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The Digital World and Neurodiversity: Autism in the Technological Revolution – a Narrative Review

Magdalena Wójcik, PhD.[1]

[1]Department of Special Psychology and Education, Faculty of Education and Psychology
Maria Curie-Skłodowska University in Lublin, Poland

ABSTRACT

With the rapid development of digital technologies such as social robots, augmented reality, artificial intelligence, and social media, new ways are emerging to assist individuals with autism spectrum disorder (ASD) in crucial areas of their lives, such as diagnosis, communication, independence in education, and social integration. To treat autism as a natural neurological variation rather than merely a disorder, this article conducts a multifaceted analysis of the potential of these technologies within the framework of neurodiversity.

The article highlights the key benefits that digital tools can offer to people with ASD, such as personalising therapy and education plans, supporting social skills and increasing their independence to the best of their individual abilities.

In addition, the article identifies and highlights the difficulties and challenges that come with putting these tools into practice, including the potential over-reliance on technology at the expense of interpersonal relationships, ethical concerns about data privacy or the risk of stigma.

Keywords: *autism, neurodiversity, artificial intelligence, new media, assistive technologies.*

Corresponding author: Magdalena Wójcik Email: magdalena.wojcik@mail.umcs.pl

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Introduction

Recent years have seen an intensive development of digital technologies to support people with autism spectrum disorders (ASD) and their families in diagnostic, therapeutic and educational aspects. These tools include the use of artificial intelligence (AI), which analyses emotional or behavioural patterns, and developing apps and various forms of interactive games to help develop executive functions and support communication (AAC). These technologies are therefore becoming an essential part of the daily lives of people with ASD, rather than just an adjunct (Grynszpan et al., 2014).

Digital tools are being developed in response to the specific needs of people with ASD, who often prefer environments that are clear, predictable and allow for progressive learning at a pace that is tailored to each student's abilities. According to Parsons and Cobb (2011), technology can serve as a sensory shield, offer individualised learning support and promote social interaction and the ability to maintain it. In the opinion of Diehl and colleagues (2012), well-designed digital solutions can significantly influence how effectively children and adolescents with neurodivergent traits develop their independence, social skills, and communication.

However, as interest in the potential of technology grows, concerns about its limitations, negative effects and moral dilemmas are becoming more common and understandable. Does technology actually encourage independence, integration and inclusion, or does it sometimes serve to exacerbate stereotypes, dependency and exclusion? Are technologies actually created with people with ASD in mind? Are these tools dedicated only to neurodiverse people or are they also universal? How can we ensure that the development of digital tools integrally coexists with the defence of the rights, privacy and dignity of neurodiverse people?

This article aims to discuss and highlight both the potential and risks, ethical controversies and limitations of digital technologies in working with people with ASD and to identify best practices and suggestions for sustainable, inclusive and informed use of contemporary solutions in diagnosis, education and therapy. The article adopts a narrative review approach, which allows for a broad, integrative, and critical synthesis of the current scientific literature on the role of digital technologies, new media, and artificial intelligence in the context of the autism spectrum and neurodiversity.

The literature was identified through targeted searches in major scientific databases, including PubMed, Scopus, and Web of Science, using keywords related to autism spectrum disorders, neurodiversity, assistive technologies, artificial intelligence, virtual and augmented reality, social media, and digital inclusion. Additionally, a retrospective citation analysis was conducted to identify influential and conceptually significant publications. Instead of applying the strict inclusion and exclusion criteria typical of systematic reviews, the selection process focused primarily on relevance to the research objectives, conceptual contribution, methodological quality, and alignment with the neurodiversity paradigm.

The scope of the analysis was gradually refined during the review, and the selected literature was organized thematically to reflect key areas such as educational support, communication and social participation, diagnostic and therapeutic applications, and ethical issues (Sukhera, 2022). This interpretive and reflective approach allowed for a more nuanced discussion of both the opportunities and limitations of digital technologies in supporting individuals with autism, while also taking into account the variable nature of evidence and practice in this rapidly evolving field.

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Neurodiversity and autism in a social and educational setting

The medical model, which regarded autism as a disorder to be treated, corrected or eliminated, dominated approaches to neurodevelopmental disorders, including autism, for many years. This approach led to a focus only on behavioural, cognitive and communication deficits and therapeutic strategies to "normalise" the behaviour of children, adolescents and adults with ASD (American Psychiatric Association, 2013). However, with the development of social science and the grassroots movement of neurotypical people, the medical model has become controversial and insufficient.

The need to change this approach has evolved into the social model of disability, which maintains that institutional, social and environmental barriers – rather than a person's medical condition – are the cause of limitations in functioning (Twardowski, 2018). According to this perspective, a person with autism can fully contribute to and be part of society if he or she is given respect for different forms of expression and interaction, a predictable and understanding environment and access to intelligible communication.

The term "neurodiversity", coined by sociologist Judy Singer in the 1990s, has gained popularity in this context as a way of recognising neurological differences, including dyslexia, autism and ADHD, as normal variations of human functioning rather than diseases to be treated (Singer, 1998). Neurodiversity is not just a slogan, but a new paradigm in learning and education that calls for a redesign of diagnostic, educational and multi-area support systems. According to Armstrong (2011), this approach encourages the exploration of the abilities, strengths and special skills of neurodiverse individuals, which can help them reach their full potential in their social, educational and professional lives.

According to researchers such as Pellicano and den Houting (2022), neurodiversity provides a framework for the development of inclusive learning environments in which differences are seen as assets to be exploited rather than barriers. This requires a move away from strict didactic frameworks towards strategies that emphasise adaptability, collaborative learning, differentiation of methods and an understanding of the unique sensory and communication requirements of students with ASD.

New media and their impact on the functioning of people with ASD

The daily lives of millions of people now revolve around new media, which include websites such as YouTube, Instagram, Facebook, TikTok, blogs, discussion forums and instant messaging. These offer a controlled environment in which people with ASD can interact, learn and express themselves. New media provide opportunities for flexibility, selectivity of sensory stimuli and forms of communication thus creating a safe digital environment.

For people with ASD, new media offer new opportunities; however, as Pinchevsky et al. (2025) emphasize, autism requires us to reconsider our assumptions about communication in the digital age, taking into account both the challenges and the possibilities it presents. Although social media can serve as an alternative to traditional social activities, they also have the potential to promote social engagement. These platforms require less decoding of complex social information, making them particularly suitable for adolescents with ASD (van Schalkwyk et al., 2017, Alon-Tirosh & Meir, 2023). Social media can also be a way to meet the social interaction needs of people on the spectrum

without having to worry about controlling things like body language, inflection or voice modulation (Hudson et al., 2023).

A factor that may further reduce social pressure on individuals with ASD is the design of digital platforms and the presence of moderation mechanisms. Empirical studies suggest that features such as asynchronous communication, the ability to edit or delay responses, content filtering, and control over visibility allow autistic individuals to engage at their own pace and with greater predictability, potentially reducing cognitive load and anxiety associated with real-time interactions (Hassrick et al., 2021; Gillespie-Smith et al., 2021; Alon-Tirosh & Meir, 2023). Moderated online spaces, including forums focused on autism or closed social media groups, provide additional structural support; active moderation can limit exposure to hostile interactions or misinformation and clarify communication expectations. Although direct empirical evidence on the impact of moderation on well-being is limited, these structured environments may contribute to a sense of safety and social inclusion, as well as help mitigate experiences of social stress, which are often reported in offline settings. Therefore, well-designed digital environments with thoughtful moderation and platform features that accommodate diverse communication needs can offer individuals with ASD opportunities for meaningful social participation, a sense of belonging, and emotional support.

With the help of social media, blogs and educational platforms, people with autism can create their own story and identity. As indicated by Pliska et al. (2023), participation in online communities increases feelings of acceptance and belonging, which supports psychological well-being. People with ASD in the virtual world have more control over their social relationships, as they are able to choose the style and pace of communication.

At the same time, digitalisation creates new employment opportunities. According to Walkowiak (2021), digital transformation therefore requires a redefinition of the workplace to incorporate the concept of neurodiversity, as well as the creation of new jobs.

As a result, the contemporary view of autism is changing from a deficit paradigm to a paradigm that values neurodiversity as a social asset, and the social model of disability and contemporary approaches to neurodiversity create and provide a logical and moral framework for the development of social systems. In this context, digital technologies act as a catalyst for change, promoting autonomy, facilitating personalisation and fostering connections between people with ASD and the general population. However, to realise their full potential, they must be used responsibly, taking into account privacy, accessibility, ethics and the real needs of the neurodiverse community.

Through platforms such as YouTube, blogs or by creating social media content, people with autism can now share personal stories, develop their identity and increase their self-esteem. Users are free to express themselves in these environments, often without the help of formal, professional channels.

As Skafle and colleagues (2024) highlight that social media platforms have also become a common source of useful information, but there are also risks associated with false information on social media. People with ASD may turn to unreliable sources, rely on misinformation, which can increase ambiguity or cause misunderstandings. Although social media has previously been seen as an unreliable source of information, Skafle's findings show that participants discovered more information about their experiences that was not fully covered in most of the recent scientific literature and online health resources. Furthermore, participants in groups for people with autism on social media reported feelings of alienation due to hostile conversations, indicating that these groups did not always foster a sense of community. This study highlights the importance of making autism information more widely available and diverse online through official health channels, and therefore regularly updated.

Nevertheless, many people with ASD are discovering and simultaneously appreciating that they can build relationships and social skills in online communities without the pressure of in-person interactions. Being part of these communities can promote wellbeing and a sense of belonging, especially when interactions are tailored to each person's pace and sensory preferences. Therefore, building safe online relationships and improving digital competence should be the basis for implementing educational programmes that teach people on the spectrum to use social media.

Digital media has many advantages in terms of difficulties in the realm of social interaction, but it also has just as many disadvantages. One of these is sensory overload, which can be caused by an overabundance of intense, rapidly changing visual and auditory stimuli. Therefore, people with ASD often express a desire to move to more static, text-based platforms to limit their exposure to this type of content.

Children with ASD process sensory information differently, which makes them more inclined to seek out media content that is either more visually intense (i.e., seeking sensory stimuli) or calming (i.e., avoiding sensory stimuli in order to control their sensory experiences by interacting with predictable media rather than unpredictable social or environmental stimuli). Many online games and digital media seem to attract the attention of children with ASD, but they often cater to their heightened sensory needs or provide an escape from social demands, rather than engaging their executive function to maintain focus. Even 'educational' apps often utilize gamification elements that distract from educational goals, leading to self-stimulatory behaviors. Children with ASD may struggle to filter these sensory stimuli, which limits meaningful learning from interactive media (Lane & Radesky, 2019).

Also, as Heffler et al. (2024) note, early-life media exposure is associated with abnormalities in sensory processing, ranging from hypersensitivity to stimulus avoidance. These findings suggest that digital media exposure might be a potential risk factor for the development of atypical sensory profiles.

Another obstacle is the difficulty in deciphering messages sent online. Many of the non-obvious cues used in online communication, such as irony, emoji facial expressions or the subtleties of likes and shares, can make it difficult for people with autism to understand what others are trying to say. Therefore, social media can be both a source of stress and a source of support, especially for users who feel excluded or have difficulty understanding messages.

The issue of false information is not insignificant, and people with autism can be particularly susceptible to it because they interpret news literally and have difficulty confirming the credibility of sources. Misinformation can cause doubt, misunderstanding and even mental health deterioration. According to Alon-Tirosh and Meir (2023), social media can provide emotional support to adolescent users with ASD, but it also reveals gaps in their comprehension and communication techniques. It is therefore essential and legitimate to develop media competencies that enable responsible and informed use of digital resources.

Children with ASD often have weaker executive functions and struggle with metacognition, which makes it difficult for them to recognize when the media manipulates their attention or behaviour. Therefore, they are particularly susceptible to persuasive design elements, such as 'likes' or tokens. Individuals with poorer executive skills often prefer media rich in audiovisual effects, which can displace offline activities that develop executive functions, such as exercise or unstructured play (Lane & Radesky, 2019).

In summary, new media provide a variety of opportunities for social engagement, identity construction and expression for people with autism. However, they require a methodical and cautious educational approach that takes into account the creation of safe, specialised online environments, assistance in dealing with sensory overload, cyber-competence training and the encouragement of sustainable media consumption. Only with this approach can the risks associated with digital media be reduced and allow people with autism to reach their full potential.

The needs of individuals with autism and assistive technology

Working with people with autism, assistive technology is increasingly being used to meet their various needs for cognitive development, social interaction, communication and emotional understanding. People who are non-verbal, or have poor communication skills, can effectively express their needs and thoughts using alternative and assistive communication (AAC). These solutions range from low-tech techniques such as the Picture Exchange Communication System (PECS) to contemporary mobile applications using speech synthesis. According to review studies, AAC technologies actually promote the development of verbal and spontaneous speech, rather than hindering it. These apps can improve children's interaction, spontaneous speech and functional communication. They can also be a useful tool to help children with ASD develop expressive language (Therrien et al., 2025).

An example is the BoardMaker application, which has a collection of more than 4,500 PCS symbols (in both black and white and colour) and the ability to create and add one's own symbols to the database, allowing the preparation of communication boards for people with whom it is not possible to communicate verbally (Czerski, 2014). Speech recognition software (Dragon Naturallyspeaking, Voice Finger, Via Talk, Tazti), on the other hand, can replace the act of writing with speech, enabling learners to express themselves effectively without fatigue (Wójcik, 2024).

Applications such as Replika, Braina and LetMeTalk, enable intelligent question answering, serve as virtual assistants or combine a series of images into a coherent sentence. As such, they will be beneficial for children who have communication difficulties and will be used as a tool in therapy to promote communication, thus enabling the therapist to modify activities and resources to interactive possibilities using different communication techniques (Wójcik, 2024).

Furthermore, because video games are appealing and immersive, technology-based interventions that use them on a variety of platforms, including tablets, desktops or robots, hold promise for helping children with ASD overcome their challenges (Grynszpan et al. 2014; Mazurek et al. 2015; Sandbank et al. 2020). According to some reviews, augmented reality (AR) (Berenguer et al. 2020) and virtual reality (VR) (Dechsling et al. 2021) are promising additions to common interventions in autism, as they enable the creation of safe, adapted spaces with precise control over a variety of stimuli, exercise trials and recording of user actions. They also show good usability and acceptability in room-centred spaces such as Cave Automatic Virtual Environments (CAVEs) (Mesa-Gresa et al. 2020) and Head-Mounted Displays (HMDs) (Malihi et al. 2020).

Research indicates that there is a degree of effectiveness in the use of mobile augmented reality in the field of autism intervention, particularly in terms of just target skills. From a target skills perspective, any achievement has to do with education to improve the basic life skills of the autistic community. The main goal of intervention in the autistic population is to reduce core symptoms or related challenges, disorders and difficulties, achieve self-care in life, improve quality of life and

reduce family stress, rather than aiming for academic success. Research indicates that there is a degree of efficacy in the use of mobile augmented reality in the field of autism intervention, particularly in terms of just the target skills. (Lian & Sunar, 2021).

There are promising and tangible benefits of Apps for computers and tablets becoming another alternative strategy based on the interests of children with ASD. Among these technologies, the use of robots – in particular social assistive robots (SARs) - has attracted attention over the past 20 years. SARs have the potential to enhance therapy, support learning processes and improve quality of life by facilitating interaction with users and offering assistance through measurable progress (Papadopoulos et al., 2020, Santos et al., 2023). Their human-like appearance has the advantage of attracting patients' attention during social and motor skills training, which accelerates the generalisation process (Santos et al., 2023).

Despite these promising results, the introduction of socially assistive robots and other advanced supportive technologies also involves several practical obstacles that may limit their widespread adoption. One of the main challenges remains cost, as robotic systems and their associated software are often expensive, making them unaffordable for many educational institutions, therapeutic centres, and families. Additionally, effective use of such technologies requires specialized training for teachers, therapists, and support staff, as a lack of appropriate technical or pedagogical skills may reduce the therapeutic value of these tools or lead to their improper use (Papadopoulos et al., 2020; Vagnetti et al., 2024).

It is also important to keep in mind that not all robotic or digital solutions can be easily adapted to the diverse sensory, cognitive, and communication profiles of individuals with ASD, which may lead to uneven benefits, and at times even greater frustration for some users. The need for ongoing technical support, maintenance, and updates can also entail additional organizational and financial burdens.

All of this demonstrates that assistive technologies, including social robots, are not a universal solution – their effectiveness depends on the context, individual needs, and the availability of appropriate resources and professional support (Hassrick et al., 2021).

Artificial intelligence in the diagnosis and support of people with ASD

With tools for behaviour analysis, prediction, early detection and personalisation of education, artificial intelligence is also becoming increasingly important in the diagnosis and treatment of people with autism spectrum disorders (ASD).

Artificial intelligence capabilities, such as automatic analysis of language, tone of voice and facial expressions, are applicable to early childhood diagnosis. This is supported by a study by Tariq and colleagues (2018), which showed that using recordings from the home environment, the system was able to diagnose ASD with an accuracy comparable to clinical assessment.

Recent advances in artificial intelligence, particularly in computer vision and deep learning, have created exciting new opportunities for ASD screening. Of particular interest is the emerging field of facial phenotype analysis, which exploits the discovery that people with ASD often have unique facial morphological features. These features – wider eyes, narrower cheeks, shorter nasal bridges and wider upper faces – are becoming more widely recognised as possible biomarkers for identifying ASD (Al-Nefaie, 2025).

Artificial intelligence can also be a very helpful tool due to its ability to automatically identify complex patterns in multivariate data. Measuring functional abnormalities associated with ASD has become possible with the recent development of neuroimaging technologies using biosensors. This is based on resting-state functional magnetic resonance imaging (rs-fMRI) data, which suggests a method for building functional connectivity networks (Eslami et al., 2019, Parui et al., 2023).

Most studies on ASD that use functional magnetic resonance imaging (fMRI) to acquire data during task performance have been conducted on adult or mixed groups of adults and adolescents. Individuals with ASD are compared with neurotypical control group subjects. The activation of specific nodal brain areas related to social functions, such as Default Mode Network (DMN) areas, is the main focus of task-related fMRI studies (Sideraki and Dridas, 2021).

Although MRI has many advantages, MRI artefacts make it difficult for clinicians to accurately diagnose autism. In addition, multiple sections and different protocols are used to capture MRI data from people with ASD. As a result, examining each MRI slice takes a long time and requires extreme precision on the part of doctors. In many cases, physician fatigue can result in an incorrect diagnosis of ASD. In addition, most physicians are inexperienced in interpreting MRI data, making it difficult to diagnose ASD early (Moridian et al., 2022), hence the need to use artificial intelligence to accurately analyse and evaluate the data.

There has also been discussion and research on the use of new technologies in the clinic for diagnostic purposes. For example, Alcañiz et al (2022) successfully used a gaze-tracking paradigm in a virtual environment to distinguish children with ASD from neurotypical children based on visual attention behaviour. They measured perception and extracted socially relevant information using visual attention. Forbes et al. (2016) confirm that participants with ASD mimic less than neurotypical individuals when interacting with avatars, highlighting the feasibility of 2D virtual reality (VR) in eliciting facial expressions - a diagnostically relevant area.

The development of an automated screening tool for the early detection of autism spectrum disorders is the aim of research within the IDEAS project (Identification of autism spectrum disorders using speech and facial expression recognition). In order to achieve the most selective distinction between autistic and typical development, the suitability of different media formats to elicit relevant symptoms is being investigated (Pliska et al., 2023a), as such an automated tool requires indirect data. Comparing media use and competence between children with ASD and typically developing (TD) children is a key starting point for understanding digital use and acceptance in this particular group (Pliska et al., 2023b).

Putting the welfare of the child and his or her family first, the risks associated with diagnosing autism through conventional means should always be kept in mind. Potential labelling is a serious concern as it can affect a child's social interactions and self-esteem. Over- or misdiagnosis can result in unnecessary treatment and interventions. In addition to being time-consuming, complex and emotionally taxing for families, the diagnostic process requires careful assessment by multidisciplinary teams.

Thus, the use of cutting-edge strategies backed by artificial intelligence (AI) could lessen this risk. A potentially ground-breaking method of ASD screening is the combination of facial analysis and deep learning techniques. The ability of contemporary deep learning architectures to extract intricate patterns from facial images has shown impressive promise, opening the door to the development of automated, quick, and affordable screening tools. This strategy is in line with the increasing need for easily accessible screening techniques that can help clinicians find patients who might need a thorough diagnostic assessment (Al-Nefaie, 2025).

To increase diagnostic efficiency, AI-assisted early screening techniques use radiomic and behavioural data to create predictive models, which are then used to make diagnoses using fresh test results (Zhang, 2025). The time required for long-term assessments through such measures is reduced, allowing for a more objective method of identifying ASD, and more accurate predictions that distinguish common developmental disorders thus become possible by using AI methods to predict diagnostic outcomes based on developmental assessments before the age of three, even though a reliable diagnosis of ASD is usually made at this age (Song et al., 2019, Ding et al., 2024).

Moreover, technology can be used to fill the gap that currently exists between parents' concerns about their child's behavior and development and access to professional expert information regarding children's socio-communicational development, providing them with evidence-based information for proper communication with professionals and seeking appropriate and suitably early diagnostic and therapeutic assistance.

Applications like ASDetect (asdetect.org) can be helpful in this regard. It is an example of a mobile application available worldwide, free of charge, on Android and Apple platforms for anyone with access to a smartphone or tablet. The application has been designed to enable parents of children aged 11 to 30 months to assess the 'likelihood' of autism occurring in their child in their own home, based on early behavioral markers of autism identified in SACS (Barbaro & Yaari, 2020).

Adaptive education is another important application of artificial intelligence. By tracking a learner's attention level via EEG signals, neuroadaptive platforms such as “NeuroChat” enable instructional materials to be dynamically adapted to the learner's current cognitive state (Baradari et al., 2025). In contrast, AutoTutor and other intelligent tutoring systems (ITS) offer conversational learning support that is tailored to the learner's emotions and level of knowledge (Graesser et al., 2004).

The dynamic intersection of cutting-edge technologies, especially virtual reality (VR), with autism spectrum disorders (ASD) has thus become a groundbreaking avenue for therapeutic and educational interventions. This new area of symbiosis between autism and technology has the potential to improve social, cognitive and language skills in a supportive and tailored way. In the current era, where information and communication technology (ICT) systems are coordinating disruptive changes across sectors, virtual reality (VR) stands out as a significant element ready for rapid expansion. Virtual reality (VR), which originated from computer graphics, provides users with immersive, multi-sensory experiences in virtual environments (Failla, 2024).

Without fear of criticism, virtual reality (VR) technologies make it possible to create environments that mimic real-life patterns and social realities. According to Kourtesis and colleagues (2023), children who received VR training to recognise emotions and respond in difficult social situations performed better in real-life interactions. Most importantly, these resources can be individually modified to accommodate sensory overload and the student's level of functioning. Children with poor communication skills, or non-verbal skills, have new opportunities thanks to advances in augmented reality (AR) and assistive and alternative communication (AAC) applications. According to El Shemy et al. (2024), the use of augmented reality (AR) in language teaching for children with ASD improves academic performance and increases motivation, especially when it comes to understanding abstract ideas and concepts.

Therefore, immersive VR technology enables the creation of simulated environments that can help people with ASD improve their behaviour, social skills and communication. These interventions aim to reduce the stress and anxiety associated with interacting with people in the real world, while providing people with ASD with a safe and supervised environment in which to practice and develop

their skills. Virtual social skills training, virtual exposure therapy and social role play are just a few examples of VR interventions.

However, technological skills are essential for the successful application of immersive VR in clinical and research settings, and poor VR training methods can have detrimental effects and detract from positive outcomes (Kourtesis et al., 2023).

We need to keep in mind that interaction deficits may also limit the digital participation of children on the autism spectrum. On the one hand, it is reasonable to assume that specific pragmatic deficits may also emerge in the digital sphere, resulting in similar limitations in interactions and perhaps negative communication experiences or exclusion. However, other studies show that when the direct pressure of face-to-face interaction is removed, children communicate more easily or even more successfully in the digital environment (Pinchevski and Peters, 2015, Pliska et al., 2023b).

When working educationally and therapeutically with children with autism, it is also worth considering applications for personalized therapy for children – particularly helpful for children with autism may be, among others (Czerski, 2021, Nalbant, 2021, Wójcik, 2024):

- Khan Academy – a free service with thousands of educational videos and adaptive exercises tailored to the child's level and abilities;
- Socratic by Google – an AI app that searches for explanations and answers in the form of videos, graphics, and articles;
- LearningApps.org – interactive templates for exercises (matching, crosswords, sequences, multiplayer games) that support learning and therapy;
- WordWall – a tool for developing reading, writing, math skills, as well as sensory-motor functions and concentration;
- Classcraft – a gamified platform that allows for developing the child's potential and diagnosing difficulties during classes.
- Math apps such as The Math Learning Center – a set of mathematical applications with the possibility of varying difficulty, stimulating basic mathematical skills.

It is also worth considering applications that develop key competences related to communication skills, social interactions, self-confidence and self-esteem (e.g. LAMP Words for Life, Proloquo2Go AAC, Leeloo AAC – Autism Speech App, Otsimo – Special Education, Card Talk, Avaz AAC) related to language learning (Speech Blubs: Language Therapy, Miogym: Speech Therapy), related to decision making, problem solving, emotion management, logical and abstract thinking, related to concentration and attention or the development of creativity (Wonster Words Learning Games, Keiki Learning Games forKids, Kids Autism Games – AutiSpark).

All these tools can support therapy by adapting content and forms to the individual needs of a child with ASD. However, essential for their proper use in practice is knowledge about the specifics of how a particular child functions, their individual capabilities and limitations, in order to skillfully and successfully apply the appropriate digital materials.

In conclusion, when using different forms of AI-assisted support in diagnosis, we must always keep in mind the ethical aspect of our actions. Standardisation and validation of data quality is required to enable wider and more reliable use of these technologies in populations of people with ASD. Privacy is also essential, especially for children, which requires the establishment of precise data processing guidelines and algorithm transparency. Finally, educators, therapists and professionals should receive adequate training to be able to analyse the data generated by AI systems and use them in both therapeutic and educational settings.

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Technology-related risks and disputes

Artificial intelligence (AI)-based technologies offer a range of possibilities for diagnosing and treating people with autism spectrum disorders, but their use also involves serious risks and ethical dilemmas. Medical data security and data privacy remain serious concerns. Artificial intelligence systems that use behavioural, linguistic or biomedical data need to be particularly protected, as misuse, disclosure or lack of informed consent can result in serious offences.

Such unethical profiling can occur if sensitive information about children with ASD is left in educational systems without appropriate legal restrictions. Furthermore, without safeguards and well-defined guidelines, large databases used to train algorithms can be used in ways that are contrary to the interests of users (Florridi and Taddeo, 2016; Karagkouni and Sotiropoulou, 2023).

In addition, the stigmatisation and automation of assessment pose a significant risk. According to Mittelstadt et al. (2016), algorithms that predict a person's likelihood of having autism can perpetuate stereotypes and, if they make decisions without considering the health context, can lead to discrimination in areas such as insurance, education and access to services.

A second concern is the potential addiction to technology and the decline in interpersonal relationships. Problematic internet use (PIU) is more common among people with ASD, especially children and adolescents. Adolescents with autism are more likely to use games and social networking sites for long periods of time. Technology can support the development of cognitive abilities, but can also exacerbate emotional disturbance and social isolation (Muris et al., 2025).

As shown in a study presented by Krishnan et al, (2021), exposure to digital media before 21 months was associated with autism risk, and this risk increased when mothers spent less than 6.5 hours a day with their child.

Specific suggestions and action plans are being developed in response to these issues (Floriddi & Taddeo, 2021; Mahmud, 2022; Radanliev et al., 2024):

- Data security and privacy: use technical solutions such as differential privacy or federated learning, as well as algorithm transparency and informed consent requirements.
- Prevention of stigma: to avoid algorithm bias, training data must represent the diversity of the population and people with ASD should be involved in the development of AI systems.
- Reducing addiction: requires training for families and therapists, monitoring time spent in front of a screen, encouraging the use of apps to facilitate offline interactions and digital education.
- Strengthening social connections: technology should be used in conjunction with interpersonal therapy, not instead of it – it cannot replace real relationships.

In summary, artificial intelligence has great potential to help people with ASD, but its use must be morally sound, responsible and consistent. Legal measures are required to protect users, as is openness in the way the systems operate, active involvement of the neurodiverse community in the development of the technology, and deliberate efforts to strike a balance between fostering human connection and providing technological support.

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Suggestions and Ideal Procedures

The modern approach to implementing technology to support people on the autism spectrum (ASD) is based on the principles of inclusivity and collaboration, emphasising the need to create tools with the participation of people on the autism spectrum themselves. The active involvement of people with ASD in design processes – not just as passive recipients, but as full-fledged co-creators – is one of the core practices of inclusive design, also known as co-design.

Co-design enables the development of technologies tailored to different cognitive styles, communication channels and user requirements. This approach also reduces the possibility of creating technological and social barriers that often accompany projects implemented without the participation of those who will be directly affected (Zhu et al., 2018; Zhu et al., 2022).

The second pillar of good practice is the methodical training of teaching staff in the use of assistive technologies for people with ASD. Such training should not be limited to short-term, ad hoc forms of professional development, but should constitute a formalized and integrated element of the vocational education of teachers, therapists, psychologists, and other specialists working with individuals on the autism spectrum. Systematic reviews of research indicate that training programs combining theoretical knowledge of ASD with practical intervention strategies contribute to the enhancement of professional competencies and the implementation of inclusive practices in real educational settings (Petersson-Bloom et al., 2023). A review of the literature indicates that a systemic approach, encompassing both formal training and continuous professional development, can contribute to a shift from fragmented training to more coherent and sustainable models of professional preparation (Petersson-Bloom et al., 2023; Gallego-Jiménez et al., 2025). Research in clinical practice also emphasizes that competencies in technology-assisted interventions require practical experience and reflective professional development, rather than merely familiarity with technical tools (Karrim et al., 2022).

In this context, it should be noted that the potential of even the most sophisticated and effective tools can be severely limited by the lack of digital competence of diagnosticians, teachers and therapists. Therefore, training should extend beyond technical implementation and include a thorough understanding of neurodiversity, the adaptation of working practices to individual learner profiles, as well as key issues related to digital ethics, data protection, and the prevention of technology dependency (Ertmer & Ottenbreit-Leftwich, 2010).

A balanced approach that views technology as a tool rather than an end in itself is also a fundamental principle of ethical and effective interventions. Digital solutions should not replace face-to-face interactions or conventional therapeutic methods; rather, they should enhance the development of social skills, communication, and executive functions. Technologies that are tailored to the unique needs of each user and seamlessly integrated with other support strategies are the most effective. However, when utilizing the benefits of digital technology, it is always important to keep in mind that excessive reliance on it can result in social isolation and even regression in the development of life skills.

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Conclusion

The digital world is becoming a more significant context for people with autism and, more generally, neurodiversity in this age of rapid technological advancement.

It is therefore necessary to continue interdisciplinary research connecting the fields of neurobiology, digital technology, psychology, pedagogy, and ethics. This will allow for a deeper understanding of the unique needs of individuals with autism in the digital sphere and will also lead to the creation of creative, useful, and socially responsible support resources. In order to have a significant impact on clinical practice, education, and policy, this research must increasingly take into account the perspectives of neurodiverse individuals and their families.

Looking to the future, technology has the potential to become a key, inclusive element that not only facilitates daily tasks for people with autism but also promotes acceptance, understanding, and inclusion in society. Increasing social awareness and establishing inclusive support networks must occur simultaneously to fully realize this potential. Therefore, neurodiversity and the digital world present us with both challenges and promises for the future, highlighting the necessity of collaboration, responsibility, and tolerance for differences.

Future-oriented thinking suggests that technology could become one of the key components of social integration and inclusion, promoting personal development and changing social and cultural perceptions of neurodiversity. However, to fully realize this potential, scientists, practitioners, policymakers, and most importantly, autistic individuals and their families must continue to engage in dialogue (Pellicano and den Houting, 2022). Building a society that is truly open to neurological diversity and where technology supports both functioning and full social participation can only be achieved through such partnerships and thoughtful approaches.

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