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CHAPTER 13

ARTIFICIAL INTELLIGENCE AND NEURODIVERSITY: POTENTIALS AND RISKS FOR STUDENTS WITH ADHD AND ASD

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ABSTRACT

This chapter examines the potentials and risks of using artificial intelligence in the education of neurodivergent students, particularly those with ADHD and ASD. The study is grounded in a narrative literature review and aims to understand how AI-based tools can either support or compromise processes of learning, autonomy and inclusion. The methodology involved the selection, organization and analytical synthesis of works on neurodiversity, inclusive education, algorithmic ethics and educational technologies. Results indicate that AI offers meaningful possibilities for cognitive accessibility, personalized scaffolding and multimodal communication, especially through tools that assist executive function for students with ADHD and support communication and predictability for autistic learners. However, the literature also reveals significant risks related to surveillance, biased datasets, behavioral normalization, cognitive dependency and extensive data collection affecting vulnerable populations.

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These issues are intensified in datified school environments where algorithms classify and track students. The study concludes that AI can contribute to more inclusive and equitable educational experiences only when its use is critically mediated by teachers and aligned with ethical principles that protect autonomy, dignity and the right to learn according to diverse cognitive profiles. Critical teacher education, strong data protection policies and a commitment to cognitive justice are essential to ensure that AI supports rather than undermines neurodivergent students.

Keywords: Neurodiversity; Artificial Intelligence; ADHD; Autism; Inclusive education; Cognitive justice.

INTRODUCTION

The growing incorporation of artificial intelligence systems in education has produced profound transformations in teaching and learning practices. Although often celebrated as a solution to persistent pedagogical challenges, AI operates according to complex sociotechnical logics that do not always align with the principles of inclusive education. For neurodivergent students, such as those with Attention Deficit Hyperactivity Disorder (ADHD) and Autism Spectrum Disorder (ASD), these transformations can be even more decisive—both for the promise of personalized resources and for structural risks associated with surveillance, datafication, and the reproduction of inequalities.

The contemporary notion of neurodiversity shifts the understanding of these students from a pathologizing perspective to the recognition of legitimate variations in human neurological functioning. Within this framework, AI can act as a mediator of cognitive accessibility, support communication, organize routines, and diversify modes of expression. However, as Selwyn (2016), O'Neil (2016), Benjamin (2019), and Williamson (2020) warn, intelligent technologies are not neutral: they carry power structures, historical-social biases, and intentionalities embedded in their operational models.

In this context, this chapter critically analyzes the interactions between AI and neurodiversity, examining how intelligent technologies can simultaneously expand access and produce new forms of vulnerability. To this end, it discusses recent literature on ADHD, ASD, algorithmic ethics, and inclusive education, articulating theoretical foundations, pedagogical implications, and ethical challenges. The chapter is structured into four axes: a review of neurodiversity concepts; analysis of AI's potentials for neurodivergent students; discussion of risks associated with datafication and algorithmic biases; and, finally, recommendations for educational practices and public policies that promote cognitive justice. This contribution is aimed at educators, researchers, and policymakers seeking to understand how AI can integrate into inclusive education critically, ethically, and emancipatorily.

METHODOLOGY

This study is characterized as a narrative literature review, an approach that proves methodologically consistent for emerging, multifaceted, and interdisciplinary themes, such as the interactions between artificial intelligence, neurodiversity, and inclusive education. Unlike systematic reviews, whose strength lies in rigid protocols and exhaustiveness, the narrative review allows for interpretative readings, the construction of dialogues between distinct theoretical fields, and the development of conceptual syntheses that illuminate complex phenomena. Its objective is not simply to gather references but to understand meanings, disputes, epistemological tensions, and possible formative pathways. It is, therefore, a method that supports in-depth analyses when the object of study is undergoing

accelerated technological transformation and demands transversal articulations among education, ethics, developmental psychology, and sociotechnical studies.

The starting point of this review was the recognition that research on AI applied to education often ignores the cognitive and sensory specificities of neurodivergent students, producing generalized discourses. For this reason, the construction of the theoretical corpus needed to simultaneously include works addressing ADHD and ASD from the perspective of neurodiversity (Armstrong, 2012; Kapp, 2020), studies on technologies and learning (Papert, 1980; Holmes & Tuomi, 2022), critical analyses of datafication and algorithms in education (Selwyn, 2016; Williamson, 2020), debates on sociotechnical ethics (Floridi, 2018), as well as works denouncing algorithmic biases and structural inequalities (Noble, 2018; Benjamin, 2019). International guidelines such as UNESCO (2023) and documents on Universal Design for Learning were also incorporated, given their relevance to inclusion.

The first methodological stage consisted of a broad survey of sources in academic databases, digital repositories, and institutional documents. Priority was given to literature with consolidated impact in the field and recent works that directly address the emergence of generative AI. This process was not limited to education but included cognitive sciences, social sciences, philosophy of technology, and critical studies on race and algorithms, recognizing that understanding AI and neurodiversity requires a plural and interdisciplinary approach.

The second stage involved exploratory reading, preparation of analytical summaries, and thematic categorization. In this process, central axes emerged, such as: AI-assisted personalization; mediation of executive function in ADHD; augmentative communication and predictability in ASD; pedagogical surveillance and childhood datafication; algorithmic biases and production of inequalities; risks of cognitive dependency; cognitive justice; multimodal accessibility; and ethical implications in basic education. This categorization was not reduced to mere listings but treated as a conceptual map, allowing the identification of relationships, tensions, and contradictions among authors.

The third methodological stage consisted of integrative synthesis, a process in which categories were cross-referenced to produce new interpretations of AI's role in neurodiverse contexts. The synthesis did not seek consensus but aimed to make visible conceptual fractures that enrich the analysis—for example, the tension between the discourse of algorithmic personalization, often celebrated by technology companies, and academic criticism of the production of cognitive dependency and behavioral surveillance. This interpretative movement enabled an understanding of how technology both expands access and reconfigures vulnerabilities. This stage also brought together fields that rarely interact—such as neurodiversity and algorithmic ethics—highlighting their convergence in defending student autonomy and dignity.

Another important methodological element was the critical analysis of silences in the literature, understood as significant absences for comprehending the theme. For instance, the scarcity of studies considering sensory specificities of autism in AI-based technologies; the lack of research on hyper-personalization risks for students with ADHD; and the almost non-existent Brazilian debate on protecting sensitive data of neurodivergent children in datafied school environments. Identifying such gaps is a constitutive part of the narrative review, as it reveals blind spots that need to be addressed by research and educational policies.

This is a theoretical study; the research did not involve human participants or empirical data collection. The methodological choice reinforces that analyses of AI and inclusion cannot dispense with conceptual depth, as educational technologies are products of historical, political, and economic processes that must be interpreted for their use to be ethically defensible.

Finally, the narrative review, far from being a mere preliminary stage, became the analytical foundation of the chapter, as it allowed the ambivalent nature of AI to be evidenced—capable of expanding access while simultaneously intensifying vulnerabilities. This methodological path reveals that understanding AI in neurodiverse contexts requires a careful, interdisciplinary, critical, and sensitive approach to singularities. The methodology employed, by valuing complexity and theoretical dialogue, ensures that the results presented do not oversimplify the phenomenon but offer rigorous contributions for educators, researchers, and policymakers seeking to build truly inclusive practices in the algorithmic era.

NEURODIVERSITY AS AN EDUCATIONAL PARADIGM

The notion of neurodiversity represents a significant epistemological shift in how education understands cognitive differences, moving away from a pathologizing logic toward a perspective that recognizes the plurality of modes of human neurological functioning. In contrast to the traditional model, which tends to frame students with ADHD and ASD in terms of deficits and deviations from the norm, neurodiversity proposes that such differences be understood as legitimate variations in cognition, attention, language, and sensory processing. Armstrong (2010) emphasizes that recognizing neurodiversity implies abandoning educational practices aimed at normalization and adopting approaches that value talents, specific interests, and unique cognitive styles.

Kapp (2020), in discussing the neurodiversity movement from the standpoint of autistic voices themselves, reinforces that inclusion is not limited to physical presence in school but involves belonging, recognition, and meaningful participation. From this perspective, the educational challenge is not to "correct" the neurodivergent student but to reorganize pedagogical practices, curricula, and assessments to encompass multiple ways of learning and expressing knowledge. This approach directly engages with

the notion of cognitive justice, understood as the right for different forms of thought to coexist and be legitimized within the school environment.

In the context of digital culture, neurodiversity becomes even more relevant, as technologies expand the possibilities for pedagogical mediation while simultaneously reinforcing normative performance standards. Thus, discussing neurodiversity as an educational paradigm entails questioning singular models of attention, productivity, and academic success, opening space for practices that are more flexible, sensitive, and ethically committed to human diversity.

ADHD AND ASD IN CONTEMPORARY SCHOOLING

In contemporary schools, students with ADHD and ASD face challenges beyond their individual cognitive profiles. Difficulties often attributed to these students largely stem from rigid school structures, inflexible curricula, and pedagogical practices centered on homogeneous learning models. For ADHD, variations in attention, impulsivity, and movement needs clash with environments privileging sustained attention and behavioral control. For ASD, differences in social communication, interpretation of implicit cues, and sensory processing can lead to misunderstandings and silent exclusions.

Traditional school practices often ignore cultural and communicational transformations brought by digital languages, affecting neurodivergent students even more intensely (Rojo, 2012; Lankshear & Knobel, 2011). These students frequently develop unique learning strategies in digital environments, where they find greater control over pace, repetition, visuality, and expression. However, schools rarely recognize these repertoires as legitimate, producing merely formal inclusion marked by enrollment and physical presence rather than effective participation.

This tension between formal and real inclusion underscores the need to rethink schooling in light of cognitive diversity. Simple activity adaptations or sporadic technology use do not guarantee inclusion without deeper changes in conceptions of learning, assessment, and success. Here, AI becomes relevant, as it can either expand mediation possibilities or reinforce exclusionary logics, depending on its pedagogical integration.

ARTIFICIAL INTELLIGENCE AND INCLUSIVE EDUCATION

Artificial intelligence has often been presented as a promise of personalized learning, capable of adapting content, pace, and learning pathways to the individual needs of students. In inclusive education contexts, this promise gains strength by suggesting solutions to historical challenges faced by neurodivergent students. AI-based tools can offer multimodal explanations, organize tasks, support executive functions, and expand communication resources, aligning with the principles of Universal Design for Learning and the specific demands of students with ADHD and ASD.

However, critical authors warn that algorithmic personalization is neither neutral nor automatically inclusive. Selwyn (2016) argues that educational technologies frequently carry discourses of efficiency and innovation that conceal power relations, commercial interests, and control processes. Williamson (2020) expands this critique by demonstrating that AI systems applied to education operate through datafication, transforming students into analyzable and predictable profiles, which can reduce the complexity of subjects to performance and behavioral indicators.

Noble (2018) contributes to this debate by showing that algorithms tend to reproduce structural biases, reinforcing existing stigmas and inequalities. In inclusive education contexts, this means that neurodivergent students risk being classified, monitored, and labeled even more intensely—now under the guise of technological neutrality. The promise of personalization can thus turn into pedagogical impoverishment when the system begins to offer reduced challenges or limited learning pathways based on initial algorithmic interpretations.

Therefore, the literature indicates that the relationship between AI and inclusive education is profoundly ambivalent. Technology can expand access and foster learning, but it can also intensify surveillance, cognitive dependency, and symbolic exclusion. Teacher mediation, pedagogical intentionality, and ethical reflection thus become indispensable conditions for artificial intelligence to effectively contribute to educational practices committed to neurodiversity and cognitive justice.

RESULTS AND DISCUSSION

The body of analyzed works reveals that AI holds significant potential to support students with ADHD and ASD, yet these potentials are inseparable from ethical, pedagogical, and sociopolitical risks.

For students with ADHD, AI tools that assist in organizing routines, segmenting tasks, and regulating time can contribute to the development of executive function. Multimodal and synthesized explanations facilitate the understanding of complex concepts when sustained attention becomes challenging. However, the literature points to the danger of cognitive dependency: when algorithms assume functions that should be progressively developed by the student, autonomy may be compromised. Selwyn (2016) argues that educational technologies often create the illusion of autonomy while reducing agency—a critical aspect for this population.

Regarding ASD, AI can support alternative and augmentative communication, visual organization of routines, and the creation of social narratives that help in understanding everyday interactions. Such resources enhance linguistic accessibility and predictability, elements fundamental for many autistic students. However, technologies for behavioral monitoring or emotional recognition are widely criticized by researchers. Benjamin (2019) shows that these systems tend to interpret neurodivergent expressions as

anomalies, reinforcing pathologization. O'Neil (2016) demonstrates that algorithms trained on biased data reproduce historical injustices—a risk amplified when dealing with vulnerable groups.

School datafication constitutes an additional risk. Williamson (2020) demonstrates that schools increasingly operate as predictive systems, classifying students based on data. For neurodivergent individuals, this can lead to the crystallization of labels and inadequate interventions. Zuboff (2019) warns that extensive data collection transforms subjectivities into commercial raw material, jeopardizing the privacy and dignity of children with ADHD and ASD.

At the same time, the literature emphasizes that, when used with critical mediation, AI can expand educational repertoires and promote cognitive justice. Intelligent tools that enable multiple forms of expression, representation, and engagement align with Universal Design for Learning principles and support broader recognition of cognitive singularities. The condition, however, is always the presence of a teacher capable of interpreting the uses, limits, and intentionalities of technology.

The relationship between AI and neurodiversity must be understood within a broader sociotechnical ecology, in which devices, people, and institutions interact continuously. Authors such as Floridi (2018) and Benjamin (2019) highlight that intelligent technologies do not merely respond to commands but structure environments, shape behaviors, and influence decisions. For students with ADHD and ASD—whose ways of perceiving and organizing the world already differ from neurotypical norms—these mediations can expand access or create additional barriers. Thus, the debate cannot be restricted to technical evaluations of tools but must consider ethical, political, and relational dimensions that permeate their use.

Another fundamental aspect concerns how digital platforms and AI systems produce forms of attention regulation. For students with ADHD, whose executive functions are often strained by multiple stimuli, digital environments can alternate between support and overload. Williamson (2020) and Santaella (2018) observe that digital interfaces are designed to maximize engagement, which can intensify distraction, impulsivity, or hyperfocus. Conversely, AI tools that organize routines, filter distractions, or transform complex information into visualizations can function as mediators of autonomy and self-management.

Among students with ASD, AI can act as a communicative and socio-affective mediation technology, especially when used in formats that respect predictability, controlled repetition, and low ambiguity—essential elements for many learners on the spectrum. Systems based on natural language processing can foster written expression, support social routines, and enhance inferential comprehension. However, as Kapp (2020) emphasizes, such technologies should not replace human relationships but expand spaces for participation and belonging.

Algorithmic personalization constitutes an equally ambivalent dimension. Adaptive systems can adjust the pace, format, and complexity of activities, reducing frustration and increasing engagement. However, Selwyn (2016) and O'Neil (2016) warn that algorithms tend to reinforce pre-existing patterns, potentially crystallizing deficit-based expectations about neurodivergent students. A student who shows initial difficulty may be systematically exposed to simpler challenges, impoverishing their educational trajectory. Thus, personalization must be constantly monitored by educators to ensure it expands rather than restricts learning horizons.

Finally, the issue of school datafication deserves special attention. The massive collection of behavioral data can produce learning profiles useful for pedagogical planning but can also reduce the complexity of the student to predictive indicators. Zuboff (2019) and Noble (2018) warn that when data replace human narratives, pedagogical decisions may be based on incomplete or biased statistical models. For neurodivergent students, this means a risk of digital pathologization or reinforcement of stigmas.

Table 1 – Potentials and Risks of Artificial Intelligence for Students with ADHD and ASD

AI POTENTIALS	AI RISKS AND LIMITATIONS
Personalization of task pace and complexity, respecting different learning times.	Reduction of pedagogical complexity when excessive adaptation limits cognitive challenges.
Tools supporting executive functions, such as routine organization, reminders, and activity sequencing.	Cognitive dependency on intelligent assistants for planning, decision-making, and problem-solving.
Augmentative and alternative communication resources expanding expression for ASD students.	Reinforcement of algorithmic biases associated with neurodivergent profiles.
Visualization of complex information in accessible formats, such as diagrams, maps, and visual syntheses.	Risk of excessive datafication and continuous behavioral surveillance.
Reduction of sensory overload through interfaces adjusted to student profiles.	Algorithmic stigmatization, with systems classifying students as less capable.
Attention regulation support via filters, timers, and guided focus.	Highly stimulating digital environments intensifying impulsivity and distraction.

Expansion of communicative, textual, and visual autonomy.	Improper substitution of essential human interactions for social development.

CONCLUSION

Artificial intelligence holds significant potential to transform educational practices for neurodivergent students, particularly by enhancing cognitive accessibility, diversifying modes of expression, and offering communicative mediations that foster engagement and participation. Resources such as multimodal explanations, intelligent organization of routines, support for augmentative communication, and the generation of visual representations can reduce historical barriers that hinder the learning of students with ADHD and ASD. Pedagogical personalization, when carefully planned, allows different rhythms, interests, and attention profiles to be recognized as legitimate elements of the educational experience, contributing to a school environment that is more equitable and sensitive to singularities.

However, these benefits cannot be analyzed without a critical understanding of the risks that AI also introduces. Behavioral surveillance, the collection of sensitive data, the use of predictive models, and the intensification of school datafication produce effects that may amplify inequalities, reinforce stigmas, and compromise student autonomy. For neurodivergent individuals—whose educational history is often marked by excessive evaluations and attempts at normalization—the introduction of algorithmic systems may represent a new layer of control, transforming singular behaviors into statistical anomalies. Algorithmic biases, as evidenced by O'Neil (2016), Noble (2018), and Benjamin (2019), tend to reproduce historical inequalities and may disproportionately impact those who already face social, cognitive, and institutional barriers.

In this scenario, pedagogical mediation becomes even more central. The teacher assumes the role of critical interpreter of technologies, assessing their relevance, limitations, and ethical consequences. It is the teacher's responsibility to protect data, contextualize tools, guide processes of self-regulation, promote reflection on AI usage, and ensure that the focus remains on meaningful learning and respect for diverse ways of knowing. Technology does not replace educational sensitivity, active listening, affective mediation, or ethical commitment to student dignity. On the contrary: the more sophisticated the tools become, the greater the need for professionals capable of humanizing processes and resisting the temptation to automate judgments or reduce subjectivities to metrics.

It is concluded that AI can occupy a relevant place in inclusive education, provided it is integrated into pedagogical projects that recognize neurodiversity as a richness rather than a deficit to be corrected. This implies conceiving inclusion as a political and ethical practice, grounded in cognitive justice,

autonomy, and respect for different ways of learning, interacting, and perceiving the world. For intelligent technologies to truly contribute to emancipatory trajectories, it is essential that schools, researchers, and policymakers adopt a critical stance toward algorithmic logic, promote continuous teacher training, ensure digital rights, and build environments in which neurodivergent students are not merely AI users but subjects capable of understanding, questioning, and interacting with these technologies ethically and creatively. Inclusive education in the AI era is not achieved through uncritical adoption of tools but through reaffirming that every student—with their history, sensory profile, and way of thinking—deserves to be recognized in their fullness and dignity.

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