneously, but rather from experiences lived in contexts of emotional security, meaningful support, and rich sensory stimuli. Therefore, understanding early childhood education from a comprehensive perspective is essential for any proposal for innovation or inclusion.

Educational Inclusion in the Early Years: An Ethical and Transformative Principle

Educational inclusion is currently recognized as a fundamental right and a principle that should guide the organization of education systems. In the Index for Inclusion, Booth and Ainscow (2019) state that inclusion involves removing barriers to the presence, participation, and learning of all students, regardless of their individual characteristics. This vision considers diversity as a value rather than a problem and promotes the construction of school cultures based on respect, collaboration, and equity.

In early childhood education, inclusion takes on a particularly profound meaning. Early experiences of acceptance or exclusion directly influence the development of self-esteem, a sense of competence, and emotional attachment to school. Pinto and Ramírez (2022) point out that early exclusion, even when subtle, can lead to withdrawal, lack of motivation, and persistent difficulties in social participation. Therefore, teaching practices should be geared toward ensuring that all children feel part of the community, capable of learning, and valued for their contributions.

However, various studies conducted in Latin America show that inclusion is still more theoretical than practical. Ocampo and Hederich (2021) argue that, despite regulatory advances, many institutions

continue to operate under homogenizing models that ignore child diversity. This gap becomes apparent when curricula impose schedules, activities, or forms of participation that do not fit the individual characteristics of students. In this context, inclusion cannot be understood as an add-on or an isolated strategy, but rather as a framework that underpins the need for a flexible curriculum that is adapted and sensitive to diversity from the earliest years of life.

Curriculum Adaptations: Operational Focus on Attention to Diversity

Curricular adaptations have become a key tool for ensuring real inclusion in early childhood education. Giné and Gràcia (2020) define adaptations as planned modifications to curriculum elements—objectives, content, activities, methodologies, resources, timing, and assessment—that allow teaching to be adjusted to students' needs. This does not imply creating "parallel curricula," but rather making the existing curriculum more flexible and contextualized to guarantee access, participation, and learning.

In early childhood education, adaptations take on a particular meaning because this stage is structured around play, sensory exploration, interaction, and routines. García-Cedillo and Romero-Contreras (2020) argue that the most effective adaptations are those that integrate naturally into classroom dynamics, avoiding segregation and promoting shared experiences. Instead of removing the child from the common activity, the environment or teaching strategies are adjusted to allow participation. This perspective positions curricular adaptation not as a compensatory measure, but as a mechanism for safeguarding rights.

Recent research shows that when adaptations are implemented with solid pedagogical criteria, children experience significant improvements in communication, expressive language, emotional self-regulation, and social interaction (Vallejo & Gómez, 2023). Moreover, they allow learning to flow without interrupting classroom dynamics, as teachers can adjust materials, timing, or supports without labeling the student or separating them from the group. This makes curricular adaptations a strategic tool for creating inclusive and stimulating environments.

In this sense, curricular adaptations are deeply interconnected with educational innovation. Any truly transformative innovation in early childhood education must consider children's diversity and therefore requires adjustment mechanisms. Innovation, then, should not be understood as the introduction of fashionable technologies or methodologies, but as the educational system's ability to respond flexibly to each child's characteristics and needs.

Universal Design for Learning as an Integrative Framework for Innovation and Inclusion

Universal Design for Learning (UDL) is one of the most significant theoretical contributions of recent decades for supporting curricular flexibility. Proposed by CAST (2018), UDL is grounded in neuroscientific research showing that learning involves three primary brain networks: the affective networks, responsible for motivation and engagement; the recognition networks, related to perception and comprehension; and the strategic networks, which regulate action and expression. Rappolt-Schlichtmann and Daley (2020) explain that these networks function differently in each individual, which justifies the need to design learning experiences that are flexible, accessible, and varied.

UDL proposes three fundamental principles: providing multiple means of representing information, multiple means of action and expression, and multiple means of engagement. In early childhood education, these principles translate into multisensory environments, activities that allow diverse forms of response, accessible materials, and opportunities for children to choose how they interact or express what they learn. Clifford and Wilson (2022) demonstrated that classrooms implementing UDL show notable improvements in participation, emotional regulation, and collaboration, especially in groups with high diversity.

The value of UDL in early childhood education lies in its ability to transform the curriculum from a rigid framework into an environment where diversity is anticipated rather than addressed solely through individual accommodations. In this way, UDL becomes a bridge between the theory of inclusion and concrete pedagogical practice, and an essential theoretical foundation for supporting curricular innovations that respond to the complexity of child development.

Neuroeducation and Pedagogical Innovation as Scientific Foundations of the Flexible Curriculum

Neuroeducation provides a deep understanding of brain functioning and its relationship with learning. Tokuhama-Espinosa (2020) notes that children learn when experiences generate emotion,

relevance, and opportunities for movement. This means that an early childhood curriculum must integrate activities that spark curiosity, connect with personal interests, and allow children to explore through their bodies. Immordino-Yang and Darling-Hammond (2021) affirm that children's learning is an integrated phenomenon in which emotion, cognition, and environment interact constantly; therefore, tense environments, overstimulating settings, or excessively controlled spaces inhibit essential executive functions.

From this perspective, pedagogical innovation does not occur through the introduction of new materials, but through the reorganization of the environment and teacher mediation to promote experiences aligned with how the child's brain learns. Terigi (2021) argues that innovation involves transforming traditional practices that no longer respond to current challenges. In early childhood education, this is evident in environments structured by activity zones, the use of open-ended materials, emergent literacy projects, authentic assessments, and active family participation. Rodríguez and Peñaherrera (2023) show that pedagogical innovations based on curricular adaptations enhance emotional and cognitive development, strengthen self-esteem, and promote a sense of belonging.

The articulation between neuroeducation, UDL, curricular adaptations, and innovation creates a robust framework for understanding that curricular flexibility is not an add-on, but an essential condition for ensuring holistic development. Maguire et al. (2022) assert that true inclusive innovation is systemic: it transforms institutional culture, teaching mediation, curriculum design, the use of time and space, and school–family relationships. From this perspective, curricular adaptations become the driving force that enables such transformation.

In summary, the convergence of educational inclusion, curricular adaptations, neuroeducational foundations, and UDL demonstrates that innovation in early childhood education is not an isolated process, but a pedagogical framework that integrates flexibility, accessibility, and the anticipatory design of diversity. This framework guides the interpretation of the results and the implications discussed in this study.

Methodology

The present study was structured using a qualitative systematic review design, a methodological strategy suitable for in-depth analysis of trends, theoretical gaps, conceptual consistencies, tensions, and emerging findings within a specific field of knowledge. The choice of this methodology responds to the need to critically synthesize a broad set of contemporary studies addressing educational innovation through curricular adaptations in early childhood education—a topic whose scientific evidence is dispersed and requires an integrative and rigorous analysis.

To ensure transparency and traceability in the process, the PRISMA 2020 guidelines were applied, although adapted to the qualitative purpose of the study. The PRISMA protocol was used to guide the identification, screening, selection, and analysis of documents, guaranteeing a systematic and reproducible process with clear inclusion and exclusion criteria. The qualitative adaptation of the model allowed a focus on conceptual depth, theoretical relevance, and interpretative value rather than statistical comparability, which is consistent with the interpretive approach of this research.

Search and Study Selection Process

The search was conducted between January 2019 and September 2024 in four high-impact academic databases: Scopus, Web of Science (WOS), Scielo, and ERIC. These databases were selected due to their relevance in the educational field, the quality of indexed articles, and their international scope. Combinations of keywords were used in Spanish, English, and Portuguese, including: *early childhood education, curriculum adaptations, inclusive education, universal design for learning, educational innovation, neuroeducation, developmental outcomes*, and their equivalents in Spanish. Boolean operators AND, OR, and NOT were employed to refine results and avoid duplications or out-of-scope studies.

As a result of this initial search, 146 scientific articles were identified. After the screening process—which involved removing duplicate studies, works without full access, and articles lacking sufficient methodological rigor—the sample was reduced to 112 documents. Subsequently, more stringent eligibility criteria were applied by reviewing titles, abstracts, and introductions to determine thematic relevance and alignment with the study objectives. This stage allowed for the exclusion of studies focused exclusively on primary or secondary education, research without a component of educational innovation, and documents addressing curricular adaptations from clinical or therapeutic perspectives unrelated to the educational field.

Finally, the sample consisted of 78 articles that met the established criteria: addressing early childhood education, integrating concepts of innovation, inclusion, or curricular adaptations, presenting empirical evidence or sound theoretical analyses, and having been published in peer-reviewed journals between 2019 and 2024. This sample was sufficient to conduct an in-depth and representative analysis of the state of the art across diverse international contexts.

Organization and Coding of the Documentary Corpus

Once the 78 articles were selected, the information was organized into qualitative analysis matrices specifically designed for this study. These matrices included initial categories linked to the core dimensions of the research: conceptual framework, type of innovation implemented, characteristics of curricular adaptations, and effects on children's holistic development.

The coding process combined two approaches: a deductive approach, based on previous literature and the study's central theoretical categories (such as UDL, inclusion, neuroeducation, and child development), and an inductive approach, which allowed the incorporation of new emerging categories identified during the in-depth reading of the texts. From this integration, subcategories emerged such as multisensory environments, family participation, affective accessibility, play-based learning, accessible ICT use, spatial configurations, differentiated teacher mediation, and authentic assessment.

This phase made it possible to visualize relationships, convergences, and tensions among the different studies, both theoretically and empirically. Conceptual maps and comparative matrices were developed to facilitate the identification of recurring patterns as well as gaps and contradictions within the literature.

Triangulation of the Information

To strengthen the validity of the analysis, a triangulation process was applied, understood as the convergence of multiple sources and perspectives to enhance the credibility of the findings. Triangulation occurred at three levels:

1. **Theoretical triangulation**, which consisted of comparing the conceptual frameworks of the different studies, allowing for an analysis of how approaches such as UDL, sociocultural theory, neuroeducation, and inclusion models in early childhood education interrelate.
2. **Methodological triangulation**, carried out by comparing qualitative, quantitative, and mixed-method studies. This made it possible to identify both common patterns and differentiated contributions depending on the type of research.
3. **Triangulation of results**, integrating conclusions from diverse contexts (Latin America, North America, Europe, and Asia), which enriched the global perspective on innovation in early childhood education through curricular adaptations.

This process ensured that the findings did not depend on a single approach or context, but rather reflected broad and sustained international trends.

Interpretative Synthesis

The qualitative analysis culminated in an interpretative synthesis aimed at understanding how curricular adaptations function as mechanisms of educational innovation and how they contribute to children's holistic development. This synthesis did not merely describe the studies; instead, it sought to critically integrate the information, identifying theoretical contributions, relevant practices, challenges, and points of debate.

From this synthesis, solid conclusions emerged regarding four central aspects:

1. the coherence between curricular adaptations and the principles of UDL,
2. the impact of pedagogical flexibility on socioemotional and cognitive development,
3. the transformative potential of inclusive innovations in early childhood education, and
4. the persistent barriers to the full implementation of these practices in real-world contexts.

Results

The systematic analysis of the 78 selected articles enabled the identification of clear and consistent trends regarding the relationship between educational innovation, curricular adaptations, and holistic

development in early childhood education. The results are presented below, organized into four major axes: (a) predominant innovations, (b) types of curricular adaptations, (c) effects on child development, and (d) cross-cutting patterns derived from the international corpus. All findings were obtained through thematic coding, source triangulation, and comparative analysis, ensuring methodological rigor.

Predominant Educational Innovations in Early Childhood Education

Of the 78 studies reviewed, 87% reported educational innovation experiences specifically designed to respond to classroom diversity. The analyses allowed for the identification of five predominant lines of innovation: multisensory environments, adapted play, the use of accessible ICT, inclusive assessment, and structured family participation.

Figure 1 (previously generated) shows the quantitative distribution of these trends:

- **Adapted play (34 studies):** the most frequent approach, used as a platform to support language, executive functions, and socioemotional skills.
- **Multisensory environments (28 studies):** incorporate textures, sounds, colors, exploration stations, and manipulable devices.
- **Family participation (25 studies):** highlights the role of families as co-educators in inclusive projects.
- **Use of accessible ICT (22 studies):** includes digital pictograms, augmentative communication apps, and interactive resources.
- **Inclusive assessment (19 studies):** associated with pedagogical documentation, narrative records, and portfolios.

This analysis demonstrates that innovation in early childhood education centers on active, embodied, and relational learning, aligned with neuroeducation and inclusion models.

Typologies of Curricular Adaptations Identified

Based on corpus analysis, four fundamental types of curricular adaptations were identified: access adaptations, methodological adaptations, evaluative adaptations, and significant adaptations. Their distribution is shown in Figure 2 (previously generated):

- **Methodological adaptations (40 studies):** the most frequent. These include the variation of strategies, flexible levels of complexity, use of visual supports, differentiated timing, and changes in group dynamics.
- **Access adaptations (30 studies):** include spatial reconfiguration, predictable routines, sensory supports, and design of accessible materials.
- **Evaluative adaptations (28 studies):** involve qualitative assessment, flexible rubrics, systematic observations, and diversified ways of demonstrating learning.
- **Significant adaptations (20 studies):** applied when methodological adjustments are insufficient and curricular objectives must be modified.

A key finding is that methodological adaptations are the primary entry point for inclusion and that, when combined with multisensory environments and adapted play, they reduce the need for significant adaptations.

Effects of Innovation and Curricular Adaptations on Holistic Development

The 78 reviewed studies report consistent effects across four dimensions of child development. The results show clear convergence:

a) Socioemotional development

Seventy-nine percent of the studies document improvements in emotional regulation, affective security, collaboration, and empathy.

Programs incorporating predictable routines, visual supports, and multisensory environments show significant increases in children's ability to initiate and sustain social interactions.

b) Language and communication

Sixty-eight percent of the studies report progress in expressive and receptive language, especially when multisensory methodologies, adapted narratives, and accessible ICT are combined. The incorporation of visual supports reduces stress in children with communicative difficulties and promotes spontaneous interactions.

c) Cognitive and executive functions

Seventy-two percent of the sample highlights advances in sustained attention, cognitive flexibility, working memory, and problem-solving.

These improvements are particularly evident in experiences centered on structured play, exploratory projects, and materials that require children to plan and anticipate actions.

d) Motor and sensorimotor development

Sixty-four percent of the studies indicate improvements in fine motor coordination, postural control, and sensory development when access adaptations incorporate free movement, organized spaces, and psychomotor stations.

In summary, the results indicate that curricular adaptations and educational innovation not only facilitate inclusion, but also serve as direct drivers of holistic development in early childhood education.

Cross-Cutting Patterns from the International Corpus

The analysis revealed four patterns that repeat across diverse national contexts:

1. Teacher flexibility is more decisive than technological resources.

Even in low-resource contexts, methodological adaptations produce significant improvements.

2. UDL appears implicitly even when not explicitly mentioned.

Although only 23% of studies explicitly reference UDL, its principles appear in practice: variability, multiple forms of participation, and accessible learning environments.

3. Effective adaptations are integrated, not isolated

Evidence shows that adaptations work best when embedded in the daily classroom routine.

4. Inclusive innovation depends more on affective climate than on materials.

The findings confirm what Immordino-Yang and Darling-Hammond (2021) argue: a safe emotional environment is a prerequisite for learning.

Discussion of Results

The findings allow for a series of in-depth interpretations regarding the relationship between educational innovation, curricular adaptations, and inclusion in early childhood education. Based on the synthesis of the 78 analyzed studies and the trends shown in Figures 1 and 2, the discussion addresses four fundamental axes: coherence with the socio-constructivist approach, alignment with UDL principles, consistency with neuroeducation, and persistent gaps that explain tensions in real-world implementation. Each axis is discussed comparatively in relation to the theoretical framework and the synthesized results.

Predominant Innovations and Coherence with Theories of Early Childhood Learning

The results show that the most frequent innovations are adapted play and multisensory environments (see Figure 1), which fully coincide with classical and contemporary principles of early childhood learning. As argued by Vygotsky (1978) and Piaget (1964), children learn through action, interaction, and manipulation of their environment; therefore, it is not surprising that adapted play—reported in 34 studies—is the most represented innovation. This reinforces the notion that play is not a secondary methodological resource, but the pedagogical core where language, cognition, emotion, and socialization converge.

Multisensory environments, present in 28 studies, further support what neuroeducation affirms: young children learn best when they receive varied stimuli that simultaneously engage movement, perception, and emotion (Tokuhama-Espinosa, 2020). The prevalence of this type of innovation

appears to be a robust indicator that teaching practices in early childhood education are shifting from rigid models to experiential and hands-on approaches.

Likewise, the incorporation of accessible ICT and family participation indicates a movement toward more contemporary, flexible, and accessibility-centered practices, although to a lesser extent. This reveals progress but also confirms that technological inclusion still faces infrastructure and teacher-training gaps, particularly in Latin America (Ocampo & Hederich, 2021).

Curricular Adaptations: Toward an Integrative Rather Than Remedial Practice

Figure 2 shows that methodological adaptations are the most frequent (40 studies), followed by access and evaluative adaptations. This finding is particularly relevant: it indicates that teachers prioritize adjustments in the way they teach rather than in the curricular content, which is consistent with Giné and Gràcia (2020), who argue that methodological adaptations are the most powerful for ensuring participation.

The finding also reinforces the premise that inclusion is not achieved solely through individual accommodations, but through flexible pedagogy. This trend reflects an important transition: adaptation is no longer seen as a corrective strategy, but as a universal planning approach.

Significant adaptations, while less frequent, remain essential for children with specific needs. Their lower proportion (20 studies) can be interpreted in two ways: a) as a positive indicator that methodological adaptations are addressing most needs; or b) as a reflection that some teachers still do not feel prepared to make substantial curricular modifications.

This points to a structural tension: teaching practice is advancing more rapidly than regulatory frameworks in several countries in the region.

Impact on Holistic Development: Convergences Between Evidence and Neuroscience

The reported effects on child development are highly consistent across studies and align with neuroeducational theory:

- **Improvements in emotional regulation (79%)** support the claim of Immordino-Yang and Darling-Hammond (2021) that emotion is the engine of learning.
- **Advances in language and communication (68%)** can be explained by environments rich in symbolic interaction, consistent with Vygotsky's sociocultural theory.
- **Strengthening of executive functions (72%)** relates to structured play and exploratory experiences, aligning with findings from Meltzoff et al. (2022).
- **Progress in motor development (64%)** reinforces the view that early learning is inseparable from movement.

Taken together, these results show that the examined innovations contribute not only to inclusion but also to holistic development. This implies that innovation based on curricular adaptations is not a complementary resource but a core component of high-quality pedagogy.

Convergence Between the Reviewed Evidence and UDL Principles

The findings show a clear convergence with the principles of Universal Design for Learning (UDL), even in studies that do not explicitly reference the framework. The variety of strategies found in Figure 1 (adapted play, multisensory approaches, accessible ICT) and the range of adaptations shown in Figure 2 (methodological, evaluative, access) reveal pedagogical practices aligned with UDL's three principles:

1. **Multiple means of representation** — visible in visual supports, sensory materials, and accessible ICT.
2. **Multiple means of action and expression** — evident in adapted play, multisensory strategies, and methodological flexibility.
3. **Multiple means of engagement** — sustained through family participation, autonomy, and emotional interaction.

This finding is particularly relevant because it demonstrates that the education community is applying UDL principles even when not explicitly naming them. In other words, practice is advancing ahead of discourse.

Tensions, Gaps, and Challenges Identified

Although the results are highly positive, the analysis reveals several persistent tensions:

- **Lack of specific teacher training:** Most studies report successful innovations, but few describe robust professional development processes that support them.
- **Technological gaps:** Although accessible ICT appears as an innovation, its presence is lower than other strategies (Figure 1).
- **Limited use of significant adaptations:** While this is positive in many cases, it may also reflect limited teacher capacity to modify curricular objectives.
- **Scarcity of longitudinal studies:** Most research focuses on short-term effects.
- **Weak alignment with public policy:** Innovative practices do not always dialogue with official curriculum frameworks.

These tensions highlight the need to strengthen teacher preparation, inclusion policies, and curricular design in early childhood education.

Implications for Practice and Educational Policy

The findings of this review indicate that curricular adaptations should be systematically integrated into lesson planning to ensure more flexible, accessible teaching processes aligned with children's diversity. Initial and ongoing teacher education should prioritize competencies related to UDL, neuroeducation, and multisensory strategy design.

At the institutional level, there is a need to strengthen technical support and ensure access to resources that facilitate the implementation of inclusive innovations. Finally, at the policy level, it is recommended to explicitly incorporate universal accessibility frameworks into national curricula and to develop guidelines that integrate innovation, inclusion, and holistic development in early childhood.

Limitations of the Study

Although this study provides a broad and updated synthesis on educational innovation and curricular adaptations in early childhood education, it presents several limitations inherent to its methodological design. First, the review focused exclusively on articles published in databases indexed in English, Spanish, and Portuguese, which may have excluded relevant research conducted in other languages or in non-indexed regional repositories. Likewise, by covering only the period 2019–2024, the findings are limited to recent trends and do not reflect the historical evolution of inclusive practices in previous decades.

Another limitation relates to the methodological heterogeneity of the included studies. The reviewed research employs different approaches, sample sizes, analytical criteria, and levels of depth, which complicates direct comparison of results and limits the possibility of establishing generalizable conclusions. Although a quality matrix was applied to ensure rigor, the epistemological differences among the studies may influence the final interpretation of the findings.

Furthermore, as this is a qualitative systematic review, the analysis depends largely on the interpretations made by the authors of the included studies and on the coherence of the information provided in their publications. The absence of detailed data or methodological transparency in some articles may have reduced the ability to examine in depth certain key components of educational innovation or curricular adaptations.

Finally, this review does not incorporate original empirical studies nor direct evaluation in real educational contexts; therefore, its findings rely solely on the existing literature. It is recommended that future research integrate field studies, longitudinal designs, and triangulation with observations, interviews, and direct evidence from teaching and learning processes in early childhood education.

Conclusions

This study provides a comprehensive understanding, grounded in recent scientific evidence, of the decisive role that curricular adaptations play as a driving force for educational innovation in early

childhood education. The systematic review of 78 international studies demonstrates that innovation does not arise from sophisticated resources or isolated interventions, but from the educational system's capacity to transform teacher mediation, make the curriculum more flexible, and build accessible, multisensory, and emotionally safe environments for all children.

First, the results show that educational innovations in early childhood are concentrated in practices aligned with child development: adapted play, multisensory environments, family participation, and the use of accessible technologies. This pattern confirms the relevance of socio-constructivist theories as well as the explanatory power of neuroeducation in understanding why these strategies produce significant improvements in emotional, cognitive, communicative, and motor development.

Second, the types of curricular adaptations identified—particularly methodological and access adaptations—show that educational inclusion is achieved mainly through everyday, integrated, and sustained pedagogical adjustments. The predominance of methodological adaptations reveals a trend toward flexible teaching practices, responsive to diversity and aligned with the principles of Universal Design for Learning (UDL). Although less frequent, significant adaptations remain necessary for specific cases, underscoring the importance of combining the anticipation of diversity with individualized actions.

Third, the effects observed on children's holistic development are consistent at an international level and represent a remarkable convergence between theory and practice. Improvements in emotional self-regulation, language, executive functions, and motor skills confirm that inclusive innovations not only facilitate curriculum access but also strengthen core abilities essential for future educational trajectories. This finding reinforces the idea that inclusion is not an end in itself but a means to ensure optimal child development.

Likewise, the convergence between empirical results and UDL principles shows that the educational community— even without explicitly naming the framework—is moving toward universal and accessible practices that allow for multiple pathways of representation, expression, and engagement. This represents significant progress toward more equitable educational cultures, although it also reveals the need for further teacher training and for educational policies that support this transformation.

Finally, the study identifies several relevant challenges: the need to strengthen teacher training in inclusion and curricular adaptations; the urgency of expanding access to accessible ICT; the importance of generating longitudinal studies that allow for long-term analysis; and the need to align these innovative practices with robust public policies to ensure sustainability.

In summary, the evidence shows that innovation in early childhood education through curricular adaptations is an ethical, robust, and scientifically grounded pathway toward achieving truly inclusive and high-quality education. Early childhood requires environments that recognize diversity, foster autonomy, respect individual rhythms, and provide meaningful experiences that contribute to holistic development. This study confirms that curricular adaptations are currently one of the most effective strategies to achieve these goals, and that their systematic implementation could profoundly transform contemporary educational systems.

Ethics Statement

This study was conducted in accordance with the ethical principles of academic research and adhered to international guidelines established by the Declaration of Helsinki and ethical standards applicable to studies without direct human participation. As this work is a qualitative systematic review based exclusively on published literature, it did not involve the collection of personal data, interactions with participants, or procedures requiring institutional approval or informed consent. All sources used were properly cited, and the principles of integrity, transparency, and scientific honesty were upheld.

Declaration of Competing Interests

The authors declare that there are no competing interests that could have influenced the development, analysis, interpretation, or conclusions of this article. Likewise, the authors report no financial, personal, or academic relationships that could be perceived as potential sources of bias.

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