

Autism: Assistive Technology

Summary

On 2 April each year the UN observes World Autism Awareness Day; this year's theme is 'Assistive Technologies, Active Participation'. Autism, also known as Autism Spectrum Disorder (ASD), is a lifelong condition that affects how people communicate and interact with others. It is estimated that 1.1 percent of the UK population have autism, although the rate of diagnosed autism is lower. Assistive technology is used to help disabled people live more independent lives; and there are a range of these services and products designed for people with ASD.

This briefing summarises some of the challenges faced by people with autism and examines how assistive technology can enable independence for people with the condition. It covers three areas; job-specific and employment skills, social skills and anxiety management. For each of these, the briefing outlines the technology available and reports of its effectiveness. In the final section, the briefing summarises some sources of government funding for assistive technology.

Autism Awareness Day 2019

World Autism Awareness Day was established by UN Resolution 62/139 on 18 December 2007 to raise public awareness of autism.¹ The day is held annually on 2 April, and to mark the occasion this year the UN will be holding its annual observance at UN headquarters. In the UK, the National Autistic Society will be running a series of fundraising activities across World Autism Awareness Week, which runs from 1–7 April 2019.² The theme for this year's World Autism Awareness Day is 'Assistive Technologies, Active Participation'.³

What is Autism?

Autism, also known as Autism Spectrum Disorder (ASD) is “a lifelong condition that affects how people communicate and interact with others”.⁴ Autism affects each person differently; however, there are two common characteristics: difficulties with social communication and social interaction, and repetitive behaviour, routines and activities.⁵ Some people with autism may face additional challenges; around 50 percent of people with autism also have a learning difficulty, and many also have mental health issues or behavioural disorders, such as attention deficit hyperactivity disorder.⁶ It is estimated that around 1.1 percent of the UK population have autism, although it is believed that only two-thirds of children and 1 in 10 adults with the condition have a diagnosis.⁷ More males than females are diagnosed with autism, although it is now thought that this may be in part due to underdiagnosis of older women and girls.⁸

What is Assistive Technology?

In 2001, the Foundation for Assistive Technology developed the following definition: “assistive technology is any product or service designed to enable independence for disabled and older people”.⁹

A 2018 report by the House of Commons Work and Pensions Committee described different types of assistive technology (AT) and how it could benefit users:

It can support people to do daily tasks, be more mobile and participate more fully in society and in employment. AT comes in many different forms. It can be highly specialised and designed to overcome a specific impairment or difficulty, such as embossing machines that can produce hard copies of information in braille. It can also be built into phones, laptops and daily living gadgets. Apple's iPhone, for example, comes with VoiceOver/"blind assist" mode (reading out words on the screen), FaceTime (allowing visual communication, such as British Sign Language), Switch Control (operating the phone without touch), and the ability to receive Textphone calls without specialist hardware. Advances in technology have driven, and continue to drive, cutting edge advances in AT. These are increasingly integrated with mainstream devices, driving down costs and improving accessibility for disabled people.¹⁰

There are a range of products and services designed and developed to promote independence specifically for people with ASD.

Assistive Technology for People with ASD

Job-specific and Employment Skills

According to the National Autistic Society, only 16 percent of autistic adults were in full-time paid work in 2016, and only 32 percent were in some kind of paid work.¹¹ Researchers studying the impact of assistive technology on training needs, state that adults with ASD often have many characteristics that are considered valuable in a workplace; for example, they may have excellent mathematical or logical ability, high productivity, and desirable traits such as honesty and reliability.¹² Nonetheless, they claim, adults with autism face additional challenges at work due to "functional difficulties related to cognition, behaviour, communication and sensory-processing that can impact work performance".¹³

A 2016 review of academic literature on assistive technology for adults with ASD found that its use could increase employment outcomes.¹⁴ The review concluded that technology-aided interventions could be used to teach adults with ASD specific on-the-job skills, such as how to complete tasks like folding or photocopying, and generic skills, such as social and interview skills. Delivery was most commonly through the use of tablets, iPads and personal digital assistants (PDAs).¹⁵ Assistive technology can be utilised in a number of ways, including:¹⁶

- Time management—applications can provide reminder prompts to users and be used to cue users to switch between tasks.
- Task management—studies have shown that to-do lists, pictorial slide shows, and task-sequencing videos that provide instruction on more complex tasks may be beneficial for people with ASD.
- Task training using video-modelling—where a skill or behaviour is learnt by watching a video of someone performing that behaviour.

One study found that "training in the use of a PDA as an assistive technology significantly reduces the need for job coaching support by workers with ASD, without reducing functional performance on the job".¹⁷

Social Skills

People with ASD may have impaired social skills; they may struggle with social interactions, have difficulty with non-verbal communication, and with developing and maintaining relationships. Those with ASD may also have difficulty understanding social cues and reading other's emotions.¹⁸ Many autism interventions aim to teach children social skills, including through apps, as recommended by the National Autistic Society.¹⁹ CALL Scotland, an organisation funded by the Scottish Government to provide advice and loans for assistive technology, provides guidance on a [wide range of apps](#) to support those with communication needs.²⁰ Studies have suggested that robots may also be able to promote social behaviour in children with autism, although the effectiveness of such interventions has been questioned.²¹

Researchers at the University of St Andrews examined the potential of wearable assistive technologies (WATs), which provide “real-time, in situ feedback on their social interactions”. WATs “present an opportunity for autistic people to accumulate cases and generalise social skills of their own over time”.²² The researchers identified prototypes that have been developed to promote social skills amongst people with ASD, including devices that detect emotions and provide feedback to the wearer, devices that track eye contact, and systems that sense when the wearer is standing too close to others when holding a conversation. The researchers suggest that although some of these innovations have proved effective in controlled settings, their effectiveness in real-life situations has yet to be proven.²³ The paper also addressed the moral and ethical considerations of such technology, stating:

All these WATs are designed from a “fixing-thing” perspective; that is, regulate behaviours of autistic people and train them to understand and follow the same social norms as everyone else. However, autistic people may have a different way of perceiving the condition and may not need or want assistive technologies. Some would prefer treating their sensory impairment not as a disability but a different way of behaving in relation to social stimuli. Taking a fundamental moral and ethical position, the future direction might look at how to design wearable technologies to enable autistic people to find their own way in social situations, or design assistive technologies for both autistic people and their conversation partners to achieve mutual understanding.²⁴

Other reviews of the use of assistive technology by children with ASD have suggested that development of new technologies should move from a problem-orientated to a strength-based approach, focusing on the potential of such children, and that people with autism should play an active role in the research process.²⁵

Anxiety Management

According to the autism research charity, Autistica:

- 2 in 5 autistic people are diagnosed with an anxiety disorder, but many more will experience symptoms of anxiety that affect how they live their lives.
- Anxiety disorders affect 42% of autistic children compared with just 3% of children without autism.²⁶

Several apps have been developed specifically to help autistic people manage anxiety, with the aim of increasing the independence of users. Autistica and King's College London jointly developed 'Molehill Mountain', an app based on cognitive behavioural therapy (CBT) to help autistic people self-manage their

own anxiety.²⁷ ‘Brain In Hand’ is another app based on CBT, designed specifically for people with autism. It contains a personal plan, coping strategies for self-management of anxiety, anxiety monitoring and access to a support team via text or phone.²⁸ The app’s user survey and trials reported several benefits to users’ mental health:

- Anxiety levels drop by 31%.
- Optimism rises by 12%.
- 14% drop in reliance on family support.
- 88% cope better with problems and feel more confident.
- 100% say it provides them with help when they need it.
- 94% say it’s having a positive impact on their life.²⁹

Government Funding for Assistive Technology

Funding for assistive technology is available through several sources, depending on the life stage of the user. Some assistive technology is funded by schools; for example, in response to a question in September 2018 on what the Government was doing to make assistive technology more affordable and accessible for disabled students, the Government stated:

We recognise that there is increasing pressure on high needs budgets, and funding is rising to meet this. High needs funding has risen from £5 billion in 2013 to £6 billion this year, the highest level on record. [...] We are working with the British Educational Suppliers Association on a ‘lending library’ designed to support schools to make decisions about technology. Once live, the library will have an area focussed on assistive technologies.³⁰

Children and young people up to the age of 25 may be able to access assistive technology as part of their education and health care (EHC) plan if they remain in education or training. Those on an EHC plan may be entitled to a personal budget, which can be used to buy services that support their plan.³¹

University students can apply for funding for assistive technology through the student finance disabled students allowance. Through this, undergraduate students may be eligible for up to £5,684 covering the whole course, as part of a specialist equipment allowance.³² In 2015–16, the Government introduced an excess fee for computers, requiring students to pay £200 towards the costs of computers financed through the scheme. Some, including Seema Malhotra (Labour MP for Feltham and Heston), chair of the All-Party Parliamentary Group on Assistive Technology, have suggested this may be leading to a reduction in take-up of the allowance.³³

In April 2018, the Government announced a new Tech Fund, as part of its access to work programme, which provides financial support for disabled people in the workplace. It announced that the fund would be used to waive the cost of the contribution that medium and large employers were required to pay towards assistive technology for employees. Prior to the announcement, “medium employers paid the first £500 towards technological solutions and large employers paid the first £1,000, with both paying 20% of the cost thereafter up to £10,000”.³⁴

However, in its 2018 report on *Assistive Technology*, the House of Commons Work and Pensions Committee argued that “cost barriers prevent disabled people realising the life-changing potential of assistive technology”, and said that many devices remain unaffordable, particularly for people on low incomes. It recommended that the Government introduce a low-interest loan scheme to enable

claimants of personal independence payment to purchase assistive technology.³⁵ In its response to the report, the Government stated that it was committed to improving access to assistive technology, but rejected the committee's recommendation, citing concerns about provision of loans.³⁶

As well as providing funding to purchase assistive technology, the Government also funds research and development into new technologies. Section 22 of the Chronically Sick and Disabled Persons Act 1970 requires a report to be laid annually before Parliament providing details of projects funded. The 2017–18 report detailed six projects related to researching and developing assistive technology specifically for people with autism, with total funding of nearly £4 million.³⁷

Further Information

- House of Commons Library, [Autism—Overview of UK Policy and Services](#), 18 March 2018
- House of Commons Work and Pensions Committee, [Assistive Technology](#), 19 April 2018, HC 673 of session 2017–19
- House of Lords Library, [World Autism Awareness Day, 2 April 2018](#), 27 March 2018

¹ United Nations General Assembly, '[Resolution 62/139—World Autism Awareness Day](#)', 18 December 2007.

² United Nations, '[World Autism Awareness Day 2 April](#)', accessed 18 March 2019; and National Autistic Society, '[Join World Autism Awareness Week](#)', accessed 21 March 2019.

³ United Nations, '[World Autism Awareness Day 2 April](#)', accessed 18 March 2019.

⁴ NHS, '[Autism](#)', accessed 20 March 2019.

⁵ *ibid.*

⁶ National Institute for Health and Care Excellence, '[NICE Support for Commissioning for Autism](#)', January 2014, p 5.

⁷ *ibid.*

⁸ NHS, '[Autism](#)', accessed 20 March 2019.

⁹ Department of Health and Social Care, '[Research and Development Work Relating to Assistive Technology 2017–18](#)', October 2018, p 1.

¹⁰ House of Commons Work and Pensions Committee, '[Assistive Technology](#)', 19 April 2018, HC 673 of session 2017–19, p 6.

¹¹ National Autistic Society, '[The Autism Employment Gap: Too Much Information in the Workplace](#)', August 2016, p 2.

¹² Tom Gentry et al, '[Reducing the Need for Personal Supports Among Workers with Autism Using an Ipad Touch as an Assistive Technology: Delayed Randomized Control Trial](#)', *Journal of Autism and Developmental Disorders*, March 2015, vol 45 no 3, pp 669–70.

¹³ *ibid.*

¹⁴ Edith Walsh et al, '[Technology-Aided Interventions for Employment Skills in Adults with Autism Spectrum Disorder: A Systematic Review](#)', *Journal of Autism and Developmental Disorders*, October 2016, vol 4 no 1, p 12.

¹⁵ *ibid.*, p 17.

¹⁶ Tom Gentry et al, '[Reducing the Need for Personal Supports Among Workers with Autism Using an Ipad Touch as an Assistive Technology: Delayed Randomized Control Trial](#)', *Journal of Autism and Developmental Disorders*, March 2015, vol 45 no 3, pp 670–1.

¹⁷ *ibid.*, pp 669–84, p 680.

¹⁸ Research Autism, '[Social Interaction and Autism](#)', 1 November 2017.

¹⁹ National Autistic Society, '[Social Interaction for Children](#)', accessed 20 March 2019.

²⁰ CALL Scotland, '[iPad Apps for Complex Communication Support Needs](#)', accessed 20 March 2019.

²¹ Parliamentary Office of Science and Technology Note, '[Robotics in Social Care](#)', December 2018, p 3.

²² Esma Mansouri Benssasi et al, '[Wearable Assistive Technologies for Autism: Opportunities and Challenges](#)', *IEE Pervasive Computing*, April 2018, vol 17 issue 2, pp 11–21.

²³ *ibid.*

²⁴ *ibid.*

- ²⁵ Marjo Virnes et al, '[Review of Research on Children with Autism Spectrum Disorder and the Use of Technology](#)', *Journal of Special Education Technology*, 2017, vol 30 no 1, pp 22–3.
- ²⁶ Autistica, '[Anxiety and Autism](#)', accessed 20 March 2019.
- ²⁷ King's College London, '[Molehill Mountain—An App to Help Autistic People with Anxiety](#)', 10 July 2018.
- ²⁸ Brain In Hand, '[How does Brain in Hand work?](#)', accessed 20 March 2019.
- ²⁹ Brain in Hand, '[Increasing Independence. Savings Costs](#)', accessed 20 March 2019.
- ³⁰ House of Commons, '[Written Question: Students: Disability Aids](#)', 3 September 2018, 169152.
- ³¹ Government website, '[Children with Special Educational Needs and Disabilities \(SEND\)](#)', accessed 21 March 2019; and National Autistic Society, '[Education, Health and Care Plans in England](#)', accessed 21 March 2019.
- ³² Government website, '[Help If You're A Student with a Learning Difficulty, Health Problem or Disability](#)', accessed 20 March 2019.
- ³³ Seema Malhotra MP, '[Assistive Technology Can Help 'Even the Playing Field' for Disabled People](#)', *PoliticsHome*, 24 January 2018.
- ³⁴ Department for Work and Pensions, '[Government Announces Tech Fund to Support Disabled People and their Employers](#)', 27 April 2018.
- ³⁵ House of Commons Work and Pensions Committee, '[Assistive Technology](#)', 19 April 2018, HC 673 of session 2017–19, p 31.
- ³⁶ House of Commons Work and Pensions Committee, '[Assistive technology: Government Response to the Committee's Tenth Report](#)', 19 September 2018, HC 1538 of session 2017–19, p 5.
- ³⁷ Department of Health and Social Care, '[Research and Development Work Relating to Assistive Technology 2017–18](#)', October 2018.

House of Lords Library briefings are compiled for the benefit of Members of the House of Lords and their personal staff, to provide impartial, politically balanced briefing on subjects likely to be of interest to Members of the Lords. Authors are available to discuss the contents of the briefings with the Members and their staff but cannot advise members of the general public.

Any comments on briefings should be sent to the Head of Research Services, House of Lords Library, London SW1A 0PW or emailed to purvism@parliament.uk.