

REVIEW

Bridging Futures Literacy and Inclusive Education in Higher Education: A Simplex Approach Based on Probabilistic Forecasting

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ABSTRACT

This article examines the emerging intersection between futures literacy and inclusive education in higher education, with particular attention to students with learning disabilities. Futures literacy, understood as the capacity to use the future to inform present decisions, is increasingly recognized as a key competence for navigating uncertainty in rapidly changing social, technological, and environmental contexts. In parallel, inclusive education has evolved from deficit-based models toward approaches emphasizing participation, accessibility, and the pedagogical value of cognitive diversity. Through a critical narrative review of primary and secondary sources published between 2014 and 2025, the study identifies significant epistemological and methodological convergences between the two fields. The analysis is organized along a deductive-dominant framework articulated across four analytical dimensions (pedagogical, technological, political-institutional, and socio-cultural), and draws on the theory of simplicity and probabilistic anticipation as its epistemological foundation. Constructivist pedagogies, scenario-based methodologies, and emerging technologies—including artificial intelligence and digital assistive tools—are discussed as enabling mechanisms that can support both anticipatory thinking and inclusion. The analysis also identifies structural and cultural challenges related to faculty preparedness, institutional capacity, digital accessibility, and attitudes toward disability. By integrating these insights, the review proposes the concept of “inclusive anticipatory pedagogy,” an integrated framework in which futures literacy and inclusive education strengthen one another. It argues that cognitively diverse learning environments can enhance futures thinking, while futures-oriented approaches can expand the transformative potential of inclusive education. The study concludes by outlining research priorities and

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policy recommendations for institutions aiming to develop inclusive, future-ready systems.

Keywords: Futures Literacy; Inclusive Education; Simplicity; Anticipatory Pedagogy; Higher Education; Neurodiversity; Adaptive Artificial Intelligence

1. Introduction

1.1. Contemporary Educational Context and Challenges

Contemporary education operates within a context of increasing complexity and accelerated change. As highlighted in the United Nations Educational, Scientific and Cultural Organisation (UNESCO)'s 2024 report *Humanistic Futures of Learning*^[1], educational institutions are simultaneously confronted with digital transformation, the climate crisis, demographic shifts, and profound redefinitions of work induced by automation and artificial intelligence. This convergence of disruptive forces raises a fundamental question: how can education prepare new generations not only to adapt to uncertain futures, but to actively participate in their making? Miller, in his seminal work *Transforming the Future* (2018)^[2], argues that the answer lies in cultivating futures literacy as a universal human capability. Unlike traditional forecasting, which assumes the possibility of predicting a single future, futures literacy acknowledges the multiplicity of possible futures and develops the competence to consciously use anticipatory imagination to inform present decisions. This competence, according to Miller, is not innate but can be systematically cultivated through structured pedagogical practices.

Parallel to these developments, the field of inclusive education has undergone a profound paradigmatic evolution. As documented by Meda et al. in their 2023 study on inclusive education in the United Arab Emirates^[3], the field has shifted away from deficit-based models, which conceived disability as an individual limitation to be compensated for, toward approaches grounded in the recognition of human potential and the removal of systemic barriers. In the context of learning disabilities, including dyslexia, dyscalculia, Attention-Deficit/Hyperactivity Disorder (ADHD), dyspraxia, and dysgraphia, this shift implies rethinking educational environments according to the principles of Universal Design for Learning (UDL), where accessibility is not an afterthought but is embedded from the outset in curriculum

design, assessment, and learning spaces.

The convergence between futures literacy and inclusive education opens unexplored yet promising pathways. If the goal of futures literacy is to democratize access to the construction of futures, and if inclusive education seeks to ensure full participation for all students regardless of cognitive characteristics, then their integration becomes not only desirable but necessary. How can foresight methodologies such as scenario planning be adapted to valorize neurodiversity? In what ways can students with learning disabilities not only benefit from but also actively contribute to the creation of future educational visions? Which emerging technologies can simultaneously support anticipatory competencies and inclusion?

1.2. Theoretical Foundations

1.2.1. Simplicity and Probabilistic Anticipation in Education

The epistemological articulation of simplicity, as originally elaborated by Alain Berthoz^[4], offers a particularly fertile conceptual framework for rethinking futures literacy and inclusive education in higher education through the lens of probabilistic anticipation, understood not merely as a methodological device but as an intrinsic principle of simplex systems capable of navigating complexity through adaptive simplification. In Berthoz's perspective, simplicity does not denote simplification in a reductive sense, but rather a strategy of life that enables organisms to act effectively in complex environments by selecting, anticipating, and projecting possible scenarios, thereby transforming uncertainty into a manageable cognitive horizon^[4]. This anticipatory capacity is inherently probabilistic, as it relies on the brain's ability to simulate multiple potential futures and to assign them differential plausibility, thereby guiding action in the present through what may be defined as embodied forecasting. In this sense, probabilistic anticipation is not external to simplicity. Still, it constitutes one of its foundational principles, insofar as it allows systems to reduce the infinite variability

of the real into a finite set of actionable hypotheses.

This foundational framework has since been substantially extended: in his 2023 monograph *La semplicità: Proprietà e principi per agire il cambiamento* (Simplexity: Properties and Principles for Enacting Change), Sibilio articulates the specific properties and principles of simplexity, including inhibition, vicariance, cooperative action, and probabilistic anticipation, as operational guides for educational design in contexts of complexity and change^[5]. The paradigm could be extended into the educational domain, proposing simplexity as a pedagogical criterion capable of mediating between the irreducible complexity of learning processes and the necessity of designing accessible and inclusive environments^[6]. This theoretical proposal has since received empirical support: Aiello et al. (2023) demonstrated that a simplex-informed approach to Italian teacher education programmes significantly develops educators' sense of pedagogical agency in inclusive settings^[7]. Di Paolo and Zollo (2022) further explored the relationship between simplexity and special education, arguing that its vicarious and cooperative principles offer a generative basis for supporting neurodivergent learners through multimodal experiences^[8].

Within this framework, anticipation becomes a central educational competence, enabling learners to orient themselves within uncertain and dynamically evolving contexts, in alignment with the principles of futures literacy as articulated by Miller^[2], UNESCO^[1], Johnston et al.^[9], and Isidori et al.^[10]. Indeed, the capacity “to use the future to inform present decisions” resonates deeply with the simplex logic of anticipatory action, suggesting that futures literacy can be interpreted as an educational operationalization of simplexity, in which probabilistic reasoning, scenario construction, and imaginative projection converge to support adaptive decision-making. This convergence is particularly significant in the context of inclusive higher education, where the diversity of cognitive profiles requires pedagogical approaches capable of accommodating multiple ways of perceiving, processing, and anticipating reality^[3,11].

From this perspective, the integration of simplexity and probabilistic anticipation enables the construction of what may be defined as an inclusive anticipatory epistemology, in which complexity is neither eliminated nor passively endured, but actively reconfigured through strategies that enhance both intelligibility and participation. As Berthoz

emphasizes, the brain constantly pre-acts the future by generating internal models that anticipate sensory and motor outcomes, a process that is fundamentally probabilistic and that allows for rapid and flexible adaptation to changing conditions^[4]. When translated into educational practice, this principle suggests that learning environments should be designed to support anticipatory cognition, providing students with opportunities to explore alternative futures, to engage with uncertainty, and to develop strategies for navigating ambiguity. Scenario planning, horizon scanning, and other foresight methodologies thus become not only tools for strategic planning but also pedagogical devices that embody the simplex principle of probabilistic anticipation^[12,13].

In inclusive contexts, this approach acquires additional significance, as it allows for the valorization of neurodiversity as a resource for collective anticipation. As highlighted in recent literature, cognitively diverse groups are better equipped to generate a wider range of possible futures, thereby enhancing the robustness of anticipatory processes. This insight aligns with Gardner's^[14] theory of multiple intelligences and with Vygotsky's^[15] sociocultural theory, both of which emphasize the plurality of cognitive pathways and the social construction of knowledge. Within a simplex framework, such diversity is not an obstacle to being managed but a condition to be cultivated, as it expands the probabilistic space of anticipation and enriches the repertoire of possible responses to uncertainty.

Moreover, the technological dimension of contemporary higher education further amplifies the relevance of simplexity and probabilistic anticipation, particularly in relation to artificial intelligence and adaptive learning systems. These technologies, which operate through probabilistic algorithms and predictive models, mirror the anticipatory logic of biological systems, offering new possibilities for personalizing learning and supporting students with diverse needs^[16]. However, as the literature warns, the use of such technologies also raises critical issues related to bias, transparency, and ethical responsibility, especially when algorithmic decisions are based on data that may not adequately represent neurodiverse populations. In this context, the principle of simplexity can serve as a guiding framework for the design of inclusive technologies, emphasizing the need for systems that are not only efficient but also interpretable, adaptable, and responsive to the complexity of human diversity.

At a broader level, the integration of simplicity, probabilistic anticipation, and futures literacy calls for a reconfiguration of the epistemological foundations of higher education, moving beyond linear and deterministic models toward a more dynamic and pluralistic understanding of knowledge. As Sibilio argues, education must embrace complexity without being overwhelmed by it, developing simplex strategies that enable learners to construct meaning through selective simplification and anticipatory reasoning^[6]. This implies a shift from transmissive pedagogies toward constructivist and participatory approaches, in which learners actively engage in the co-construction of knowledge and in the exploration of possible futures. In such a paradigm, inclusion is not an additional requirement but an intrinsic dimension of educational quality, as it ensures that the multiplicity of perspectives necessary for effective anticipation is fully represented.

Ultimately, the recognition of probabilistic anticipation as a principle of simplicity provides a powerful conceptual bridge between neuroscience, pedagogy, and futures studies, offering a coherent framework for addressing the challenges of contemporary higher education in an inclusive and future-oriented manner. By integrating the insights of Berthoz and Sibilio with the emerging discourse on futures literacy, it becomes possible to envision an educational model that can navigate uncertainty with rigor and creativity, transforming complexity into a resource for learning, and ensuring that all students are equipped to participate in the ongoing construction of shared futures. Most recently, La Manna et al. (2025) provided empirical evidence that simplex-based pedagogy enhances student engagement in virtual and mixed learning environments, a finding with direct implications for inclusive futures education in digitally enhanced higher education contexts^[17].

1.2.2. Genealogy of Futures Literacy

Futures literacy as an academic and pedagogical field has roots dating back to the 1970s, but its contemporary formulation is profoundly shaped by the work of Riel Miller at UNESCO. As documented by Isidori et al. in their 2023 analysis, presented at the Education, Reflection, Development Conference^[10], futures education is characterized by an approach that moves beyond linear, short-term thinking, encouraging future-oriented mindsets that consider multiple, possible, probable, and preferable futures. The authors trace an intellectual genealogy that includes foundational

contributions from thinkers such as Alvin Toffler, whose works *Future Shock* (1970) and *The Third Wave* (1980)^[18] transformed public and academic conceptions of the future, even if they did not directly focus on educational paradigms. Equally influential was Paulo Freire, whose critical pedagogy^[19] deeply shaped discourse on the future of education through the problem-posing approach, encouraging learners to critically engage with their environment and develop the intellectual tools necessary to navigate future social challenges.

John Dewey emerges as a central figure thanks to his philosophy of experiential education^[20], which emphasizes “learning by doing” and critical thinking, elements that resonate strongly with future-oriented pedagogy. Peter Bishop, founder of the Teach the Future initiative^[21], played a pivotal role in bridging theoretical foresight with practical pedagogy. Ray Kurzweil, through his theories of technological acceleration^[22], raised important questions about the implications of technological disruption for educational systems, suggesting that education must undergo transformative change to keep pace with technological evolution. In the fields of cognitive psychology and learning theory, foundational contributions come from Lev Vygotsky^[15], whose sociocultural theory provides insight into the role of social and cultural contexts in learning, an essential dimension for preparing students to navigate rapidly evolving societal dynamics. Howard Gardner, through the theory of multiple intelligences^[14], revolutionized educational practice by challenging monolithic conceptions of intelligence and arguing for systems flexible enough to accommodate diverse cognitive profiles. Maria Montessori, with her child-centered approach emphasizing independence and self-directed learning^[23], offers valuable perspectives on autonomy and adaptability, competencies crucial for navigating uncertain futures.

Particularly relevant for the integration of futures literacy and inclusive education is the emphasis on creativity and emotional intelligence. As argued by Isidori and colleagues, emotional intelligence, encompassing self-awareness, self-regulation, empathy, and social skills, serves as a catalyst for creative thinking, enabling individuals to navigate complex emotional landscapes, tolerate ambiguity, and manage uncertainty^[10]. These competencies are essential in futures education, where imagining multiple scenarios often requires confronting unsettling possibilities and ethical dilemmas. A

recent systematic review by Menéndez-Alvarez-Hevia and colleagues^[24] confirms that futures literacy is increasingly recognized as a key element for bringing futures studies ideas closer to education, and that futures studies contribute to changing the way of working with and conceptualizing the future in education, promoting transformative movements.

The evolution of inclusive education, particularly concerning learning disabilities, reflects profound shifts in understandings of normalcy, difference, and human potential. As documented by Ayub in her 2025 thesis on the future of inclusive education in the UAE^[25], learning disabilities refer to neurological processing challenges that affect learning, such as dyslexia, dyscalculia, and ADHD, which may interfere with reading, writing, organization, focus, and social interaction. It is crucial to distinguish between learning disabilities in the strict sense and other neurodevelopmental disorders that influence academic performance. Dyslexia, dyscalculia, and dysgraphia are formally recognized as Specific Learning Disorders in diagnostic frameworks^[26]. In contrast, ADHD and dyspraxia, also known as Developmental Coordination Disorder, are classified as neurodevelopmental conditions that, though not learning disabilities per se, can substantially impact academic functioning through challenges in attention regulation, executive functioning, or motor coordination.

Each of these conditions requires distinct pedagogical adjustments and accommodations within higher education. As highlighted by Morgado et al. in her influential 2017 study on inclusive higher education^[11], genuine inclusion requires not only physical access but the adaptation of teaching, assessment, and support mechanisms to meet diverse student needs. This entails transformation in both mindset and practice, including participatory pedagogy, supportive learning environments, and the application of Universal Design for Learning (UDL) principles. However, even in developed regions such as the United States and Europe, institutional preparedness, from staff training to accessible digital infrastructure, remains inconsistent. This gap is even more pronounced in transitional systems such as the UAE, where, despite progressive policy frameworks like the National Policy for Empowering People of Determination (2017)^[27] and the Inclusive Education Framework (2020)^[28], students with learning disabilities still experience uneven levels of support across institutions.

1.3. Rationale for Integration and Study Objectives

The convergence between futures literacy and inclusive education is not merely the juxtaposition of two separate fields, but a necessary synergy for addressing the educational challenges of the twenty-first century. If one accepts the premise that education must prepare learners for a future defined by uncertainty, complexity, and rapid change, then it becomes evident that this future must be imagined and constructed with the participation of all students, regardless of their cognitive characteristics. As argued by Johnston et al. in their 2024 analysis of futures literacy course design^[9], we live in an era in which the only constant appears to be change, and in which technologies such as artificial intelligence, 5G infrastructure, and robotics contribute to heightened uncertainty. In this context, what is needed is not one-time interventions or five-year strategic plans, but the development of futures literacy as a practical competence, one that, as Johnston and colleagues demonstrate through the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) and ARCS-V (Attention, Relevance, Confidence, Satisfaction, and Volition) instructional frameworks, individuals can acquire through structured and motivationally grounded courses.

However, as highlighted by Ayub^[25], there remains a significant research gap concerning the application of foresight methodologies to inclusive education. While numerous international organizations have explored futures literacy, its specific application to the support of students with learning disabilities in higher education remains largely unexplored in academic literature. Equally absent from the existing literature is a unified theoretical framework that integrates futures literacy, inclusive education, and the simplex theory of probabilistic anticipation into a coherent pedagogical model specifically designed for the higher education context. The systematic review by Menéndez-Alvarez-Hevia and colleagues^[25] confirms that, while futures literacy is increasingly recognized as a key element for education, its intersection with inclusive pedagogy and disability studies remains substantially underdeveloped. This study therefore aims to address these gaps by proposing the concept of “inclusive anticipatory pedagogy”, which, to the authors’ knowledge, represents the first systematic synthesis that positions

futures literacy, simplicity, and inclusive education as mutually constitutive rather than merely compatible domains, and that specifically situates this synthesis within the context of higher education.

The study addresses the following research questions: Which pedagogical methodologies supporting futures literacy are documented in the scientific literature, and how are they implemented in real educational contexts? How can emerging technologies, particularly artificial intelligence and adaptive learning platforms, support the inclusion of students with learning disabilities in future-oriented educational environments? What structural, cultural, and epistemological barriers hinder the integration of futures thinking and inclusive pedagogy? Which strategic frameworks can guide educational institutions in designing support systems that are simultaneously inclusive, future-oriented, and resilient in the face of uncertainty?

2. Materials and Methods

2.1. Methodological Approach and Rationale

This study adopts a critical narrative review as its primary methodological approach. Following the typology proposed by Grant and Booth^[29], a narrative review is appropriate when the objective is to synthesize heterogeneous literature originating from multiple disciplines and to identify emerging patterns, conceptual gaps, and future lines of inquiry, rather than to produce an exhaustive quantitative inventory of all available studies. This distinguishes the present work from systematic reviews (which prioritize replicability and completeness through rigid search protocols, as exemplified by the PRISMA-compliant review conducted by Menéndez-Alvarez-Hevia et al.^[24]) and from integrative reviews (which formally aim to generate new conceptual frameworks through the explicit integration of heterogeneous evidence).

The choice of a critical narrative approach is epistemologically grounded in the nature of the phenomenon under investigation. The intersection between futures literacy, simplicity, and inclusive education in higher education is not a consolidated research domain with a homogeneous body of literature. Relevant knowledge is dispersed across multiple disciplinary traditions, educational neuroscience, futures studies, disability studies, instructional design, and

educational technology, each with its own epistemologies, methodologies, and terminologies. As Johnston and colleagues observe in their literature review on futures literacy course development, the field draws on constructivism, instructional design models such as ADDIE and ARCS-V, and foresight methodologies, requiring a cross-disciplinary synthesis approach^[9]. A narrative review allows the crossing of these disciplinary boundaries and the highlighting of connections and complementarities that would not emerge from more restrictive methodological approaches.

The analytical approach adopted is deductive-dominant. The four analytical dimensions structuring the synthesis (Pedagogical, Technological, Political-Institutional, Socio-Cultural) were derived from a prior conceptual mapping of the two primary fields under examination, futures literacy and inclusive education, conducted through an initial reading of the core primary sources and relevant theoretical frameworks, including the simplex theory of Berthoz (2011) and Sibilio (2014, 2023). These dimensions were then applied as organizing categories to the full corpus of reviewed literature, with analytical codes assigned to textual segments and cross-validated across sources. Where evidence did not map cleanly onto the pre-established dimensions, an inductive adjustment was made to ensure representational fidelity to the data. This mixed deductive-inductive procedure is consistent with the epistemological openness characteristic of critical narrative reviews in interdisciplinary fields. The rationale for selecting four dimensions, rather than a different number or configuration, is discussed in Section 2.3 below. Alternative configurations were assessed during the analytical process: a three-dimensional model collapsing the political-institutional and socio-cultural dimensions was rejected as analytically insufficient; a five-dimensional model adding an affective-emotional dimension was also considered but rejected because affective elements emerged as transversal across all four adopted dimensions rather than constituting an autonomous analytical category.

2.2. Source Identification and Selection Strategy

The research strategy unfolded in several phases. Initially, key primary sources were identified through the analysis of documents provided as the empirical foundation of this study. These included three peer-reviewed academic

publications and a UNESCO report, forming the core of the review. The first, *Futures Education and Creativity: From Theory to Practice*, by Isidori and colleagues (2023), offers an in-depth analysis of the philosophical and pedagogical foundations of futures education, tracing intellectual genealogies and proposing frameworks for integrating creativity and emotional intelligence into futures-based learning. The second, *Futures Literacy: The Need for and Contents of a Course*, by Johnston and colleagues (2024), presented at an international conference, provides an operational framework for developing university-level futures literacy curricula, including learning theories, instructional design elements, and assessment strategies. The third, Ayub's *Future of Inclusive Education in the UAE* (2025), applies scenario planning methodologies to analyze possible futures for supporting students with learning disabilities in higher education within the United Arab Emirates. Finally, UNESCO's (2024) *Humanistic Futures of Learning* report offers a global perspective on anticipatory education framed through a humanistic lens emphasizing knowledge as a common good.

To contextualize and deepen the insights emerging from these primary sources, strategically selected secondary sources were also integrated. These include UNESCO's

Futures Literacy (2024)^[30], which provides the core conceptual definition and operational framework of the competence; Sippl's *The Futures Stories Lab* (2025)^[31], documenting narrative approaches to futures pedagogy; Alnajdi's account of the ADDIE instructional-design model^[32], and Li and Keller's review of the ARCS motivational model^[33], which inform the pedagogical design dimension of the analysis; Alzyoudi et al.'s study on university students' attitudes toward peers with disabilities^[34]; Meda et al.'s 2023 study on inclusive education in the UAE^[3]; Börjeson et al.'s *Scenario Types and Techniques* (2006)^[12], offering a critical epistemological reflection on futures studies; and Inayatullah's *Futures Studies: Theories and Methods* (2013)^[13].

2.3. Multidimensional Analytical Framework

The analysis of the literature was organized according to a multidimensional analytical framework derived from the integration of insights across the studies examined. This framework is articulated along four principal dimensions that consistently appear in the literature as critical domains for understanding and implementing the integration between futures literacy and inclusive education (**Table 1**).

Table 1. Sources organized by analytical dimension, thematic focus, and contribution type.

Dimension	Key Sources	Thematic Focus	Contribution Type
Pedagogical	Johnston et al. ^[9] ; Isidori et al. ^[10] ; Pande and Bharathi ^[35] ; Menéndez-Alvarez-Hevia et al. ^[24] ; Pouru-Mikkola and Wilenius ^[36] ; Sippl ^[31] ; Facer ^[37,38] ; Sibilio ^[5,6] ; Aiello et al. ^[7] ; Di Paolo and Zollo ^[8]	Constructivism; FL pedagogy; simplex didactics; ADDIE/ARCS-V; course design	Theoretical/Empirical
Technological	Kaluri et al. ^[16] ; Opoku et al. ^[39] ; Ayub ^[25] ; Johnston et al. ^[9] ; Isidori et al. ^[10] ; La Manna et al. ^[17]	Adaptive AI; assistive technologies; algorithmic bias; digital accessibility	Empirical/Theoretical
Political-Institutional	Ayub ^[25] ; Meda et al. ^[3] ; Morgado et al. ^[11] ; UNESCO ^[1,30] ; Johnston et al. ^[9] ; Benkohila et al. ^[40]	Policy frameworks; governance; faculty development; institutional capacity	Policy-analytical/Empirical
Socio-Cultural	Alzyoudi et al. ^[34] ; Meda et al. ^[3] ; Inayatullah ^[13] ; Börjeson et al. ^[12] ; Bell ^[41] ; Menéndez-Alvarez-Hevia et al. ^[24]	Stigma; neurodiversity; epistemological pluralism; student advocacy	Empirical/Theoretical

Pedagogical Dimension: This dimension examines the learning theories underpinning futures literacy approaches, with particular emphasis on constructivism as the dominant paradigm. As highlighted by Johnston and colleagues in their course development framework, constructivism is particularly suited to futures-oriented education because it recognizes that knowledge is constructed through interaction with the environment, that cognitive conflict stimulates learning,

and that understanding evolves through social negotiation. This dimension also incorporates models of instructional design such as ADDIE^[32] and ARCS-V^[33], which provide structured approaches for creating effective and motivating learning experiences.

Technological Dimension: This dimension explores the role of emerging technologies in supporting both futures literacy and the inclusion of students with learning disabili-

ties. Artificial intelligence, ranging from adaptive learning algorithms to assistive technologies, emerges as a potentially transformative force while posing ethical and pedagogical risks if implemented without appropriate safeguards^[16]. Issues such as digital accessibility, platform interoperability, and cultural/linguistic localization are central in contexts like the UAE, where multilingual and multicultural diversity shapes educational environments.

Political-Institutional Dimension: This dimension analyzes national and institutional policy frameworks that enable or inhibit the integration of futures literacy and inclusive education. As detailed in Ayub's examination of UAE policies, significant gaps often exist between progressive national visions and their practical institutional implementation. Governance mechanisms, resource distribution, accountability systems, and leadership commitment are all identified as pivotal structural variables.

Socio-Cultural Dimension: This dimension examines cultural attitudes toward neurodiversity, phenomena of stigma, and the role of student advocacy in driving cultural change within institutions. As highlighted in UAE-based studies, negative attitudes toward students with disabilities persist even within higher education environments, revealing the need for more robust cultural transformation strategies^[34].

3. Results

3.1. Pedagogical Foundations of Futures Literacy in Inclusive Education

The analysis of the literature reveals a robust consensus on the inadequacy of traditional transmissive educational models for the development of futures literacy. As argued by Isidori and colleagues in their 2023 article, citing the work of Pande and Bharathi (2020), constructivism emerges as the preferred learning theory for futures education^[35]. This theoretical preference is not arbitrary but is based on deep alignments between the epistemological assumptions of constructivism and the competences required for futures thinking. Constructivism, as articulated by thinkers such as Jean Piaget, Lev Vygotsky, and Jerome Bruner, maintains that knowledge is not simply transferred from teacher to student but is actively constructed by the learner through interaction with the physical and social environment.

Pande and Bharathi identify three fundamental propositions of constructivism that have direct relevance for futures literacy. The first proposition states that understanding emerges from our interactions with the environment, and that what is learned and how it is learned are inseparable. Applied to futures literacy, this means that the development of anticipatory competences cannot be separated from the social, cultural, and technological context in which students are immersed. The second proposition maintains that cognitive conflict or puzzlement constitutes the stimulus for learning and determines the organization and nature of what is learned. In the context of futures education, this cognitive conflict is deliberately generated through exposure to plausible but disturbing future scenarios that challenge deterministic assumptions or linear expectations about the future. The third proposition affirms that knowledge evolves through social negotiation and the evaluation of the viability of individual understandings. This aspect is particularly crucial for inclusive futures-oriented education, where the shared construction of future narratives through participatory processes involving students with and without learning disabilities can simultaneously develop futures-thinking competences and reduce the stigma associated with neurodiversity.

The analysis by Johnston and colleagues provides detailed insights into how constructivist principles can be translated into concrete instructional design practices. Their work identifies two complementary models that are particularly relevant for developing futures literacy curricula accessible to students with learning disabilities: the ADDIE model and the ARCS-V model. The ADDIE model, an acronym for Analysis, Design, Development, Implementation, and Evaluation, is a widely used framework in instructional design that provides a structure for designing effective learning experiences. As highlighted by Johnston and colleagues, citing the work of Alnajdi (2018), ADDIE keeps instructional and learning design complexities to a minimum while facilitating the use of different learning methods^[32]. This methodological flexibility is essential for inclusion, allowing multiple means of content presentation, multiple ways of expressing knowledge, and multiple forms of engagement.

The ARCS model, and its extension ARCS-V, developed by John Keller, seeks to position student motivation at the center of design. As documented by Li and Keller (2018) and explained by Johnston and colleagues^[33], ARCS repre-

sents four components of motivation that must be addressed in educational design: Attention refers to the need to capture and sustain the students' attention through strategies that stimulate curiosity and interest; Relevance concerns communicating why students need to learn the content, connecting learning to personal goals, interests, and future needs; Confidence involves building learners' belief that they can succeed if they apply effort, through design that provides appropriate scaffolding and constructive feedback; Satisfaction concerns helping students feel rewarded and proud of their learning and achievements. Keller later recognized that the ARCS model did not adequately explain students who persisted in their learning when their motivation had faded, or students who abandoned learning even though they needed the outcomes. This led to the addition of a fifth component, Volition, referring to the power to make one's own decisions and maintain goal-oriented focus and task persistence throughout the learning experience even in the face of distractions or difficulties. For students with learning disabilities, particularly those with ADHD or executive-function challenges, the volitional component is critically important.

3.2. Methodological Approaches to Futures-Oriented Inclusive Pedagogy

Horizon scanning emerges from the literature as a fundamental methodology for both futures literacy education and for anticipating the evolving needs of inclusive education. As applied by Ayub in her 2025 study, and discussed theoretically by Johnston and colleagues, horizon scanning is a systematic methodology for identifying emerging trends, weak signals of change, and potential disruptors that could shape alternative futures. In the educational context, horizon scanning can be conceived simultaneously as an institutional research methodology and as a pedagogical practice. As a research method, it allows institutions to monitor the external environment to identify developments that might influence the demand for support for students with learning disabilities, the emergence of new assistive technologies, or changes in policy and social expectations. As a pedagogical practice, teaching students to perform horizon scanning develops competencies in environmental awareness, critical thinking, and pattern recognition, which are essential components of futures literacy.

Ayub implements horizon scanning using the PEST

framework, which organizes the analysis into four domains: Political, Economic, Social, and Technological^[25]. This methodological choice favors clarity and simplicity while maintaining complete coverage of the main drivers of change. Although expanded frameworks such as STEEPV (Sociocultural, Technological, Economic, Environmental (or Ecological), Political, and Values) (adding Environmental and Values) or PESTEL (Political, Economic, Social, Technological, Environmental, and Legal) (adding Environmental and Legal) exist, Ayub argues that, in the context of higher education in the UAE, environmental changes tend to affect institutions indirectly through political channels, policy shifts, regulatory frameworks, or government mandates that respond to climate-related concerns.

Scenario planning constitutes the methodological core of the application of futures literacy to inclusive education. As theorized by Peter Schwartz in his seminal work *The Art of the Long View* (1991)^[42], scenario planning is a methodology for exploring multiple plausible futures in contexts of deep uncertainty. Unlike traditional forecasting, which seeks to predict a single future, scenario planning recognizes that multiple futures are possible and that strategic preparation requires the exploration of this multiplicity. Johnston and colleagues describe scenario planning as a tool to support strategic decision-making by exploring how different combinations of uncertainties might shape future outcomes^[9]. In the educational context, this means that instead of asking "What will be the future of inclusive education?", scenario planning asks "What could the futures of inclusive education be under different conditions, and how can we prepare our institutions to thrive across these alternative futures?"

The canonical process of scenario planning, as applied by Ayub in her 2025 study, follows several structured phases. The first phase involves the selection of the critical uncertainties that will form the axes of the scenario matrix. Ayub identifies two primary critical uncertainties from her horizon scanning: the adoption of artificial intelligence and adaptive technologies (ranging from Low Adoption to High Integration along the X-axis) and the positioning of inclusive education within national reforms (ranging from Marginalized Priority to Centrally Positioned along the Y-axis). The second phase involves the construction of four distinct scenarios corresponding to the four quadrants of the two-by-two matrix. Ayub develops four scenarios with evocative titles:

“Vision Realized”, “Ready, Set ... Wait”, “Unwatched Pot”, and “Lights On, Doors Closed”. Each scenario explores different configurations of technological adoption and policy prioritization, providing stakeholders with a comprehensive view of possible futures and their implications for students with learning disabilities.

3.3. Artificial Intelligence and Adaptive Learning: Promises and Risks

Artificial intelligence emerges from the analysis as a potentially transformative but profoundly ambiguous force for future-oriented inclusive education. As documented by both Ayub and Johnston et al., the potential of AI to radically reshape how students with learning disabilities are supported is substantial, but this potential can manifest in very different ways depending on how the technology is designed, implemented, and governed. Isidori and colleagues, in their chapter on AI in education, identify several salient applications^[10]. A first application concerns the personalization of learning experiences. By analyzing data on individual learning styles, strengths, and weaknesses, AI can adapt educational content to meet the specific needs of students. Such personalization is hypothesized to support the nurturing of creativity, since it identifies and cultivates creative aptitudes that are unique to learners. For students with dyslexia, for example, an adaptive learning system could automatically adjust the linguistic complexity of texts, modify spacing and font to optimize readability, integrate text-to-speech for decoding support, and provide contextual scaffolding when difficulty in comprehension is detected.

A second documented application concerns the simulation of real-world challenges that require creative solutions. Through gamified experiences or interactive scenarios, learners are encouraged to think critically and generate innovative solutions. This form of experiential learning, augmented by AI, aligns coherently with the principles of futures education, which emphasize the imperative of equipping students for complex future scenarios. However, enthusiasm for these possibilities must be tempered by the recognition of significant risks. Johnston and colleagues underline that while the potential of AI to enhance education and cultivate creativity is substantial, it simultaneously raises pivotal ethical and social issues^[9]. These include concerns related to data privacy and the potential for algorithmic bias. The issue of algorithmic

bias is particularly concerning in the context of learning disabilities. As noted by Ayub, citing the work of Kaluri and colleagues (2024), AI models trained on neuronormative populations can perpetuate discrimination^[16].

While artificial intelligence dominates contemporary discussions on educational technology, the literature also highlights the importance of more traditional assistive technologies, which, enhanced by digital capabilities, continue to play crucial roles in supporting students with learning disabilities. As documented by Ayub, citing the research of Opoku and colleagues (2023)^[39], persistent challenges exist in integrating these technologies into higher education in the UAE, despite their demonstrated potential. Speech-to-text and text-to-speech technologies, for example, have benefited enormously from advancements in AI, particularly in natural language processing, which have dramatically improved accuracy and naturalness. Digital mind-mapping tools offer particularly useful support for students with executive function challenges, including many with ADHD or dyspraxia. However, as emphasized across the literature, the mere availability of these technologies is not sufficient. Ayub identifies the lack of localization and cultural relevance of assistive technologies as a critical barrier^[25]. Many tools are designed for Anglophone contexts of the Global North and may have limited effectiveness in multilingual and multicultural contexts such as the UAE.

3.4. Institutional Frameworks, Policy, and Socio-Cultural Dimensions

Ayub’s detailed analysis of the context of the United Arab Emirates provides critical insights into how progressive policy frameworks interact with complex institutional realities. The UAE has articulated a strong national commitment to inclusive education through key initiatives such as the National Policy for Empowering People of Determination (2017) and the Inclusive Education Framework (2020). These policies emphasize dignity, equity, and institutional responsibility in ensuring access and support for students with disabilities. The National Policy for Empowering People of Determination outlines goals for equitable access to education and vocational training by 2030^[27]. The Inclusive Education Framework (2020) provides more specific guidelines for higher-education institutions, with a focus on accessibility standards, Universal Design for Learning, and

the need for comprehensive support services. However, as highlighted by Meda and colleagues in their 2023 critical study, a significant gap exists between national vision and consistent institutional implementation. The authors find that while inclusive education is conceptually embraced in the UAE, its implementation often falls short, with students with disabilities remaining passive participants, a reality that contrasts with principles of transformative pedagogy. This gap underscores the need for systemic reform and future-oriented strategies that prioritize active student engagement. Studies conducted by Benkohila et al. (2020) revealed that while UAE university faculty members held generally positive attitudes toward inclusion, their preparedness to support students with learning disabilities was low^[40]. Only a minority reported having received formal training. Badr, in a 2019 study cited by Ayub^[43], notes that class sizes, time constraints, and cultural stigmas further hinder inclusive efforts.

Particularly illuminating is the study by Alzyoudi et al. (2021), which found that typically-developing university students often maintained negative attitudes toward peers with disabilities, indicating that inclusion efforts are undermined by persistent stigmas^[34]. Interestingly, the study revealed a paradox: students who were not aware of inclusion policies held more positive perceptions than those who claimed awareness, suggesting that awareness alone may not promote empathy. Integrating recommendations from Ayub, Johnston and colleagues, and Isidori and colleagues, essential components emerge for institutional frameworks that can effectively integrate futures literacy and inclusive education. The first element concerns leadership and governance: inclusion must be embedded in the institutional vision and mission, not relegated to a peripheral “special needs office.” Accountability mechanisms are critical, including specific KPIs on inclusive outcomes in rankings and accreditations, regular accessibility audits, and transparent reporting on progress and challenges. As Ayub notes, while regulatory bodies such as the Knowledge and Human Development Authority (KHDA)^[44] have begun incorporating inclusion considerations into quality-assurance standards, enforcement remains inconsistent. A second crucial element concerns faculty development. As consistently shown in the literature, inadequate faculty preparation is a major barrier to effective inclusion. Training must be mandatory, not optional, and must cover multiple dimensions. As suggested by Johnston and colleagues, drawing on

the work of van Wyk and colleagues^[45], faculty communities of practice can facilitate peer learning and ongoing support.

4. Discussion

4.1. Interpretive Synthesis: Convergences and Tensions

The analysis of the literature reveals a growing yet still incompletely realized convergence between the field of futures studies and disability education research, a convergence that can be further illuminated when interpreted through the theoretical lens of simplicity and its intrinsic rule of probabilistic anticipation, as elaborated by Alain Berthoz^[4]. This convergence is epistemological, methodological, and pragmatic. Epistemologically, both fields have undergone similar shifts from expert-driven models toward participatory and constructivist approaches, while simplicity provides a meta-theoretical framework capable of explaining this transition as a movement from deterministic simplification toward adaptive simplification grounded in anticipatory processes. Futures literacy, as articulated by Miller and UNESCO^[2,30], rejects the idea that experts can predict “the” correct future and instead emphasizes the democratization of anticipatory capability, a stance that resonates with Berthoz’s conception of the brain as a system that continuously generates probabilistic simulations of possible futures to guide present action. In this sense, anticipatory cognition is inherently plural, distributed, and open to revision, reflecting a simplex logic in which the reduction of complexity does not eliminate uncertainty but renders it navigable through the construction of plausible scenarios. Similarly, inclusive education, as theorized by Morgado et al.^[11], Meda et al.^[3], and others, rejects deficit-based models in which experts determine what is best for students with disabilities, and instead embraces paradigms of co-design and self-determination, thereby aligning with Sibilio’s vision of simplex as a pedagogical criterion that values diversity as a resource for constructing meaning within complex systems. This parallel evolution reflects broader shifts in epistemology away from positivist certainty toward recognition of multiple valid ways of knowing^[41], while simultaneously affirming the centrality of probabilistic anticipation as a cognitive and educational strategy for inhabiting uncertainty.

Methodologically, both fields privilege approaches that

value diversity of perspectives, recognize the validity of multiple ways of knowing, and use visual, narrative, and experiential methods in addition to purely textual or quantitative ones, and it is precisely within this methodological pluralism that the simplex principle of probabilistic anticipation finds its most concrete operationalization. Scenario planning, for example, with its emphasis on storytelling and imagination, and its recognition that multiple futures are simultaneously plausible, resonates deeply with inclusive pedagogical approaches that acknowledge multiple modes of learning and expression^[12,42], while also embodying the anticipatory logic described by Berthoz, in which action is guided by the simulation of alternative possibilities rather than by linear prediction. As Menéndez-Alvarez-Hevia et al.^[24] note in their systematic review, futures studies contribute to changing the ways of working with and conceptualizing the future in education, promoting transformative dynamics that align with inclusive pedagogical principles, and such dynamics can be interpreted as simplex strategies that organize complexity through selective, meaningful simplifications oriented toward action. The interpretive and participatory traditions within futures studies, as identified by Inayatullah^[13], share with inclusive education a commitment to empowering marginalized voices and challenging dominant assumptions about normalcy and capability, and within a simplex framework, this commitment acquires an additional significance, insofar as cognitive diversity expands the probabilistic space of anticipation, enabling the co-construction of richer and more robust future imaginaries. In this way, simplexity and probabilistic anticipation do not merely complement the convergence between futures literacy and inclusive education but provide its deepest epistemic foundation, articulating a vision of higher education in which complexity is not reduced to uniformity but transformed into a shared horizon of possibility through inclusive and anticipatory practices.

4.2. Implications for Theory and Pedagogical Practice

The findings of this review have substantial implications for how we conceptualize and practice education in higher education. Theoretically, the integration of futures literacy and inclusive education suggests the need for an expanded pedagogical paradigm that the present study desig-

nates as “inclusive anticipatory pedagogy” (**Figure 1**). This paradigm recognizes that preparing students for uncertain futures requires not only the development of specific cognitive competences (such as systems thinking or scenario planning) but also the cultivation of dispositions such as curiosity, epistemic humility, comfort with ambiguity, and commitment to equity and justice. As Pouru-Mikkola and Wilenius^[36] suggest in their work on building individual futures capacity through transformative futures learning, futures literacy must consider cognitive, affective-emotional, and active dimensions—a framework that resonates strongly with inclusive pedagogical approaches emphasizing the whole learner.

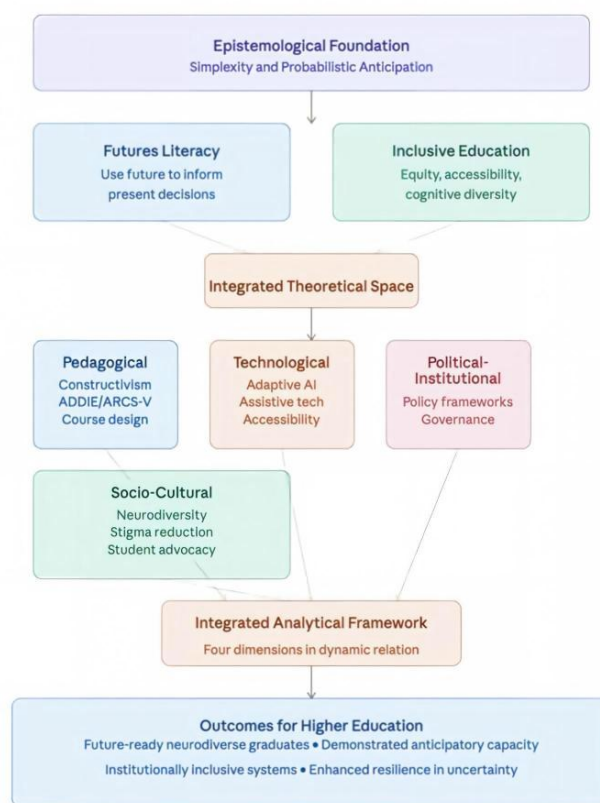


Figure 1. Inclusive Anticipatory Pedagogy: conceptual framework illustrating the relationships among the epistemological foundation (simplexity and probabilistic anticipation), the two primary theoretical domains (futures literacy and inclusive education), the four analytical dimensions (pedagogical, technological, political-institutional, and socio-cultural), and the outcomes for higher education.

Source: authors' elaboration based on Berthoz^[4], Sibilio^[5,6], Miller^[2], Morgado et al.^[11], UNESCO^[1,30], Johnston et al.^[9], Aiello et al.^[7], Di Paolo and Zollo^[8], La Manna et al.^[17].

Crucially, this paradigm recognizes that the dispositions central to futures thinking are best cultivated in learning envi-

ronments characterized by cognitive diversity. When students with different ways of processing information, organizing thoughts, and expressing understanding work together on complex challenges, such as imagining desirable educational futures, diversity itself becomes a pedagogical resource. Neurodivergent perspectives can illuminate assumptions that neuronormative perspectives would take for granted, can suggest creative solutions that would not emerge from homogeneous thinking, and can help the group develop more robust and inclusive visions of the future. As Facer^[37] argues, educators must develop the ability to create educational situations in which to put different resources from three different time points into play: the capability to imagine a future in a positive but multiple way, the capability of action in the present, and meeting with the historical resources of knowledge and experience. The affective dimension, encompassing emotions such as hope, fear, loss, and desire, must also be recognized and worked with rather than suppressed^[38,46]. The relevance of this framework is particularly acute in higher education specifically, which presents distinctive features not shared by other educational levels. Students with learning disabilities in HE operate within a substantially different support structure: statutory entitlements are more limited, disclosure is voluntary, and the onus of self-advocacy falls more heavily on the individual student^[11,25]. Three concrete instructional scenarios illustrate operationalization of the framework: (a) a UDL-informed scenario planning module in which neurodivergent and neurotypical students collaboratively construct alternative disciplinary futures, with multiple means of representation, expression, and engagement embedded from the outset^[9,11]; (b) an accessible horizon-scanning exercise in which students with dyslexia engage with a PEST framework supported by text-to-speech, AI-assisted summarization, and visual mind-mapping, using only AI tools selected to mitigate algorithmic bias risks^[16,25]; and (c) participatory futures research in which students with LD serve as co-investigators in an institutional project on the future accessibility of learning environments, operationalizing both futures literacy and the co-design principle of inclusive education^[11,13].

4.3. Limitations of the Study and Directions for Future Research

This study, like any narrative review, has limitations that must be acknowledged and that suggest productive di-

rections for future research. The first limitation concerns the nature of the sources. The review is based primarily on published literature and policy documents, with limited access to grey literature such as internal institutional reports, evaluations of specific programs, or materials developed by practitioners that may not be formally published. Consequently, innovative practices and lessons learned may exist that are not captured in this analysis. As Menéndez-Alvarez-Hevia et al.^[24] note in their systematic review, the literature on futures studies in education shows a balance between theoretical and empirical studies, but concentrates in specialized journals and certain countries, suggesting that voices from other contexts may be underrepresented.

A second limitation concerns geographic and cultural representation. While this review includes significant focus on the United Arab Emirates as a case study of an educational system in transition, the majority of the literature on futures literacy and inclusive education originates from Global North contexts, particularly North America and Europe. Voices, perspectives, and experiences from the Global South are underrepresented. This is particularly problematic given the critique raised by scholars such as Inayatullah and Börjeson regarding the “colonialism of time” and “methodological imperialism,” in which Western approaches to futures thinking are imposed on cultural contexts with their own, potentially different, ontologies and epistemologies of time and the future^[13,47]. Future research should prioritize cross-cultural comparative studies that explore how different cultural traditions conceive the future, how this influences educational aspirations and practices, and how futures literacy methodologies might be adapted or transformed in different contexts. A third limitation, and the most significant for the field, concerns the absence of empirical validation of the proposed framework. The concept of “inclusive anticipatory pedagogy” remains at the theoretical and conceptual level; no experimental or quasi-experimental studies testing its efficacy in actual higher education settings have been conducted to date. This is an inherent limitation of the critical narrative review methodology, which is designed to synthesize and generate rather than to test. Future research should therefore prioritize empirical testing of the framework, including longitudinal studies tracking the impact of futures literacy education on outcomes for students with different learning profiles^[24,36].

4.4. Evidence-Informed Strategic Recommendations

Based on the synthesis of the literature, strategic recommendations emerge for different stakeholders in the higher education system. For national-level policymakers and accreditation agencies, the primary recommendation is to explicitly mandate futures-literacy capability as a requirement for all institutions, as suggested by recent developments in UNESCO's educational frameworks^[1,30]. This could manifest as the incorporation of futures-thinking competencies into accreditation standards, as requirements that institutions demonstrate horizon-scanning and scenario-planning capability in their strategic-planning processes, and as the inclusion of futures-literacy assessment in quality-assurance frameworks. Policies should also incentivize innovation through dedicated funding schemes for pilot programs that integrate futures literacy and assistive technology, with preference for projects that demonstrate co-design with students with learning disabilities^[11,48]. Establishing measurable targets is crucial: KPIs could include the percentage of students with learning disabilities who complete degrees within standard time, faculty training hours on inclusive futures pedagogy, and institutional expenditure on accessible technology as a percentage of total budget.

5. Conclusions

5.1. Synthesis of the Central Arguments

This review has explored the emerging but promising intersection between futures literacy and inclusive education in higher education, with a particular focus on students with learning disabilities. The central thesis that emerges from the analysis is that futures literacy and inclusive education are not simply compatible domains but are mutually constitutive: each requires the other for its full realization. Futures literacy, understood as a universally accessible capacity to use the future to innovate the present^[2,24,30], requires cognitive diversity for its effectiveness. The ability to imagine radically different futures, to identify hidden assumptions, and to construct plausible scenarios that challenge the status quo is amplified when teams include people who think in different ways. Students with dyslexia, ADHD, dyspraxia, and other cognitive differences bring perspectives and problem-solving

approaches that, far from being deficits to compensate for, are assets for collective futures thinking^[11].

Symmetrically, inclusive education requires a futures orientation in order to be transformative rather than merely accommodative. Designing supports for students with LD today necessarily involves making assumptions about how technologies, labor markets, and societies will evolve over the coming decades. These students will graduate into worlds that may be profoundly different from the present. By equipping them with futures literacy, inclusive education prepares them not only to adapt but to be active architects of their professional and personal futures. As the UNESCO report on Humanistic Futures of Learning emphasizes^[1], education must develop capacities for anticipation, reflection, and participation in shaping collective futures—capacities that are particularly valuable for students navigating the additional challenges posed by learning disabilities.

5.2. Contributions to the Literature

This work contributes to the literature in multiple ways. It represents, to the best of the authors' knowledge, one of the first systematic syntheses that integrates literatures on futures literacy, inclusive education, disability studies in higher education, and educational technology to build a unified framework. This framework is simultaneously theoretical, identifying epistemological and pedagogical alignments between fields; methodological, documenting how foresight tools can be adapted for inclusive pedagogy; and practical, providing evidence-informed recommendations for stakeholders at multiple levels of the educational system. The work advances the theoretical concept of "inclusive anticipatory pedagogy," which positions futures literacy and inclusion not as separate goals but as integrated dimensions of transformative educational practice. This paradigm has implications for how we conceptualize learning outcomes, instructional design, assessment, and faculty development, extending recent work on futures literacy competencies^[24,36] into the domain of inclusive education.

5.3. Agenda for Future Research and Action

The agenda for future research is simultaneously broad and urgent. Empirically, longitudinal research is needed to track the long-term impacts of futures literacy education on

student outcomes, with particular attention to how these impacts vary for students with different learning profiles^[24,36]. Intervention studies are also needed that rigorously test the efficacy of specific pedagogical approaches, such as scenario-based learning or horizon scanning, for developing futures competencies in diverse student populations. Methodologically, future research should invest in participatory action research in which students with LD are co-investigators, guiding questions, design, and interpretation^[11,48]. This would not only generate richer knowledge but would also model the type of partnership that future-oriented inclusive education should embody. Cross-culturally, there is a pressing need for research that explores how different cultural traditions conceive temporality and the future, and how this shapes educational practices and aspirations^[13,47]. Particularly valuable would be research that centers indigenous knowledge systems and non-Western epistemologies, exploring how these could enrich or transform dominant approaches to futures literacy.

5.4. Final Reflection: Toward Inclusive Futures

In conclusion, building inclusive futures through futures-literacy pedagogies is as much ethical work as it is epistemological or methodological. It is fundamentally about who has the right and capacity to imagine and shape the future. For too long, futures have been imagined by the few for the many, with implicit assumptions that certain forms of cognition, certain ways of being in the world, are the norm against which all others are framed as deficiencies^[11,13]. The integration of futures literacy and inclusive education offers the opportunity to radically democratize future-making. When students with dyslexia, ADHD, autism, and other neurodiversities participate fully in imagining educational futures; when their insights shape institutional strategies; when their visions of justice and equity are centered rather than marginalized, the futures that emerge are inevitably richer, more creative, more just, and more robustly prepared for uncertainty.

As argued by Isidori and colleagues, the imperatives for futures education, creativity, and emotional intelligence become increasingly evident as we navigate the complexities of the twenty-first century, and their integration into higher

education represents not merely an academic interest but a social necessity^[10]. This necessity is amplified when we recognize that the century ahead will be shaped by challenges—climate change, pandemics, technological disruption, and migration—that require forms of creativity, collaboration, and adaptive capacity that diverse minds, working together, are uniquely positioned to generate. With everyone at the table, the futures we build will inevitably be more inclusive, more innovative, and more humane. This is the promise of integrating futures literacy and inclusive education, and it is work that cannot wait.

Author Contributions

Conceptualization, P.F., A.D.P. and M.D.T.; methodology, P.F. and A.D.P.; software, P.F.; validation, A.D.P. and M.D.T.; formal analysis, P.F. and A.D.P.; investigation, P.F.; resources, P.F.; data curation, P.F. and A.D.P.; writing—original draft preparation, P.F., A.D.P. and M.D.T.; writing—review and editing, P.F., A.D.P. and M.D.T.; visualization, P.F.; supervision, M.D.T. All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest

The authors declare no conflict of interest.

AI Use Statement

During the preparation of this manuscript, the authors used ChatGPT (OpenAI) solely for language refinement. No AI tools were used for data analysis, interpretation, or generation of scientific content. All outputs were critically reviewed and edited by the authors. The authors take full responsibility for the integrity and accuracy of the work.

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