Disability technology

How data and digital assistive technologies can support independent, fulfilled lives.

Executive summary

THE ROYAL SOCIETY

Disability technology: Exploring how data and digital assistive technologies can support independent, fulfilled lives.
Executive summary
Issued: June 2025 DES9221_6
ISBN: 978-1-78252-798-5

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Cover image: *Neural Nebulous*, 2021, a light-based copper installation embedded in a tree that links the brain's neural networks to the vast unknowns of space. © Alexis Neumann. Alexis Neumann is a California-based artist, scholar, and curator whose interactive installations and mixed media art works explore her experience with disability and the intersections of culture, identity, and theology.
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Foreword

Some fifty years ago, I was introduced to Stephen Hawking and told that he would be lucky to live another year. In fact, he had a long and influential life ahead of him and became one of the Royal Society's most famous Fellows. Writing in his own foreword for a 2011 World Health Organization report, he described the removal of barriers to participation for disabled people as a 'moral duty'. In his view, achieving this would unlock the vast potential of disabled people and, as exemplified by his own life as a highly accomplished disabled academic, technology can play an important role. This report aims to push forward Hawking's vision by considering how we can accelerate the development of digital technologies to help disabled people live independent, fulfilled lives.

One of the most important facets of this challenge is data. As a statistician, I am acutely aware that categorisation in data collection can affect everything and everyone. The way disability is understood, surveyed and categorised has far-reaching effects on financial allocations, service delivery and product design. In a world of data-driven technologies, we need to continually assess how we are collecting and publishing data on disability. Approaches to data categorisation and collection are an important part of our exploration of the landscape of digital assistive technologies.

Issues of disability are of interest not only to those who are disabled. Disability can be temporary or long-term and can affect any of us at any point in our life. Disability has varying definitions across the world and can affect individuals in different ways; indeed, some people living with a disability may not recognise themselves as disabled. These are among the reasons we recommend a shift from an identity-focused approach to data collection towards one centred on understanding specific functional challenges.

In an age of artificial intelligence, global research and development largely focuses on big data. As much disability data is sparse and non-standardised, this presents a fundamental challenge for digital assistive technologies, as is also the case in areas such as personalised medicine. Progress will require methodology built using 'small data', such as few-shot machine learning. As a prompt for researchers and their funders, our report sets out potential avenues for small data approaches.

Fulfilment in life has many dimensions and technology needs to adapt to as many of these as possible if we are to truly meet the challenge of disability inclusion. With this in mind, the report sets out case studies for digital assistive technologies for work, leisure, rest and care.

The development of these technologies has a long way to go and we are conscious that in many cases technology can be a hindrance rather than a help. However, the opportunity in front of us is substantial. To be successful, it will require action from decision-makers across many sectors. I hope, after reading our report, you will be one of those who acts and helps society fulfil its moral duty.

Finally, our grateful thanks are due to the staff at the Royal Society including June Brawner, Areeq Chowdhury, Mahi Hardalupas, Charise Johnson and Isabelle Magkoeva. They have been a delight to work with.

Sir Bernard Silverman FRS
Chair of the Royal Society Disability Technology Steering Committee

Executive summary

Disabled people face barriers in their everyday lives to work, play, rest and care. Disability is estimated to affect 1.3 billion people or 16% of the world's population[1]. In the UK, there are 16 million people reporting a disability, with the prevalence increasing with age[2].

Digital assistive technologies (DigAT) promise to promote independence for disabled people, potentially reducing or eliminating existing barriers. This report defines DigAT as 'any technology that processes information to help make people's lives easier'[3]. Examples include screen-readers, speech-to-text software, or smartphone applications which support daily living. This definition does not include non-digital assistive technologies (eg white canes or sticks, manual wheelchairs, or magnifying glasses).

While this report is focused primarily on the needs of disabled people, disability access is relevant to all as everyone can experience temporary and permanent disability throughout their life. Accessibility can also benefit the whole of society as products designed for disabled people (eg automatic doors, closed captioning and voice assistants) are often valued by all.

The physical, emotional and social impact of disability, as well as attitudes towards disabled people, can affect all aspects of disabled people's lives. This includes impacts on education, employment, wellbeing and life expectancy. DigAT will not be a standalone solution for these challenges and, in some cases, technology itself causes significant challenges for disabled people.

However, if designed and deployed appropriately, these technologies can be transformative in helping disabled people live more independent and fulfilled lives. Exemplifying this, the report highlights five case studies of how DigAT can support disabled people across work; gaming; tourism; music; and social care.

In addition to exploring the landscape of DigAT, the report is focused on various challenges within the DigAT lifecycle related to measurement, inclusive design and sustainability. Furthermore, it provides an overview of small data methods. These methods, which help researchers derive insights from limited data, present significant potential across a broad range of scientific fields, including the development of DigAT.

The nature of disability is inherently diverse and complex. To ensure a more defined focus, the report has generally explored disabilities related to hearing; cognition; mobility; self-care; built-environment; vision; and communication.

The report has been guided by an international expert steering committee, many of whom have lived experience of disability. It has been informed by a series of activities undertaken by the Royal Society. These include a survey of more than 800 UK-based disabled people; a nationally representative survey of approximately 2,000 members of the British public; focus groups with UK-based DigAT users; literature reviews on disability data and small data; a case study analysis of DigAT in the UK, US, India and Kenya; and various roundtables and workshops on inclusive design, gaming, social care and technology transience.

1 The World Health Organization. 2023 Disability. See https://www.who.int/news-room/fact-sheets/detail/disability-and-health (accessed 14 April 2025).

2 House of Commons Library. 2024 UK disability statistics: Prevalence and life experiences. See https://commonslibrary.parliament.uk/research-briefings/cbp-9602/ (accessed 14 April 2025).

3 This definition was co-formulated with Disabled participants in research conducted for this report by the Research Institute for Disabled Consumers (RiDC).

The key findings and recommendations of the report are intended to be useful for policymakers across the world.

Key findings

- Simple, quantitative measures to approximate complex health statuses can be inconsistent and reductive. Examples include self-identification in population surveys and perceived measures from medical datasets. This can have implications for disability-related policy interventions and comparisons of their efficacy. It may also incentivise the inappropriate prioritisation of the medical model of disability (where exclusion from activities results directly from an individual's functional challenges) over the social model (which accounts for society's failure to meet people's accessibility needs). Understanding the limitations of this data is essential for the responsible design of disability-related research, effective policy-making and to avoid misrepresentation.
- Digital assistive technologies can enable disabled people to engage independently in a range of activities including those related to employment, leisure and the home. According to a survey of UK-based disabled people, conducted for this report, more than half of DigAT users said they could not live their lives the way they do without DigAT. In addition, a nationally representative survey of the British public suggests there is an expectation for technologies to meet people's needs as they grow older and a willingness to use them if they were shown to enhance their independence.
- Inclusive design (or 'co-design') practices are essential to the development of effective and user-friendly DigAT. There are several aspects to this including the accessibility of design software and work environments; the involvement of disabled people throughout the design process; sharing accessibility information ahead of the launch of a product; and actioning feedback from disabled users post-development. This may also require developers to unlearn exclusionary design practices and to consider long-term challenges related to a product's sustainability (eg obsolescence and repairability).
- Big data techniques may fail to represent minority groups (eg disabled people) in the large datasets being analysed. This can lead to disabled people not being represented in patterns extracted by these techniques, reinforcing biases in favour of non-disabled people. Small data approaches, which focus on context-specific information from smaller datasets (eg personalised data gained via wearable technologies) can allow for more granular analysis of disabled people's experiences. These approaches, however, remain at an emerging stage of development and are likely to require longer term advancements within machine learning to be most useful for DigAT.
- The development of inclusive technologies can improve the user experience for all users, disabled or non-disabled. Assistive features designed for disabled people can often produce better experiences for non-disabled people too. Examples of this include closed captioning, text-to-speech and voice assistants. As such, a sole focus on disability prevalence when making the case for investment in DigAT may lead to an underestimate of the economic opportunity.

- Accessibility training and education for users and professionals is key for DigAT adoption in work, leisure and social care settings. This can help address DigAT adoption challenges due to lack of awareness of DigAT and digital skills gaps.
- There are various ethical concerns related to the development of DigAT, including privacy; data bias; data minimisation; informed consent; equitable access; and ideological beliefs (eg discriminatory eugenics). How these concerns are addressed and balanced against the opportunities provided by DigAT will be an important influencing factor in how widely they are adopted by disabled people.

Future research questions

The following topics and issues emerged in research activities as key considerations for disability data and digital assistive technologies:

- New sensory datasets: What new sensory datasets (eg sound, smell, haptic) need to be developed or made available to enhance multi-modal analytical techniques for improving DigAT?
- Inequities in global data for DigAT: What barriers exist to the provision of DigAT that can be applied globally as widely as possible across regions and cultural contexts? This may include considerations of the quality of data on diverse languages and built environments.
- Education and training: How best can carers and general users be educated on how to use DigAT? How can DigAT enable greater access to education for disabled people and children?
- Complex disabilities and intellectual disabilities: Many applications of DigAT are focused on specific individual types of disability. How can the development of DigAT be adapted to better consider the needs of those who experience complex disabilities (where people have a combination of different disabilities) and/or intellectual disabilities?
- Regulation of medical devices: What are the advantages and disadvantages of current regulatory approaches to medical devices if applied to DigAT?
- Funding for DigAT research and development: The nature of DigAT research is often interdisciplinary. What are the challenges in obtaining funding for research and development of DigAT? How can these be addressed by research funders?
- Personalised AI: How can AI systems which automatically adapt to individual user behaviours, preferences and needs enhance the effectiveness of DigAT?

Recommendations

AREA FOR ACTION: COLLECTING NEW TYPES OF DISABILITY DATA

RECOMMENDATION 1

National statistics bodies should shift toward collecting data on functional challenges and limitations across populations, rather than solely focusing on disability identity. This approach would provide a more nuanced understanding of how people experience limitations in their day-to-day lives, allowing for better-informed policymaking.

Disability is an inherently diverse and personal experience[4]. Simplified measurements of disability can end up misrepresenting more complex health statuses and have limited utility for policymaking or resource allocation. Self-identification of disability is motivated by several factors and can lead to an underreporting of disability by certain groups (eg older people who do not renegotiate their identity despite experiencing changes in functioning which would constitute disability)[5]. Perceived measures of disability (where researchers categorise people as disabled based on health records) rely on the medical model of disability and can contribute to interventions which do not account for an individual's environmental and social context and fail to meet their needs.

While both self-identification and perceived measures can have value, it is significantly limited if the overall objective for data collection is to design better policies, products and services for disabled people. To better understand people's accessibility needs, data collection should focus on assessing specific functional challenges and limitations people may face (eg issues with seeing, hearing, walking and remembering). It is important these questions are validated and developed in consultation with disabled communities and organisations[6].

4 Danemayer, J. and Holloway, C. 2024 Disability and Assistive Technology in Population-Based Data. See: https://royalsociety.org/news-resources/projects/disability-data-assistive-technology/ (accessed 14 April 2025).

5 Leahy A. 2023 Disability Identity in Older Age? - Exploring Social Processes that Influence Disability Identification with Ageing. Disability Studies Quarterly. 42, 3-4. (doi:10.18061/dsq.v42i3-4.7780)

6 Open Society Foundations. 2014 Ethnic Origin and Disability Data Collection in Europe: Measuring Inequality – Combating Discrimination. See https://www.opensocietyfoundations.org/publications/ethnic-origin-and-disability-data-collection-europe-measuring-inequality-combating (accessed 12 March 2025).

To be effective, population surveys need to capture the diversity of functional challenges people face and move away from binary classifications of 'disabled' or 'non-disabled'. The functional assessment questions developed by the United Nations' Washington Group on Disability Statistics present a method for achieving this which could be integrated into existing national data collection[7]. The most widely implemented of these, the short set (WG-SS), contains six questions on difficulties related to vision; hearing; mobility; cognition; self-care; and communication. Respondents are asked to report levels of difficulty for each category from 'no difficulty' to 'cannot do at all'.

This approach has already been adopted by many countries around the world. According to a 2023 review of national censuses and household surveys by the Disability Data Initiative, 125 countries have at least one dataset with functional assessment questions, including 70 with at least one dataset using the WG-SS[8]. The report, however, found geographical disparities with functional assessment surveys being a rarity in Europe and Central Asia compared with a greater availability in sub-Saharan Africa.

Combined with a disaggregation by factors such as age, gender, socioeconomic status and location, the collection of this data could strengthen the efficacy of initiatives designed to support disabled people. In the context of policymaking, this data can help support more targeted interventions specific to described needs. In the context of DigAT, this data could be used to incentivise the development of new technologies and improve the quality of existing tools. It may also help improve alternatives to big data research methods (eg small data[9] methods used for analysing relatively smaller datasets or demographic subgroups). In doing so, national statistics bodies can play a leading role in furthering research on small data and coordinating initiatives to benefit disabled people.

7 Washington Group on Disability Statistics. 2025 Question Sets. See: https://www.washingtongroup-disability.com/question-sets/ (accessed 14 April 2025).

8 Disability Data Initiative. 2023 Disability Data Report 2023. See: https://disabilitydata.ace.fordham.edu/disability-data-report-2023/ (accessed 14 April 2025).

9 Hackenberg *et al*. 2024 Small data explainer - The impact of small data methods in everyday life. See: https://royalsociety.org/news-resources/projects/disability-data-assistive-technology/ (accessed 14 April 2025).

AREA OF ACTION: RECOGNISING DIGITAL TECHNOLOGIES AS ASSISTIVE

RECOMMENDATION 2

Governments should consider the smartphone as an assistive technology.

Smartphones serve as a multi-purpose DigAT for disabled people, offering various accessibility features including voice-to-text; text-to-speech; screen magnifiers; captioning; navigation; and colour correction. It is estimated that more than half the global population (4.6 billion) have access to smartphones[10] with disabled people being significantly less likely to have access compared to non-disabled people[11]. This disparity is also apparent in the UK, with lower levels of smartphone ownership estimated for disabled people compared to non-disabled people (86% vs 64%)[12].

As with information communication technologies more generally (eg laptops, tablets and PCs), internet access can break down barriers to healthcare, education, employment and social connections for all. The portable nature of smartphones and their ability to integrate accessibility features with ease makes them a powerful form of DigAT. They should not be considered any less a form of assistive technology than hearing aids, manual wheelchairs, or white canes. For disabled people, smartphones can enable new methods for independence. In a social care setting, smartphones are often essential for the effective functioning of smart home devices and personalised health data collection[13].

10 GSMA. 2024 The State of Mobile Internet Connectivity 2024. See https://www.gsma.com/r/wp-content/uploads/2024/10/The-State-of-Mobile-Internet-Connectivity-Report-2024.pdf (accessed 14 April 2025).

11 GSMA. 2021 The Mobile Disability Gap Report 2021. See https://www.gsma.com/solutions-and-impact/connectivity-for-good/mobile-for-development/wp-content/uploads/2021/11/Mobile-Disability-Gap-Report-2021.pdf (accessed 14 April 2025).

12 Ofcom. 2021 Use of communication services, consumer omnibus 2020. See https://www.ofcom.org.uk/siteassets/resources/documents/research-and-data/multi-sector/accessibility-research/use-of-communication-services-consumer-omnibus/use-of-communication-services-consumer-omnibus.pdf (accessed 14 April 2025).

13 Royal Society and Policy Connect workshop on inclusive design and deployment of smart home devices for social care and independent living, April 2024.

For many disabled people, their DigAT is their smartphone[14] and major mobile operating system providers such as Google[15] and Apple[16] have made progress in making their devices more accessible. In a survey of disabled DigAT users, conducted for this report, 64% said they need DigAT to access critical services. More than half of respondents said they could not live their lives the way they do without it[17].

For policymakers, the acknowledgement of smartphones as an assistive technology should shape approaches towards the provision of DigAT to disabled people as well as the provision of essential services (eg health, social care, education, banking) which are delivered or regulated by governments. For example, the use of smartphones as DigAT should inform any proposals to ban them in schools. Reliable internet access should also be considered as a key part of supporting the use of smartphones as DigAT. It may also require the categorisation of smartphones as an assistive technology for universal health coverage initiatives.

14 Research Institute for Disabled Consumers. 2024 Research report: Disability data and assistive technologies. See: https://royalsociety.org/news-resources/projects/disability-data-assistive-technology/ (accessed 14 April 2025).

15 Android. Innovative Accessible Phones, Devices, and Settings. See https://www.android.com/intl/en_uk/accessibility/ (accessed 13 March 2025). See also: Project Relate: An App for Non-Standard Speech - Google Research

16 Apple. Accessibility. See https://www.apple.com/uk/accessibility/ (accessed 13 March 2025).

17 Research Institute for Disabled Consumers. 2024 Research report: Disability data and assistive technologies. See: https://royalsociety.org/news-resources/projects/disability-data-assistive-technology/ (accessed 14 April 2025).

AREA OF ACTION: PRIORITISING INCLUSIVE DESIGN IN TECHNOLOGY DEVELOPMENT

RECOMMENDATION 3

Disabled people should be meaningfully involved in the design and development of new digital products and services from the outset.

Ensuring the inclusion of disabled people throughout the design process of digital products and services is important to improving their accessibility. This principle should apply both to specialised DigAT as well as mainstream technologies used by all. It should also apply for the entire lifecycle of a product, from conception, to design and deployment and to end-of-life. Accounting for the views and needs of disabled people in this way will help ensure that new technologies can be truly accessible and can lead to a better overall user experience for disabled and non-disabled people alike[18, 19].

There are many good examples of companies carefully considering accessibility needs in the development of new digital products and services. These include efforts from major technology companies such as Google[20], Apple[21] and Microsoft[22], as well as smaller companies such as those highlighted across the case studies within this report. Despite this, the need to better include disabled people across the broad range of current and future DigAT applications was emphasised repeatedly across many of the research activities conducted.

Meaningfully involving disabled people will require investment in accessible recruitment processes, financial compensation and clear processes for engagement. A failure to do this carefully and effectively can lead to disabled people being excluded from user experience (UX) design or negatively impact their involvement[23]. Examples of poor practice highlighted in the Research Institute for Disabled Consumers (RiDC) research, conducted for this report, include a non-disclosure agreement sent in an inaccessible digital format and a survey with inaccessible checkboxes.

With altruism being a motivating factor for disabled people involving themselves in UX exercises[24], meaningful involvement will also require developers providing feedback to participants on what will change, if anything, as a result of their contributions. This may also require moderated engagement and evaluation, in which developers are able to engage directly (remote or in-person) with participants to fully understand UX challenges.

18 Royal Society and Sony PlayStation roundtable on DigAT for gaming, July 2024.

19 Royal Society and Policy Connect workshop on inclusive design and deployment of smart home devices for social care and independent living, April 2024.

20 Android. Innovative Accessible Phones, Devices, and Settings. See https://www.android.com/intl/en_uk/accessibility/ (accessed 13 March 2025). See also Project Relate: An App for Non-Standard Speech - Google Research

21 Apple. Accessibility. See: https://www.apple.com/uk/accessibility/ (accessed 13 March 2025).

22 Microsoft. Accessibility Technology and Tools. See https://www.microsoft.com/en-us/accessibility (accessed 13 March 2025).

23 Research Institute for Disabled Consumers. 2024 Research report: Disability data and assistive technologies. See https://royalsociety.org/news-resources/projects/disability-data-assistive-technology/ (accessed 14 April 2025).

24 *Ibid*.

Continuing the involvement of disabled people in the design of updates to products and services, post-deployment, is another important factor of inclusive design. This is easier with software and online services as feedback can be gauged in real-time (eg through social media platforms) with new versions designed and installed. An example of this being done well was highlighted during the Royal Society and Sony PlayStation roundtable with some developers using Discord as a platform to receive real-time feedback from disabled gamers, prior to making amendments to the gameplay in version updates[25].

Given the integration of technologies across daily activities and people's reliance on them, the end-of-life for a product should also be considered throughout the design process. When DigAT become obsolete, due to products no longer being maintained by their providers or due to companies closing, the disruption to people's lives can be severe and immediate[26]. This may involve the consideration of releasing the source code of obsolete DigAT devices (under an open-source license), patent pools and escrow provisions. It may also require initiatives related to the repair of a device, particularly in the event of product discontinuation. For policymakers, it could require legislative action (eg strengthening right to repair laws and regulations).

The principle of meaningful involvement should extend to the development of the product or service as a designer. This means that it should be possible for disabled people to pursue careers in software and hardware design. If achieved, this will help embed the lived experience of disability into the teams developing these products. This aspiration will require investment in skills and training for disabled people and potential employers, as well as investment in the development of accessible design software and hardware. This could involve the redesign of existing design platforms and hardware. It may also require the introduction of new design modules in colleges and universities which are accessible, inclusive and attractive for disabled students.

25 Royal Society and Sony PlayStation roundtable on DigAT for gaming, July 2024.

26 Royal Society roundtable on approaches for future-proofing essential technologies against obsolescence and user abandonment, July 2024.

AREA FOR ACTION: CREATING AFFORDABLE DIGITAL ASSISTIVE TECHNOLOGIES

RECOMMENDATION 4

Governments, technology companies and research funders should explore initiatives to promote low-cost, interoperable and sustainable digital assistive technologies.

Disabled people, across the world, are less likely to be in work and more likely to earn lower wages, when compared with non-disabled people[27]. In the UK, disabled people are almost twice as likely as non-disabled people to be unemployed[28] and the average disabled household faces over £1,000 a month in extra costs in order to have the same standard of living as non-disabled households[29]. The affordability of DigAT should be seen as a key priority for all interested in their development and adoption. It is a challenge which was repeatedly highlighted across many of the research activities conducted for this report.

There are, broadly, five approaches which can help address this. The first is to focus on addressing market failures in the provision of DigAT which emanate from a disparate and diverse disabled population with low levels of disposable income. Creating products for disabled people, therefore, may not be the most profitable or financially sustainable business proposition for private companies and their shareholders. Solving this (eg by subsidising purchases of DigAT, establishing DigAT accelerators, or by improving data collection on disabled populations) could help create a more competitive DigAT environment and lower consumer costs for DigAT products.

The second approach is to focus on improving the utility and lifespan of DigAT. Ensuring that products can be used to a high standard for many years (eg through hardware repairability or software updates) could help improve the appeal of expenditure on DigAT for disabled people. Furthermore, if these products are interoperable with other technologies (assistive or otherwise), this can also improve their appeal. For example, an accessibility controller which only works with one device (eg a gaming console) may be less appealing than one which also works with many other devices (eg televisions, personal computers). Addressing the lifespan and utility challenges could also have a positive environmental impact by reducing waste. This approach, however, will need to be balanced against commercial interests which may require products to have limited lifespans in order to generate profit and incentivise innovation.

27 International Labour Organization. 2024 A study on the employment and wage outcomes of people with disabilities. See https://www.ilo.org/sites/default/files/2024-08/WP124_web.pdf (accessed 18 December 2024).

28 The Health Foundation. 2024 Unemployment rates for disabled and non-disabled people. See https://www.health.org.uk/evidence-hub/work/employment-and-unemployment/unemployment-rates-for-disabled-and-non-disabled (accessed 18 December 2024).

29 Scope. 2024 Disability Price Tag. See https://www.scope.org.uk/campaigns/disability-price-tag (accessed 18 December 2024).

The third approach is to consider lending models for DigAT as part of existing public libraries. This approach would enable disabled people to borrow DigAT that they would otherwise be unable to access or purchase. This could help with testing the suitability of products prior to purchasing them or to help with specific use cases (eg job interviews, playing games, or learning an instrument). Libraries, themselves, could also receive funding to be equipped with DigAT to help disabled people more easily access books and the internet.

The fourth approach involves raising awareness of existing DigAT to help disabled people review different products and obtain better value for money. Awareness of DigAT products was a challenge raised throughout the activities conducted for this report. Barriers to awareness include information on DigAT being decentralised[30], inconsistent information on accessibility descriptors[31] and lack of incentives for companies[32]. As highlighted in the RiDC research, DigAT is discovered through a wide variety of sources including social media; disability groups; friends or family; and medical staff.

Amongst non-users of DigAT, 58% of respondents said they would use DigAT more if they knew what types were on the market. This was the most popular response to a question asking what would help participants to use DigAT[33].

Finally, initiatives to lower the costs of producing DigAT can be explored. This could include the creation of open datasets to be used for the creation of DigAT (eg new audio datasets for training AI systems); the release of existing datasets (eg public sector datasets or navigation data generated by private companies); and further research into small data approaches for DigAT development. Beyond this, traditional methods of achieving lower costs (eg through tax incentives or by investment in training and skills of the workforce) could be explored.

30 Research Institute for Disabled Consumers. 2024 Research report: Disability data and assistive technologies. See: https://royalsociety.org/news-resources/projects/disability-data-assistive-technology/ (accessed 18 December 2024).

31 Royal Society and Sony PlayStation roundtable on DigAT for gaming, July 2024.

32 Royal Society and Policy Connect workshop on inclusive design and deployment of smart home devices for social care and independent living, April 2024.

33 Research Institute for Disabled Consumers. 2024 Research report: Disability data and assistive technologies. See: https://royalsociety.org/news-resources/projects/disability-data-assistive-technology/ (accessed 18 December 2024).

AREA FOR ACTION: SAFEGUARDING AGAINST DIGITAL EXCLUSION

RECOMMENDATION 5

Service providers should consider the social impact of replacing analogue services with digital alternatives.

For many people, analogue services will always be the preferred option. Solving digital exclusion will take time and for some disabled people, DigAT of any form may not help them to live independent, fulfilled lives. As more services move online, organisations must ensure that analogue alternatives as well as live human interaction remain available and of high quality. If this is not possible, they should ensure users have adequate support to make the transition from analogue to digital.

The transition from analogue to digital can exclude disabled people by introducing digital systems that are difficult or impossible to use given certain types of disability. When considering these transitions, there should be a comprehensive assessment of which groups may end up excluded and how this may occur. For example, a transition from keypad card readers to touchscreen card readers may not be understood to be a transition from analogue to digital, however this is a transition which can easily exclude people with vision impairments[34].

The transition to digital services can also leave behind those who are digitally excluded (ie individuals without access to reliable internet, devices, or the skills necessary to navigate new technologies). This exclusion can exacerbate feelings of loneliness and isolation, particularly for those who may rely on face-to-face or phone-based services for social interaction and essential services. A 2024 report by the UK-based disability charity, Sense, found that nearly half of people with complex disabilities face exclusion as they struggle to access and engage with services online[35]. This includes accessing health support (eg booking a medical appointment online).

As outlined in recommendation 3, to ensure products and services are accessible, it is important to meaningfully involve disabled people throughout the entire design lifecycle. Doing so can help identify potential risks that could lead to the exclusion of disabled people.

34 BBC News. 2023 Touchscreen card devices may prevent blind customers paying. See https://www.bbc.co.uk/news/disability-67239870 (accessed 18 December 2024).

35 Sense. 2024 Potential and Possibility: Addressing digital exclusion. See https://www.sense.org.uk/about-us/research/potential-and-possibility-research/potential-and-possibility-2024-addressing-digital-exclusion/ (accessed 18 December 2024).

RECOMMENDATION 6

Governments should ensure disabled people and carers, of all ages, are equipped with the skills required to most effectively utilise current and future DigAT.

The development and promotion of DigAT, alone, will not be sufficient to ensure disabled people are able to benefit from these tools. There will need to be skills training initiatives to ensure that disabled people are able to understand how mainstream technologies (including popular AI assistants) and other DigAT can be best applied for their individual requirements. These initiatives will also need to be easily accessed by paid and unpaid carers who may want to adopt DigAT in both formal social care settings and more generally.

These trainings may be delivered through formal educational settings, as part of ensuring young people with diverse needs understand the opportunities and risks presented by digital technologies, or via other settings such as libraries, community organisations and charities. They may also be delivered by private companies (eg social care providers and technology developers).

These initiatives should cover information on existing accessibility features within mainstream technologies, advice on where to find, compare and purchase DigAT and guidance on how to set up or maintain DigAT. Beyond this, there should be an ongoing focus on general digital literacy skills, to ensure that participants are able to more easily adapt to new technological innovations.

The Royal Society is a self-governing Fellowship of many of the world's most distinguished scientists drawn from all areas of science, engineering and medicine. The Society's fundamental purpose, as it has been since its foundation in 1660, is to recognise, promote and support excellence in science and to encourage the development and use of science for the benefit of humanity.

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Registered Charity No 207043

ISBN: 978-1-78252-798-5
Issued: June 2025 DES9221_6