TPT
Thomas Pocklington Trust
for people with sight loss

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Assistive and Inclusive Home Technology: A guide for people with sight loss

Contents

Scope and Purpose of the Guide

Significant recent advances in assistive and inclusive technology (AIT) have created many new opportunities for people to overcome everyday problems and challenges associated with sight loss. This Guide aims to inform visually impaired people and their families and should be relevant to people of all ages, whether they live alone, share with partners, family or friends, or are living in supported accommodation. It should also provide a useful resource for professionals such as occupational therapists, vision rehabilitation officers or support workers, as well as developers who manufacture and design technology. The focus is on 'home technology', referring to the types of technologies and the kinds of devices that can be useful to people with visual impairment when carrying out domestic and personal tasks around the home.

The Guide covers a broad range of products, equipment, gadgets, systems, software and hardware, both high-tech and low-tech, the technically complex and the very simple. It also considers specialist assistive technology (specifically designed for people with sight loss) alongside mainstream inclusive technology (designed for the mass market but accessible to people with particular needs).

This publication builds on:

- Housing for People with Sight Loss (Pocklington Good Practice Guide 4)
- Good Housing Design - Lighting (Pocklington Good Practice Guide 5)
- Assistive Technology (Pocklington Good Practice Guide 6)
- Making an Entrance (Pocklington)
- Choosing Central Heating Controls (Rica)
- Choosing Cookers, Ovens, Hobs and Microwaves (Rica)
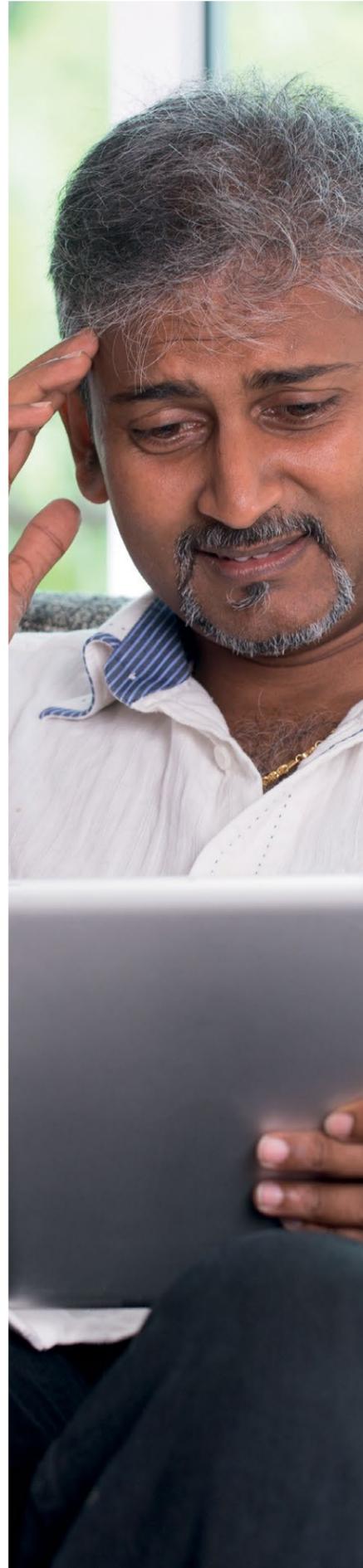
AIT – Today and Tomorrow

Assistive Technology

The field of assistive technology has changed dramatically over the past few years, with combinations of radical new technologies bringing significant changes in many areas. Traditional low-tech specialist equipment is still very important and this will surely always be the case. When it comes to keeping one's pairs of socks together in the wash, for example, it is difficult to think of a high-tech substitute for the simple but effective sock-lock (which pegs them in pairs). Traditional specialist equipment has been steadily improving over the years, generally becoming more ergonomic, better-designed and increasingly attractive.

The field of assistive technology (AT) is increasingly blurring into other areas. As AT becomes more complex and pervasive it blends into subjects such as architecture, design, lighting, assisted living, rehabilitation and medical technology. Advances in technology can cross over from other sectors such as sports, health, education, geo-data and computer games design. For example, headsets originally designed to improve the immersive atmosphere of computer games have provided foundational technology that is being adapted to develop specialist systems to assist navigation. Crucially, AT is now blurring into mainstream technology, with inclusive design becoming increasingly prevalent in several key areas.

Inclusive Technology

Mainstream technology can be considered inclusive when it is accessible to a wide range of users with differing abilities or particular needs. Inclusive technology will be as intuitive and easy-to-use as possible (with reasonable tolerance of human error) and be flexible and adaptable to an individual's personal preferences. A fully inclusive product should ideally be accessible right out of the box (enabling eyes-free and low dexterity set up).

However, mainstream technology that can be made accessible relatively easily, such as a smartphone that becomes accessible after downloading one bundle of apps, can also be considered as inclusive technology. Versatility and scope for adaptation and add-ons are thus key elements of inclusive design. How far the accessibility is built into the foundation of the technology is a good indicator of its overall inclusiveness; a mobile with an in-built high resolution zoom function could be considered more inclusive than a device which only acquires the extra resolution after downloading a specialist magnifier app.

Truly inclusive technology should meet the principles of universal design described below:

1. Equitable use – the product should be usable by people with diverse abilities, including people with significant sensory impairments.

2. Flexibility in use – the product's design should accommodate a wide range of needs and preferences and enable choice regarding method of use. In regard to visual impairment this could involve offering multi-sensory options, such as audio-based control or tactile feedback.

3. Simple and intuitive use – the technology should be easy and natural to use. For example, arranging user information according to its importance is especially helpful for people unable to visually scan things quickly.

4. Perceptible information – all user information should be perceptible to people with various sensory impairments. Visual information should be big and bold and ideally also available through auditory or tactile mediums.

5. Tolerance for error – the technology should allow for human error and should minimise the adverse consequences of accidental or unintended actions. General robustness is often important to visually impaired technology users, who may be more likely to knock things onto the floor.

6. Low physical effort – the product should be usable with minimum physical effort. In relation to sight loss this might involve minimising the need for users to strain their eyes whilst using the technology.

7. Size and space for approach and use – appropriate space should be provided to use the product.

Although many low-tech specialist AT products seem unlikely to need radical improvement, at the higher-tech end of the spectrum there are numerous cases of specialist AT equipment being effectively made obsolete by inclusive mainstream technology (and often by smartphone apps). Highly effective OCR (Optical Character Recognition) reading software or electronic magnification apps can now be obtained for free (after the initial outlay for the mobile device) and can replace specialist equipment that cost hundreds or thousands of pounds. Inclusivity can result in substantially lower costs for consumers of AIT, because mass producers recoup their costs by selling a large number of competitively priced products.
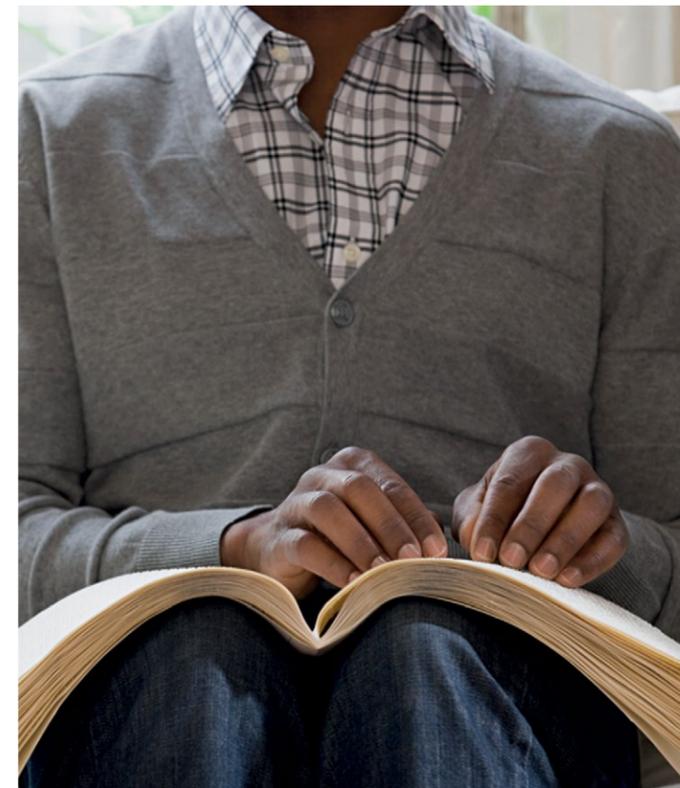
Tasks and Activities around the Home

Home Environmental Control

Inclusive technology such as counter lights can usefully illuminate work surfaces and dimmer switches enable a greater degree of brightness control. The new Philips Hue Personal Lighting System is a good example of mainstream technology that could be especially useful for people with sight loss. It offers the ability to vary the brightness, hue and tint of the lighting to enable a wide range of subtly diverse options. The system is remotely controlled via a mobile device such as a smartphone or tablet (see 'Accessibility of Mobile Devices' section for more information). The RNIB LED lamps offer visually impaired people lighting that is highly portable and slickly designed, enabling them to adapt the localised lighting as appropriate to the task. More information and practical guidance on lighting can be found in Pocklington's 'Good Housing Design – Lighting' publication.

Modern boilers with digital visual displays can often make it difficult for visually impaired people to control their home heating and hot water systems. Alternative designs with tactile switches and features such as default reset buttons tend to be more appropriate for people with sight loss and RICA has produced useful guidance on this subject (see Rica's 'Choosing Central Heating Controls' publication). Using smart-home technology such as the British Gas 'Hive' mobile app could help solve the problem of inoperable boilers, by enabling users to control household heating through an accessible smartphone or tablet device.

Some recent technology trends threaten to undermine home access and security for visually impaired people, with concerns that touchscreen-reliant security systems could make front doors inaccessible. On the other hand, biometric security technology can improve accessibility, with fingerprint locking mechanisms making it unnecessary for people to have to fiddle around finding the right key and guiding it into the keyhole. Lower-tech solutions such as keys with in-built torches and basic intercom systems can also assist with home access and security control.

The concept of high-tech automated 'smart-homes' has been around since the 1930s but it is only with recent advances related to mobile devices and the 'internet of things' that this sci-fi dream has started to become reality. The integration of lighting and heating control systems (such as the aforementioned Hue and Hive apps) with systems for controlling door access, window blinds, plant-watering mechanisms etc. could enable all home environmental control to be coordinated through a single device, such as a smartphone or tablet.

Household Chores and Tasks

Many household appliances are becoming less accessible, as streamlined design and the use of digital visual displays often hinder touch-based control of the machine. Modern appliances can be an accessibility rollercoaster, with many ovens, microwaves, dishwashers, washers and dryers being hard to operate by people with sight loss. Sometimes accessible options are withdrawn from the market without being replaced and some manufacturers have highly inconsistent degrees of accessibility across their range of products.

On the positive side, Whirlpool has recently released the Whirlpool Duet, a highly accessible washer and dryer combination that features auditory feedback to verify programme selection. Whirlpool also offers many other accessible mainstream appliances, demonstrating that some producers do seem to be improving the consistency of accessibility across their range. Mainstream microwaves can be quite inaccessible, but specialist talking microwaves are available. Sometimes simple options such as labels and tactile markers can improve an appliance's accessibility and special discs to fix around cooker dials can be useful in this respect. There are mainstream products that offer smartphone control of various kitchen appliances, such as kettles and washing machines. For more information on cooking appliances, see Rica's guidance publication, 'Choosing Cookers, Ovens, Hobs and Microwaves'.

There is a wide range of equipment specially designed to enable people with sight loss to accomplish tasks in the kitchen and around the home. Special gloves, grips, silicon handles and oven shelf guards minimise the risk of burning or spilling.

Kitchen utensils such as baby box graters, guides for bread-cutters, one-touch tin-openers, Dycem mats and liquid level indicators can be very useful, as can talking tins and talking utensils such as temperature probes, egg-timers and scales. Mainstream products such as sandwich makers or coffee machines can also make good, easy-to-use devices for visually impaired people. Gadgets such as needle-threaders and sock-locks can be used to assist with household chores and tools such as tactile measuring tapes and audible spirit levels can help with DIY tasks.

Timekeeping

Talking clocks and watches verbally speak the time on request or give auditory updates at set intervals. Vibrating watches deliver the same information through a different medium and tactile watches allow users to feel the time. The Bradley Timepiece is an elegant tactile watch and this popular product is a good example of how AIT can be desirable to consumers when it is deliberately designed as an attractive and aesthetically-pleasing product. Apple's smart-watch offers more than just a timepiece; it is a wearable mobile device with multiple accessibility features built in.

Labelling, Locating and Identifying

Labelling systems can be very useful and products such as braille stickers, bump-ons, tactile markers and squeeze-on marking gel are available to facilitate this. Devices such as the Penfriend can be used to add personalised audio labels to items and objects and the latest version of the technology works with freezer food (previous audio-labels malfunctioned under frozen conditions).

There are simple gadgets to assist with finding commonly misplaced items, such as keys that can give off auditory alerts to signal their location. The Locator Lite device can connect with two items to enable easy detection. Specialist identification equipment such as money identifiers can assist with cash management and the colour coordination of clothes can be enabled by colour detectors. There are now a variety of apps offering these capabilities, meaning that smartphone owners don't need to carry around lots of different gadgets and can often get access to the technology free of charge.

Case Study: *Elizabeth*

Elizabeth has been visually impaired since an accident in her early fifties, but has some vision remaining in her left eye. She finds storage heaters useful for controlling temperature and uses RNIB Daylight portable lamps to improve lighting where needed. She prefers old-fashioned appliances and is frustrated that she can no longer find plug-in-the-back kettles. Her cooker is very old but she likes the tactile controls and can't find a modern replacement she "feels comfortable with". Her washing machine has tactile markers to guide control.

Other gadgets Elizabeth uses include a talking watch, a colour-detector and a needle-threader. She has a scanner reading machine for letters and uses a DAISY player for audio-books. She reads a lot of talking newspapers and enjoys radio and listening to music (the controls on her stereo have labels stuck on). She finds her TV difficult to operate and tries to keep it on the same channel, either fully on or fully off, in order to minimise confusion. She has a BT big button phone that she finds useful and an Alto-mobile device that she can't get to work.

Although she is in her eighties, Elizabeth still works and uses computers in her role. She has stickers on her keyboard and Dolphin accessibility software installed on her computer that enables her to access different functions through a simple, linear system of menus and sub-menus. She can use email and can print out material, although she doesn't feel comfortable searching the web. She said she would "need someone to give me confidence" in order to expand her use of information technology.

Barcode recognition apps (such as LookTel or Digit-Eyes) can read the barcodes of a huge range of products and then verbally relay useful information with a good degree of accuracy.

Taking identification AIT one stage further, 'TapTapSee' is an exciting new app that combines money identification, colour detection and complex computer vision technology to recognise a huge variety of things and relay accurate information for people with sight loss. The 'Be My Eyes' app relies entirely on crowdsourcing for identification, drawing on a pool of 130,000 sighted volunteers to provide real-time information based on images transmitted from a visually impaired person's smartphone camera. The Talking Goggles object/environment recognition app is aimed at mainstream users, but it is easily usable by people with sight loss because it gives audio-feedback as standard.

Reading and Writing

Simple products such as extra-large stationery and easy-to-see calendars and diaries can be useful, as can basic tools such as signature guides, envelope guides and writing frames. 'Swell Paper' can enable someone to write text that rises and becomes readable through the medium of touch and scented pens enable writers to smell what colour pen they are using.

Magnifying glasses (sometimes with in-built torches) can help some partially-sighted people to read and recent versions of this traditional tool have steadily become more streamlined and easier to use. Specialist electronic magnification devices (such as the Optelec Compact Magnifier) magnify images through a hand-held screen, enabling digital highlighting and contrasting to enhance visual clarity even further. Large CCTV machines do the same thing but display images on a big monitor. There is now a wide range of mobile apps that can replicate the magnification functions of specialist devices and such software can also be used on large-monitor computers as a cheaper alternative to traditional CCTV machines.

Reading machines combine optical character recognition (OCR) technology with scanning hardware and text-to-speech software to read out printed documents when they are placed under the camera. These machines are traditionally large and expensive, but once again modern mobile apps offer a cheaper alternative to smartphone and tablet users. The KNFB Reader iPhone app can read documents with a high degree of accuracy provided the camera is pointed correctly. The Giraffe-Reader is a portable stand that is designed to hold the iPhone in place while reading, enabling the device to replicate all the advantages of a traditional reading machine for a significantly lower cost.

Current OCR technology is reliable under simple conditions but struggles in complex real-world environments (e.g. when text overlays images). A lot of research is being undertaken in this area and Humanware's Zoom-Twix technology is a good example of advanced OCR, as it is able to scan a whole book very quickly and can read text accurately at a long distance. The new, slickly-designed Orcam Glasses track their wearer's finger and can be gesturally directed to read out bodies of text such as labels or letters.

As well as the low-tech, non-electronic writing equipment mentioned at the beginning of the section, there are various technologies that enable accessible electronic writing. Text-to-speech software (such as Aesop) verbally announces letters when typed. Speech-to-text technology facilitates writing by dictation and speech recognition systems have taken massive leaps forward in reliability in recent years.

A range of braille equipment is available to people with sight loss. Braille note-takers are specialist braille-centric computers, while another option is to connect braille keyboards to mainstream computing devices or mobiles. Refreshable Braille Displays connect to computing devices to translate information into braille, using mechanical pins to present the text. Braille writing machines (Braillers) and braille printing devices

(Embossers) are also available. The specialist nature of braille equipment tends to make it expensive and attempts to significantly lower the costs have yet to bear fruit.

Accessing Computers and Online Resources

Using computers and the internet is increasingly important in the modern world and there is much concern that visually impaired people may be left behind if they are not able to access this technology in an effective way. Fortunately, there is a range of AIT available to assist people with sight loss and make computers easier to use for the wider population as well. Mainstream computers have various accessible features built-in as standard, for example: embossed dots on the f, j and 5 keys, scroll wheels and easy-to-use keyboard shortcuts. Physical adaptations such as extra-large monitors, screen-attached magnifiers, special keyboards, keyboard skins and stickers can be used to improve accessibility.

Screen magnification tools (such as ZoomText) can zoom in to enlarge text or images and software can also improve contrast and definition in a variety of useful ways. Screen readers speak out the contents of the computer screen. The JAWS screen reader is the most popular, although NVDA software offers an effective (and free) alternative.

Apple's Mac computers come with multiple accessibility features installed as standard, with software for screen-reading, magnification, contrasting, text-to-speech, speech-to-text, etc. Bundles of AIT software are available to be installed on other computers to make them accessible. AbilityNet's 'My Computer My Way' offers advice to disabled people on how to use AIT to adapt their computer to be as accessible as possible.

Home Shopping and Finance

It is becoming increasingly common to do shopping and banking online and effectively accessing these resources could be especially useful for people with sight loss. Unfortunately, many of these sites are not fully accessible and screen readers often interact badly with the information displayed on the web-page. One significant issue is that because web accessibility regulations are currently flawed, many websites are theoretically compliant with the rules, while actually not being accessible in practice. Bank card-readers (required for security verification during many online transactions)

are often a problem for visually impaired people as the mainstream devices tend to be small, fiddly and difficult to use.

Some banks are making significant efforts to improve the accessibility of their services. For example, Barclays offers: accessible card-readers with large buttons, simple layouts and audio feedback options; debit cards with bold colours and tactile notches; and the option to receive statements in large font or braille text. Barclays has worked with AbilityNet to try and improve the accessibility of their website and their online banking services. Other banks are also attempting to improve accessibility, with Natwest offering tactile-marked debit cards and braille correspondence options. Halifax offers a wide range of telephone-banking services and the useful ability to bypass card-reader security verification using telephone-based authentication.

Online shopping site eBay has been working on improving the accessibility of their services, with advice from the American National Federation of the Blind. There are step-by-step instructions describing how screen reader users can browse and buy things on the site and the company also offers a course teaching visually impaired people how to sell things on eBay. The Amazon website is now fully accessible with screen readers. Regarding online food shopping, Ocado offers the ability to customise viewing and accessibility settings according to personal needs and preferences. Tesco has been working with RNIB to improve the accessibility of its website. It originally had a separate site especially designed for disabled users, but now it has incorporated accessibility features into the mainstream website, another example of efforts to improve the inclusivity of mainstream services.

Should any particular website prove difficult to access, one good general tip is to try using the mobile version of the site instead. Because the versions of websites designed for mobile displays tend to be concise and visually minimalist, they are often easier for screen reader users to navigate.

Entertainment and Leisure

There are a large number of AIT products that can assist visually impaired people in accessing books, radio, music, TV and games. DAISY Talking Books have been around for many years and they can be accessed using specialist Victor Reader Stream Players. E-books have been great news for people with sight loss because once text is in electronic form, there opens up a wide range of options for making it accessible. The mainstream drive to translate all books into electronic form has thus had a very positive impact for people with sight loss, especially when combined with the great strides forward in inclusive tablet technology. The newest kindle e-readers have accessibility features built-in as standard and are designed to be accessible right out of the box. A vastly expanded range of books can now be read in braille, thanks to new software such as the recent Kindle iPhone app. Listening to audio-books is becoming an increasingly mainstream activity and Amazon Audible is designed to cater for this mass market, with the disproportionate benefits for people with sight loss a happy bonus. National Talking Newspapers and Magazines (part of the RNIB Group) offers auditory versions of all major UK papers and magazines.

Despite the intrinsically sight-loss accessible nature of the medium, radio devices have often been quite inaccessible. The 'Sonata' device is a new product developed by the British Wireless Association for the Blind. It can access internet radio, podcasts, etc. and its six easy-use buttons make it highly accessible.

The mainstream trend towards discarding physical products in favour of digital alternatives is generally good news for visually impaired people and radical changes in methods for accessing music are a great example of this. Provided the device itself is adequately accessible, storing and accessing music using a computer is much easier than finding and playing a CD (or a video or DVD for that matter). Mainstream music cloud services like Spotify can give access to a huge amount of audio content through a computer or mobile device, although the websites themselves are often not very accessible (many visually impaired people find Spotify difficult to use). iTunes enjoys good accessibility features and so offers a good option for music-lovers.

Case Study: *Vicky*

Vicky is partially-sighted, after recently developing an eye condition. An academic and artistic person who has always loved technology, she has prioritised AIT that can help her continue her work, blogging and creative pursuits. Making her computer more accessible was crucial, so she now uses an extra-large monitor along with MS Zoom. She uses Dolphin Supernova software on her laptop. She uses Google Drive cloud storage to avoid fiddling about with memory sticks and YouTube to listen to music, keep up with the news and guide yoga routines. She also has Sky TV, using audio-description to watch soaps but turning it off during films, where she finds it too distracting. Contrasting colour settings enable her to read the TV menus.

Vicky reads Audible audio-books on a Kindle and also uses Librivox, an online resource of free audio-books. Her Samsung phone is set up with negative colours and she uses the speech software features which are "pretty reliable". Vicky does much of her food and general shopping online and is a keen Amazon customer. She banks with Halifax and says its online banking is accessible, she particularly likes being able to do transactions over the phone without needing a card-reader.

Vicky has recently started to adapt her flat, putting in powerful room lighting and extra lamps. She has plans to remove a light-obstructing pillar and redo the flooring in a lighter colour. She has fitted handrails and bright lights on the stairs, as this is important for her confidence. She has started using audio-labelling and uses an electronic magnifier to identify things around the house. She thinks her specialist electronic magnifier is better than her smartphone magnification apps but prefers to use her beautifully-crafted traditional magnifier where possible.

Specialist TV-watching glasses and big button or easy-use TV remotes can be used to improve TV accessibility. Mainstream voice-controlled TVs (such as those recently developed by Panasonic) may become especially useful for people with sight loss, the latest models offering complete audio feedback features. Audio Description (AD) enables visually impaired people to understand TV programmes more easily by providing a narrator to verbalise important visual information. More and more content is provided with AD, as regulators have steadily introduced more stringent requirements on TV channels. The BBC has recently improved the accessibility of its online iPlayer after sight loss organisations exerted pressure for change. The BBC and Channel 4 both give information about the AD content on their websites and people with sight loss can also get information from sites such as 'TV Help' (which lists recent audio-described TV and DVD options).

There is a range of specially designed board-games, packs of cards, family games and toys available for people with sight loss. There is currently a big movement in computer games accessibility, with the 'Blind Legend' audio game one example of many new eyes-free games. The RS Games Client site enables screen reader users to play games against each other online.

Health, Fitness and Wellbeing

AIT available to assist with fitness includes gadgets such as talking pedometers and talking timers. Smartphone and smart-watch apps can also provide these functions. Talking blood sugar level monitors and audio-thermometers can help with maintaining health, while accessible pill-organisers and ergonomic eye-drop dispensers can assist with medication management. Personal care equipment with in-built lights (such as tweezers and mini-torch combinations) can also come in handy. Grab-rails on the stairs and non-slip mats in bathrooms can help maintain safety in areas of the home where people with sight loss may be at increased risk of accidents.

Telecare and Telehealth systems can be useful for visually impaired people with other disabilities or health issues. Telehealth enables remote monitoring of an individual's vital signs and raises the alarm

should any potential problems be detected. Telecare systems, such as community alarms, are intended to provide emergency contact and rescue services for individuals who fall or get into difficulty. Some technologies rely on wearable pendants that can be deliberately triggered by someone who has fallen and is unable to get up. Other systems may trigger alarms if weight sensors detect that a person has not returned to bed for a certain period of time, or if a person fails to check in and confirm they are well by a specified time each day. The 'Fallcheck' app gives a comprehensive guide to alert users to potential fall hazards around the home and provides information on how to remove or reduce risks.

Communication

There are several accessible landline phones available for people with sight loss, Doro easy-see phones and BT Big Button phones being popular examples. The Alto2 talking phone is an accessible mobile device with tactile controls, specially designed for use by visually impaired people. Synapptic offers sight loss specialist mobile hardware, such as phones and tablets, as well as software that can be installed on other devices.

Apple can be credited with leading the way in being the first major mobile developer to include basic accessibility technology as standard on its devices. The iPhone and iPad come with effective screen readers, screen-magnifiers with zoom functions, colour contrast controls, speech-to-text and text-to-speech software pre-installed and ready to go straight out of the box. The Siri voice control app (which comes as standard) is impressively accurate and represents a radical leap forward in speech recognition technology. The iPhone's Touch ID system (using fingerprint recognition rather than passcodes to access the device) can also make things easier for individuals with visual impairment. The 'Accessibility Mode' feature can make mobile devices much easier to use, even for people who are less tech-savvy.

Other major mobile manufacturers have followed Apple's lead and started producing highly inclusive smartphones and tablets. According to the Global Accessibility Reporting Initiative (GARI), several Samsung mobiles are currently even better than Apple products in overall accessibility terms. Bundles of
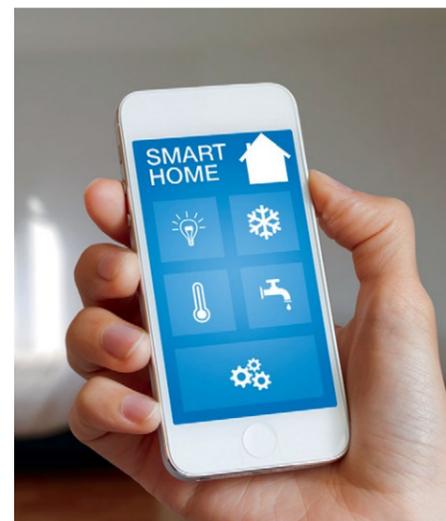
accessibility apps can be downloaded all at once to transform inaccessible phones into accessible ones. Examples of such packages include: Equal Eyes Accessibility, IDEAL Accessibility Installer and CapturaTalk. The fact that mobile manufacturers are currently leading the way in assistive and inclusive technology development is very good news for people with sight loss, given the increasingly central role that these devices play in enabling access to technology in general.

Accessibility of Mobile Devices

Modern smartphones offer much more than just a phone-line. For many people, mobile devices are moving towards becoming the single point of access gateways to connect with a huge range of different technologies, enabling lighting control, household appliance operation, object-identification, reading, writing, web-searching, shopping, banking, etc. to be coordinated using just one device. These tools are versatile and multi-functional thanks to the model of building a basic hardware foundation (mini-computer, touchscreen, camera, microphone, speaker, communications equipment) upon which a vast range of different software can run. The potential of these integrated technology devices to revolutionise AIT for people with sight loss is already being realised for early adopters of the technology and there are many exciting new possibilities on the horizon. Making sure mobiles are as accessible as possible is therefore highly significant.

There has been a lot of concern that streamlined designs and touchscreens make modern mobiles less accessible for people with sight loss. However, adaptations such as screen readers can mitigate these issues and can actually make touchscreen devices more accessible than their mechanised counterparts. Touchscreen readers speak what is on the screen as the finger explores, allowing visually impaired people to get information regarding the layout of the screen that would not otherwise be available. Once a user gets the hang of it, touchscreen reader navigation in many ways represents an advance for people with sight loss in terms of effectiveness and ease-of-use.

Case Study: *Alan and Joanne*

Alan and Joanne are a couple living in a bungalow. Joanne has no vision, while Alan has some remaining sight. They have different needs and preferences when it comes to AIT and have to make compromises when selecting home technology products. Joanne prefers tactile information and control systems while Alan would rather use his remaining vision where possible, with a secondary preference for audio. Joanne reads braille TV guides and uses braille for CD-labelling systems. She has a mechanical Perkins brailler.

Joanne has recently changed her 'limited' android phone for an iPhone and finds the good audio-feedback features make it relatively easy to use. She doesn't use the internet on the phone much but Alan uses his iPhone for things like mobile banking. He has the Ping-it payment system installed which allows him to send and receive money using just a phone number. Joanne uses online banking at home and has a speaking card-reader to enable remote payments. There was a debate as to whether to get a Panasonic TV, Freeview with connected RNIB accessibility box or an Apple TV. Eventually they got an Apple device, which generally works out well. They enjoy using Netflix but would prefer it if they could get a system where one person can hear audio-description through headphones while the other can watch without the distraction.

Their home is equipped with strip lights, dimmer switches, spotlights and table lamps. They found digital heating controls "a nightmare" and so had a mechanical system installed, where they receive tactile feedback from buttons and can easily reset to default if needed. Their kitchen appliances are bumped with tactile markers. They use a standard microwave because the price of a talking one is so much higher. The kitchen is equipped with talking scales and an audio measuring jug and they also have a speaking thermometer. Although they like using audio around the house they both prefer tactile watches, as they feel talking watches are too conspicuous when out and about. They use audio-book services such as Audible and RNIB's Overdrive online library system.

Alan likes using his iPad art software. He also does DIY around the house and garden, using a cordless lawn mower for improved safety. He often gets frustrated with the inaccessibility of many user manuals but recommends online tutorials through Lynda.com as a good way of finding things out.

Assessing Need for Technology – Checklist and Questions

The checklist on pages 22-23 is intended to assist professionals such as occupational therapists, ROVIs and support workers to assess the AIT needs of their visually impaired clients. It can also be used to guide informal or self-assessment. It can be useful for people who are newly diagnosed with sight loss as well as those who have been visually impaired for a long time. The checklist follows the AIT activity categories used in the section of the Guide on 'Tasks and Activities around the Home'.

To make the assessment, go through each activity on the checklist in turn and ask the person whether they have difficulty undertaking that activity.

Having established which activities are more difficult for them, ask which areas are most important, in terms of finding a solution to make their daily life easier. Then quickly go through each 'major difficulty' activity in order of importance and ask the following questions:

1. **How do you carry out this activity?**
Focus on the kinds of devices, products, appliances or equipment they use in the process and whether they are specialist or mainstream devices, high-tech or low-tech (including their own individual workarounds).

2. **What are the particular difficulties you have in carrying out this activity?**
Focus on accessibility of design features, understanding/familiarisation, ease of use, safety and security, inadequate lighting or contrast, difficulties related to visual impairment, difficulties related to other disabilities/health conditions. Find out where the person feels the problem lies.

3. **Do you know of any products/devices or improvements that could make this activity easier and are they available to you?**
Focus on desired design features, design functionality and acceptability, cost issues, practicality and set up/installation issues, reservations and risks, access to advice, training and support. Focus on preference for different types of solution, such as interest in high-tech or low-tech products or interest in using mobile devices.

4. **Would you like to know about other products/devices that could make it easier?**
Focus on signposting towards established products/technology relating to this activity, mainstream products and devices with inclusive design features, new or improved specialist products, add-ons and updates to current devices and equipment; also cost and practicality, sources of information, advice, training and support. Refer to the 'Tasks and Activities around the Home' section and suggested links in 'Useful Resources' section for ideas regarding what AIT to recommend.

If the person wishes to continue, ask the same four questions in relation to the 'minor difficulty' activities. And finally, if there is time and it feels appropriate, ask if they would like to know about new, alternative or additional equipment, products and devices that they might use to carry out activities with which they have no difficulty. Agree on a planned way forward based on the results of the assessment.

	No difficulty	Minor difficulty	Major difficulty	Not relevant	Difficulty due to VI (Yes/No)	Comments
Home Environmental Control						
Control of lighting and daylight						
Control of heating						
Accessing and securing the home						
Control of smart home products/features						
Household Chores and Tasks						
Cooking and kitchen tasks						
Washing, laundry and clothing						
Household, gardening and DIY tasks						
Timekeeping						
Telling the time						
Planning and organising						
Labelling, Locating and Identifying						
Labelling						
Locating and identifying						
Reading and Writing						
Writing and recording						
Using stationery						
Reading print, paper and packaging						
Reading books, magazines + newspapers						
Reading and writing braille						

	No difficulty	Minor difficulty	Major difficulty	Not relevant	Difficulty due to VI (Yes/No)	Comments
Accessing Computers + Online Resources						
Physically adapting your computer						
Reading screens						
Using AIT software						
Home Shopping and Finance						
Shopping						
Banking						
Paying bills						
Money management						
Entertainment and Leisure						
Listening to music						
Listening to radio						
Accessing TV						
Playing games and computer games						
Enjoying hobbies and creativity						
Health, Fitness and Wellbeing						
Maintaining health and wellbeing						
Fitness and physical recreation						
Communication						
Using landlines						
Using mobiles						
Using mobile software and apps						

Case Study: *Dave*

Dave lives in his own flat and has no sight. He sometimes uses tactile markers on his kitchen appliances but prefers to rely on memorising the control systems where possible. He has a Bosch washing machine with a specially-fitted accessible interface that has marked dials and braille labelling. He can generally operate the mainstream boiler but sometimes requires sighted support to reset if he loses track of the control positioning. He makes use of inclusively-designed kitchen utensils such as cutting guides, cheese grater boxes and guided bottle openers.

Dave uses an especially well-designed Sharp talking clock. The 1980s model has since been discontinued but he foresaw this and bought two of them. He uses a tactile wrist watch as well, but as a keen sailor, his favourite time-keeper is a beautiful maritime clock, set to chime every four hours (originally to regulate the changing of the watch aboard ship). Dave also has a passion for music and has an impressive pair of flat-panel speakers that produce crystal clear sound. He has an extensive record collection which he keeps in alphabetical order. An attempt to audio-label his music went wrong when the Penfriend device frustratingly lost its memory. The records are now all labelled in braille.

Dave uses a reliable old Blazie braille-and-speak computer that reads things back to him as he inputs and also has a scanner for reading mail. He has preset the stations on his mainstream Sonos radio and uses a Plextalk Daisy audio-book reader. He does telephone banking and gets money from his local bank in £10 denominations (he folds £5 notes to make discrimination easy). He is experimenting with doing online shopping at Ocado and so far finds the site fairly easy to use.

Dave always thinks about post-sales support when purchasing expensive AIT, preferring manufacturers with engineers that he can actually speak to if something goes wrong.

Getting to Grips with Technology - Hints and Tips

- Persevere in learning to use key foundational technology like smartphones. There tends to be a 'hump' where the whole thing seems more trouble than its worth, but keep going and it will probably be worth it in the end. Skills such as the ability to use touchscreens with screen readers are likely to become increasingly important in many areas of life in the future.

- Try to take a problem-solving approach and find workaround solutions when your technology doesn't work for you first time round. For example, certain screen-reading programs might frustratingly ignore page numbers no matter how you adjust the settings. But perhaps copy-and-pasting the text into another application may get you access to the information you need.

- If you are having difficulty with a software package (such as Microsoft Word for example) try typing the keyword that best describes your problem into the 'help' box and see if it comes back with any useful solutions.

- If you find the standard version of a website inaccessible, perhaps try the version designed especially for mobiles. Mobile sites tend to be more concise and less visually cluttered, so are generally more accessible to screen reader users.

- If you are having problems reading websites because of things like font size or style then you could try changing your browser settings. In Google Chrome, for example, you can set it so that all websites are instructed to present themselves in your selected format.

- Wait for a few days or weeks before updating important apps or software. This way you can go online to check whether others are having problems with the app or simply wait it out until the initial software bugs and problems have been fixed. This is good advice for all technology users but is particularly relevant to visually impaired people, who run the risk of an update suddenly making the app completely inaccessible to them.
- Be aware that there are many newly developing privacy and security issues concerning advanced technology. For example, when using apps like BeMyEyes you are fundamentally relying on the goodwill of strangers, so be careful what you show them (don't ask them to help read your bank statement). Also, remember that speech-controlled devices are actively listening to you and could potentially send back information to their manufacturers.
- If you want to be ahead of the game when it comes to the rapidly evolving world of AIT then why not get involved in development? Organisations such as Rica, sight loss charities, or AIT developers and manufacturers themselves may be looking for people to assist with product testing or user-led design... and then there are online forges or web-platforms such as OATS (Open Source Assistive Technology).

Case Study: *Scott*

Scott lives in a house on the coast, having moved in with his mother and brother as Usher's syndrome began to severely affect his vision and hearing. An ex-computer programmer, Scott now finds that eyesight problems inhibit his ability to write code, but he is putting the spare ingenuity to good use building his own futuristic smart-home with his brother. The house will be super-accessible and boast a range of innovative inclusive features:

- A central system where all smart technologies can be controlled through the computer
- Super-bright, smart lighting systems using the latest LEDs
- Multiple smart loud speakers all over the house
- Smart temperature sensors and heating system
- Smart taps protecting against flooding and water wastage
- Appliances such as fridges, freezers, ovens, washing machines etc. also smart and connected to the mainframe
- Smart plug sockets that monitor energy use and assist in maintaining safety
- Speech control technology for curtains, lights, air con, telephones, radio, TV, alarms, etc.
- Technology that monitors human activity and looks out for things such as accidents and falls
- Extra-wide corridors that allow space for additional furniture and fittings
- Automatic sliding doors for fire protection control, safety and convenience
- Accessible stair lift
- Facial recognition system at entrance
- Cameras in kitchen for label scanning and product recognition
- Any other useful things Scott and his brother can invent, create and integrate into the house

Finding the Right Technology – Questions to Ask

- What kind of solution appeals most to you? Would you rather minimise technology and go for non-tech or low-tech solutions or do you incline towards high-tech solutions? Could elegant design be a good way of making your home more accessible without technology? Simple things such as choosing different shaped coffee/ tea/ sugar tins can avoid the need for labelling or technology solutions.

- Have you made use of the available information resources to explore and find out about AIT before you buy it? Try to find neutral sources of information and guidance... actively ask around and seek advice from peers, or go online and check out product reviews before you purchase. Use retail websites to explore and compare options and then use manufacturer's sites to get more detailed technical descriptions. Beware of overly-pushy salespeople who are thinking more about their own commission rather than whether their product is actually suited to you.

- Will the technology work for you in practice? You may be able to make use of local resource centres and loan libraries to try out AIT before you buy. Some larger stores have products on display, making it possible to test out first-hand how accessible they are.

- Is it worth paying for commercial technology or are there adequate free solutions available? The surging growth of people creating free, open-source software has led to products such as the NVDA screen reader. Most people think that paid-for screen reader software is generally still better than NVDA, but the quality gap seems to be closing quite fast.

- When you consider the cost and value of AIT products, are you thinking about your AIT needs on a holistic level? Buying a colour detector on its own is much cheaper than getting a tablet device just to help you with colours, but when you add up the costs of all the separate gadgets a tablet could potentially replace (electronic magnifier, reading machine, etc.), then multi-functionality is often the cheaper and easier option.

- Do you really need a big computer? The ongoing miniaturisation of computing hardware and the advance of cloud-based systems increasingly enable mobile devices to replicate the functions of larger desktops and laptops. Big computers remain popular with many tech-users partly because of their screen-size, but if you have no vision then a huge monitor maybe of little use to you. Unless there is a particular reason you need a larger computer, perhaps you could save money by using just one advanced mobile device for all your computing needs.

- What happens if the technology breaks down or doesn't work? Will you have access to good post-sales support after purchasing expensive AIT? Does the manufacturer have a phone-line you can call and a reputation for good customer service?

- Does the technology solution you need actually exist yet? If you cannot find an existing AIT solution that is suited to you, you could try contacting Remap, Demand or Designability, all charities that specialise in building bespoke items of AIT.

See the 'Useful Resources' section to find out where and how to access more information and advice.

Funding Technology – Questions and Answers

What options are there for getting financial assistance to purchase AIT?

• There are various routes through which visually impaired people may get financial assistance to buy assistive technology. However, there is much regional variation in how this works, as local authorities and devolved administrations are now responsible for distributing funds that used to be coordinated on a national UK level. The best place to find out what assistance you may be eligible for is your local authority social services department, which can arrange an assessment of your needs.

How does a needs assessment by a local authority work?

• Contact your local authority social services department to arrange a needs assessment. They should schedule an appointment with a ROVI (Rehabilitation Officer – Vision Impairment) or an Occupational Therapist, who will then undertake the assessment. They can then prescribe you with assistive technology as appropriate to your needs.

What sort of assistive technology might I be prescribed?

• The products that needs assessors are able to prescribe will vary significantly depending on the locality. Prescriptions are generally only available for specialist AT and it is unlikely that funding for inclusive mainstream technology will be available through this channel (although this could change, as mainstream technology for disabled people is sometimes publicly funded in an educational context, for example). Local authorities cannot charge for assistive technology that costs less than a certain amount (currently £1000), although some will ask for personal contributions towards more expensive equipment. Local authorities are encouraged to operate a 'retail model', where prescriptions can either be exchanged for basic level AT (often referred to as community equipment in this context) or can be used to part-fund more expensive alternatives.

What is a Disabled Facilities Grant (DFG) and might I be eligible for one?

• DFGs are available across much of the UK and can be used to finance housing adaptations according to particular needs. They are generally used to make alterations that enable access for wheelchair users and people with restricted mobility, but they can also be used to adapt the houses of people with sight loss (for example, to improve lighting or boiler control systems). DFG requests are made to local authority housing departments, with a social services needs assessment as the first step in the process. Applications can be made by home owners, tenants or landlords for adaptations to owner-occupied, privately rented, council and housing association properties. The local authority approves applications on the basis of whether they can be deemed to be both 'reasonable and practical' and there are financial limits to what can be provided. DFGs are not available in Scotland although equivalent forms of funding are distributed through local authorities.

Could AT funding be available through other public bodies?

• Low vision clinics and hospital eye departments can give out small aids (such as magnifiers) on long-term loan. The local fire brigade may be able to provide free equipment relating to safety and accident prevention.

Can schemes focused on financing AIT to assist access to employment or education also be used to fund home technology?

- There are various schemes that fund AIT to assist access to education and employment. Although these do not aim to fund 'home technology' specifically, there is clearly some overlap when considering AIT that enables home-based working and learning. Young people under 18 may be able to get AIT financing through their Local Education Authority, college students may be able to use the Access to Learning Fund and those in higher education may be eligible for technology funding through the Disabled Students Allowance. Visually impaired workers can speak to a Disability Employment Advisor (at the local Job Centre) to find out whether they are eligible for AIT support through the Access to Work scheme.

What options are there for getting AIT funding assistance from charities and other socially responsible organisations?

- Housing association tenants may be able to get funding for home adaptations through their landlord organisations. Visually impaired people can also seek help with AIT financing from specialist charities on a local or national level, although this should normally be a last resort, as most of these organisations insist that all other possible funding channels have been exhausted before they consider stepping in themselves.

If I am buying my own AIT, are there any money-saving tips I should be aware of?

- Privately purchased assistive technology can be bought VAT-free, if it is specifically intended to assist a disabled individual. You may also be able to save money by looking for second-hand products or getting discounts from manufacturers who are selling old demonstration equipment. The RNIB Shop sometimes allows the purchase of technology to be paid for in instalments.

Designing AIT

Inclusive Design

Several decades ago, Microsoft executives explicitly stated that accessibility was not a core consideration for them, saying they wanted to enable a specialist digital AT marketplace to develop around their mainstream products. Unfortunately, it is generally much harder to work backwards and make something accessible as an afterthought and so people with sight loss were often excluded or had to endure frustrating time lags as complicated accessibility workarounds were devised.

We have now reached a point where companies like Apple, Panasonic and Whirlpool say that they consider accessibility to be a core element in the technical design of their products and all of these organisations can show some good evidence to support their claims. The disability rights movement has certainly helped to make this a reality, improving disability awareness and encouraging the principles of Universal Design to become more embedded within mainstream culture.

Accessibility regulations have also generally been moving in the right direction. But it is not merely that corporations are deciding to be nicer or being forced to be nicer; they are opting for inclusivity because the practice closely aligns with key business and technology trends. Notable among these are the trends towards improved user-friendliness and personalisation, which are driven by mainstream consumers wanting products that are easy to use and highly adaptable. Because of this, some improvements in inclusivity occur largely by accident (for example, the explosive growth of audio-books has been fuelled primarily by mass demand for an alternative to visual reading).

The 'happy accidents' are happening alongside increasingly deliberate moves by companies towards accessibility and inclusive design. Product developers are realising that they can work with disabled people to test out whether their technology is fundamentally user friendly. If they can make their products accessible to a range of 'specialist' users, this is likely to be advantageous for all users. Therefore, in progressive organisations, accessibility is moving from the fringe of the company (Corporate Social Responsibility) to the core of the

business (Product Development). Microsoft has now changed its tune, with one of its chief technology officers enthusing about the company's desire to 'design for the 1% and create a novel innovation for the 99%'. Entrepreneurs are beginning to see the potential of this strategy. The startup company Fleksy deliberately engaged with visually impaired users in order to develop their mainstream predictive text software. By starting at the 'specialist' end of the user spectrum, companies can benefit from enhanced public image and improved access to grant or crowd funding, as well as actually improving their chances of developing a flexible, user-friendly product that is attractive to the mass market.

Developing user-friendly AIT involves testing the technology with users from an early stage, measuring results and going back and forth in a process of cooperative design. Including a range of specialist users (such as visually impaired people) in this process will help designers create products that work as easily and effortlessly as possible. The consumer research organisation, Rica, can help facilitate specialist user testing, enabling commercial enterprises to tap into their extensive network of older and disabled people who have signed up as product testers. Some companies are looking to facilitate co-creation with prospective consumers through their own online platforms. Apple has brought together an impressive network of visually impaired customers on their AppleVis website. This vibrant community of enthusiastic users has made over 20,000 posts on the site over the last few years, giving Apple a wealth of information and feedback on what this particular segment of their market needs and desires.

Tips for Designers

- Consider accessibility to be a core aspect of usability and incorporate the principles of universal design throughout the product development process (see section on Inclusive Technology).
- Work with visually impaired people to test out AIT in the early stages of development.
- Watch out for accessibility 'gaps' in technology. For example, an online shopping app could work hard on improving accessibility in general, but if the designers forget to make one key aspect of the shopping process accessible, then this could render the app effectively unusable by people with sight loss.
- Think about making AIT accessible right out of the box, so that visually impaired people can set it up and begin using it independently.
- Software and app developers should consciously ensure that accessibility is maintained during updates of their product.
- Think about including tactile buttons where appropriate. Many mainstream users appreciate touch-based feedback and it can greatly improve accessibility for people with sight loss.
- Think about including audio-based information and feedback where appropriate. Ideally, the audio option will be easy to turn off and on, as some users will prefer quiet operation.
- Think about easy visibility when designing screen displays. Ideally there will be the option for users to set the size of text, numbers and symbols and choose contrasting colours, so that those who need big and bold information can get it.
- Making technology 'smart', so that it can be operated via a mobile or computer, can be a good way of enabling accessibility (for example, app-operated home appliances).
- Try to ensure that organisational websites are genuinely accessible. This requires going further than meeting the minimum web accessibility standards. Organisations such as AbilityNet can advise businesses on best practice regarding inclusive website design.
- Remember that, like everyone else, visually impaired people tend to prefer aesthetically pleasing products. Modern AIT should be designed to look stylish and attractive.

Technology in the Future

Mainstream technology and business trends can appear to be pointing in opposite directions when it comes to inclusive technology. Information visualisation and miniaturisation trends may point towards a decline in accessibility, but this is countered by positive trends towards user-friendliness and personalisation. The debate about how the touchscreen trend affects inclusivity is complex and is related to the trend towards integrated technology devices, which hold much revolutionary promise for AIT.

Visualisation

The trend towards information visualisation is not generally positive for people with sight loss. However, many efforts are being made to translate visual information into other forms. The Microsoft Soundscape Headband enables a sound-based understanding of the spatial environment, while haptic technology transforms images into tactile feedback. The visualisation trend could be one aspect of a multi-sensory 'realisation' trend, leading to an immersive, sensory-rich (and more accessible) virtual environment.

Miniaturisation and streamlining

Small, fiddly devices can be difficult to operate for visually impaired people but the problems could potentially be mitigated through the use of accessible gateway devices or voice control. On the positive side, miniaturisation can enable wearable technology and improve the aesthetics of AIT.

Touchscreens

A touchscreen that is equipped with a screen reader can improve accessibility. As touchscreens become more prevalent on appliances and door systems, accessibility should be considered as standard. An example of developing eyes-free touchscreen technology involves a dialling system with the numbers positioned systematically relative to where the finger first touches.

Integrated technology devices

The reality of modern integrated technology devices (mobiles and tablets) has already been transformative for many users of AIT. The trend is towards deeper and broader integration of technologies. It is likely that mobile devices will become door keys, bank cards, ID cards, etc., as well as gateways to many other functions.

User-friendliness

User-friendly products are naturally more popular with consumers and there has been a concerted drive by producers and developers to make their technologies easier to use. The efforts are synergistic with the drive to improve accessibility and some developers (such as Fleksy) are realising that they can work directly with visually impaired people to test the user-friendliness of their mainstream products.

Personalisation

Mainstream consumers are demanding that products become more flexible and customisable. Amazon Audio provides a good example of spill-over benefits for people with sight loss. What is 'specialist' if everyone carries personal technology that is specialised to their particular needs?

3D Printing

3D Printing enables greater personalisation of products and could change the economics of production in favour of decentralised, localised production. This could enable specially-adapted assistive equipment to be 'printed' at a low cost. People with disabilities are already using online innovation forges to develop personalised AIT.

Open innovation and crowdsourcing

Open sourcing software development enables the core code to be modified and adapted by others, making it easier to build in accessibility features. Crowd sourced innovation can facilitate user-centred design and enable co-creation between producers and consumers. Other examples of positive accessibility impacts include: crowd sourced development of audio books; online volunteer remote assistance via mobile; and open source development of AIT software and hardware.

Voice control and the conversational internet

Since Siri first cracked the problem of reliable voice control for iPhone users, Apple's rivals have developed competitive alternatives, such as Android's Voice Assistant. As this technology advances there is scope for a huge range of AIT to be voice controlled and the tantalising prospect of the fully conversational internet.

Internet of Things

A proliferation of computer chips inside a wide variety of machines and objects has given rise to the concept of the internet of things. This is now being used to facilitate beacon technology for outside navigation and will also be used within the home as appliances become increasingly smart (e.g. fridges that can assess food safety).

FACIAL RECOGNITION

Computer vision

Computers are getting dramatically better at recognising writing, objects, faces and expressions. In simple conditions most of these problems are effectively solved, although the technology can falter in complex and chaotic real world environments. Advancing computer vision technology is enabling wearable Glass technology to move forward on a variety of fronts.

Wearable technology

Google's 2014 'Give Vision' project aimed to combine text, object, face, expression and environment recognition technology in an ambitious piece of Glass AIT that could narrate the visual world to a visually impaired user. Smart watches and technologies such as finger-worn text readers may also have a positive impact.

Haptic technology

A Disney-backed project has developed prototype technology that enables images on a touchscreen to be felt by creating a tactile illusion for the finger. There are also attempts to develop effective artificial skins that could sheath touchscreens to enable greater tactility. Bristol-based company Ultrahaptics has developed technology that can create dramatic, tactile illusions above the surface of its special device.

Aesthetics and Design

Personal technology is cool and stylish in the mainstream. Slick and aesthetically-pleasing devices such as the iPhone and iPad are highly desirable status symbols and it is now normal for people to walk around with multiple gadgets. AIT should be designed to be as appealing as possible, in order to reduce stigma and promote its use.

Useful Resources

Useful Information Sources

A range of professionals should be able to provide information and advice, although the level of AIT knowledge is widely variable:

- Occupational therapists
- ROVI specialists (Rehabilitation Officers – Vision Impairment)
- Optometrists
- Doctors
- Eye hospital staff
- Housing managers
- Support workers

Other possible sources of information include:

- Local authority social services departments (especially Sensory Teams)
- Low vision clinics
- Disability resource centres (may be able to try out assistive technology in practice)
- Technology roadshows such as Sight Village
- National sight loss organisations – magazines, newsletters, advice lines
- RNIB Shop
- Training programmes and support for getting online e.g. RNIB 'Online Today'
- Local sight loss organisations – open days, training and support groups
- Local home improvement agencies (advice on home adaptations)

Online Information Resources

The RNIB Online Shop is a good place to purchase assistive technology and the DLF websites offer a wide range of useful information on the subject.

Sight loss sector (UK):

- Thomas Pocklington Trust - www.pocklington-trust.org.uk
- Royal National Institute of Blind People - www.rnib.org.uk
- Action for Blind People - www.actionforblindpeople.org.uk
- Royal London Society for Blind People - www.rlsb.org.uk
- Guide Dogs - www.guidedogs.org.uk
- Blind Veterans UK - www.blindveterans.org.uk
- Macular Society - www.macularsociety.org
- British Computing Association of the Blind - www.bcab.org.uk
- Sense - www.sense.org.uk
- Seeability - www.seeability.org
- InfoSound - www.infosound.org.uk

Wider disabilities and AT sector (UK):

- Disabled Living Foundation (DLF) - www.dlf.org.uk
- Rica - www.rica.org.uk
- Age UK - www.ageuk.org.uk
- Carers UK - www.carersuk.org
- AbilityNet - www.abilitynet.org.uk
- Really Useful Stuff - shop.reallyusefulstuff.co
- Foundations - www.foundations.uk.com
- Helen Hamlyn Centre for Design (Royal College of Art) - www.rca.ac.uk
- Remap - www.remap.org.uk
- Demand - www.demand.org.uk
- Designability - www.designability.org.uk

International:

- American Foundation for the Blind - www.afb.org
- European Assistive Technology Information Network (EASTIN) - www.eastin.eu
- Global Accessibility Reporting Initiative (GARI) - www.gari.info
- Cool Blind Tech - www.coolblindtech.com
- Open Source Assistive Technology Software (OATS) - www.oatsoft.org
- AppleVis - www.applevis.com