

Article

Developing Inclusive Preschool Education for Children with Autism Applying Universal Learning Design Strategy

Inese Tīgere ^{1,*}, Dina Bethere ^{1,*}, Pāvils Jurs ¹ and Velta Ļubkina ^{2,†}

¹ Center for Pedagogy and Social Work, Riga Technical University Liepaja Academy, LV-3401 Liepaja, Latvia; pavels.jurs@rtu.lv

² Center for Academic Excellence, Riga Technical University, LV-1048 Riga, Latvia

* Correspondence: inese.tigere@rtu.lv (I.T.); dina.bethere@rtu.lv (D.B.)

† The author is deceased.

Abstract: The study investigates the universal design for learning (UDL) framework, utilizing neuroscience-based principles to support all children, particularly those with autism spectrum disorder (ASD), within inclusive preschool environments. Highlighting the critical nature of early childhood for cognitive and social development, it examines practical UDL strategies implemented through a case study of five preschoolers, aged between 4 and 8 years, conducted from September 2023 to May 2024. The research employs observation aligned with UDL guidelines version 3.0., focusing on skill development in communication and social interaction. In the study, children's skill development has been assessed using Vygotsky's Zone of Proximal Development as the measurement framework. This concept underscores the importance of providing appropriate support and scaffolding to facilitate learning within a child's optimal development zone. By integrating Vygotsky's principles, the research highlights how tailored, supportive strategies—aligned with UDL's emphasis on flexible, individualized support—can effectively bridge the gap between current abilities and potential, fostering meaningful skill acquisition and social growth. Findings affirm the effectiveness of UDL principles in facilitating inclusion and growth, emphasizing the importance of teacher competence in successful implementation.

Keywords: autistic spectrum disorder; inclusive; preschool education; universal design for learning



Academic Editor: Ingrid Pramling Samuelsson

Received: 20 March 2025

Revised: 14 May 2025

Accepted: 20 May 2025

Published: 22 May 2025

Citation: Tīgere, I., Bethere, D., Jurs, P., & Ļubkina, V. (2025). Developing Inclusive Preschool Education for Children with Autism Applying Universal Learning Design Strategy. *Education Sciences*, 15(6), 638. <https://doi.org/10.3390/educsci15060638>

Copyright: © 2025 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

Over the past century, preschool education policy has shifted significantly, transforming its goals from simply increasing access for specific groups to ensuring high-quality education meeting all children's needs (West, 2020). The current inclusive education trends encourage policymakers, practitioners, and researchers to focus on meeting diverse needs across all educational levels, including preschool. This is particularly crucial given recent challenges, such as the pandemic, which has highlighted the need for flexible teaching methods (Basham et al., 2020).

The concept of inclusive education is central to both research and policy, yet its practical application remains complex and multifaceted. Factors such as educational practices, sociocultural contexts, and evolving societal norms constantly reshape its definition (Ainscow et al., 2006; Ainscow & Kaplan, 2005; Berlach & Chambers, 2011; Florian & Black-Hawkins, 2011; Forlin, 2012; Graham & Jahnukainen, 2011; Loreman, 2009). The mentioned complexity is particularly salient in early childhood education, where the principle of inclusion necessitates collaborative learning environments within daycare settings, ensuring

equitable access for all children (Albers et al., 2010; Ainscow et al., 2006; Bouillet & Domović, 2021; Florian, 2005, 2008; Jónsson, 2016; Kalambouka et al., 2005; Sanches-Ferreira et al., 2022). Global policy initiatives underscore the crucial role of high-quality early childhood care and the importance of early identification of special needs, emphasizing collaborative partnerships among all stakeholders (United Nations, 2015; European Commission: Directorate-General for Employment, Social Affairs & Inclusion, 2021; UNESCO, 2021; OECD, 2023).

Effective support for diverse learning needs requires a comprehensive approach. High-quality early childhood education must provide accessible learning environments, well-trained professionals, strong leadership, and active family involvement, adapting both the physical environment and pedagogical approaches to meet the needs of children with disabilities (Ainscow et al., 2006; Booth et al., 2000; European Agency for Special Needs & Inclusive Education [EASNIE], 2017; UNESCO, 2021; Wood, 2015; Symeonidou & Loizou, 2023). Children with ASD present significant challenges for inclusive education due to a trio of symptoms that impede cognitive, social, and emotional development: (1) challenges in social interactions with peers; (2) communication challenges, encompassing restrictions in language development and echolalia; and (3) stereotypical behavioral patterns, restricted interests, and difficulties in responding to alterations in daily routines (American Psychiatric Association [APA], 2000). The study focuses specifically on preschool education enhancement for children with ASD, a neurodevelopmental condition affecting up to 1.9% of the population, necessitating tailored pedagogical approaches (Maenner et al., 2020; Posserud et al., 2021; American Psychiatric Association [APA], 2000). Significant barriers, such as limited resources and delayed diagnoses, often impede access to appropriate educational services for autistic children, highlighting the critical need for supportive learning environments that foster both individual and collaborative learning (Committee on Social Affairs, Health & Sustainable Development, 2020; Guðjónsdóttir & Óskarsdóttir, 2016). Ultimately, adequate support for all children, especially those with ASD, is paramount for achieving social justice and ensuring that all learners reach their full potential (Coburn & Gormally, 2017).

The study examines the effectiveness of UDL principles in inclusive preschool settings for children with ASD. UDL, a framework focused on creating flexible and adaptable learning experiences, offers a promising approach to enhancing learning outcomes for all students, including those with diverse learning needs (CAST, 2024; Rose & Meyer, 2002). UDL provides a solution grounded in neuroscience findings and the principles of established educational theorists (Meyer et al., 2014), including Vygotsky's theory of social constructivism (Vygotsky, 1978; Trudge & Winterhoff, 1993). Their theory facilitates the examination of the interactions among various educational agents and elucidates the manner in which instructors' knowledge evolves in reaction to social dynamics within the surrounding context. This study evaluates children's skill development through the concepts of the Zone of Proximal Development (ZPD), emphasizing the importance of customized support to bridge the gap between current abilities and potential. Vygotsky's concept of the ZPD serves as a fundamental framework for comprehending how targeted support and scaffolding can enhance optimal learning outcomes. The UDL pedagogical framework emphasizes the need for learning experiences that embrace each child's unique needs, based on different types of intelligence (Gardner, 2011), special interests (Csikszentmihalyi, 1990), emotional needs (Arace et al., 2021), and personal authenticity, not just academic skills. Allowing a child to actively participate in learning, regardless of diagnosis, undiagnosed disabilities, family social background, or special needs, promotes meaningful learning and socio-emotional practices that lay the groundwork for future learning and social inclusion. Diversity should be seen as a tool for social justice and

equality, rather than an issue (UNESCO, 2021). While the research on the application of UDL in early childhood settings is still emerging, existing evidence suggests its significant benefits, especially for children with developmental disabilities, offering tailored strategies to meet their unique needs (Almumen, 2020; Bauminger-Zviely & Shefer, 2021; Chen & Dote-Kwan, 2021; Fundelius et al., 2023; Gauvreau et al., 2019; King-Sears et al., 2023; Lohmann et al., 2023; Moffat, 2022; Seok et al., 2018; Taylor et al., 2023). Successfully supporting children with ASD necessitates addressing several key challenges: teacher professional development to equip educators with the necessary skills; but also effective communication strategies to facilitate understanding and interaction, and the fostering of emotional self-regulation to support socio-emotional learning for children with ASD (Fernell et al., 2013; Petersson-Bloom & Bölte, 2022; Ros & Graziano, 2019; Siller et al., 2021; Zwaigenbaum et al., 2019). The implementation of UDL principles, encompassing multiple means of engagement, representation, and action and expression, holds significant promise for enhancing the learning experiences of children with ASD and fostering essential life skills (CAST, 2024; Koegel et al., 2013; Little et al., 2015).

The primary aim of the study is to evaluate the impact of specific UDL strategies on skill development in preschool children with and without ASD in inclusive settings and to investigate the following key questions: (1) What practical methods and observational tools are available for analyzing children's responses to UDL implementation in inclusive preschool settings? (2) What are the most frequently used strategies and tools employed by preschool teachers to implement UDL in inclusive classrooms? (3) How do children in inclusive preschool environments respond to learning experiences designed using UDL principles?

2. Method

The research employed a mixed methods approach (Creswell, 2014) to examine the efficacy of UDL principles for children with and without ASD in an inclusive preschool setting. The research processes have employed the following methodologies: qualitative content analysis of regulation documents via school self-evaluation, indirect observation through discussions with parents and group teachers, and direct observation utilizing video recordings. This thorough methodology has guaranteed strong internal and external validity, while conforming to rigorous ethical standards.

2.1. Research Design and Procedures

The study has employed a descriptive design to investigate the relationship between the implementation of specific UDL strategies and skill development in preschool children with and without ASD within an inclusive setting. The research has focused on identifying independent and dependent variables to understand how UDL's flexible and adaptable learning experiences influence learning outcomes. The independent variables are specific UDL strategies, operationalized based on the three core principles from the UDL guidelines version 3.0 (CAST, 2024): multiple means of representation, multiple means of action and expression, and multiple means of engagement. These principles have been implemented through a range of classroom activities and teaching techniques detailed in the methods section.

The dependent variable is children's skill development, specifically within the framework of Vygotsky's Zone of Proximal Development (ZPD) (Vygotsky, 1978). This framework has allowed for a nuanced assessment of skill mastery using a three-level categorization—skills a child can perform independently, skills that require guidance or support, and skills the child cannot perform, even with assistance. This approach has provided a more detailed picture of individual abilities and how these abilities have been

influenced by the implementation of the UDL strategies. By measuring performance at these three levels within the ZPD, the study has aimed to generate a rich understanding of how UDL strategies support skill development and bridge the gap between a child's current capabilities and their potential. The findings from this analysis have been then used to address the study's specific research questions, as outlined in the following section.

The observation process has incorporated both indirect and direct methodologies to gain a comprehensive understanding of children's needs, with all activities being meticulously coordinated and organized in accordance with the study's ethical standards and data storage principles. Indirect observation was conducted via meetings with parents and teachers from 11 to 29 September 2023, ensuring transparent communication and collaboration throughout the process. Direct observation occurred during structured activities from 4 October to 7 December 2023. Following the refinement of an education plan in December, a pilot activity using diverse teaching strategies took place from 10 January to 8 May 2024. Informed consent has been obtained from all study participants, whereby the legal representatives of the children have signed a consent form that has been subsequently reviewed and approved by an ethics committee. The individual student assessments and video recordings collected for this study have been anonymized and permanently deleted after data processing and analysis to ensure participant privacy. The study has prioritized ethical considerations and transparent reporting, ensuring that the methods are rigorous, and the findings have been interpreted with integrity.

2.2. Research Context and Participants

The study has employed a purposive quota sampling method to select participants from a municipality preschool, located in a city of Latvia with a student population of 64 children. This preschool is notable for its commitment to a modern, developmentally appropriate learning approach and continuous innovation in educational strategies, especially for children with special needs. The self-evaluation report for the educational institution is consistent with the national self-evaluation guidelines for educational institutions ([LR Izglītības Kvalitātes Valsts Dienests \[State Education Quality Service of the Republic of Latvia\], 2022](#)), highlighting the preschool's commitment to continuous improvement and effective practices adapted to support children with special needs. This commitment not only reflects compliance with the established educational standards but also emphasizes the importance of individualized support and inclusive practices in the learning environment. The preschool also offers comprehensive support, including two speech therapists, a special education teacher, an occupational therapist, a pediatric masseur, and a nurse. Individual education plans are developed collaboratively and revised three times a year to ensure they meet individual needs.

Given the preschool's focus on inclusive education and its existing support systems, this setting has provided a rich context for studying the impact of UDL. The limited availability of preschools that comprehensively support children with ASD and fully implement UDL has informed the decision to utilize a non-probability quota sample. While quota sampling is not often preferred due to potential sampling bias ([Mārtinsone et al., 2016](#)), its use has been justified in this case due to the stringent criteria for participant selection and the aim of ensuring participant representation across relevant subgroups ([Ho et al., 2014](#)). Five children have been chosen from a larger cohort of twelve in preschool special education programs; among these five, three have verified diagnoses of ASD, as indicated in [Table 1](#). All five participants were boys, which is expected given that in the preschool group of 12 children, only one girl was present.

Table 1. Characteristics of study participants from indirect observation.

Participant Details	Support Services
PPA: Age 8, 6 Preschool Years, ASD, Speech/Language Disorder	Speech therapy, Montessori
PPB: Age 5, 3 Preschool Years, ASD, Mental Developmental Disorder	ABA, speech therapy, physiotherapy, Montessori
PPC: Age 6, 1 Preschool Year, Speech/Language Disorder	Assistant, speech therapy, special education, Montessori
PD: Age 6, 3 Preschool Years, ASD, Mixed Developmental Disorder	ABA, speech therapy, physiotherapy, Montessori
PPE: Age 4, 1 Preschool Year, Speech/Language Disorder	Assistant, speech therapy, physiotherapy, Montessori

Two additional participants were included to investigate the effectiveness of UDL interventions for children with diverse behavioral challenges, including those with other developmental challenges (e.g., speech/language disorders). These children do not meet the criteria for an ASD diagnosis, but show difficulties with speech and language, attention, social interaction, restricted interests, and/or self-care skills, and have been selected based on pre-study observations.

Since the kindergarten group attended by the study participants is based on Montessori principles—featuring materials designed to stimulate multiple sensory modalities and promote hands-on, experiential learning—and speech therapy sessions are closely aligned with these guidelines, the study also utilizes Montessori materials. This approach is particularly valuable for children with diverse developmental profiles, as multisensory engagement enhances neural integration, cognitive development, and social interaction by involving tactile, visual, auditory, and kinesthetic experiences, thereby supporting individualized learning.

To assess skill levels across all developmental domains, a performance-based assessment has been implemented using a four-level scale aligned with the Latvian curriculum Skola2030 framework (LR Valsts Izglītības Satura Centrs—VISC [State Education Quality Service of the Republic of Latvia], n.d.): (1) Beginning, (2) Developing, (3) Proficient, and (4) Advanced. These assessments, which are part of the criteria used for participant selection in the first phase of the study, have been conducted monthly for each child and recorded in the school management system “E-klase”—a digital learning environment providing a central repository for student assessments, accessible to teachers, special education staff and other relevant professionals. The multifaceted assessment approach, incorporating both general observations of skill development and individual education plan (IEP) reviews, has facilitated the effective monitoring of developmental progress and guided the selection of potential study participants.

Individual student assessments and video recordings were collected for analysis. The video recordings involved filming children in various settings throughout the day, including individual sessions, group activities, indoor learning sessions, and outdoor playtime. The approach allowed for a comprehensive observation of the children’s interactions and engagement during both structured and unstructured activities. Immediately following the completion of the data processing and analysis, the video recordings were deleted permanently to protect the confidentiality of the participants. The results of the children’s skill assessments are included in the publication as part of both the indirect and direct observation findings, facilitating review and evaluation.

3. Results

This section presents results from direct and indirect observations with established ethical protocols. To ensure confidentiality, each child was assigned a unique code through pseudonymization. The findings offer a comprehensive view of the children’s experiences

in the UDL-based program, summarizing skill profiles, support needs, and engagement, along with qualitative descriptions that provide context for each child's responses.

3.1. Individual Participant Profiles: Skill Development Across UDL Principles

In the study, children's skill development was assessed using Vygotsky's Zone of Proximal Development as the measurement framework. The following describes the skills that children can perform independently, demonstrating their current abilities and reflecting the skills that fall within their autonomous performance. Data on each child's individual skills according to the distribution of the three principles of UDL can be seen in Table 2. The results indicate a range of skills across participants, varying according to developmental stage. While some children demonstrated strong literacy and numeracy skills, others exhibited more limited abilities in these areas. Notably, children with ASD showed comparatively lower academic skills than their peers. Another important nuance to the main results is that while all children have special interests, the interests of children with ASD are clearly more pronounced and persistent, influencing the selection and implementation of appropriate learning strategies. Identifying each child's special interests proved to be very important in motivating them to engage in daily activities, directly influencing the effectiveness of the implemented UDL strategies.

Table 2. Skills of the study participants from indirect and direct observation.

Modalities	PPA	PPB	PPC	PPD	PPE
Multiple Means of Engagement					
Interests and Identities	Literacy activities; being recorded during tasks	Rotation, toys with small details; digital technology	Physical activities, role-playing, professions; structured routines	Hands-on tasks; specific musical instruments	Dinosaurs; collecting dinosaur-related items; specific dinosaur species
Effort and Persistence	Maintains attention on the task of interest	Maintains attention on the task of interest	Competition elevates motivation; articulates needs to peers and adults	Maintains attention on the task with music	Maintains attention on the task of interest
Emotional Capacity	Selects an emoticon from the provided options—happy or sad	Expresses needs and guides the assistant by hand toward desired activities or objects	Choose an emoticon according to his mood. Apologizes when someone is hurt	Expresses needs and guides the assistant by hand toward desired activities or objects	Expresses their needs and claims to adults and peers; selects an emoticon from the provided options—happy, sad, sleepy
Multiple Means of Representation					
Perception	Understands concise directions; follows a visual daily schedule; engages in activities with assistance; recognizes various colors and shapes	Retrieves items relevant to the lesson; recognizes and differentiates objects by color	Understands task requirements and works independently; follows the daily routine; recognizes colors, shapes, and shades; sorts items by size; categorizes objects by similarities and differences	Recognizes and names colors and differentiates objects by color; discriminates sounds and sorts them by tone	Understands verbal instructions; follows the daily routine; recognizes some colors; sorts items by size; categorizes objects and identifies similarities and differences

Table 2. Cont.

Modalities	PPA	PPB	PPC	PPD	PPE
Language and Symbols	Uses a limited set of approximately 10 short syllables and words to refer to loved ones, objects, and daily activities	When unwilling to engage in an activity, uses words such as “no”, “stop”, and names visible items, including animals, food, furniture, clothing, and vehicles, utilizing approximately 50 words daily	Speaks in extended sentences, describes pictures and arranges plot images in the correct order; can discuss personal experiences and immediate surroundings	Names visible items such as animals, food, furniture, clothing, and vehicles, utilizing approximately 10 words daily; sings songs in their unique language	Speaks in extended sentences to describe pictures; engages in discussions by asking and answering questions; shares information about themselves and their surroundings
Building Knowledge	Partially recognizes and names printed letters; repeats sounds, syllables, and some short words; independently writes their name almost correctly	Recognizes and names letters; counts to 10 and arranges numbers in ascending order; repeats sounds, syllables and many words; attempts to write their name	Recognizes almost all letters; counts to 100 and arranges numbers; answers questions with drawings and creations; independently writes their name and most letters	Recognizes some letters and names them; counts to 3; temporarily repeats sounds and words, naming visible objects	Recognizes the first letter of their name; knows numbers up to 5 and counts to 6; identifies circles and lines; attempts to write their name using a model
Multiple Means of Action and Expression					
Interaction	Employs gestures and syllables in communication; actively listens to teachers and peers; initiates peer interaction through physical proximity	Independently greets familiar peers and adults; demonstrates positive social engagement and communication through nonverbal cues and physical guidance to adults	Uses words, gestures, facial expressions; participates in cooperative play, creating game scenarios	Demonstrates positive social engagement and communication through nonverbal cues and physical guidance to parents	Demonstrates effective multimodal communication; actively listens; participates in cooperative play; interacts appropriately with peers and adults
Expression and Communication	Demonstrates both verbal and nonverbal communication, using “yes”, “no”, thumbs up/down gestures, syllables, and short words	Engages in self-talk during play, imitating sounds, using phrases, and singing	Communicates about activities and environments using sentences; actively participates in discussions	Uses their unique language	Uses complete sentences to discuss activities and environments; participates in discussions
Strategy Development	Demonstrates independent self-care skills (tidying, table clearing, dressing, restroom use)	Demonstrates independent play skills involving organization, construction, and role-playing	Demonstrates planning and organizational skills by developing game strategies, assigning roles, and creating scenarios with peers	Experiments with musical instruments; selects and performs songs	Demonstrates extensive knowledge of dinosaurs through research, drawing, and storytelling

Observations using the UDL modalities have revealed a wide range of acquired skills and interests across various domains, providing a rich dataset crucial for understanding individual learning profiles. These comprehensive data have highlighted not only the im-

portance of identifying children’s challenges, but also strengths to effectively support skill development. However, despite the observed skill acquisition, a range of difficulties and limitations in skill development are also evident and are discussed in the following section.

The next table, Table 3, describes individual participant profiles regarding skill development in relation to UDL principles. Challenges have been observed across all participants, but children with ASD (PPA, PPB, and PPD) face significantly greater difficulties in engagement, persistence, and emotional regulation. Specifically, all three children with ASD demonstrate considerable communication challenges stemming from limited expressive language skills, a prominent feature of ASD. These findings underscore the importance of tailored interventions to address these specific needs and promote positive learning outcomes.

Table 3. Areas from indirect and direct observation of the study participants requiring assistance.

	PPA	PPB	PPC	PPD	PPE
	Multiple Means of Engagement				
Interests and Identities	Exhibits fear of unexpected sounds and textures (A); demonstrates frequent destructive behavior; displays sensory sensitivities (OO); engages in oral exploration of objects regardless of edibility (OO)	Exhibits food selectivity, requiring separate, unblended food items (OO) and noise sensitivity (A)	Demonstrates physically aggressive behaviors towards others (A)	Struggles to disengage from musical activities, resorting to forceful actions to access resources (A)	Demonstrates a significant need for consistent individualized attention (A)
Effort and Persistence	Limited attention span (OO); requires frequent prompting and encouragement (OO)	Limited attention span (OO); requires frequent prompting and encouragement (OO)	Limited attention span (OO); responds to demanding tasks by leaving the activity (A)	Limited attention span (OO); frequently disengages from scheduled activities (A); requires frequent prompting and encouragement (OO)	Limited attention span (OO); requires frequent prompting and encouragement (OO); refuses to get dressed; disregards clothing; eats with hands (A)
Emotional Capacity	Tears up other children’s drawings (A); engages in physical confrontations and evades peers while enjoying being caught (A/OO)	Exhibits behavior like shouting and physically striking adults to obtain the desired item (A/OO)	Engages in physical confrontations with peers, demonstrating various martial arts techniques (A/OO)	Exhibits behaviors like crying, yelling, and falling with adults and engaging in kicking, hitting, and biting toward peers (A/OO)	Frequently cries and expresses sadness, showing a desire for the mother (A); struggles to understand tasks due to loud talking and laughing; inconsistently follows rules (A/OO)

Table 3. Cont.

	PPA	PPB	PPC	PPD	PPE
Multiple Means of Representation					
Perception	Needs guidance in daily routines (OO); experiences difficulties understanding tasks with multiple conditions (OO); story pictures are out of order (OO)	Needs guidance in daily routines (OO); experiences difficulties understanding verbal instructions and tasks with multiple conditions (OO)	Experiences difficulties in matching sounds and blending them to form syllables and words (OO)	Needs guidance in daily routines (OO); experiences difficulties understanding verbal instructions and tasks with multiple conditions (OO); unable to answer questions affirmatively or negatively (A)	Experiences difficulties in comprehending and following rules (OO)
Language and Symbols	Insufficient vocabulary (OO); difficulty understanding the meaning of symbols (A); unable to generalize similar objects or differentiate them by features (OO)	Utilizes English vocabulary (OO); names visible objects mechanically (NA)	The language contains profanity (A)	Utilizes English vocabulary (OO); names visible objects mechanically (OO)	Speech is mostly unintelligible due to poor articulation (OO)
Building Knowledge	Does not read (NA); mixes numbers and lacks counting skills (OO); acquired cognitive skills vary daily (NA)	Letters, numbers, and colors are identified in English (A)	Does not read (A)	The letters are identified in English (A); mixes numbers and lacks counting skills (A); acquired cognitive skills vary daily (NA)	Acquired cognitive skills vary daily (A)
Multiple Means of Action and Expression					
Interaction	Weak motor skills (A) and movement coordination (OO); gets tired easily during physical and cognitive activities; struggles to navigate unfamiliar environments (A)	Weak motor skills (A) and movement coordination (OO); struggles to navigate unfamiliar environments (A); functionally not engaged in role-plays and imitates the actions of other peers (NA)	Often interrupts the speaker emitting loud laughter (A); frequently knocks over objects or disrupts constructions (OO)	Weak fine motor skills (A); struggles to navigate unfamiliar environments (AA); resists the pulling of different clothes, new bedding, and avoids contact with water; functionally not engaged in role-plays (NA)	Weak motor skills (A) and movement coordination (A); frequently interrupts the speaker, emitting loud laughter, and playfully poking others seated beside them (A)
Expression and Communication	Does not speak in sentences (NA); rarely utilizes functional speech (OO)	Language is not used functionally (NA); does not make requests verbally (OO)	Vocal volume is reduced in regular communication (OO); uses profanity (A) and engages in arguments with peers (OO)	Language is not used functionally (NA); does not make requests verbally (OO)	Articulation is unclear and speech is primarily unintelligible (OO)

Table 3. Cont.

	PPA	PPB	PPC	PPD	PPE
Strategy Development	Does not understand long-term goals involving multi-step tasks (OO); does not engage in meaningful play with peers and lacks understanding of game rules (OO)	Does not understand long-term goals involving multi-step tasks (NA); does not engage in meaningful play with peers and lacks understanding of game rules (OO)	Experiences challenges in transitioning between activities (A)	Does not understand long-term goals involving multi-step tasks (NA); does not engage in meaningful play with peers and lacks understanding of game rules (OO)	Struggles to complete tasks independently (A)

The classification corresponds with the ZPD's evaluation standards, offering a lucid comprehension of each child's proficiency and necessary assistance for continued development, since it highlights various areas where support is significantly required. For instance, PPA shows limited expressive communication, attention deficits, and emotional dysregulation despite some understanding of instructions; he also has sensory sensitivities and disruptive behaviors. PPB enjoys repetitive movements, excels in task completion and categorization, but struggles with self-regulation and emotional control. PPC exhibits advanced communication and enjoys social interaction yet faces challenges with repetitive interests and transitions; they demonstrate independent self-care but still need support for some tasks. PPD likes hands-on tasks and music but struggles with focus, self-regulation, and communication, displaying repetitive behaviors and emotional dysregulation. PPE demonstrates significant challenges in attention, expressive language, emotional regulation, and self-care, alongside a markedly restricted interest profile limited almost exclusively to dinosaurs.

The assessment outlines each child's unique requirements, highlighting essential domains that necessitate individualized support in communication, attention, emotional regulation, and self-care. The next paragraph examines methods and strategies aligned with the three UDL principles and modalities. The paragraph addresses the research question concerning the most frequently used strategies and tools employed by preschool teachers to implement UDL in inclusive classrooms.

3.2. The Skill Acquisition of Participants Within the UDL Principles and Learning Modalities

The next Table 4 provides a thorough examination of methods and strategies aligned with the three UDL principles and modalities, addressing the research question regarding the most commonly used methods and strategies by preschool teachers for adopting UDL in inclusive classrooms. Strategies have been purposefully designed to address multiple means of engagement, representation, and action and expression. This includes the strategic use of visual supports, such as visual timers and schedules to enhance routine predictability, hands-on activities to cater to various learning styles and preferences, and motivation and attention-sustaining methods such as the token system and "Before" and "After" cards. Furthermore, recognizing the interconnectedness of UDL principles, lots of strategies have been implemented to simultaneously address multiple skill areas, fostering holistic skill development, and promoting a more inclusive and effective learning environment. Detailed results regarding the UDL principles and learning modalities are available in Table 4.

Table 4. The program of the UDL principles and learning modalities.

Provide Multiple Means of Engagement		
Welcoming Interests and Identities	Sustaining Effort and Persistence	Emotional Capacity
<ul style="list-style-type: none"> • A card with a positive reinforcer integrated into the visual daily plan before task commencement; • Bags from home for children to collect natural materials with peers; • Tasks promoting independence, such as cooking and setting the table; • Visits to parks or interactions with professionals, like pastry chefs, for positive reinforcers; • Visual timers and schedules to enhance routine predictability; • “BEFORE”, “AFTER”, and “BREAK” cards for improved structure; • Token systems incorporating positive reinforcement. 	<ul style="list-style-type: none"> • Clarification of the future activity’s goal and presentation of possible results during the “Morning Circle”; • Goal setting for long-term projects, such as planting a seed; • Project planning involving the entire kindergarten to gather various materials, like recycled paper and leaves; • Prompts or scaffolds to visualize desired outcomes, such as illustrating an insect’s life rhythm with visual aids; • The availability of various stationery types and colors for creative expression; • Praise and encouragement provided upon task completion; • Opportunities for peer-to-peer interactions, such as collaborative play or project work. 	<ul style="list-style-type: none"> • Selection of a seating area and surface for the “Morning Circle”; • Use of emoji signs to express feelings and attitudes; • Simulations or real-world scenarios to demonstrate coping mechanisms; • Implementation of calming strategies, such as breathing or tensing and relaxing exercises. • Circling the words “Yes” or “No” on paper or a blackboard, using signs for approval or denial, such as thumbs-up and thumbs-down.
Provide Multiple Means of Representation		
Perception	Language and Symbols	Building Knowledge
<ul style="list-style-type: none"> • A larger or closer card with a picture or word indicates the correct response and is emphasized; • Calendars, schedules, visual plans, and illustrative materials positioned at the child’s eye level; • Distinct types, fonts, sizes, and colored backgrounds for words, syllables, and letters; • Think-aloud exercises to offer insightful commentary on completed tasks; • The teacher’s speech delivered in a calm, expressive manner with moderate volume; • Goals, instructions, and rules for tasks repeated multiple times by various individuals in different settings; • Videos are paused during viewing to allow processing time and promote questioning and scenario building; • Use of diverse resources to illustrate concepts, including written words on pages, blackboards and sand, images on cards or in books, and real objects; • Various research tools utilized, such as binoculars, magnifying glasses, and glasses with different lens colors. 	<ul style="list-style-type: none"> • Use of Montessori sand letters and movable alphabets; • Use of Montessori sound pouches to enhance vocabulary; • Drawing letters and words on a tablet; • Reading and vocabulary enrichment tasks on the tablet; • Presentation of key concepts through symbolic representation alongside alternative forms, such as images, movement, videos, or audio. 	<ul style="list-style-type: none"> • Linking topics such as winter with safety rules, clothing, or vehicles; • Use of cues to highlight important concepts; • Learning traffic laws through cards, videos, games, and plays (covering traffic signals, sidewalks, and directional arrows), reinforced by excursions beyond the kindergarten’s territory; • Establishing clear requirements for the performance of each task; • Breaking tasks into detailed steps, represented visually; • Generalizing concepts by depicting dogs in various shapes, colors, shades; and breeds.

Table 4. Cont.

Provide Multiple Means of Action and Expression		
Interaction	Expression and Communication	Strategy Development
<ul style="list-style-type: none"> • Providing answers through hands-on activities by distributing images with words, syllables, or pictures around the space for children to locate; • Interaction via an interactive whiteboard for responses; • All equipment and materials placed within easy reach; • Use of gestures for answers when learning new verbs or modes of travel, such as mimicking swimming or cycling; • Placement of numbers and markers on the ground to indicate where to stand and navigate within the kindergarten group and territory, using different colored markers for various directions. 	<ul style="list-style-type: none"> • In the “Morning Circle”, encourage peers to respond in one word simultaneously; • Utilize various strategies for paper-based assessments, such as writing, coloring, tracing, connecting, or applying stickers; • Organize task performance or responses in pairs, or small groups to foster social interaction; • Employ cards depicting requests for breaks or assistance; • Facilitate role-plays to enhance social interaction; • Use calculators for answering math questions. 	<ul style="list-style-type: none"> • Use a visual plan to promote the sequencing of activities; • The achievable result is made visible during task performance; • Utilize video modeling for independent work; • Involve families in longer-term objectives, with tasks completed at home or in groups with relatives; • Provide choices regarding resource usage, collaboration for final work (individually, in pairs, or in groups), and the location of task completion; • Use achievement books to compile drawings, worksheets, photos, and other materials.

While UDL guidelines advocate for universal access to various learning modalities rather than separating strategies based on specific needs, furthermore, Table 5 “Personalized Methods and Strategies in Line with UDL Principles and Participant Needs”, focuses on strategies relevant to the specific needs of the participants. Children with ASD (PPA, PPB, PPD) have demonstrated more pronounced needs than other peers (PPC, PPE), especially regarding engagement, sensory processing, emotional regulation, and communication, requiring tailored support. While the UDL framework promotes diverse modalities for all, children with developed verbal skills do not require alternative communication methods. However, even they occasionally choose sensory aids like noise-canceling headphones or gloves during certain activities, such as sand play in the outdoor area, illustrating the value of choice in addressing individual sensory preferences.

The chosen strategies have enriched the children’s individualized education plans (IEP) across the pedagogical process in group settings, speech and language therapy sessions, and special education classes. It is important to emphasize that the implementation of the IEP-recommended methods has faced many challenges. Time constraints and teachers’ lack of knowledge have been the main reasons why not all the recommended methods are used effectively. Teachers, in collaboration with the support team, have prioritized strategies that are familiar and easier to learn, allowing for the use of certain approaches.

Although daily planning schedules and charts have also been used periodically in the past, they have regularly been updated during the study period. However, some methods, such as PECS communication cards, have been underused because only one teacher has mastered the use of cards. In addition, parental involvement, which was initially high, has decreased over time, potentially affecting the effectiveness of certain methods.

Strategies that have consistently been used include First/Then, cards, token systems, Montessori materials with special education support and speech therapy. Limitations on technology resources, such as microphones and interactive whiteboards, have highlighted the need for financial investment to improve the effectiveness of these methods in everyday learning.

Table 5. Personalized Methods and Strategies in Line with UDL Principles and Participant Needs.

Multiple Means of Engagement	
PPA	<ul style="list-style-type: none"> • Sensory overload considerations: use gardener’s gloves; • Sustain effort and persistence: use PECS cards for desired objects/activities; • Design emotional capacity: various prompts (verbal, gestural, physical, visual, and positional) and provide a modeling assistant.
PPB	<ul style="list-style-type: none"> • Sensory overload considerations: use noise-canceling headphones; • Sustain effort and persistence: use PECS cards for desired objects/activities; • Design emotional capacity: various prompts (verbal, gestural, physical, visual, positional) and provide a modeling assistant.
PPC	Sustain effort and persistence: organize competitions in various activities with strict rules.
PPD	<ul style="list-style-type: none"> • Specific interests and sensory needs: use tokens with music-related symbols; • Sustain effort and persistence: use PECS cards for desired objects/activities; • Design emotional capacity: various prompts (verbal, gestural, physical, visual, positional) and provide a modeling assistant.
PPE	Specific interests: incorporate dinosaur-themed tokens in the token economy system.
Multiple Means of Representation	
PPA	<ul style="list-style-type: none"> • Enhance perception: child records own voice and adds pictures to the written content; • Design options for language/symbols: supplement graphic symbols with written words, tangible representations, and actual counting; • Promote reading: split words into sounds, syllables, or corresponding symbols.
PPB	<ul style="list-style-type: none"> • Enhance perception: child records own voice and adds pictures to the written content; • Design options for language/symbols: supplement graphics with written words; use Latvian and English concepts.
PPC	Promote reading and math skills: use visual representations and vocabulary improvements through synonyms.
PPD	<ul style="list-style-type: none"> • Enhance perception: child records own voice and adds pictures to the written content; • Design options for language/symbols: supplement graphics with written words; use Latvian and English concepts.
PPE	Encourage math skills and comprehension: create tangible representations and use synonyms for vocabulary improvement.
Multiple Means of Action and Expression	
PPA	<ul style="list-style-type: none"> • Design options: use stationery with lower pressure; • Promote independence: tactile labels for navigation; • Encourage communication: use a toy microphone and PECS cards.
PPB	<ul style="list-style-type: none"> • Design options: use stationery with lower pressure; • Promote independence: tactile labels for navigation; • Encourage communication: use a toy microphone and PECS cards.
PPD	<ul style="list-style-type: none"> • Design options: use stationery with lower pressure; • Promote independence: tactile labels for navigation; • Encourage communication: use a toy microphone and PECS cards.

The following analysis in the next paragraph outlines the UDL modalities, methods, and strategies corresponding to all three principles—multiple means of engagement, multiple means of representation, and multiple means of action and expression. The evaluation of children’s skill development in this chapter utilizes specific criteria—acquired (A), not acquired (NA), and ongoing observation (OO)—as outlined in Table 3, which highlights areas requiring assistance.

3.2.1. Multiple Means of Engagement

Addressing sensory needs has varied: gardener's gloves (Acquired—PPA) and gloves with noise-canceling headphones (Acquired—PPB) have effectively managed sensory overload. Competition (Acquired—PPC) has effectively sustained effort, but further observation (Ongoing Observation—PPA, PPB, PPD, and PPE) is needed for its effectiveness with others. Various prompting methods (Ongoing Observation—all participants) have been used for emotional capacity development; continued monitoring is crucial. For PPD, the use of music-related tokens (Acquired) has proved highly effective in maintaining engagement, leveraging their specific interest. Similarly, incorporating dinosaur-themed tokens (Acquired) into the token economy system for PPE has successfully fostered participation, aligning with their individual interest. Video modeling has successfully promoted desired behaviors (Acquired—all participants); yet, in a variety of unexpected situations (Ongoing Observation—all participants), such as modifications to daily routine, behavior has periodically resurfaced.

3.2.2. Multiple Means of Representation

Different types of materials and methods (Ongoing Observation—PPA, PPB, and PPD) have enhanced perception. Supplementing graphic symbols with written words and tangible representations (Ongoing Observation—all participants, except Acquired for PPC) has improved comprehension. PPA has acquired the meanings of most symbols utilized in the program and PPC has significantly diminished the use of profanity in their vocabulary. A bilingual approach (Acquired—PPB, PPD; Not Applicable—PPA, PPC, PPE) has enhanced comprehension. Similarly, the use of synonyms to improve vocabulary has shown effectiveness for all participants. PPC is currently reading syllables and short words, indicating progress in literacy acquisition, while PPD has acquired numbers and the ability to count to 10, but PPE has acquired skills to demonstrate consistency in daily activities.

3.2.3. Multiple Means of Action and Expression

Low-pressure stationery (Acquired—all participants) has increased comfort. Tactile labels (Acquired—PPA, PPB, and PPD) have improved navigation and independence. PPB and PPD still encounter difficulties engaging in functional play with peers, while PPC and PPE have shown improvements in listening skills and meaningful participation in daily routine activities. Using a toy microphone and, where applicable, PECS cards (Ongoing Observation—PPA, PPB, and PPD), has improved effectiveness in terms of communication and requesting desired toys and activities; however, they still do not use language functionally. Prompts, video modeling, and reinforcements have been used to support strategy development for communication with peers, role-plays, and independency (Ongoing Observation—PPA, PPB, PPD); therefore, long-term assessment is needed.

In conclusion, the diverse strategies implemented across various methods of engagement, representation, action, and expression have demonstrated varying degrees of effectiveness in promoting skills and participation among participants. Continued adaptation and individualized support are essential to further enhance communication and social interactions, especially for those still facing challenges in functional play and language use.

4. Discussion

While the neurodiversity discourse (e.g., [Timimi, 2014](#)) questioning the utility of rigid diagnostic labels and highlighting blurred boundaries within ASD raises important considerations ([Timimi et al., 2019](#)), our study suggests that focusing on functional needs through UDL can promote greater inclusivity. Our findings align with studies by [Seok et al. \(2018\)](#), [Ayuso-del Puerto and Gutiérrez-Esteban \(2022\)](#), [King-Sears et al. \(2023\)](#),

demonstrating that UDL strategies benefit not only children with ASD but also those with speech/language disorders and social, emotional, and behavioral difficulties. The UDL framework inherently promotes accessibility for all learners, aligning with the broader goal of inclusive education (UNESCO, 2021). This prompts reflection on whether societal labels and categorization help or hinder social justice, or if embracing neurodiversity as a natural variation—without strict diagnostic distinctions—might be more effective. Policy at the societal level could shift towards flexible, needs-based frameworks that challenge normative standards and foster true inclusion beyond diagnostic labels.

The study has utilized a mixed-methods approach, combining direct and indirect observation. Indirect observation, through meetings with parents and teachers, has provided crucial contextual information regarding individual needs (Section 2.1). Direct observation, focusing on structured activities and a UDL intervention, has systematically analyzed children's responses using a three-level coding system: Acquired (A), Not Acquired (NA), and Ongoing Observation (OO) (Table 3). The approach has offered a nuanced understanding of skill development within Vygotsky's Zone of Proximal Development (ZPD) framework (Vygotsky, 1978), assessing skills across independent performance, performance with support, and an inability to perform even with assistance. The UDL guidelines emphasize the importance of supporting all children, recognizing that relevant diagnoses may not always be promptly established, and that autism's comorbidity with other disorders and its diverse spectrum of characteristics can vary significantly (American Psychiatric Association [APA], 2000). It is essential to highlight that while children with ASD possess distinct demands and challenges in adapting to preschool education, other children may also have comparable challenges, but not necessarily evident or recognizable until certain teaching approaches and strategies are implemented.

Analysis of teaching practices has revealed a diverse range of UDL strategies and tools, reflecting the flexible and adaptable nature of UDL. The results highlight the significance of personalized approaches to address diverse needs. Frequently observed strategies included video modeling, tactile labels, picture cards and graphic symbols, and a variety of prompting techniques (e.g., PECS cards, verbal reinforcement, and physical prompts) (refer to Tables 2 and 3 for examples). The successful integration of children's individual interests (e.g., music for PPD or dinosaurs for PPE) has significantly impacted their engagement and learning outcomes, aligning with research emphasizing the benefits of tailored strategies for children with ASD. Employing motivation-enhancing strategies and predictability-enhancing techniques, such as First/Then, cards, token systems, visual timers, and structured plans on daily, weekly, monthly, and annual bases have facilitated children's comprehension of task execution, the necessary duration of effort, and engagement in their daily routines. These strategies function as catalysts for behavioral sustainability and motivation among all children engaged with them, enhancing the social environment of the entire group.

Analysis of children's responses to UDL-designed learning experiences has revealed positive impacts on skill development and inclusion, supporting the effectiveness of UDL in inclusive preschool settings. However, significant individual differences have emerged, highlighting the necessity of ongoing monitoring and adapting UDL strategies to meet diverse needs. PPC, for example, has demonstrated significant progress across multiple skills (Table 2), exhibiting a strong positive response to UDL, as evidenced by independent use of literacy skills, transitioning from the 'Developing' to the 'Acquired' level within the ZPD framework. In contrast, PPA, PPB, and PPD continue to face challenges (Table 3). PPA has shown ongoing difficulties (OO) in expressive communication and emotional regulation; PPB struggles (OO) with self-regulation and emotional control; and PPD has demonstrated persistent difficulties (OO) with attention and focus. These challenges may

stem from underlying sensory sensitivities (PPA), difficulties with executive functioning (PPB) and emotional dysregulation impacting attention (PPD) which aligns with the main characteristics of ASD. PPE, while having improved self-care skills and progressed to the 'Proficient' level in independent self-care routines, still presents challenges in expressive language and emotional regulation, despite utilizing video modeling and prompting techniques. The multifaceted assessment approach, using Vygotsky's Zone of Proximal Development, has proved crucial in identifying areas requiring additional support to bridge the gap between the children's current capabilities and their potential. This individualized approach to assessment and intervention aligns with the principles of inclusive education and the UDL framework, emphasizing the importance of flexibility and adaptation to meet the diverse needs of young learners.

Future research should focus on exploring the long-term impacts of UDL implementation on both student outcomes and teacher practices in diverse educational contexts. Investigating the scalability and sustainability of strategies across different school systems and cultural settings can provide deeper insights into how UDL can be most effectively embedded into everyday teaching. Addressing these areas will contribute to a more comprehensive understanding of how to optimize inclusive education and maximize the benefits of UDL for diverse populations.

5. Conclusions

The main findings of the study, which indicate that practical methods and observational tools are available for analyzing children's responses to UDL implementation in inclusive preschool settings, are based on observations using UDL modalities. Results demonstrate the effectiveness of a multifaceted approach to supporting the development of skills in preschool children. Meanwhile, it has been essential to assess the specific needs of each child, which is necessary not only to identify limitations and difficulties, but also by carefully observing acquired skills and special interests. Specific interests have significantly improved the effectiveness of the methods used and strategies implemented, increasing motivation and thereby ensuring access to desired activities and materials. Data collection has been carried out using a variety of methods—information from children's legal representatives, teachers, and an independent observer, recognizing that children's behavior and demonstration of skills in different environments and interactions can vary significantly. To ensure thorough analysis, repeated observations of different activities have been made, provided by video recordings, which have allowed for detailed examination of nuanced behavior. Finally, Vygotsky's Zone of Proximal Development framework has provided a structured method for assessing skill acquisition.

Analysis of implemented UDL strategies, addressing the research question concerning frequently used strategies and tools, has revealed several prominent approaches. The implementation of methods and strategies has been influenced by the existing professional competence of teachers, because of which certain strategies, such as alternative communication methods, have not been used consistently. However, communication challenges in children with ASD restrict social interaction with peers and adults, engagement in daily activities, and promote problem behavior, which is why their use is crucial. Meanwhile, several methods and strategies have been proven to be particularly effective—positive reinforcement, various prompting techniques, visual timers, and a token economy system were often used to promote engagement and motivation. Notably, multiple strategies, including visual daily schedules, which had previously been employed but later abandoned, are utilized more frequently during the observation period, thus positively influencing the preschool educational process. It should be noted that classroom assistants play a vital

role in ensuring consistent strategy implementation; however, further research is needed to fully evaluate the long-term impact and refine these strategies for optimal effectiveness.

Addressing the research question concerning children's responses to UDL-designed learning experiences reveals largely positive outcomes. While individualized adaptations have proven crucial, especially for children with ASD, the overall results demonstrate improvements in engagement, persistence, and emotional regulation across all participants. The consistent application of UDL principles has fostered a more inclusive and supportive learning environment, by enhancing the quality of preschool education and promoting skill development for all children. This highlights UDL's capacity to establish sustainable educational approaches that address the requirements of different learners. However, achieving UDL's full potential necessitates continuous professional development for educators in the application of varied strategies, together with the help of classroom assistants to guarantee consistent and effective implementation. Only via constant application can the true effectiveness and long-term sustainability of UDL principles be adequately evaluated.

Author Contributions: Conceptualization, I.T. and D.B.; methodology, I.T., D.B., P.J. and V.L.; formal analysis, I.T., D.B., P.J. and V.L.; data curation, I.T. and D.B.; writing—original draft preparation, I.T., D.B., P.J. and V.L.; writing—review and editing, I.T., D.B., P.J. and V.L.; visualization, P.J.; supervision, D.B. and V.L.; funding acquisition, I.T. All authors have read and agreed to the published version of the manuscript.

Funding: This work has been supported by the EU Recovery and Resilience Facility within the Project No. 5.2.1.1.i.0/2/24/I/CFLA/003 "Implementation of consolidation and management changes at Riga Technical University, Liepaja University, Rezekne Academy of Technology, Latvian Maritime Academy and Liepaja Maritime College for the progress towards excellence in higher education, science and innovation" academic career doctoral grant (ID 1043).

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of Research Committee of Riga Technical University (protocol code 04000-10.1-e/11 at 17 March 2025).

Informed Consent Statement: Informed consent has been obtained from all subjects involved in the study.

Data Availability Statement: The individual student assessments and video recordings collected for this study have been anonymized and permanently deleted after data processing and analysis to ensure participant privacy.

Conflicts of Interest: The authors declare no conflicts of interest.

References

- Ainscow, M., Booth, T., & Dyson, A. (2006). Inclusion and the standards agenda: Negotiating policy pressures in England. *International Journal of Inclusive Education*, 10(4–5), 295–308. [CrossRef]
- Ainscow, M., & Kaplan, I. (2005). Using evidence to encourage inclusive school development: Possibilities and challenges. *Australasian Journal of Special Education*, 29(2), 106–116. [CrossRef]
- Albers, E. M., Riksen-Walraven, J. M., & de Weerth, C. (2010). Developmental stimulation in child care centers contributes to young infants' cognitive development. *Infant Behavior and Development*, 33(4), 401–408. [CrossRef]
- Almumen, H. A. (2020). Universal design for learning (UDL) across cultures: The application of UDL in Kuwaiti inclusive classrooms. *Sage Open*, 10(4), 1–14. [CrossRef]
- American Psychiatric Association (APA). (2000). *Diagnostic and statistical manual of mental disorders* (4th ed.). American Psychiatric Association.
- Arace, A., Prino, L. E., & Scarzello, D. (2021). Emotional competence of early childhood educators and child socio-emotional wellbeing. *International Journal of Environmental Research and Public Health*, 18(14), 7633. [CrossRef]
- Ayuso-del Puerto, D., & Gutiérrez-Esteban, P. (2022). Achieving universal digital literacy through universal design for learning in open educational resources. *Educational Change*, 26, 1–18. [CrossRef] [PubMed]

- Basham, J. D., Blackorby, J., & Marino, M. T. (2020). Opportunity in crisis: The role of universal design for learning in educational redesign. *Learning Disabilities: A Contemporary Journal*, 18(1), 71–91. Available online: <https://eric.ed.gov/?id=EJ1264277> (accessed on 4 March 2025).
- Bauminger-Zviely, N., & Shefer, A. (2021). Naturalistic evaluation of preschoolers' spontaneous interactions: The autism peer interaction observation scale. *Autism*, 25(6), 1520–1535. [CrossRef]
- Berlach, R. G., & Chambers, D. J. (2011). Interpreting inclusivity: An endeavor of great proportions. *International Journal of Inclusive Education*, 15(5), 529–539. [CrossRef]
- Booth, T., Ainscow, M., Black-Hawkins, K., Vaughan, M., & Shaw, L. (2000). *Índice de inclusión. Desarrollando el aprendizaje y la participación en las escuelas*. Ministerio de Educación. Available online: <https://unesdoc.unesco.org/ark:/48223/pf0000138159> (accessed on 4 March 2025).
- Bouillet, D., & Domović, V. (2021). Capacities of early childhood education professionals for the prevention of social exclusion of children. *International Journal of Educational and Pedagogical Sciences*, 15(11), 957–963. Available online: <http://morenec.ufzg.hr/wp-content/uploads/2022/06/capacities-of-early-childhood-education-professionals-for-the-prevention-of-social-exclusion-of-children-1.pdf> (accessed on 4 March 2025).
- CAST. (2024). *Universal design for learning guidelines version 3.0*. Available online: <https://udlguidelines.cast.org> (accessed on 4 March 2025).
- Chen, D., & Dote-Kwan, J. (2021). Preschoolers with visual impairments and additional disabilities: Using universal design for learning and differentiation. *Young Exceptional Children*, 24, 70–81. [CrossRef]
- Coburn, A., & Gormally, S. (2017). Social justice and equality. *Counterpoints*, 483, 51–76. Available online: <https://www.jstor.org/stable/45177771> (accessed on 4 March 2025).
- Committee on Social Affairs, Health and Sustainable Development. (2020, October 21). *Supporting people with autism and their families* (S. Fataliyeva, Rapporteur, Provisional version). Available online: <https://assembly.coe.int/LifeRay/SOC/Pdf/TextesProvisoires/2020/20201021-AutismSupport-EN.pdf> (accessed on 21 May 2025).
- Creswell, J. W. (2014). *Research design: Qualitative, quantitative and mixed methods approaches* (4th ed.). Sage.
- Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. Harper & Row.
- European Agency for Special Needs and Inclusive Education (EASNIE). (2017). *Inclusive early childhood education: New insights and tools—Contributions from a european study* (M. Kyriazopoulou, P. Bartolo, E. Björck-Åkesson, C. Giné, & F. Bellour, Eds.). European Agency for Special Needs and Inclusive Education. Available online: <https://www.european-agency.org/resources/publications/inclusive-early-childhood-education-new-insights-and-tools-contributions> (accessed on 21 May 2025).
- European Commission: Directorate-General for Employment, Social Affairs and Inclusion. (2021). *The european pillar of social rights action plan*. Publications Office. Available online: <https://op.europa.eu/webpub/empl/european-pillar-of-social-rights/en/> (accessed on 20 May 2025).
- Fernell, E., Eriksson, M. A., & Gillberg, C. (2013). Early diagnosis of autism and impact on prognosis: A narrative review. *Clinical Epidemiology*, 5, 33–43. [CrossRef]
- Florian, L. (2005). Inclusion, special needs, and the search for new understandings. *Support for Learning*, 20(2), 96–98. [CrossRef]
- Florian, L. (2008). Inclusion: Special or inclusive education: Future trends. *British Journal of Special Education*, 35, 202–208. [CrossRef]
- Florian, L., & Black-Hawkins, K. (2011). Exploring inclusive pedagogy. *British Educational Research Journal*, 37(5), 813–828. [CrossRef]
- Forlin, C. (2012). *Future directions for inclusive teacher education*. Routledge.
- Fundelius, E., Wade, T., Robbins, A., Wang, S., McConomy, M. A., & Fumero, K. (2023). Universal design principles for multimodal representation in literacy activities for preschoolers. *Inclusive Practices*, 2(1), 13–21. [CrossRef]
- Gardner, H. E. (2011). *Frames of mind: The theory of multiple intelligences*. Basic Books.
- Gauvreau, A. N., Lohmann, M. J., & Hovey, K. A. (2019). Using a universal design for learning framework to provide multiple means of representation in the early childhood classroom. *Journal of Special Education Apprenticeship*, 8(1), 1–13. [CrossRef]
- Graham, L. J., & Jahnukainen, M. (2011). Wherefore art thou, inclusion? Analyzing the development of inclusive education in New South Wales, Alberta and Finland. *Journal of Education Policy*, 26(2), 263–288. [CrossRef]
- Guðjónsdóttir, H., & Óskarsdóttir, E. (2016). Inclusive education, pedagogy and practice. In *Science education towards inclusion* (pp. 7–22). Nova Science Publishers, Inc.
- Ho, H. S., Yi, H., Griffiths, S., Chan, D. F., & Murray, S. (2014). 'Do It Yourself' in the parent–professional partnership for the assessment and diagnosis of children with autism spectrum conditions in Hong Kong: A qualitative study. *Autism*, 18(7), 832–844. [CrossRef]
- Jónsson, Ó. P. (2016). Democratic and inclusive education in iceland: Transgression and the medical gaze. *Nordic Journal of Social Research*, 7(2), 77–92. [CrossRef]
- Kalambouka, A., Farrell, P., Dyson, A., & Kaplan, I. (2005). The impact of population inclusivity in schools on student outcomes. In *Research evidence in education library*. EPPI-Centre, Social Science Research Unit, Institute of Education, University of London. Available online: https://eppi.ioe.ac.uk/cms/Portals/0/PDF%20reviews%20and%20summaries/incl_rv3.pdf?ver=2006-03-02-124937-203 (accessed on 4 March 2025).

- King-Sears, M. E., Stefanidis, A., Evmenova, A. S., Rao, K., Mergen, R. L., Owen, L. S., & Strimel, M. M. (2023). Achievement of learners receiving UDL instruction: A meta-analysis. *Teaching and Teacher Education*, 122, 103956. [CrossRef]
- Koegel, L. K., Koegel, R. L., Ashbaugh, K., & Bradshaw, J. (2013). The importance of early identification and intervention for children with or at risk for autism spectrum disorders. *International Journal of Speech-Language Pathology*, 16(1), 50–56. [CrossRef] [PubMed]
- Little, L. M., Ausderau, K., Sideris, J., & Baranek, G. T. (2015). Activity participation and sensory features among children with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 45, 2981–2990. [CrossRef]
- Lohmann, M. J., Hovey, K. A., & Gauvreau, A. N. (2023). Universal design for learning (UDL) in inclusive preschool science classrooms. *Journal of Science Education for Students with Disabilities*, 26, 1–12. [CrossRef]
- Lozman, T. (2009). Straight talk about inclusive education. *CASS Connections*, 6(4), 43–47.
- LR Izglītības Kvalitātes Valsts Dienests (State Education Quality Service of the Republic of Latvia). (2022). *Pašvērtēšana (Self-assessment)*. Published 17 August 2022; Updated 25 May 2024. Available online: <https://www.ikvd.gov.lv/lv/pasvertesana> (accessed on 4 March 2025).
- LR Valsts Izglītības Satura Centrs—VISC (State Education Quality Service of the Republic of Latvia). (n.d.). *Pirmsskolas mācību programma (preschool curriculum)*. Available online: <https://mape.gov.lv/catalog/materials/1F6E6155-9FAF-4B29-A41D-A3AF9A965B4F/view> (accessed on 4 March 2025).
- Maenner, M. J., Shaw, K. A., Baio, J., Washington, A., Patrick, M., DiRienzo, M., Christensen, D. L., Wiggins, L. D., Pettygrove, S., Andrews, J. G., Lopez, M., Hudson, A., Baroud, T., Schwenk, Y., White, T., Rosenberg, C. R., Lee, L.-C., Harrington, R. A., Huston, M., . . . Dietz, P. M. (2020). Prevalence of autism spectrum disorder among children aged 8 years—Autism and developmental disabilities monitoring network, 11 sites, the United States, 2016. *MMWR Surveillance Summary*, 69, 1–12. [CrossRef]
- Mārtinsons, K., Pipere, A., & Kamerāde, D. (2016). *Pētniecība: Teorija un prakse/research: Theory and practice/*. RaKa.
- Meyer, A., Rose, D. H., & Gordon, D. (2014). *Universal design for learning: Theory and practice*. CAST Professional Publishing.
- Moffat, T. (2022). The beauty of universal design for learning (UDL) and why everyone in early childhood education and intervention should be using it. *Kairaranga*, 23, 66–73. [CrossRef]
- OECD. (2023). *Equity and inclusion in education: Finding strength through diversity*. OECD Publishing. [CrossRef]
- Petersson-Bloom, L., & Bölte, S. (2022). “Now We All Share the Same Knowledge Base”—Evaluating professional development targeting preschool staff’s understanding of autism and inclusion skills. *Frontiers in Education*, 7, 846960. [CrossRef]
- Posserud, M. B., Skretting Solberg, B., Engeland, A., Haavik, J., & Klungsoyr, K. (2021). Male to female ratios in autism spectrum disorders by age, intellectual disability and attention-deficit/hyperactivity disorder. *Acta Psychiatrica Scandinavica*, 144(6), 635–646. [CrossRef]
- Ros, R., & Graziano, P. A. (2019). A transdiagnostic examination of self-regulation: Comparisons across preschoolers with ASD, ADHD, and typically developing children. *Journal of Clinical Child & Adolescent Psychology*, 49(4), 493–508. [CrossRef]
- Rose, D., & Meyer, A. (2002). *Teaching every student in the digital age: Universal design for learning*. Association for Supervision and Curriculum Development (ASCD).
- Sanches-Ferreira, M., Gonçalves, J. L., Araújo, S. B., Alves, S., & Barros, S. (2022). Building inclusive preschool classrooms: How desirable and feasible is a set of strategies that facilitate teacher-child relationships? *Frontiers in Education*, 7, 944822. [CrossRef]
- Seok, S., DaCosta, B., & Hodges, C. (2018). A systematic review of empirically based universal design for learning: Implementation and effectiveness of universal design in education for students with and without disabilities at the postsecondary level. *Open Journal of Social Sciences*, 6(5), 171. [CrossRef]
- Siller, M., Morgan, L., Wedderburn, Q., Fuhrmeister, S., & Rudrabhatla, A. (2021). Inclusive early childhood education for children with and without autism: Progress, barriers, and future directions. *Frontiers in Psychiatry*, 12, 754648. [CrossRef]
- Symeonidou, S., & Loizou, E. (2023). Bridging early childhood education and inclusive practices in classrooms that serve children with disabilities: A narrative portrait. *European Early Childhood Education Research Journal*, 31(1), 92–105. [CrossRef]
- Taylor, K., Neild, R., & Fitzpatrick, M. (2023). Universal design for learning: Promoting access in early childhood education for deaf and hard of hearing children. *Perspectives on Early Childhood Psychology and Education*, 5, 4. [CrossRef]
- Timimi, S. (2014). No more psychiatric labels: Why formal psychiatric diagnostic systems should be abolished. *International Journal of Clinical and Health Psychology*, 14(3), 208–215. [CrossRef]
- Timimi, S., Milton, D., Bovell, V., Kapp, S., & Russell, G. (2019). Deconstructing diagnosis: Four commentaries on a diagnostic tool to assess individuals for autism spectrum disorders. *Autonomy (Birmingham, England)*, 1(6), AR26. Available online: <https://pmc.ncbi.nlm.nih.gov/articles/PMC6687500/> (accessed on 21 May 2025).
- Trudge, J. R. H., & Winterhoff, P. A. (1993). Vygotsky, Piaget, and Bandura: Perspectives on the relations between the social world and cognitive development. *Human Development*, 36, 61–81. [CrossRef]
- UNESCO. (2021). *Inclusive early childhood care and education: From commitment to action*. UNESCO. Available online: <https://unesdoc.unesco.org/ark:/48223/pf0000378076> (accessed on 4 March 2025).
- United Nations. (2015). *Sustainable development goals (SDGs), target 4*. Available online: <https://www.undp.org/sustainable-development-goals/quality-education> (accessed on 4 March 2025).

- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
- West, A. (2020). Legislation, ideas and pre-school education policy in the twentieth century: From targeted nursery education to universal early childhood education and care. *British Journal of Educational Studies*, 68(5), 567–587. [[CrossRef](#)]
- Wood, R. (2015). To be cared for and to care: Understanding theoretical conceptions of care as a framework for effective inclusion in early childhood education and care. *Child Care in Practice*, 21(3), 256–265. [[CrossRef](#)]
- Zwaigenbaum, L., Brian, J., & Ip, A. (2019). Early detection for autism spectrum disorder in young children. *Paediatrics & Child Health*, 24(7), 424–432. [[CrossRef](#)]

Disclaimer/Publisher’s Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.