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Neurodiversity Inclusive Early Childhood Education for Generation Alpha and Generation Beta: A Review

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Abstract

Early childhood classrooms increasingly serve children growing up under conditions of pervasive digital exposure and an evolving understanding of neurological variation as a natural dimension of human development rather than solely as a deficit requiring remediation. This narrative review examines how early childhood education systems can adapt to support neurodivergent learners within the generational contexts of Generation Alpha (born 2010–2024) and the emerging Generation Beta (born from 2025). Literature was identified from Scopus, Web of Science, ERIC, and Google Scholar, encompassing peer-reviewed articles, books, and reports published between 2018 and 2026. Searches combined terms related to neurodiversity, early childhood education, Generation Alpha, Generation Beta, Universal Design for Learning, assistive technology, and multi-tiered systems of support. Sources were included when they addressed neurodevelopmental variation, inclusive pedagogy, or generational characteristics relevant to early childhood or closely related educational settings. The review synthesizes the developmental and technological characteristics of Generation Alpha alongside the emerging profile of Generation Beta and examines Universal Design for Learning and artificial intelligence-supported assistive technologies as pedagogical approaches for neurodivergent learners. It further identifies teacher

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preparedness and multi-tiered systems of support as essential mechanisms for addressing persistent inequities in early childhood classrooms. The review concludes that meaningful inclusion for neurodivergent children cannot be achieved through a single intervention but requires a coordinated educational architecture integrating teacher preparation, inclusive physical and digital learning environments, assistive technologies, and tiered support systems. This review contributes a generationally responsive perspective to inclusive early childhood education by emphasizing the need for coherent and continuous support structures that accompany neurodivergent learners from infancy through the transition into formal schooling.

Keywords: Early Childhood Education; Generational Learning; Inclusive Pedagogy; Neurodiversity; Universal Design for Learning

Introduction

Contemporary early childhood classrooms now serve two overlapping demographics of learners. According to McCrindle (2025), Generation Alpha, generally dated from 2010 to 2024, has already progressed through infancy and toddlerhood into preschool and the early primary years, while Generation Beta, whose members began arriving in 2025, is only beginning to enter nurseries and daycare settings. Both demographics are being raised under conditions that earlier generations of children did not experience, including constant exposure to networked digital devices, algorithmically curated media, and a social environment in which neurological variation is increasingly recognized, identified, and openly discussed rather than overlooked or stigmatized. These conditions converge in the early childhood classroom, a learning environment where children experience rapid neurological development while possessing limited capacity to articulate their needs and advocate for appropriate educational support.

The number of children identified with neurodevelopmental differences has continued to increase throughout the period covered by this review. Fast et al. (2024) reported that although the age standardized prevalence rate of Autism spectrum disorder has remained relatively stable worldwide, the absolute number of children living with the condition has increased substantially between 1990 and 2021 because of population growth and improvements in case identification. Similarly, Canals et al. (2024) estimated that approximately one in thirteen children aged twelve years meets the criteria for Attention-deficit/hyperactivity disorder, while just over one in one hundred has autism spectrum

disorder. Their findings also indicate that many children experience more than one neurodevelopmental condition (Canals et al., 2024; Fast et al., 2024). These trends are particularly significant for early childhood education because the identification and referral of neurodevelopmental differences often begin during the preschool years, placing increasing demands on a workforce that has traditionally received limited preparation to recognize, assess, and respond to diverse developmental needs. As Angwaomaodoko (2023) and Tiwari (2024) observed, many early childhood educators continue to report inadequate preparation for implementing inclusive practices and supporting neurodiverse learners in mainstream preschool settings.

This review asks how early childhood education systems should be reorganized in response to the joint realities of generational change and increasing neurodevelopmental identification, a convergence that, to date, has not been examined as a single coordinated challenge in the existing literature. Prior studies have tended to address generational demography, neurodiversity theory, and multi-tiered support frameworks as separate issues, this review's contribution is to synthesize these strands into a single coordinated architecture spanning teacher preparation, environmental design, and systemic support, one intended to move with neurodiverse learners from infancy into formal schooling. Rather than treating neurodiversity as a peripheral concern or a category addressed through separate specialist provision, the review argues that it should be embedded as a foundational principle of early childhood education, informing curriculum design, pedagogy, learning environments, assessment, and support systems for all learners. The review follows a growing body of works that treats neurological variation as a normal feature of any classroom population, one that should shape the default design of instruction, environment, and support rather than an afterthought (Armstrong, as cited in Schuck & Fung, 2024). The review is organized around the developmental and technological characteristics of Generation Alpha, the emerging profile of Generation Beta, and the ways in which early childhood classrooms can be intentionally designed to meet the diverse learning needs of neurodiverse children across both generations. It concludes by examining teacher preparation, multi-tiered systems of support, and the persistent equity challenges that influence the implementation of inclusive early childhood education.

The Developmental and Digital Profile of Generation Alpha

Generation Alpha is commonly dated from 2010, the year the iPad reached the consumer market and Instagram launched, through 2024, and its members are described in the demographic literature as the first generation born entirely within the twenty first century and the first to grow up without any lived memory of a world before smartphones (McCrindle & Wolfinger, 2020). This generation's early years coincided with a period of rapid consumer technology diffusion, so that children who are now in kindergarten or the early primary grades have typically interacted with touchscreen devices before they could speak in full sentences. This is a form of digital fluency that begins almost at birth, distinguishing Generation Alpha from Generation Z, who encountered these same technologies as adolescents rather than as infants (Hutajulu et al., 2024).

This early and sustained exposure to digital environments carries developmental implications that are directly relevant to early childhood classroom practice. Madigan et al. (2020), through meta analytic evidence examining screen use and child language development, found that greater screen exposure is generally associated with weaker expressive and receptive language outcomes, particularly when digital experiences lack responsive human interaction. Extending this argument, Gath et al. (2023) reported that increased screen engagement among preschool children may reduce opportunities for reciprocal verbal exchanges that are fundamental to early language development and may also influence the quality of parent child interactions. However, the relationship between digital exposure and development is not inherently negative. In their meta-analysis, Jing et al. (2023) demonstrated that screen media can produce modest benefits for vocabulary development when digital resources are interactive, educationally designed, and involve active engagement, with electronic books showing stronger associations than passive video consumption. Collectively, these findings indicate that the developmental implications of digital saturation among Generation Alpha are shaped less by technology itself and more by the quality of content, the nature of interaction, and the extent of adult guidance. As Panjeti Madan and Ranganathan (2023) argue, early childhood curricula must therefore move beyond simplistic views of digital exposure and incorporate more intentional approaches that balance technological engagement with human interaction, play, communication, and developmental appropriateness. Early childhood education should strategically move beyond both technological determinism and outright technological avoidance already expressed above and adopt a balanced approach that positions digital

tools as complementary resources within relational, play based, and developmentally appropriate learning environments.

Generation Alpha's classroom behaviours have also been described as distinctive in ways that extend beyond patterns of media engagement. Hutajulu et al. (2024) observed that learners from this generation tend to respond positively to multimodal instructional approaches that integrate auditory, visual, and kinaesthetic experiences, while showing reduced engagement with traditional lecture based approaches characterized by limited variation in format and pace. Complementing these observations, Panjeti Madan and Ranganathan (2023) noted that mental health surveillance data collected during the period when Generation Alpha progressed from infancy into later childhood indicate increasing reports of childhood anxiety, depression, and parent identified mental, emotional, developmental, and behavioural concerns among children between three and five years of age. These patterns should not be interpreted as evidence that digital exposure produces neurodevelopmental differences; rather, they highlight the complex developmental conditions within which Generation Alpha is growing. The significance of these trends lies not in defining Generation Alpha as a fundamentally different group of learners, but in recognizing that contemporary early childhood classrooms must be sufficiently flexible to accommodate diverse patterns of attention, regulation, communication, and engagement. Consequently, inclusive pedagogy must move beyond uniform instructional expectations and prioritize responsive learning environments capable of supporting neurological variation among learners.

Generation Beta: An Emerging Profile

Generation Beta, defined by demographer Mark McCrindle as those born from 2025 to 2039 (McCrindle, 2025). Little or no study yet exists on this demography's developmental trajectory. What is available instead is demographic forecasting grounded in technology diffusion trends and stated intentions of the Millennial and Generation Z parents who are having children during this period. The anticipated learning needs of Generation Beta are likely to emerge within a childhood environment characterized by even deeper technological integration than that experienced by Generation Alpha. McCrindle (2025) projects that Generation Beta will be raised by parents who may demonstrate greater awareness of sustainability, digital wellbeing, and the potential developmental implications of excessive screen exposure. This emerging parental

orientation suggests a generational shift from the initial adaptation to digital technology experienced by many Generation Alpha families toward a more intentional negotiation of technology use within children's everyday lives.

However, the issue for early childhood education is not whether technology should be present or for learners, but how learning environments should respond to learners who are developing within highly saturated digital ecosystems. Generation Beta learners are expected to encounter artificial intelligence systems, autonomous and smart systems, advanced personal computing, extended reality etc from earlier ages. A technology-saturated environment may amplify differences in attention, sensory processing, communication styles, and problem-solving approaches. Therefore, the central challenge for early childhood education will not be technology adoption itself, but the development of pedagogical approaches that ensure technology remains developmentally appropriate, relationally grounded, and supportive of learner's holistic growth. Responding to the emerging learning needs of Generation Beta, particularly in relation to neurological variations of learners, requires an inclusive early childhood educational approach that avoids viewing technology as either inherently beneficial or inherently harmful. Rather than adopting extreme positions, early childhood systems must develop flexible, adaptive learning environments capable of anticipating and supporting learners' needs even before their interactions with human educators.

This Generation Beta's emerging profile established above represent a set of provisional understanding requiring empirical validation rather than as established developmental conclusions. It is therefore advocated in this review, that early and sustained research engagement, encouraging early childhood scholars to begin data collection before this demography reaches formal schooling age in order to establish meaningful developmental, educational, and social baselines. The current absence of evidence should not be interpreted as a reason for inaction but as a critical research gap with immediate policy implications. Educational systems that delay curriculum planning, teacher preparation, and inclusive practices until a substantial body of evidence becomes available may find themselves responding retrospectively rather than proactively to the needs of a generation already shaped by changing technological, social, and family environments.

Neurodiversity as an Educational Paradigm

The neurodiversity paradigm reframes conditions such as autism, attention deficit hyperactivity disorder (ADHD), dyslexia, and related neurological profiles as naturally occurring variations in human cognition and functioning rather than as disorders that must be corrected to conform to a single normative standard (Schuck & Fung, 2024; Cook, 2024). This perspective challenges traditional deficit-based models that have historically positioned neurodivergent children primarily through the lens of impairment, limitation, or deviation from expected developmental pathways. Instead, neurodiversity emphasizes the importance of recognizing diverse ways of cognition, communicating, processing information, regulating emotions, and engaging with the social and physical environment. Translating this paradigm into pedagogical practice requires a fundamental reconsideration of how early childhood education conceptualizes learning, development, and support (Dawson, 2022). Recognizing that many difficulties experienced by neurodivergent learners emerge from a mismatch between individual characteristics and inflexible educational environments, rather than from inherent deficits within the child, has significant implications for the design and organization of early learning spaces. This shift requires educators to examine classroom structures, teaching approaches, assessment practices, and interactions with children to ensure that they accommodate a wider range of developmental pathways (Azuka et al., 2024). In this context, neurodiversity-affirming practice does not simply involve providing additional support for identified needs; rather, it involves creating inclusive environments where differences are anticipated, valued, and embedded within everyday educational practice. Consequently, the paradigm calls for enhanced professional knowledge, reflective teaching practices, and systemic changes that enable early childhood settings to move beyond adaptation of the child and towards adaptation of the learning environment.

This reframing represents a significant movement away from deficit-oriented interpretations of neurodivergence and places responsibility for meaningful inclusion within the broader educational system rather than solely on individual learners. It positions teachers, early childhood practitioners, and educational leaders as central agents in transforming educational cultures and practices. Implementing a neurodiversity-affirming approach requires educators to reconsider assumptions about typical development, behaviour, communication, and engagement, while recognizing that children may demonstrate competence and understanding through diverse pathways. Rather than

attempting to modify learners to fit predetermined structures, inclusive practice requires educational environments to become more flexible, responsive, and accessible. This may involve adapting teaching methods, incorporating multiple forms of communication, providing varied opportunities for participation, and designing learning experiences that acknowledge differences in sensory processing, attention, and interaction styles. Such approaches reflect the principle that inclusion involves more than physical access to educational spaces; it requires genuine participation, recognition, and belonging. When early childhood environments are designed around learner diversity, neurodivergent children may experience greater opportunities to develop confidence, agency, and positive identities as capable learners. Furthermore, neurodiversity-affirming education has implications beyond individual outcomes, as it contributes to broader cultural changes within educational communities by challenging assumptions about normality and promoting respect for human variation. However, achieving this transformation requires sustained professional development, supportive leadership, and institutional commitment to ensure that inclusive values are reflected consistently in everyday practice.

While this reframing represents an aspirational and progressive direction for early childhood education, its implementation is likely to remain uneven due to differences in educational structures, policy priorities, cultural understandings, and available resources across countries. For example, in many countries, commitments to inclusive education coexist with substantial challenges in translating policy aspirations into everyday practice. Efforts made efforts to advance inclusive educational frameworks may be made, however, many early childhood settings continue to experience barriers including limited access to specialist services, insufficient teacher preparation, large class sizes, and poor early identification and intervention opportunities. These disparities demonstrate that inclusion is shaped not only by educational philosophy but also by broader social, economic, and geographical inequalities. Consequently, a learner's opportunities for recognition, support, and meaningful participation may still depend significantly on the educational environment and location into which they are born. Addressing these inequalities requires attention to systemic investment, teacher capacity-building, and policy implementation to ensure that neurodiversity-affirming practices become accessible rather than remaining available only within privileged educational contexts.

Universal Design for Learning in Early Childhood Settings

Universal Design for Learning, hereafter abbreviated as UDL, provides one of the most thoroughly documented frameworks for translating neurodiversity affirming values into everyday classroom practice. The framework tasks educators to build multiple means of engagement, multiple means of representation, and multiple means of action and expression into the default design of instruction, so that variation among learners is anticipated in advance rather than accommodated after a child has already struggled (Moffat, 2022; Nwachukwu et al., 2025). This anticipatory logic is what distinguishes UDL from earlier models of differentiation, which typically treated flexibility as a supplementary layer added onto an otherwise uniform lesson once a specific learner's difficulty became visible. By contrast, UDL locates flexibility inside the architecture of the lesson itself, which shifts the analytical question from "how do we adjust for this child" to "why was the original design narrow enough to require adjustment in the first place." Early childhood applications of UDL emphasize that learners develop primarily through trusting relationships with caring adults, which means that UDL implementation in this age range depends heavily on building the capacity of the educators who work with very young children rather than on curriculum materials alone (Moffat, 2022). Beck et al. (2026) reinforce this point through their account of a co-designed program aimed specifically at strengthening educator knowledge and efficacy in supporting children with neurodevelopmental disabilities, suggesting that capacity-building of this kind cannot be left to incidental exposure but requires deliberate, structured collaboration between educators and specialists. This relational dependency carries an important implication, UDL cannot be reduced to a set of portable classroom techniques, since its effectiveness is mediated by the quality and consistency of teacher-child interaction that precedes and surrounds any given activity. Also, evaluating UDL in early childhood settings requires looking beyond whether multiple modalities are technically present in a lesson plan, toward whether the teachers delivering that lesson have the relational skill and situational awareness to deploy those modalities responsively. This reframes UDL not merely as a design framework but as a professional practice that is only as strong as the human relationships through which it is enacted.

UDL's framework and principles target variability in general rather than any single diagnostic category, which means that a single well-designed curriculum or lesson can serve a heterogeneous group of learners without requiring a separate individualized plan for every

distinct profile in the room. Chris and Petty (2025) describe this capacity as central to inclusive pedagogical frameworks more broadly, arguing that classroom dynamics improve when instructional models are built to engage neurodivergent learners as a matter of course rather than through isolated accommodations layered onto a standard lesson. This is an analytically significant departure from deficit-based models of support, which typically organize resources around discrete labels and therefore implicitly treat any learner outside a recognized category as an afterthought. Because UDL addresses variability as a structural property of any group of children rather than as a set of exceptions attached to particular individuals, it avoids the administrative and psychological costs of continuously sorting learners into categories before support can be offered. This has direct consequences for early childhood settings in particular, where formal diagnosis is often unavailable, delayed, or developmentally premature, yet where variation in sensory processing, communication, and attention is nonetheless present from the outset (Carriere, 2024). A framework that requires diagnosis as a precondition for support effectively withholds accommodation from the youngest and least categorized learners, whereas a framework built on anticipated variability extends support universally and without a diagnostic gatekeeping step. The efficiency implied here is not merely administrative convenience, it reflects a different theory of who is entitled to flexible instruction and when that entitlement begins. Under UDL's logic, flexibility is a default condition of good teaching rather than a resource rationed out in proportion to formally documented need, which repositions inclusion as a starting assumption rather than a downstream correction applied once a child has been identified as falling outside the norm.

In many early years learning spaces, the UDL framework is mostly adopted in name without the structural changes it requires in practice. Teachers may report familiarity with UDL terminology while continuing to deliver a single fixed mode of instruction, because genuine multi-modal design requires planning time, material resources, and administrative support that many early childhood programs do not receive (Tiwari, 2024). Hogan et al. (2024) similarly note that meaningful UDL adoption at scale depended on dedicated development of partnerships built specifically around the framework, rather than on individual teachers absorbing its principles independently, which underscores how much institutional investment is required before UDL functions as more than shared vocabulary. This gap between stated familiarity and structural practice suggests that UDL's diffusion has outpaced the institutional conditions needed to sustain it, so that the framework

circulates more readily as vocabulary than as redesigned pedagogy. The pattern is analytically important because it reveals that adopting UDL is not simply a matter of individual teacher willingness or awareness; it is constrained by resourcing decisions made well above the classroom level. Ogunlana and Peter-Anyebe (2024) locate this constraint at the policy level, arguing that advancing neurodiversity equity in public programs depends on inclusive instructional models being built into policy design itself, rather than left to individual program discretion. Where planning time is compressed, materials are limited to a single format, or administrative expectations still reward uniform delivery, teachers face a structural incentive to retain fixed instruction regardless of their conceptual understanding of UDL. UDL's promise, in other words, is contingent on implementation that the wider system does not always make it possible, which means that evaluating the framework's impact in early childhood education requires distinguishing between UDL as a conceptual model and UDL as an actually resourced practice.

UDL and Spatial Safety for Neurodiverse Learners

Universal Design for Learning (UDL) also offers a good framework for understanding physical and sensory environments so that neurodiverse learners including those with autism, ADHD, sensory processing differences, and anxiety-related conditions can engage safely and fully. Schools are to provide multiple means of engagement, representation, and action/expression, and spatial safety is a natural extension of this principle into the built environment. Rao et al. (2025) note that a classroom designed with UDL in mind recognizes that sensory input is not neutral; lighting, unpredictable noise, crowded transitions, and rigid seating arrangements can create genuine physiological stress for learners whose nervous systems process stimuli differently. Spatial safety means intentionally designing rooms with flexible zones, quiet corners for decompression, movement-friendly areas for those who regulate through motion, and clearly defined pathways that reduce unpredictability and support a sense of control (Ralph et al., 2026). Predictability itself is protective; visual schedules, consistent furniture placement, and clear sightlines reduce the cognitive load of constantly scanning an environment for threat or change, freeing up mental resources for learning rather than survival. Spatial safety as expressed here is not about isolating neurodiverse students in separate "special" areas, but about building environments flexible enough that all students, regardless of neurotype, can find a configuration that works for them, embodying UDL's core commitment to reducing barriers proactively. As Highland, (2025) and Francis, (2025) argues when physical space is

designed this way, it communicates something essential to learners, that their variations are anticipated and respected, not merely tolerated This foundation of psychological and physiological safety is a prerequisite, not a supplement, to meaningful engagement, representation, and expression in learning.

Artificial Intelligence Supported Assistive Technology

Artificial intelligence has become an increasingly prominent feature of assistive technology aimed at neurodivergent children, spanning social robotics, augmentative and alternative communication systems, computer vision based behavioural analysis, and adaptive digital therapy platforms. Social robots such as those used in published intervention studies are designed to support skills including eye contact, emotional recognition, and conversational turn taking, and researchers have suggested that some children with autism find interaction with a robot less anxiety inducing than interaction with an unpredictable human partner because the robot's responses are more consistent and structured (MadridRuiz et al., 2025; Ravandi et al., 2025; Lan et al., 2024). This consistency argument carries an analytical weight beyond simple comfort, since it implies that a meaningful share of the difficulty some autistic children experience in social interaction may stem not from an inherent deficit in social capacity but from the unpredictability of human responsiveness itself. If a fixed, rule-governed interlocutor lowers anxiety and increases engagement, the source of difficulty is partly relocated from the child to the interactional environment, which mirrors the same reframing UDL applies to physical classroom design but extends it to the behavioural register of the people or agents a child interacts with. Augmentative and alternative communication systems incorporating word prediction and voice recognition have similarly been framed as tools that reduce the frustration associated with expressive communication difficulty by adapting to an individual child's vocabulary and communication style over time (Kewalramani et al., 2024; Vagnetti et al., 2026). What distinguishes this adaptation from earlier static communication boards is its temporal dimension, the system does not merely offer a fixed set of options but recalibrates its predictions as the child's own language use evolves, which means the technology is tracking developmental change rather than substituting for it. This positions AI-supported communication tools less as a replacement for human teachers and more as an intermediary layer that narrows the gap between a child’s variations and external expression.

The emphasis here is that the central value of artificial intelligence and Edtech in early years learning space lies in its capacity for individualized adaptation at a scale that human teachers, who face caseload and time constraints, cannot easily match (Barua et al., 2022). This scale argument reframes the comparison between AI-supported tools and teacher-led differentiation, the issue is not that human intervetion is qualitatively inferior to algorithmic adaptation, but that sustained, moment-to-moment personalization across an entire classroom exceeds what any single educator can realistically deliver within ordinary constraints of time and attention. A related part of effort applies computer vision and machine learning to more targeted skill domains, such as an AI assisted system that provide personalized feedback on handwriting to improve fine motor and graphomotor skills in children with autism, illustrating how the technology can be directed at narrow, well defined functional goals rather than only broad social or communicative ones (Alam & Mohanty, 2024). This narrower application matters analytically because it demonstrates that AI-supported assistive technology is not a single undifferentiated category of intervention but a spectrum ranging from broad social-emotional support to discrete motor-skill remediation, each requiring different evidentiary standards and different claims about what the technology is actually measuring or correcting.

For Generations Alpha and Beta, whose members are encountering artificial intelligence and other smart technology as an ambient rather than novel feature of daily life, the assistive technology should be developed around them. Tools designed to introduce AI mediated support as a special accommodation may need to be reconceived as one option among many within an environment where AI mediated interaction is already the child's baseline expectation, which raises new questions about how a genuinely personalized intervention is distinguished from ordinary background technology in a child's daily life. This blurring is significant because earlier generations of assistive technology derived part of their perceived value from contrast, a communication device or social robot was legible as an intervention precisely because it stood apart from a child's otherwise low-technology environment. Once AI-mediated interaction becomes ambient rather than exceptional, that contrast collapses, and the marker of an effective intervention can no longer be the mere presence of AI but must instead be evidence of its specific contribution relative to whatever baseline AI exposure a child already receives outside any formal support setting. This shifts the evaluative burden for future assistive technology research toward isolating

incremental effect within a tech-saturated environment, rather than measuring effect against an AI-free comparison that no longer reflects most children's lived experience.

Teacher Preparedness for Inclusive Practice

A recurring and remarkably consistent finding in early childhood education research is that many educators enter the profession without sufficient preparation to implement inclusive pedagogical practices effectively, even though inclusive education is widely endorsed within national and international policy frameworks. While policies often emphasize the importance of providing equitable learning opportunities for all children, the practical knowledge and skills required to translate these commitments into everyday classroom experiences remain limited among many teachers. Rowan et al. (2021) and Massar (2022) identify that educators remain unprepared to address the diverse developmental, communication, behavioural, and learning needs of children requiring support. These challenges are commonly associated with gaps in both pre-service teacher education and ongoing professional development opportunities. Initial teacher preparation programs may provide limited exposure to disability studies, differentiated instruction, assistive strategies, and collaborative approaches for supporting children with diverse abilities. Similarly, available in-service training is often insufficiently frequent, specialized, or contextually relevant to address the complex realities of inclusive classrooms (Mahara, 2024). So, many teachers experience reduced confidence and uncertainty when adapting curricula, designing supportive learning environments, and collaborating with specialists. These limitations have been identified as significant barriers to the successful participation of children with variations in preschool programs, contributing to persistent disparities in engagement and access to quality early learning experiences.

Teacher preparedness has significant implications for the structure and sustainability of inclusive early childhood systems. The persistence of gaps in teacher readiness suggests that inclusive practice cannot be treated as a specialist responsibility located within separate special education pathways. Instead, it requires a fundamental shift in how teacher competence is conceptualized within initial teacher education. Given that early childhood educators generally work as generalists rather than variation specialists, positioning inclusive pedagogy as an optional or isolated area of study risks reinforcing the assumption that supporting neurodivergent children falls outside the role of the mainstream teacher. Embedding inclusive principles throughout teacher education

programs is therefore necessary to develop a workforce that understands diversity as an inherent characteristic of early learning environments and is equipped to respond through flexible, responsive, and equitable teaching approaches (Addy et al., 2023; Florian, 2022).

However, strengthening initial preparation alone is insufficient, as competence in inclusive practice develops through continued engagement with complex classroom realities. Current models of professional development that rely heavily on short, one-off workshops often fail to produce meaningful changes because they provide limited opportunities for teachers to apply new knowledge, reflect on their practice, or receive context-specific guidance. A more effective approach requires sustained professional training structures that integrate mentoring, coaching, and collaboration, enabling educators to develop practical expertise over time. This underscores the need for early childhood systems to view teacher training as an ongoing process rather than a requirement fulfilled through initial certification or self-claim.

The overreliance on qualifications as indicators of preparedness presents significant limitations. Possessing formal credentials does not necessarily demonstrate the capacity to implement inclusive practices effectively, because it may not accurately reflect classroom competence. Therefore, early childhood systems require independent and practice-based measures that assess teachers' actual ability to facilitate participation, adapt learning experiences, and respond to diverse developmental needs of learners. Addressing these issues requires systemic reform that connects teacher education, professional training, and accountability mechanisms to ensure that inclusive education is realized in practice rather than remaining primarily a policy aspiration.

Teacher Preparedness and Classroom Management

When teachers lack adequate training in recognizing and responding to learner variation, a gap emerges between what policies expects and what classrooms can actually deliver. This gap runs deeper than a simple lack of awareness, it points to a structural shortfall in teacher preparation programs, which often fail to connect theoretical understanding of neurodiversity to the practical demands of everyday classroom management (Matamala & Bechard, 2023). Ndou-Chikwena (2025) similarly found that educators' knowledge levels and their training are closely linked, suggesting that gaps in preparation are not incidental but reflect an unmet demand for more targeted professional training on neurodivergent learners. In the absence of this grounding, educators are

frequently left to construct inclusive strategies through trial and error, an approach that delays support for the children who need it most and places avoidable strain on both teachers and learners.

Learner variation means that children process sensory input, communicate, and engage with social and learning demands in fundamentally different ways, so classroom structures must be flexible enough to accommodate this range without singling out individual children as exceptions. Effective management in this setting depends on teachers being able to anticipate diverse needs proactively, rather than reacting only after a child struggles or is formally diagnosed (Chris & Petty, 2025). This distinction between anticipation and reaction is not merely a matter of timing, it reflects two fundamentally different logics of classroom management. A reactive model treats the classroom as a fixed structure into which children must fit, with variation surfacing only as a problem to be solved once a child fails to meet learning expectations. A proactive model, by contrast, treats variation as a known and common condition of any group of learners, which shifts the burden of adaptation from the child to the environment itself (De & Basu, 2024). This shift has structural consequences, it requires teachers to design routines, transitions, and instructions with built-in flexibility from the outset, rather than backfilling after difficulty appears. Classroom management as an ongoing, adaptive practice implies that it cannot be reduced to a fixed set of techniques applied once and maintained, it must be continuously recalibrated as new learners, contexts, and developmental stages introduce new forms of variation. Zahir et al. (2024) demonstrated that sustaining this kind of adaptive practice depends not only on individual teacher effort but on wider community and institutional support behind the training itself. In this sense, treating diversity as a default feature rather than a disruption becomes a practical necessity for sustaining inclusion in the classroom, rather than a one-time adjustment.

Multi-Tiered Systems of Support in Neurodiverse Classroom

Multi-tiered systems of support in this review refers to a help-before-crisis model that involves physical design features, dedicated professional development time, specialist staffing ratios, well-resourced programs, broader policy environment and administrative priorities of the system (Stodden et al., 2023). It is organized into universal, targeted, and intensive levels of support without requiring every learner with variation to first receive a formal diagnostic label. This is a departure from static diagnostic categories, which tend to

assign a label that persists independent of whether the environment around the child has since changed (Evans et al., 2023). Gen Alpha and Beta are growing up amid continuously shifting technological and social environments that may produce forms of dysregulation, sensory overload, or attentional variation that do not resemble the profiles the previous support system has learned to recognize and respond to (O'Neill, 2025). Physical design features, dedicated professional development time, specialist staffing ratios, well-resourced programs, broader policy environment and administrative priorities of the system are interdependent conditions that together anticipate variation as a normal feature of the classroom rather than an exception to be managed.

Each element mentioned above performs a distinct anticipatory function that only becomes coherent when the others are also in place. Physical design features, such as flexible seating arrangements, low-stimulation retreat spaces, and adaptable transition routines, anticipate variation by removing the environmental triggers that would otherwise convert ordinary sensory or attentional differences into visible crises requiring reactive intervention, the room itself absorbs a portion of the variation before any teacher or specialist needs to notice or respond to it (Piller, 2025). Dedicated professional development time anticipates variation by giving educators the standing capacity to recognize early, low-visibility signs of difficulty, such as withdrawal or subtle communication breakdown, before they escalate into the disruptive presentations that typically trigger faster response.

Specialist staffing ratios anticipate variation by ensuring that rather than waiting until a child's variation becomes visible enough to justify calling in a specialist, schools need to assign a variation specialist inside the classroom on standby from the outset, as a standing feature of how the room is staffed, not as a response triggered by something that has to be noticed first. This reverses the usual order of operations. In most systems, a specialist only enters the picture after a teacher has flagged a concern, after that concern has been escalated, and after some threshold of visible difficulty has been crossed, meaning the specialist's presence is always a reaction to variation that has already surfaced. If variation is genuinely treated as a normal, expected part of every early years classroom rather than an occasional exception, then it makes little sense to wait for it to appear before making support available, since by definition it is already there in some form, in every group of children, from day one (Stansberry Brusnahan et al., 2025). In effect, this model treats specialist support the way a school treats a fire extinguisher or a first-aid kit, not

something requested after an emergency is confirmed, but something built into the room in advance because the need for it is assumed to exist, not proven case by case.

Well-resourced programs anticipate variation by supplying the instructional materials and adaptive tools needed to act on early signals immediately, rather than requiring a lag while resources are requested or approved, a lag that reintroduces exactly the diagnosis-like delay the model is meant to eliminate. Finally, the broader policy environment and administrative priorities anticipate variation at the systemic level by determining, in advance, that flexible response is a funded and expected default rather than a discretionary exception each school or program must independently justify, which is what ultimately prevents the anticipatory promise of the other four elements. None of these elements is sufficient in isolation, the anticipatory position of the help-before-crisis model therefore rests not on any single element but on their simultaneous, funded coexistence (Lin, Mullick, & Campbell, 2026).

This help-before-crisis orientation is meant to anticipate needs, because Generation Alpha and Generation Beta learners represent a moving target rather than a stable population whose needs can be mapped once and applied. Since variation will keep being part of the early years classroom, every inclusive model should absorb every form of learner variation that has not yet been named. The practical operation of this model depends heavily on resources that sit above the level of any individual classroom. This dependency means that the model is only as strong as the infrastructure available to enact it, which means identification and provision can become decoupled in under-resourced settings even when the framework is nominally in place on paper.





Figure 1. **Multi-Tiered Systems of Support in Neurodiverse Classroom -Help-Before-Crisis Model**

Toward a Coordinated Architecture of Inclusion

The review does not support the reduction of neurodiversity inclusive early childhood education to a single dominant intervention, framework, or technological solution. Although Universal Design for Learning (UDL) provides a coherent foundation for designing flexible learning experiences that accommodate learner variability (Ackah-Jnr, & Fluckiger, 2023), its effectiveness depends largely on the quality of implementation, teacher competence, institutional support, and availability of resources. Similarly, artificial intelligence supported assistive technologies demonstrate considerable potential for improving accessibility, communication, and personalized learning opportunities for neurodiverse learners. Also, there are concerns regarding the appropriate balance between technological assistance and the irreplaceable value of human interaction in early childhood learning. Beyond pedagogy and technology, teacher preparation remains a persistent challenge, as many early childhood educators enter classrooms without sufficient knowledge and practical experience to implement inclusive strategies effectively despite widespread policy commitments to inclusion. Multi-tiered systems of support provide a promising alternative to approaches that depend exclusively on formal diagnosis before assistance is provided, yet their success remains dependent on equitable funding, specialist availability, and institutional capacity. Therefore, meaningful inclusion requires a broader educational transformation rather than reliance on isolated solutions.

What emerges from the synthesis of these perspectives is that no single educational mechanism, regardless of how strongly supported in research, can independently achieve the goals of neurodiversity inclusive early childhood education (McAnelly & Gaffney, 2019). Inclusion is a complex process that requires alignment between instructional design, teacher capability, environmental accessibility, and institutional structures. This review therefore argues that inclusion should not be viewed as the outcome of adopting a

particular strategy but as the result of interconnected practices that collectively shape children's opportunities to participate, communicate, and learn.

The coordinated architecture proposed in this review is based on the recognition that teacher preparation, physical and digital learning environments, and multi-tiered support systems must develop together rather than operate as separate initiatives competing for limited educational attention. Effective inclusion requires early childhood systems to move away from fragmented approaches where individual components are introduced without consideration of how they interact within the wider learning ecosystem. Teachers require preparation that connects theoretical understanding of neurodiversity with practical classroom application; learning environments must be designed to accommodate sensory, communicative, cognitive, and social differences; and support systems must provide assistance before children experience prolonged educational exclusion. Similarly, digital tools should be evaluated according to their contribution to children's participation and development rather than their technological sophistication alone. The central challenge for Generation Alpha and Generation Beta early childhood education is not simply preparing classrooms to receive more diverse learners, but redesigning early childhood systems so that diversity becomes an expected and default feature of educational planning. Such an approach requires collaboration among educators, policymakers, researchers, and specialists to ensure that inclusion is embedded within everyday practice rather than treated as an additional responsibility assigned to particular professionals.

Early childhood systems that interpret generational change as a temporary adjustment rather than a continuous feature of educational development risk repeatedly designing practices for learners who have already entered a different social and developmental reality. The emergence of Generation Alpha and Generation Beta illustrates that childhood is continually shaped by changing technological environments and understandings of human development. Consequently, educational systems cannot rely solely on reactive reforms that occur after new challenges become visible, they must develop mechanisms for ongoing research, professional learning, and policy adaptation. For neurodiverse learners, this means creating classrooms capable of responding to diversity as a permanent characteristic of learning rather than as an exceptional circumstance requiring separate intervention. This review argues that the future of inclusive early childhood education depends on the capacity of systems to remain adaptive, reflective, and evidence informed, ensuring that pedagogical practices evolve alongside the

children they are designed to support and structures capable of accommodating variation, and continuous change while preserving the foundations that define effective learning in the early years.

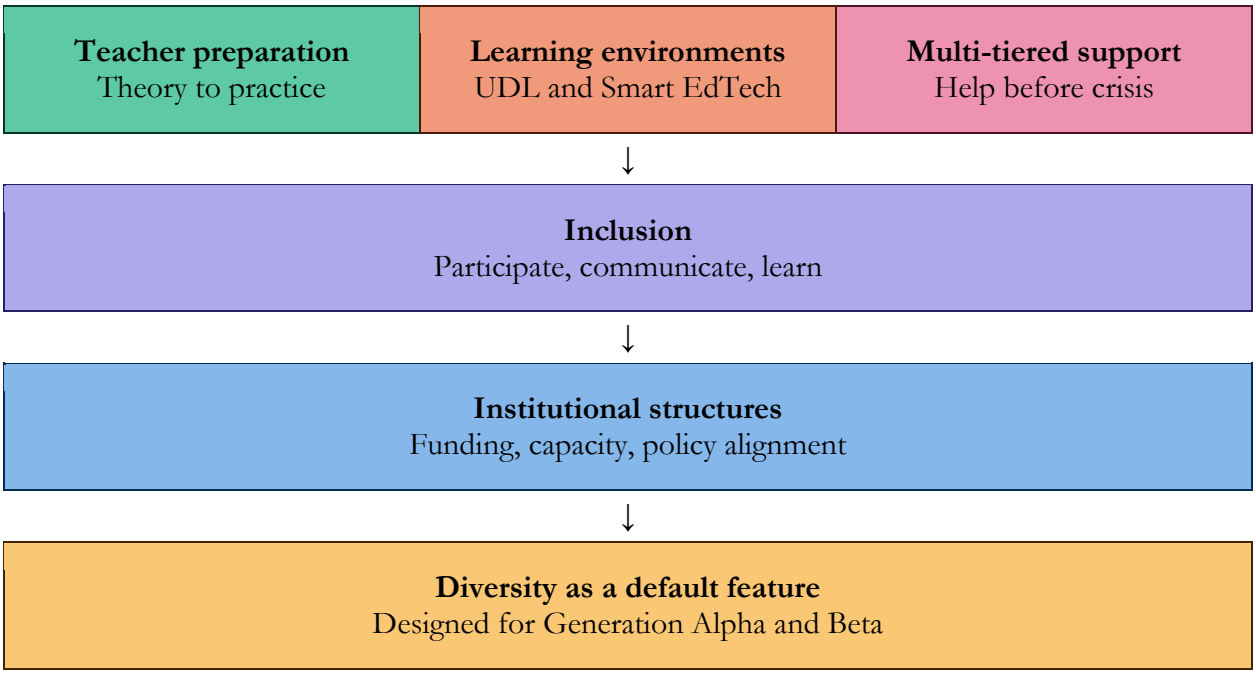


Figure 2. **Coordinated architecture of inclusion**

The diagram shows three equally weighted components teacher preparation, learning environments, and multi-tiered support that develop together rather than competing, converging into inclusion as the emergent outcome of their interaction rather than the product of any single intervention; this outcome rests on institutional structures such as funding, capacity, and policy alignment, which make the pillars viable in practice; the process ultimately aims toward diversity becoming a default, built-in feature of educational design rather than a reactive accommodation. This structure ensures the system keeps evolving rather than treating inclusion as a fixed, one-time achievement.

Conclusion

Neurodiversity inclusive early childhood education should be understood as a coordinated architecture of practices that extends beyond individual classroom strategies to encompass teacher preparation, inclusive pedagogy, environmental design, and policy support. Viewing neurodiversity as a natural dimension of human variation rather than as a

deficit requiring remediation represents an essential conceptual shift, yet translating this perspective into the everyday realities of preschool practice remains an ongoing challenge. Realizing this transformation will require research, teacher education, curriculum development, and educational policy. Today's young children are growing up in environments increasingly shaped by artificial intelligence, smart technologies, and digitally mediated interactions, creating new opportunities as well as new challenges for inclusive learning. This review is limited by its reliance on small-scale qualitative studies rather than experimental evidence, especially regarding Generation Beta, future research should prioritize tracking this generation and testing whether Universal Design for Learning and multi-tiered support produce measurable gains when properly resourced. If early childhood education can meet this generational moment with this intentionality, inclusion will cease to be an aspiration and become simply how the classroom works.

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