

B SUPPORTING AUTISM WITH DIGITAL TECHNOLOGIES

1 - AUTISM

Autism is a neurodevelopmental condition characterised by deficits in social communication and interaction, combined with restricted, repetitive patterns of behaviour, interests, or activities (1,2,3). Autism is on a spectrum which means that, whilst all autistic people share these characteristics, autism can affect people in different ways. In addition, autism can be associated with differences such as relative strengths in attention to detail, pattern recognition and logical reasoning (3,4). When considering support for autistic people, professionals may use the following terms to identify the level of support required, determined by the level of impairment:

Mild

When the impairment is mild, some support is required. The person has noticeable impairments, interfering with functioning in one or more contexts.

Moderate

When the impairment is moderate, substantial support is required. The person has marked impairments, interfering with functioning in a wide range of contexts

Severe

When the impairment is severe, very substantial support is required. The person has severe impairments, interfering with functioning in all contexts.

In addition, the vast majority of autistic people, also have an associated condition, such as an intellectual (learning) disability (5) or anxiety (6), which needs to be considered when planning appropriate support. This variability highlights the need for individualised support and digital supports are ideally-placed to enable personalised support.

2 - DIGITAL SUPPORTS FOR AUTISM

Smartphone or tablet apps are a common form of digital support for autism. A quick search of the term autism into the Apple or Google apps stores returns a multitude of results. Similarly, blog posts with titles like '10 best apps for autism' are abundant on the internet and press. There are also online curated lists of autism-related apps, for example on the [DART](#) (UK), [Applications-Autisme](#) (France) and [AppyAutism](#) (Spain) websites. A number of desktop computer games have also been developed to provide training in a variety of skills, such as social interactions, emotion recognition, language proficiency or academic skills. Some of them have been designed specifically for autistic people.

Augmentative/Alternative Communication (AAC) is a term that encompasses communication systems, strategies and tools that replace or supplement natural speech. It allows individuals who cannot speak to socially interact. It promotes autonomy, expands communication, and increases social interactions. This can be supported digitally through Voice Output Communication Aid devices (VOCAs). VOCAs are portable electronic devices that can produce synthetic speech for the user. VOCAs may be used with graphic symbols, as well as with alphabet keys. They assist users in communicating with others in a variety of situations and settings ([Types of VOCAs](#)).

Virtual reality (VR) technologies can support the learning of autistic individuals. A particular focus has been on the application of VR to support and practice social skills in motivating but minimally threatening environments that can be carefully designed and controlled while also supporting more lifelike and less didactic interactions. VR technology has relevance because of its potential to help overcome the physical and cognitive barriers to social inclusion ([How VR is transforming autism studies](#)).

Robots are being utilised to help autistic children learn about body language, personal space and interaction in a fun, safe environment. The humanoid social robots most commonly used with autistic children are [Zeno](#), [Nao](#), [Milo](#) and [Kaspar](#). They are short enough to be non-threatening and easy to interact with even for children with restricted mobility.

3 - EVALUATING THE EVIDENCE FOR DIGITAL SUPPORTS FOR AUTISM

There is an important distinction to be made regarding the goal of digital supports – inclusion or integration (7). If the goal is inclusion, the digital support enables the environment to be autism-friendly. For example, internet-based communications (such as Facebook) can allow the time needed for autistic people to socially interact online in a manner consistent with non-autistic people (7). If the goal is integration, the digital support aims to adjust the behaviour of the autistic person. For example, an app to teach emotion recognition may aim to support social interaction. Whatever the goal of the digital support, a key question is what evidence is there that it will do what it aims to do. This can now be identified using the BETA framework - see the online tool.

References and resources

- (1) DSM-5 diagnostic criteria for autism
- (2) Autism spectrum disorders - WHO 2018
- (3) Signs and Symptoms of Autism Spectrum Disorders - CDC
- (4) What is autism - NAS
- (5) Intellectual disability and ASD
- (6) Co-occurring Psychiatric Disorders in Preschool and Elementary School-Aged Children with Autism Spectrum Disorder (article)
- (7) Brosnan, M., Good, J., Parsons, S., & Yuill, N. (2019). Look up! Digital technologies for autistic people to support interaction and embodiment in the real world (article)
- (8) A systematic quality review of high-tech AAC interventions as an evidence-based practice (article)
- (9) Autism and speech devices – Autism Speaks
- (10) Are Robots Ready to Deliver Autism Interventions? A Comprehensive Review (article)
- (11) State-of-the-art of virtual reality technologies for children on the autism spectrum (article)
- (12) Evaluating iPad technology for enhancing communication skills of children with Autism Spectrum Disorders (article)