Redefining Cognitive Diversity in Education: The AI Approach for Autism Spectrum Disorder

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"The best way to predict the future is to invent it" - Alan Kay (Kay, 1982).

Imagine a child brimming with potential, yet denied the chance to fully contribute to society because their mind works differently. Sadly, this is the reality for many individuals with Autism Spectrum Disorder (ASD). Despite technological advances, the labour force participation for those with ASD is 83% lower than for their neurotypical counterparts (Australian Bureau of Statistics, 2014). Even when employed, their contributions are frequently undervalued. It's clear that our current systems are failing people with ASD, depriving them of fulfilling lives and depriving society of their potential contributions.

Proficient written communication increasingly determines success in educational and professional domains (Asaro-Saddler, 2014), a skill that assumes even greater significance given the documented challenges individuals with ASD face regarding handwriting (Handle et al., 2022). These challenges can obstruct their expression and equitable assessment. Nevertheless, the ubiquity of laptops and advanced speech-to-text recognition technology has made producing legible text more accessible than ever. However, educational regulatory bodies such as NESA prohibit the use of a keyboard during final school examinations (HSC), arguing it could provide an unfair advantage to students (NESA, n.d.; Firth, 2018).

Technology Change

Effective writing and communication are inherently reader-centric, rather than author-focused. Baron-Cohen (1990) introduced the term "mind-blindness" to describe a core challenge of autism. If one cannot understand the perspective of others, how can they learn to write and communicate effectively?

Recent breakthroughs in artificial intelligence (AI) (Krizhevsky et al., 2012; Sutskever et al., 2014; Vaswani et al., 2017; Devlin et al.) have spurred a surge in adopting AI large language models (LLM) like ChatGPT and Gemini, enhancing written content creation. Additionally, tools like `Hume.ai` can interpret emotional expressions and assist in generating empathetic responses. These models train on vast datasets encompassing a broad spectrum of human experience. While beneficial for neurotypical individuals, as Hoover (2023) highlights, could these also offer 'mind-sight' for those with autism?

Goals and Questions

The primary goal of this literature review is to render the educational and economic disadvantages associated with ASD obsolete. It posits the hypothesis that AI can enhance the capabilities of individuals with ASD, critically shaping their education and inclusion in mainstream classrooms. This review seeks to answer the following questions:

1. Should the cognitive processes of individuals with ASD be viewed primarily as a disorder, or are they more accurately characterised as a form of diversity?
2. What technologies have the potential to augment the capabilities of individuals with ASD to achieve peer-level intellectual outcomes?
3. What are the key approaches to integrating AI into mainstream classroom settings to specifically improve the academic performance of students with ASD?

Methodology

This review evaluates the quality of studies using Leigh's (2009) evidence hierarchy, a framework widely recognised in Australian public policy. This hierarchy ranks studies by their methodological rigour, favouring randomised controlled trials over natural experiments or expert opinions, and systematic reviews (meta-analyses) over individual studies.

Sources ranked lower in the evidence hierarchy, such as those on the AutismCRC website, contributed to the review's context but were not explicitly cited. Additionally, the development of autism-focused GPT models in OpenAI's repertoire is acknowledged for context but not elaborated upon.

The search strategy encompassed a variety of terms utilised within Google Scholar and the Macquarie University multi-search tool. Identification of relevant articles led to the exploration of related works, ensuring a thorough review.

Cognitive Processes in ASD are Different, Not a Disorder

Understanding ASD is essential for developing applicable learning environments. Traditional views see ASD as a medical condition, but recent studies advocate computational psychology approaches.

The Medical Approach: Viewing ASD as a Disorder

Lord et al. (2020) extend their earlier work (2018) to provide a comprehensive ASD primer, treating it as a heritable disease. They distinguish ASD from intellectual disability and report that MRI studies have yet to identify any definitive structural or functional brain differences in autistic individuals. Despite the 277 references, treating ASD as a disease hasn't yielded useful interventions for improvement, a point the authors themselves highlight by noting the limited research aimed at addressing solvable problems for autistic individuals and their families.

Computational Psychiatry: Exploring Different Cognitive Processes

Pellicano and Burr (2012) pioneered a novel approach by associating ASD with aberrant Bayesian inference processing in the brain. Van de Cruys et al. (2014) furthered this by introducing “The Anticipating Brain” and Predictive Coding concepts, effectively modelling the brain as a prediction engine that learns from and corrects prediction errors.

Van de Cruys et al. (2014) demonstrated that individuals with ASD may excel in visual search tasks due to their precision. However, their performance notably declines with increased environmental noise, as they tend to focus on irrelevant features.

Further studies employing the Bayesian/Predictive Coding framework have consistently shown that people with ASD process information more precisely than neurotypical individuals but struggle more in noisy environments. For instance:

1. Manning et al. (2015) found children with ASD as capable as their peers in detecting movement direction when uniform, excelling even more with varied movement directions.
2. Lawson et al. (2017) discovered that individuals with ASD overestimate “noise” in volatile environments, adversely affecting their learning.
3. Van de Cruys et al. (2017) highlighted that poor precision-setting hampers learning in unstable conditions, assigning relevance to inputs, and robustness in learning environments.
4. Keating et al. (2024) noted that individuals with ASD form more detailed visual emotion representations, yet this does not enhance their emotion recognition capabilities, unlike in neurotypical individuals.

5. Pesthy et al. (2024) recently found no difference in predictive processing capabilities between adults with ASD and neurotypical adults.

Resolution to Question One

While the traditional medical model views ASD as a disorder (Lord et al., 2020), the lack of breakthrough interventions highlights its limitations. This approach often fails to consider how individuals with ASD process information differently.

The computational psychology perspective, however, provides new insight. By focusing on predictive coding mechanisms (Van de Cruys et al., 2014), studies show that ASD individuals may excel in specific tasks but struggle in chaotic or unpredictable environments (Manning et al., 2015; Lawson et al., 2017).

Crucially, recent work suggesting no difference in predictive processing capabilities (Pesthy et al., 2024) further supports the idea that ASD involves alternative processing rather than a deficit. This aligns with studies reinterpreting ASD traits through the lens of monotropism (Gissom et al., 2023).

AI Technologies, Combined with an Integrated Learning Platform Can Enhance Intellectual Capabilities for People with ASD

Cognitive processing differences for people with ASD manifest in numerous ways (Lord et al., 2020), including:

- Verbal and non-verbal communication
- Social-emotional reciprocity
- Challenges in social interaction and communication
- Restricted interests and repetitive behaviours

- Differences in sensory processing (over- or under-sensitivity)
- Less structured compositions and more spelling errors in writing

The expression of written thought is essential for demonstrating critical thinking and opinions, particularly in educational assessments (Accardo et al., 2019). Instruction in writing, beginning in primary school, operates on the premise that continual critique will lead to improved writing skills (Accardo et al., 2019). For people with ASD, who face challenges in writing fluency, this suggests a risk of systematic disadvantage.

Given the volume of research published and specific works, e.g., Cardon et al. (2016), unprecedented opportunities now exist to augment the learning experiences of people with ASD with new technologies. The recent availability of low-cost Large Language Models (LLMs) is particularly promising, given they are trained on extensive subsets of human writing, offering a mechanism to express oneself using the entirety of human written expression as a basis.

However, long-standing experience in fields involving writing, such as software development, highlights the improbability that any single technology will act as a “silver bullet” (Brooks, 1986) to improve human capability tenfold. Instead, identifying “brass bullets” and composing these into an overall strategy to assist people with ASD is a more pragmatic route.

Evaluating the efficacy of different technologies requires a comprehensive conceptual framework. To this end, incorporating computational psychiatry as the core of its design logic assists in applying technology to disentangle signal from noise (Van de Cruys et al., 2017) for people with ASD.

Moreover, Chrysaitis and Series (2023) note from their analysis of 83 papers that most studies on Bayesian and Predictive Coding had small, low-power samples. Thus, how to instrument the learning environment itself becomes a significant consideration.

The literature on current writing and technology interventions will first be reviewed, followed by initial work applying AI technologies.

Through literature review and direct investigation, potential technologies will be critiqued, and methods for synthesis described.

Current Writing Interventions & Technology

This literature review identified other reviews that cover a broad summary of the field, including:

1. Abdo & Al Osman (2019) conducted a systematic review of studies from 2013–2017 on the impact of technology on the reading and writing skills of children with ASD, including 17 studies.
2. Accardo et al. (2020) synthesised 24 single-case design studies on writing interventions for individuals with ASD, representing a total of 62 participants.
3. Hume et al. (2021) carried out a third-generation review of evidence-based practices, presenting clear scientific evidence of positive effects (i.e., evidence-based practices or EBPs). The review covers articles from 1990–2017, searches 31,779 articles, and synthesises 972 articles.

On the one hand, all papers identified evidenced “packages” for improvement, providing a context for improvement. Accardo et al. report that technology can have positive impacts on reading and writing skills, similarly to Abdo & Al Osman (2019). Both papers note that the technology used is not specifically customised for people with ASD.

What is noticeable is the omission of a common underlying theoretical basis across the studies. So, while studies can assess improvements by applying specific techniques, they are unable to generalise the technique as can be done by applying computational psychological techniques. All papers report small data sets, mostly from individual research settings.

Given the complexity of the challenge and the societal impact of ASD, a more applied approach to improvement might seem more appropriate. Such an approach could be used by entire populations, allowing the scale of the dataset for evaluation to change from 10–100 participants to 10,000–100,000 participants on an ongoing basis. This would enable far higher quality research work, developed faster, which can be more readily assessed and rapidly translated into large-scale positive educational impacts.

Investigations into the Use of AI in Inclusive Education

Research into the application of AI in supporting individuals with ASD is in its nascent stages with consistent positive reports on its potential. For example:

1. Hopcan et al. (2023) highlight that AI enables a personal learning environment, provides immediate and constructive feedback, supports distance learning, and enables content customisation based on individual learning plans. Also, that AI enables this to be done at scale at a low cost.
2. Toyokawa et al. (2023) performs initial investigation into the use of data analytics to assist in tailored interventions and discusses the potential integration between educators, students, and parents.

3. Chiu (2023) performs a qualitative study involving 88 participants on the perspectives from teachers and leaders.
4. Bertacchini et al. (2023) propose an innovative educational approach that utilises the capabilities of ChatGPT, integrated with image generation, to develop emotion recognition and problem-solving skills in individuals with ASD.
5. Garg and Sharma (2020) examine the use of AI with different sensory inputs and perform a qualitative student and teacher assessment.

The papers raise the need for robust tooling and environments that are specifically customised for diverse learners.

Opportunities for Capability Augmentation

Leverage Open-Source Technologies used in Software Engineering

Software is a multi-trillion-dollar industry that includes some of the world's largest companies (e.g., Microsoft, Apple, Google etc.).

Fundamental to this industry are distributed collaborative environments for writing, and the production and management of content. Many of these environments are widely available and either open source (and thus free - e.g., Zed) or available at a nominal cost (e.g., GitHub). Given the significant economic and productive impact of AI on this industry, significant investment is currently occurring to incorporate AI into these environments.

Many of the issues raised in the literature surrounding robustness, collaboration, affordability, close AI integration, customisability come "out of the box" and would never be developed were solely funded for the purpose of inclusive education.

Pipelined and Automated Approaches

Van de Cruys et al. (2018) perspective of the imperative of disentangling signal from noise for people with ASD, the technology choice and approach is critical. Common documentation technologies such as MS Word and Canva, while obviously successful for neurotypical users, mix features in a single environment. To a person with ASD, these add noise to the environment.

Instead, for a person with ASD, a programmer environment solely focused on the production of text (say in markdown format), is potentially less distracting. Automated text review can then occur as a second pipeline, as can a more aesthetically pleasing format, using a markdown viewer.

This pipelining logic then permits automation. So, for example, if the goal were to produce an academic paper in PDF format, with fully correct APA v7 referencing, a combined AI/software build process can occur that once a text document is completed, an automated process occurs to perform a final proof of the document, ensure all references are APA v7 perfect, and then generate a full production PDF with no human involvement.

Further, the more focused writing environment is simpler to instrument for the purpose of assessment, and the capability of the person with ASD is obviously enhanced if the whole process of referencing validation and publishing is fully automated away, once achieved, available for all students.

Specific AI Technologies

With the establishment and use of educative platforms optimised for use by people with ASD, the potential to extend these in a customisable way to support mass student-centred learning exists. For example:

1. Speech-to-text and text-to-speech technologies for improved communication. Entire classes can be converted to text & or text videos. Students can ask questions verbally, by typing.
2. AI-powered emotional intelligence tools such as Hume, to support social learning and assist teachers on how the class is running, and to provide the students with ASD about the human emotion in the room that they would not otherwise pick up.
3. AI Agents are an emerging technology that will see AI develop planning capabilities. Again, for the person with ASD, they will help automate away sources of noise in the environment but enables greater structuring of tasks to assist the student develop the skills.
4. Not only do LLMs assist in production and review of text, but adjustment of content for the needs of the student, and the needs of the reader.

Resolution to Question Two

The integration of computational psychiatry within a holistic student-centred learning environment built upon research, existing technologies, and rapid advances in AI offers a potential paradigm shift towards developing capability outcomes and intellectual achievements compared to traditional pedagogies.

Clear parallels exist in work on computational psychiatry compared to AI, especially highlighted by the seminal works of Vaswani et al. (2017) and Sutskever et al. (2014), it is conceivable to design learning environments that are both adaptive and responsive to the needs of students with ASD. Such environments could offer tailored learning experiences that continuously evolve based on real-time data, to optimise learning outcomes.

With such an approach to intellectual augmentation, not only would it be possible for people with ASD to achieve peer-level academic outcomes, if not otherwise surpassing them.

Embracing AI: A Leap Towards Inclusive Education for Students with ASD

The journey through education for children with autism is fraught with challenges, a reality underscored by Lord et al. (2020), who paint a rather sombre picture of the current state of support for these individuals and their families. The negative impacts of autism not only weigh heavily on the individuals themselves but also on their families and society. This stark reality prompts a deeper reflection on our approaches and the potential technologies at our disposal that could transform these challenges into opportunities for growth and inclusion.

The prevailing view of autism as a disorder, as summarised by Lord et al. (2020), while perhaps an accurate reflection of mainstream attitudes, misses a crucial dimension of this condition: the unique cognitive differences it encompasses. Amidst a sea of research, one beacon of hope shines brightly: computational psychiatry, paralleled by the rapid advancements in artificial intelligence (AI). This emerging framework offers a fresh perspective, suggesting that autism represents a distinct form of cognitive processing, not merely a disorder to be managed. It prompts us to reconsider our strategies, asking how we might better support those who navigate the world in ways that diverge from the neurotypical norm.

The inclusion of students with autism in mainstream educational settings often hinges on the well-intentioned efforts of educators striving to adapt their teaching methods. However, the sheer diversity and scale of educational environments mean that such efforts, while commendable, may not consistently yield the positive experiences we hope for (Spandagou, 2021). Indeed, as Wong (2024) observes, physical presence in the classroom does not equate to true inclusion, leaving many students with autism feeling isolated amidst their peers.

This brings us to a crucial crossroads, one that every parent of a child with autism must face. Do we accept the status quo, acknowledging the limitations of current practices and the potential lifelong disadvantages our children may face? Or do we advocate for a paradigm shift towards the integration of technology in education, particularly AI, to bridge the gap between cognitive differences and learning outcomes?

As a parent of four daughters, I find the answer clear. Acceptance of a future where a child is disadvantaged, silenced, or excluded simply because their cognitive processes differ from the majority is untenable. Supporting Wong's (2024) argument for true belonging in the classroom, I envision an educational landscape where my child, and others like them, can thrive, achieving parity with their neurotypical peers, perhaps with the aid of technology.

The debates surrounding the ethics and fairness of integrating AI and other technological aids into educational settings are necessary and will undoubtedly continue. However, from a parent's perspective, the imperative to employ every available resource to mitigate the long-term disadvantages faced by our children transcends these discussions.

The integration of AI and technology in the classroom emerges not just as an option but as a moral imperative, a vital step towards ensuring that all children, regardless of neurodiversity, have the opportunity to realise their full potential.

In advocating for this shift, we do more than seek to leverage technology; we champion a more inclusive, compassionate, and equitable approach to education. For the sake of our children and their futures, let us embrace the possibilities

that technology affords, forging a path towards an educational system that recognises, accommodates, and celebrates cognitive diversity.

Resolution to Question Three

Thus, the first key dimension for the integration of AI into mainstream classroom settings is to start. As highlighted previously, high-quality underlying technology to commence an undertaking, which is either free or at a very low cost, represents a very substantial starting point, along with existing AI apps and APIs.

The practical reality is that AI technology is new, and all of society needs to learn how to use it. The opportunity costs of waiting until all the kinks and bumps are resolved will likely be very high for people with autism. Instead, this is an opportunity to participate in an open-source effort to not only build a future for themselves but also for those who follow.

Conclusion

The integration of AI into mainstream education for students with ASD necessitates a threefold approach: acknowledging cognitive diversity, leveraging advanced technology, and initiating collaborative innovation. Recognising ASD as a form of cognitive diversity challenges traditional perspectives and aligns with emerging computational psychology insights. This reframing suggests individuals with ASD possess unique cognitive abilities, particularly in less sensory-noisy environments (Pellicano & Burr, 2012; Van de Cruys et al., 2014).

AI technologies, including Large Language Models (LLMs) and tools like Hume.ai, offer customized learning experiences that align with the preferences of students with ASD. These technologies have the potential to bridge communication gaps and facilitate understanding of complex emotional and social cues, enhancing the educational experience for students with ASD (Accardo et al., 2019; Bertacchini et al., 2023).

By envisioning a classroom where students with ASD feel understood, empowered, and capable of expressing their brilliance, we move closer to an educational system that recognizes, accommodates, and celebrates cognitive diversity.

As Alan Kay presciently said, ‘the best way to predict the future is to invent it’ - let us invent a future where no child is left behind simply because their mind works differently.

References

1. Abdo, M., & Al Osman, H. (2019). Technology impact on reading and writing skills of children with autism: A systematic literature review. *Health Technol*, 9, 725–735. https://doi.org/10.1007/s12553–019–00317–4
2. Accardo, A. L., Finnegan, E. G., Kuder, S. J., & Bomgardner, E. M. (2020). Writing interventions for individuals with autism spectrum disorder: A research synthesis. *Journal of Autism and Developmental Disorders*, 50(6), 1988–2006. https://doi.org/10.1007/s10803–019–03955–9
3. Australian Bureau of Statistics. (2014). 4428.0: Autism in Australia, 2012. https://www.abs.gov.au/ausstats/abs@.nsf/Latestproducts/4428.0Main%20Features62012?opendocument&tabname=Summary&prodno=4428.0&issue=2012&num=&view=

4. Bertacchini, F., Demarco, F., Scuro, C., Pantano, P., & Bilotta, E. (2023). A social robot connected with ChatGPT to improve cognitive functioning in ASD subjects. *Frontiers in Psychology*, 14, Article 1232177. https://doi.org/10.3389/fpsyg.2023.1232177
5. Brooks, F. P., Jr. (1987). No silver bullet: Essence and accidents of software engineering. *IEEE Computer*, 20(4), 10–19. https://doi.org/10.1109/MC.1987.1663532
6. Cardon, T. A. (Ed.). (2016). **Technology and the treatment of children with autism spectrum disorder. Springer International Publishing**. https://doi.org/10.1007/978–3–319–20872–5
7. Chiu, T. K. F. (2023). The impact of generative AI (GenAI) on practices, policies and research direction in education: A case of ChatGPT and Midjourney. *Interactive Learning Environments*, 1–17. https://doi.org/10.1080/10494820.2023.2253861
8. Devlin, J., Chang, M. W., Lee, K., & Toutanova, K. (2019). BERT: Pre-training of deep bidirectional transformers for language understanding. *Proceedings of the 2019 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies, Volume 1 (Long and Short Papers)*, 4171–4186.
9. Firth, J. (2018). Disability provisions in the HSC: Review of implementation. The New South Wales Education Standards Authority. https://www.educationstandards.nsw.edu.au/wps/wcm/connect/0e234201–4ce5–495b–93ee-cfb363ff7fc4/Disability+provisions+in+the+HSC.DOCX?MOD=AJPERES&CVID=
10. Garg, S., & Sharma, S. (2020). Impact of artificial intelligence in special need education to promote inclusive pedagogy. *International Journal of Information and Education Technology*, 10(7), 523–527. https://doi.org/10.18178/ijiet.2020.10.7.1418

11. Grissom, A., Finke, E., & Zane, E. (2024). Verbal fluency and autism: Reframing current data through the lens of monotropism. *Autism Research*, 17(2), 324–337. https://doi.org/10.1002/aur.3071

12. Handle, H. C., Feldin, M., & Pilacinski, A. (2022). Handwriting in autism spectrum disorder: A literature review. *NeuroSci*, 3(4), 558–565. https://doi.org/10.3390/neurosci3040040

13. Hedley, D., Uljarević, M., Cameron, L., Halder, S., Richdale, A., & Dissanayake, C. (2017). Employment programmes and interventions targeting adults with autism spectrum disorder: A systematic review of the literature. *Autism*, 21(8), 929–941. https://doi.org/10.1177/1362361316661855

14. Holmes, W., Persson, J., Chounta, I.-A., Wasson, B., & Dimitrova, V. (2022). Artificial intelligence and education: A critical view through the lens of human rights, democracy and the rule of law. Council of Europe.

15. Hoover, A. (2023, May 30). For some autistic people, ChatGPT is a lifeline. *Wired*. https://www.wired.com/story/for-some-autistic-people-chatgpt-is-a-lifeline/

16. Hopcan, S., Polat, E., Ozturk, M. E., & Ozturk, L. (2023). Artificial intelligence in special education: A systematic review. *Interactive Learning Environments*, 31(10), 7335–7353. https://doi.org/10.1080/10494820.2022.2067186

17. Hume, K., Steinbrenner, J. R., Odom, S. L., Morin, K. L., Nowell, S. W., Tomaszewski, B., Szendrey, S., McIntyre, N. S., Yücesoy-Özkan, S., & Savage, M. N. (2021). Evidence-based practices for children, youth, and young adults with autism: Third generation review. *Journal of Autism and Developmental Disorders*, 51(11), 4013–4032. https://doi.org/10.1007/s10803–020–04844–2

18. Hyatt, S. E., & Owenz, M. B. (2024). Using universal design for learning and artificial intelligence to support students with disabilities. *College Teaching*, 1–8. https://doi.org/10.1080/87567555.2024.2313468

19. Keating, C. T., Ichijo, E., & Cook, J. L. (2023). Autistic adults exhibit highly precise representations of others' emotions but a reduced influence of emotion representations on emotion recognition accuracy. *Scientific Reports*, 13(1), 11875. https://doi.org/10.1038/s41598–023–39070–0

20. Krizhevsky, A., Sutskever, I., & Hinton, G. E. (2012). ImageNet classification with deep convolutional neural networks. *Advances in Neural Information Processing Systems*, 25, 1097–1105.

21. Lawson, R. P., Mathys, C., & Rees, G. (2017). Adults with autism overestimate the volatility of the sensory environment. *Nature Neuroscience*, 20(9), 1293–1299. https://doi.org/10.1038/nn.4615

22. Leigh, A. (2009). What evidence should social policymakers use? *Economic Roundup*, (1), 27–43.

23. Legault, M., Bourdon, J.-N., & Poirier, P. (2019). Neurocognitive variety in neurotypical environments: The source of "deficit" in autism. *Journal of Behavioral and Brain Science*, 9, 246–272. https://doi.org/10.4236/jbbs.2019.96019

24. Lord, C., Brugha, T. S., Charman, T., Cusack, J., Dumas, G., Frazier, T., Jones, E. J. H., Jones, R. M., Pickles, A., State, M. W., Taylor, J. L., & Veenstra-VanderWeele, J. (2020). Autism spectrum disorder. *Nature Reviews. Disease Primers*, 6(1), Article 5. https://doi.org/10.1038/s41572–019–0138–4

25. Lord, C., Elsabbagh, M., Baird, G., & Veenstra-Vanderweele, J. (2018). Autism spectrum disorder. *The Lancet*, 392(10146), 508–520. https://doi.org/10.1016/S0140–6736(18)31129–2

26. Manning, C., Tibber, M. S., Charman, T., Dakin, S. C., & Pellicano, E. (2015). Enhanced integration of motion information in children with autism. *The Journal of Neuroscience*, 35(18), 6979–6986. https://doi.org/10.1523/JNEUROSCI.4645–14.2015

27. Melo, M (2023, March 1). ChatGPT can help students and faculty with ADHD. *Inside Higher Ed*. https://www.insidehighered.com/views/2023/03/01/chatgpt-can-help-students-and-faculty-adhd-opinion

28. New South Wales Education Standards Authority (NESA). (n.d.). HSC disability provisions guide for teachers and parents. Retrieved from https://educationstandards.nsw.edu.au/wps/portal/nesa/11–12/hsc/disability-provisions/hsc-disability-provisions-guide-for-teachers-and-parents

29. Pellicano, E., & Burr, D. (2012). When the world becomes 'too real': A Bayesian explanation of autistic perception. *Trends in Cognitive Sciences*, 16(10), 504–510. https://doi.org/10.1016/j.tics.2012.08.009

30. Pesthy, O., Farkas, K., Sapey-Triomphe, L.-A., Guttengéber, A., Komoróczy, E., Janacsek, K., Réthelyi, J. M., & Németh, D. (2023). Intact predictive processing in autistic adults: Evidence from statistical learning. *Scientific Reports*, 13(1), Article 11873. https://doi.org/10.1038/s41598–023–38708–3

31. Spandagou, I. (2021). Inclusive education is another country; developments, obstacles and resistance to inclusive education. *International Journal of Inclusive Education*. https://doi.org/10.1080/13603116.2021.1965805

32. Sutskever, I., Vinyals, O., & Le, Q. V. (2014). Sequence to sequence learning with neural networks. *Advances in Neural Information Processing Systems*, 27, 3104–3112.

33. Toyokawa, Y., Horikoshi, I., Majumdar, R., & Ogata, H. (2023). Challenges and opportunities of AI in inclusive education: A case study of data-enhanced active reading in Japan. *Smart Learning Environments*, 10(1), Article 19. https://doi.org/10.1186/s40561–023–00286–2

34. Van de Cruys, S., Evers, K., Van der Hallen, R., Van Eylen, L., Boets, B., de-Wit, L., & Wagemans, J. (2014). Precise minds in uncertain worlds: Predictive coding in autism. *Psychological Review*, 121(4), 649–675. https://doi.org/10.1037/a0037665

35. Van de Cruys, S., Van der Hallen, R., & Wagemans, J. (2017). Disentangling signal and noise in autism spectrum disorder. *Brain and Cognition*, 112, 78–83. https://doi.org/10.1016/j.bandc.2016.08.004

36. Vaswani, A., Shazeer, N., Parmar, N., Uszkoreit, J., Jones, L., Gomez, A. N., Kaiser, Ł., & Polosukhin, I. (2017). Attention is all you need. *Advances in Neural Information Processing Systems*, 30, 5998–6008.

37. Wei, X., Yu, J. W., Shattuck, P., McCracken, M., & Blackorby, J. (2013). Science, technology, engineering, and mathematics (STEM) participation among college students with an autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 43, 1539–1546. https://doi.org/10.1007/s10803–012–1700-z

38. Wong, M. (2024). Inclusion may not lead to belonging: The case for student-centered classrooms. *College Teaching*. https://doi.org/10.1080/87567555.2024.2307884