Moving together:

mobile apps for inclusion and assistance

A One Voice for Accessible ICT Coalition report
by Dan Jellinek and Peter Abrahams

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Forewords

Nigel Lewis, One Voice for Accessible ICT Coalition

Welcome to the first ever in-depth attempt to analyse all the key issues relating to mobile apps for older and disabled people.

This report covers how people can access them from turning on the device to running and using apps; what apps can do; developer tips; barriers to overcome and issues for the future.

Mobiles have transformed how we use technology, and will continue to do so. We expect to be able to access technology, systems, services and content while we are on the move in an easily digestible form. Mobiles and more importantly mobile apps are transforming how services are delivered with a more user centric approach to completing tasks on the move.

Within the One Voice for Accessible ICT Coalition we are committed to the promotion and development of accessible technology for the widest range of users across the widest platform base.

Adopting inclusive design and providing accessible solutions and technologies for the widest possible user group has proven benefits and ensures you deliver a product that your users or clients want, need and are able to use.

We can learn so much from the user centric simplified approach used in mobiles and mobile app development to deliver digital systems, services and content.

This report not only highlights what is going on in the mobile space but continues our work in One Voice to provide practical advice on how to deliver accessible and usable applications and services to meet users' needs.

Nigel Lewis

Chair, One Voice for Accessible ICT Coalition

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Liz Williams, BT

Today's technology enables us to communicate and access information in ever more powerful ways. Young people today have not experienced life without the internet and more of us are using devices on the move. BT gives its broadband customers free access to 3.5million Wi-Fi hotspots across the UK and Ireland and an app helps these customers find a hotspot and log on quickly.

This opens up all kinds of exciting opportunities for enriching our lives. There are many examples of applications or 'apps' that offer new and exciting ways to accomplish tasks and resolve problems. However, it is a simple fact that for individuals to exploit the potential these apps offer they need to know about them and understand how they can help them personally.

For some that exploration is a natural journey that they revel in. For others, it can be a frightening unknown and they may never get there without a guide. This may be particularly true for people with disabilities and those who are older, even though for them the positive potential is arguably even greater, with some apps already on the market that can be incredibly life-enhancing. For example, did you know about the app that will read aloud a scanned barcode or take a picture to identify what is in front of you? If you are blind, tools like this can be revolutionary.

This report aims to explore the benefits apps can offer – given over half of the UK now own smart phones and there is immense growth in the use of tablet computers, the potential for social good is significant. We are delighted to support One Voice and will continue to champion the need for a greater understanding of the social good apps can offer and how people with various impairments can access and use them.

Liz Williams

General Manager, BT Retail Corporate Responsibility

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1: Introduction, key points and recommendations

A few years ago we had never heard of them, but now most of us are familiar with "apps", the term used to refer to software applications designed to run on mobile devices such as smartphones and tablet computers. There are other kinds of apps as well, but when people say apps these days, they usually mean mobile apps.

Mobile apps are typically designed to offer a single service or task in a simple, direct, self-contained way, or to interact with a single service, task or website on the internet. It follows that the average app is quite simple and straightforward for many people to use. Unfortunately, however, this is not always the case for all users.

Mobile apps have huge potential to help and liberate people, including disabled people and the elderly, who face challenges with other methods of communication. But as with other new technologies, there is also the potential to further exclude people who are already at a disadvantage by providing small, hard-to-use, inflexible interfaces to devices and apps that create more problems than they solve.

App developers in particular may not know what they are expected to do to improve accessibility of their products, or how to do it. This, combined with the gold rush mentality that has characterised the meteoric rise of the app – which could be summarised as "anything goes, but get there first" – means accessibility can be ignored.

There are many reasons, however, why it should and must not be ignored. There are ethical and social reasons: it is unfair and against the principles of equal opportunities to exclude any group of people from using an app unless there is a good reason for doing so. There are common sense business reasons: in a tough economic climate, does it make sense to narrow your potential user base?

There are legal reasons, too: advice from the UK's leading charities is clear that the Equality Act in England, Scotland and Wales, and the Disability Discrimination Act in Northern Ireland, apply to digital services such as mobile apps. To guard against possible legal action, reasonable steps need to be taken to ensure apps are accessible. Lawsuits in this field are rare, it is true, but out of court settlements are more common, and the risk of action being initiated is real.

This report shows however that there is much that organisations and developers can do quickly and easily to make their apps more accessible. Of necessity, it is a snapshot – we understand the technical details will change almost as soon as they are written – but we hope nevertheless to highlight as many issues as possible which are generic and long term.

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We hope as well that there will be useful information in this report for all relevant audiences, from app developers to service managers, and that it will help raise awareness and act as a starting point for more detailed technical research, as part of the important ongoing awareness-raising work undertaken by the One Voice for Accessible ICT Coalition.

1.1 Key points

Here are the key messages that have emerged from compiling this report:

There is no such thing as full accessibility for everyone, but that should not stop app developers from attempting to maximise accessibility.

Mobile apps, like all new digital technologies, can be useful, valuable and liberating for disabled and older people or they can be yet another barrier to their enjoyment of ordinary everyday activities taken for granted by most other people.

App accessibility is currently very mixed, ranging from extremely inclusive to disastrously unusable: different mobile devices offer wildly different levels of "out-of-the-box" accessibility for users with different access needs.

The accessibility of a specific device to a specific user's needs can sometimes be enhanced by running apps that allow users to carry out frequent tasks such as texting using more customisable interfaces.

For each platform, developers need to look at its existing built-in features and consider the user groups they are aiming to support.

There are not yet many sets of established guidelines for developing accessible apps, but there are some useful points of reference, which we detail in this report.

The easiest way for an organisation creating an app to ensure it is accessible is to build accessibility into the decision-making processes from top to bottom. This means that many different types of people in an organisation need to be aware of at least the basics of accessibility.

Thousands of apps have already been created which can help people with special access needs to communicate, travel, access work and play games. Various online directories to such resources have been created, some including ratings or review systems.

With the continued convergence of technologies such as phones, computers and TVs the future of mobile apps could be closely linked to the use of devices around the home. Technologies are emerging to allow home devices like TVs to be controlled by the user's own personal mobile device, with all the extra accessibility that can bring.

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Another key emerging area of apps for assistance are those that draw on the power of a group to help individuals, through "crowdsourcing" or mobile access to social networks for information, help or advice.

As a starting point, all organisations developing apps and app developers should consult the “seven steps to accessible mobile apps” published alongside this report by the One Voice for Accessible ICT Coalition. All steps have been chosen to apply in as many situations and for as many users as possible; to be simple; and to have maximum effect for the effort they require.

Finally, technology firms, retailers, organisations that work with disabled people and all other stakeholders must play their part in helping the new mobile world to include as many people as possible. Detailed task recommendations for each group are set out below.

1.2 Recommendations

Device manufacturers and operating system developers

Mobile device manufacturers and operating system developers must work to ensure the maximum possible accessibility “out of the box” is implemented and sustained for all groups of users, not just blind and visually impaired people.

- Mobile phone and smartphone manufacturers should ensure all the accessibility features of their products are listed in the Global Accessibility Reporting Initiative (GARI) database run by the international Mobile Manufacturers Forum, to help users find devices that suit their specific needs: www.mobileaccessibility.info
- Mobile device manufacturers should make accessibility features clear on boxes and packaging.
- Manufacturers must put in place a clear and well-promoted feedback mechanism for users to report accessibility problems; strong processes for acting on that feedback; and mechanisms for reporting what actions were taken as a result of any feedback.

App developers

- Mobile app developers must ensure accessibility considerations are built into all stages of the development process, and that decisions taken in this respect are recorded – BS887 is a good model for this.
- Organisations should consider what guidelines and guidance to use for accessible app development, based on the projects and standards referenced in this report, and promote their use to all relevant people.
- Developer teams within an organisation should share accessibility expertise and content.

- Organisations should consult the seven steps to accessible app creation published by One Voice for Accessible ICT Coalition (see Appendix 1: Seven Steps to Accessible Mobile Apps).

Retailers

- Mobile device retailers must ensure their sales assistants have basic disability awareness training.
- Retail assistants should be trained to use the GARI database and other sources of manufacturer information so they can quickly find out for customers which handsets and tablets have which accessibility features.
- Retailers should make accessibility information or links to information available on their websites and in their stores, in clear accessible formats, including statements of their policies in these areas and contact details to find out more or offer feedback.

Schools, charities and voluntary groups

- Schools, charities and voluntary groups that support disabled children and adults should ensure the relevant staff are kept up to date with the latest devices and apps available to support the people they teach or help, and that they know how to support these tools.
- Groups must also make sure policies and strategies are in place to help their users and customers be aware of developments in this area, and learn how they can access and use apps and help themselves.
- Organisations should look to directly support the growth and development of apps that draw on the help of large groups to review or develop technologies; develop maps or resources detailing accessible locations; and other “crowdsourcing” tools.

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2: The nuts and bolts: operating systems and basic tools

When someone buys a smartphone, tablet computer or other mobile device and switches it on, the basic experience they have – how to navigate around the main features of a phone, or how to find their apps and run them on a tablet computer – are governed by the software environment that comes ready-installed on the device: the operating system.

So for apps, how you find them, download new ones, run them, change them or delete them all depend on the operating system a device is running. Whether or not an app is accessible to use thus depends a lot on that operating system: and it also depends on how well the app is designed to make best use of the accessibility features of an operating system.

In this section we take a look at the main mobile operating systems in use, with some of their accessibility features, as a starting to point to considering how accessible the apps that run on them can be.

2.1: Apple iOS

Apple's iOS touchscreen operating system – current version 5.0.1 – is used on the iPad tablet devices; its iPhone smartphones; and the iPod Touch which is essentially an iPhone without the phone capability.

To date, iOS devices have led the way in introducing "out of the box" accessibility for blind and visually impaired users and users with other disabilities.

When a new iPad or iPhone is switched on, a triple-click on the "home button" – the only button on the face of the device – starts up the speech service "VoiceOver" which reads out information on the screen. Tapping a finger or moving it over a part of the screen will read it out: double-tapping will select. VoiceOver also reads out notifications such as when a new text message is received.

The operating system is also designed to work with a set of other gestures that trigger access features , such as double-tapping with three fingers to magnify the screen, and swiping to increase or decrease magnification.

Devices running iOS also make use of a "rotor" gesture, like turning an imaginary knob between thumb and forefinger, which can be set to switch between various accessibility features such as the speed of the VoiceOver reading. You can customise gestures so that the rotor for example can be set to switch between

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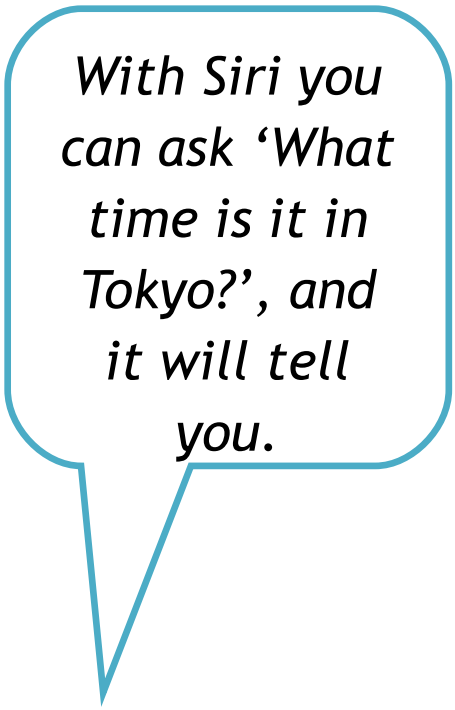
features of your choice. Other accessibility features are also available for iOS such as large text and reverse contrast.

Users of iOS at a recent “Phone Watch” event hosted in London by the RNIB praised Apple’s built-in accessibility, though several said the gesture system – and particularly navigating a touch-screen keyboard using sound – takes a lot of practice to master. Some blind users are therefore adding a refreshable Braille display, mini keyboard connecting using BlueTooth or a standard Apple wireless keyboard – all work well but reduce ease of use, and Braille displays are expensive.

In iOS5, in most situations where there's a keyboard on screen, there is also a "Dictate" button at the bottom left that can be used to dictate messages, passwords, music track names and other commands into the phone. And the newest iOS feature which could revolutionise access to mobile devices for people with impaired vision or mobility problems is “Siri”, a voice-controlled intelligent assistant currently only installed in trial form on the new iPhone 4S but likely to be rolled out to the iPad and other devices in due course.



Siri is a piece of software that uses voice recognition to understand commands and then links with an artificial intelligence system held on remote servers – so you need an internet connection to make it work – and also with the data on your phone, to carry out tasks using everyday, colloquial speech.

So for example you can ask “what time is it in Tokyo?”, and it will tell you. Or you can say “Play a Beatles song” and it will look on your phone for Beatles music you have, and offer you suggestions. In the US, the system is also already linked to maps so you can ask where the nearest Chinese restaurant is and receive directions, all by voice. Setting time, context or location-aware reminders, sending texts and other commands are all possible, and the system has the potential to be location and context-aware so that a reminder to buy milk when you leave the office could be triggered by leaving the office. Its use of artificial intelligence means that, for example, follow-up questions (such as “What’s the weather like in Manchester?” followed by “How about Liverpool?”) will be recognised in the context of the first question or comment.

Like other new systems, using Siri takes practice, and cannot be relied on for all uses as you need to be online. It will also only work within the Apple system – third party apps cannot interact with Siri. But it is a significant development.

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2.2 Android

Android is a Linux-based open source operating system for mobile devices. It is maintained by a developer group led by Google and including many other device manufacturers and software developers.

Android is used on a wide range of devices including smartphones made by Acer; HTC; LG; Motorola; Samsung and Sony Ericsson, and tablet computers manufactured by Advent; Archos; Asus; Dell; HTC; Motorola; Packard Bell; Samsung and Sony.

The fact that it is open source and it runs on hundreds of products means Android and the devices that run it are far less standardised, and the shared core of the system does not currently build in anything like as many accessibility features or capabilities as Apple's closed system. On the other hand, the fact that the operating system is easier to interface with than the closed Apple system means third party accessibility apps are numerous.

The latest version is Android 4.0, known as "Ice Cream Sandwich" (all Android releases are named after desserts – the next one is expected to be called Jelly Bean).

At the moment there are few devices available running the version, though more will appear this year. Like the new Windows Mobile version set to appear later in 2012 (see below in this section), Android 4.0 is designed to harmonise the experience of using Android tablet computers and smartphones – an accessibility step forward in itself as it will make life less complicated.

It features an updated screenreader called TalkBack developed by Google, with "Explore-by-touch" functionality together with Soundback (tone/click generation) and Kickback (which generates haptic pulses). The system speaks out-of-the-box by tracing a square with your finger, and there are other new in-built accessibility features such as large font display.

The system is still not as fully-featured for accessibility as iOS, though out-of-the-box capability is expected to improve further with Jelly Bean.

There are many apps available for Android that can make the Android devices themselves easier to use (see also section 2.6, below). One popular example is Mobile Accessibility, an application from the Spanish specialist firm Code Factory which allows people who are blind or have low vision to use an Android phone (Code Factory also has products for other platforms such as Symbian and Windows Mobile).

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Code Factory allows the user to experience a core suite of 10 applications such as a phone dialler and texter with high accessibility, although the user has a lot less freedom outside that suite.

The software must also be purchased separately to an Android phone – though the combined cost can still be less than a new iPhone.

2.3 Symbian

Symbian is a mobile operating system maintained by Accenture on behalf of Nokia, and used mainly on Nokia handsets.

Though it has no inbuilt accessibility features, the fact that Symbian runs on simpler, button-operated phones means it remains popular with people who feel more comfortable using a simpler, old-style phone that just makes calls and texts.

Most Nokia users with impaired vision use TALKS&ZOOMS, a software application from Nuance that converts displayed text into speech or large print, costing around £150. It is easy to change the volume and pitch with TALKS, and it reads everything on screen, though in some phones TALKS does not access all areas, unlike deeper accessibility built into the iPhone and newer Android phones.

Code Factory (see Android section, above) also makes a version of its Mobile Speak for Symbian, and recently Nokia launched a free screen reader based on Mobile Speak for some of its devices running the newest Symbian Belle version of its operating system: the C5 5MP, 700 and 701 handsets. For low cost, pared down products, many low vision users swear by the C5.

2.4 BlackBerry OS and QNX

The BlackBerry OS operating system is in use on BlackBerry smartphones, and the operating system QNX is used on the BlackBerry Playbook tablet computers.

These operating systems do not have the same text-to-speech functionality as Apple iOS or the newest version of Android. However users of BlackBerry phones can download a low-vision “theme” called Clarity which adds large fonts and different colour and contrast settings.

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A screen reader called Oratio for Blackberry was released in the US and Canada in 2010, but it currently only works with some older model phones that have physical keyboards and up to now has not reached the UK.

Some deaf and hard of hearing users like BlackBerry phones for BlackBerry Messenger, a built-in text-based instant messaging system that allows powerful instant communication with other people using BlackBerry handsets, and is soon to be available across other platforms such as Android.

There is more information about Clarity, and links to other accessibility information including a developer guide on RIM's BlackBerry accessibility page (see resources section).

2.5 Windows Mobile/ Windows Phone

Despite Microsoft Windows for PCs and laptops offering a range of built-in accessibility features, the current version of its smartphone operating system – Windows Phone 7 (formerly called Windows Mobile), a cut-down version of the familiar Windows for PCs – is not considered to be very accessible. It does not have a built-in screen-reader, and it is not constructed to allow others to write apps accessing the screen elements.

However Microsoft is working with disability charities worldwide to develop a broad range of accessibility features for Windows Phone 8, which is set to mark a major new direction when it appears later this year.

With the new version, Microsoft is set to merge its new desktop and laptop operating system Windows 8 with its smartphone and tablet system to create a more unified experience across all Windows devices. A new general design style known as “Metro” is intended to be simpler and more intuitive, with a system of large “tiles” presenting features and services. Greater accessibility “out of the box” is expected to feature.

2.6 Access apps

There is a whole family of smartphone apps that can add accessibility features to basic everyday tasks, and while these are not built-in or supplied with phones, many are free to install.

One example is Handcent http://www.handcent.com/,
a free texting app for Android that is highly customisable, allowing users to set their own font styles, colours, ringtones and vibration patterns for different aspects of use, for fine-tuning to individual accessibility preferences. Running apps like this can then make the basic mobile task of texting more accessible, even if the basic phone operating system does not allow the right level of customisation.

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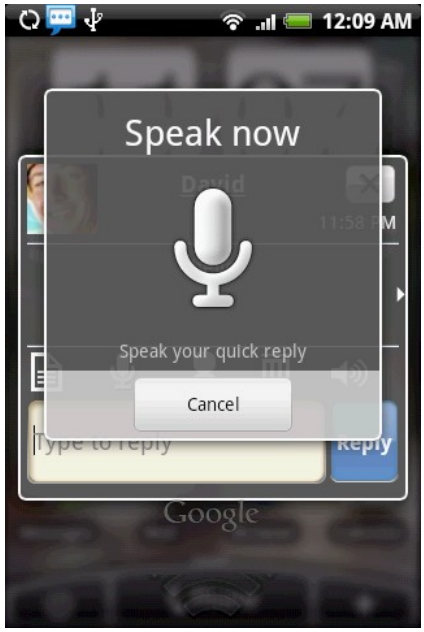
Apps like this can be experimented with by anyone with special access needs to create more accessible interfaces: exploring accessible app websites or marketplaces will produce a range of ideas (Appendix 2: Selected resources).



Another example of this approach is BIG Launcher, an alternative customisable Android home screen for elderly or visually impaired users who often struggle to use the small keyboards on most devices, developed in the Czech Republic.

The app was a prize winner in the first Smart Accessibility Awards, presented in December 2011 by the Vodafone Foundation with AGE Platform Europe and the European Disability Forum

BIG Launcher uses big buttons and large fonts to represent all the basic functions of a phone such as voice calls, text messages and cameras.

Here in the UK, developments in this field include the experimental “Safe and Sound” app designed by accessibility pioneers Screenreader.net and available for £5 from the Android marketplace. A version for iOS is also planned.

The app is based around a guide to help disabled people when they are out using a smartphone’s built-in geo-location system, but at the heart of the concept is a new interface which its developers say is potentially translatable to almost any purpose.

The interface is based around simple screens with five big clear buttons in a choice of colours, which talk when you touch them, and with similar functions always set out in similar places to build familiarity and ease of use to anyone with restricted access.

Roger Wilson-Hinds, director of Screenreader.net, says the interface could potentially be licensed to other developers and used to sit on top of all sorts of other apps, from podcasts to local information, so users could become familiar with the way it works and then access a range of other services in the same way.

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Of course, running apps whose features are accessible does not absolve the manufacturers of mobile devices from the need to make their basic handsets and operating systems as flexible and accessible as possible. If the user cannot access the handset and the operating system, they will not be able to run the apps they need in the first place.

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3: App development: key issues for accessibility

Developing mobile apps is on the whole a simpler process than building a website or creating software for a desktop computer.

As we have seen, however, there can still be many barriers to building in maximum accessibility, so this does need to be considered early in the development process and throughout.

The difficulty of designing an accessible app depends on the users you are aiming to enable to use the app. A complex interface which might enable a blind user who is very familiar with a device and adept at using it to access complex functionality, might lock out technically challenged, dyslexic, or other cognitively impaired users.

There is no such thing as full accessibility for everyone, but that should not stop developers from attempting to maximise accessibility, and to build in as much choice, adaptability and flexibility as possible.

3.1: Where to start

The main problem with making accessible apps is the number of platforms and devices that are out there, and the fact that you might need to make a slightly different app for each of them. And in a market that is moving at breakneck speed even for the technology industry, new devices and new versions of operating systems emerge almost every month.

For each platform you need to look at the existing built-in features and consider the user groups you are aiming to support.

Some help is available.

For the main mobile platforms, there is a great deal of accessibility advice for developers published by the makers of those platforms – see below in this section. After defining a set of devices which will be appropriate for their users and for the service they wish to provide, developers need to follow the guidelines that exist for each device to make sure they maximise the built-in possibilities for accessibility.

For more generic advice, there is nothing as definitive yet for apps as the international ‘WCAG’ (Web Content Accessibility Guidelines) produced by the Web Accessibility Initiative (WAI) of the World Wide Web Consortium (W3C) which set out basic standards for website accessibility. However the same body has produced a specification for accessible rich internet applications called WAI-ARIA 1.0, which looks at how multimedia content can be made more accessible. While these guidelines are not created for use with apps, some elements of them can be useful to consider because they cover generic issues such as adding tags for elements of a

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service that are not marked up in HTML; and requiring keyboard support in a device-independent way.

W3C has also produced some Mobile Web Best Practices (MWBP) guidelines (see Resources section). Again, these are geared to web content delivered to mobile devices rather than apps; but as more and more app front-ends are written using HTML5, they could become more relevant.

There is also a British Standard – BS8878 – covering the overall process of developing accessible websites, from planning to updating, and these principles are equally applicable to the development of accessible apps (see section 3.3 below).

Beyond useful general tools like these, however, there is little currently available aimed specifically at mobile apps.

Henny Swan, Senior Accessibility Specialist at the BBC, says the field of app accessibility is now "mimicking where we were back in 1999 with the web – we are back to basics, telling people to put in alt tags for images and things like that. For developers, it really is hard – there is not a big body of information out there."

Swan is currently working on her own set of mobile accessibility guidelines for app developers at the BBC which are technology-agnostic at their core, but then are supported by sets of technology-specific guidelines.

So for example there will be core guidance on having alternative descriptive labels for visual or touch objects, supplemented by technical information on how to implement the guidance on iOS, Android, BlackBerry and the rest.

The key, says Swan, is to start with a little research into the main types of device being used by your own users. "After that, make sure all your content teams are talking to each other: just because one is developing for the web and another is developing for tablet computers doesn't mean they don't have useful accessibility advice and content for each other."

Finally, with this report, the One Voice for Accessible ICT Coalition has developed its own "First seven steps to greater mobile app accessibility" (see Appendix 1: Seven Steps to Accessible Mobile Apps).

3.2 In the developer's workshop

For Apple and Android apps, specific developer tools are available which help to build in accessibility, particularly for blind or visually impaired users.

The software development kit (SDK) for Apple iOS can be accessed through the iOS (Error: Reference source not found). All "native" app controls available in the kit are accessible by default to VoiceOver, but if a developer is creating a custom control they need to check the right boxes to make sure VoiceOver will understand how it behaves. A short text label also needs to be added which VoiceOver will

read out when a control is tapped (again, these already exist for native controls), along with a hint which VoiceOver speaks after the label (following a short pause and in a slightly higher tone), usually just two or three words more to describe what the control does (for example, “raises volume”).

The SDK for Android developers also has accessibility features built into it (see resources section).

The Android Developer’s Guide available alongside the kit contains best practice advice on accessibility. This includes two basic rules:

Make all of your user interface controls accessible with a trackball or directional controller (d-pad); and

Label your ImageButton, EditText, and other input “widgets” using the android:contentDescription attribute.

The two main app platforms both offer app testing tools – to check for bugs and performance – which reinforce accessibility. The Android testing tool “Lint” and Apple’s “Automation Instrument” for testing apps also test for accessibility features such as text labels.

Artur Ortega, senior accessibility developer for Yell in the UK, says the sophisticated functionality of tablets and smartphones in general make it easier to test for accessibility than it has ever been on PCs or earlier generations of mobile devices.

“It is much easier to test for accessibility on a smartphone, because you can have audio or magnification more easily.

“On the iPhone, you can switch off the screen while testing with a voice so anyone can use it as if they are blind to check if they can hear labels, use with keys and so on. You don’t have to install anything or buy anything – so there is no excuse any more for not testing accessibility, it’s so easy.”

3.3: Building accessibility into all your processes

The easiest way to ensure no major mistakes are made and that as much accessibility as realistically possible is built into the design of ANY digital product or service your organisation makes, whether it is your intranet for staff, a website or an app, is to build accessibility into your decision-making processes from top to bottom.

This means that many different types of people in an organisation need to be aware of at least the basics of accessibility – what it means, and how important it is – from the most senior (and non-techie) decision-makers and finance officers, down to front-line service providers, content providers and communications teams – plus all the technical people in-between, from product managers and project managers to app developers.

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Someone senior needs to drive this saturation of accessibility values, ideally a board member or an accessibility champion working closely with a senior manager for added clout.

For websites, this kind of thinking has been exemplified in the British Standard BS8878, a “code of practice” for web accessibility. But Jonathan Hassell, director of accessibility consultancy Hassell Inclusion and the lead author of BS8878, says its principles are equally applicable to the development of apps. In fact, BS8878 already includes a section on how to decide on your accessibility strategy for mobile.

The code sets out the many groups within an organisation that need to be involved with building in accessibility to a development process, and states that organisations must start out by identifying all the potential audiences for their product. They must then identify all key decisions taken from early planning to implementation; ensure accessibility is considered for each; and record the details of this consideration – not least to cover themselves against possible legal action.

“Every single principle in BS8878 is absolutely the same if you are doing an app – the only part of the process that is different is the technology standards that you would use,” Hassell says.

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4: The state of the art

There are many apps and types of app that already exist – thousands of them – which can (whether intentionally or incidentally) be of huge value to people with special access needs including older and disabled people.

This is not an attempt to compile a comprehensive directory: simply to highlight some key areas and demonstrate their potential. In the resources section of this report, at the end, you will find further links to websites with more thorough directories of useful apps, many of which include ratings or review systems.

4.1: Alternative communication systems

Mobile devices are superb aids for people who have trouble communicating, such as those on the autism spectrum; stroke sufferers; or people with other learning or communication difficulties.

Both smartphones, with their pocket portability, and tablets with their larger screens can be powerful tools in a field sometimes known as "Augmentative and Alternative Communication" (AAC).

The number of apps available in this field is growing fast: the website AppsForAAC (http://appsforaac.net), which catalogues iOS apps to assist adults and children with speech and language difficulties, reports a trebling in its entries from 65 apps in January 2011 to 184 a year later. Most are free or affordable: of the 186, 46 are free, 68 cost less than £8, 62 cost up to £100 and just 10 cost more than £100.

The site's creator Will Wade, who works at Kent assistive technology service supporting the county's NHS and education bodies, says the low price of most apps shows how easy they are to develop, with new ones often created by parents and teachers of children who need them.

"The iPad and tablet computers in particular have got great potential to help people communicate," he says. "Battery life is longer and weight is a fraction of any laptop. The cost alone is a game-changer – this market used to be dominated by specialist devices costing thousands of pounds."

There are still a few problems, however: "The volume isn't fantastic in a busy classroom, and it's hard to get your recorded work onto another device. There is a dearth of apps to help children record their work in a classroom."

New directions for this kind of technology are emerging all the time.

One new app offering icons and interfaces to present spoken communication developed by a research partnership including the University of Toronto - MyVoice (http://myvoiceaac.com/) - features location-aware vocabulary which can detect

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that a user has entered say a restaurant or library and present them with words appropriate to that location.

The mobile app can also provide a new lease of life to long-running communications systems which have until now relied on bulky, expensive equipment or materials.

One such is “MyChoicePad” (http://www.mychoicepad.com/), an app built for the iPad by entrepreneur Zoe Peden in partnership with the Makaton Charity, where Peden used to work. The app makes it easy to carry and use the signs and symbols of Makaton, the UK’s leading language programme for adults and children with learning or communication difficulties.

The app development process was supported by extensive user testing including with children at the Severndale specialist school in Shrewsbury. As a result the developers realised they needed to pare back interface colour, design and features to create a product that was as plain and basic as possible, for example disabling some of the touch and gesture features like the “bounce” when a control is scrolled over the edge of the screen which were proving a distraction to users, Peden says.

“People were getting obsessed with the scrolling, they were focusing on that rather than what they were doing. So we had to lock it – a user’s father came up with the method.”

The app is now being rebuilt for the iPhone – “we have got to redesign it because the screen is so much smaller” – and her company is looking for investment to create a version for Android phones, which will also require complete rebuilding, she says.

As for the cost structure, because the Makaton Charity operates as national custodian for Makaton and part-funds this work by charging for resources, the new partnership does need to charge for the app to replace some of the revenue which will be lost on books, Peden says. But overall there will still be big savings for users as well as a better service, she says.

“The app cost £74.99 for core vocabulary, and around £200 for all aspects. But for the parents it is cheaper – they used to pay £1,000 for comprehensive materials – books, cut out symbols and videos.

“The app is making things affordable to the average person for the first time.”

4.2: Motor or dexterity impaired users

For users who have difficulties with motor control or mobility, there are fewer options so far for alternative control of mainstream mobile devices, perhaps because such technologies take a little longer to develop. For most devices there are still very poor switch or joystick control options, though a few are emerging.

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The iPortal wheelchair control from Dynamic Controls seems to be the most advanced so far to interact directly with an iPad, iPhone or iPod Touch using VoiceOver by direct access from the joystick or other wheelchair control (http://www.dynamiccontrols.com/iportal/iportal-accessibility). This allows the wheelchair user to control their mobile device using their normal wheelchair controls including the ability to access apps on the devices, particularly the "native" apps. There is another switch box due out this year from Origin Instruments, the Tornado, which connects with VoiceOver commands and hence should mean that most apps can be controlled. And R J Cooper makes a "Bluetooth super-switch".

One of the better options in this field is a Windows 7 tablet, as various switch access systems have already been built for Windows.

For Android devices, an open source project called Tecla

https://market.android.com/details?id=ca.idi.tekla&hl=en

has built an interface between wheelchair controls and switches and mobile devices using Bluetooth, but a piece of hardware called a Tecla Shield needs to be connected, and the control software must interact with this, so compatibility is an issue.

The "Wheeltop" project run by the charity Scope with BT developed applications running on a laptop or tablet to allow wheelchair users with minimal limb movement to operate media and other devices such as mobile phones or music players using single switch interfaces. The project worked with students at Beaumont College, Scope's residential college in Lancaster:

http://www.beaumontcollege.ac.uk/technology/

Further accessibility features are likely to be added to smartphones in future that make use of the built-in accelerometers found in most modern phones to help people with impaired mobility. Early examples include the free 'Dasher' app which allows the user to tilt and move the phone with one hand to select items:

http://itunes.apple.com/us/app/dasher/id315473092?mt=8

Beyond these isolated projects, mobile devices and apps are not yet very accessible to those with physical access issues. There are apps that are amenable to access using switches, but the joining up of switch to app is often a customised arrangement too difficult for the average user to attempt.

4.3: Visually impaired users

For blind people and people with impaired vision, the emergence of a new breed of digital device operated by touching a flat screen raised major concerns.

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As it turned out, most if not all of a mobile device's capabilities are at least potentially available to most visually impaired users with the sorts of voice access and feedback we have already outlined in the first part of this report. And the possibilities for use and value beyond that are many and varied.

Speech capabilities can be enhanced by apps like the free Edwin, a "speech-to-speech" Android app which allows people to ask questions and receives answers in audio form.

The presence of a camera on most smartphones and many tablets is a powerful ally. For example, there are various apps that allow people to take pictures of text, recognise it and then either speak it or magnify it.

One app which allows people to take a picture of text, magnify it and even adjust fonts and background colours was among the winners of the inaugural 2011 Smart Accessibility Awards presented by the Vodafone Foundation with AGE Platform Europe and the European Disability Forum.

Zoom Plus Magnifier, developed by a UK partnership of 232 Studios, Ian Hamilton and Digital Accessibility Centre, is one of a new breed that offers functionality for free that has previously largely only been available in software and camera products costing hundreds of pounds. These apps use optical character recognition, and are good for spot reading of items like menus or cooking instructions on the backs of food products, though probably not for whole books.

Other uses of the camera include a Light Detector app which converts light levels to rising of falling audio tones – useful to help a blind person detect if a light is on (such as a temperature warm-up light on an oven). Other apps can identify colours.

The combination of geo-location, mapping, audio and video capabilities also give mobile devices huge potential to help blind people or people with impaired vision when they are out and about.

The LookAround app for Android tells you what street you are on including junctions and what house number you are near, with controls optimised for visually impaired users including haptic, audio and "shake" controls. Ariadne GPS has similar features including the ability to trace your fingers over roads with audio labels describing the map and vibrations tracing the path of a road. Audio and vibrate signals can also indicate the presence of pre-set key locations on a map.

Future potential in this field includes tools to allow the user to call for assistance, and show the person at the other end exactly where they are, using geo-location or camera.

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4.4: Hearing impaired users

Mobile apps have added a wide range of text-based message and chat services to mobile devices that extend their usefulness to deaf and hearing-impaired users well beyond the already useful functions of SMS text messaging.

Free video-conferencing and chat services like Skype, ooVoo and FaceTime mean that sign language users can use video communication alongside communication and storage of text.

Apps are also in development that will help people book and use live sign language interpretation or text captioning to make communication between hearing and deaf people, or access for deaf people to meetings and conferences, much easier to organise on demand.

“We are involved in the development of next generation mobile applications that enable both deaf and hearing people to call each other either directly if the need arises for a sign language interpreter,” says Jeff McWhinney, Managing Director at Significan't. “This is a real liberating factor as a communication tool - at the moment we’re using webcams through a laptop or other videoconferencing methods, but obviously a mobile device is extremely portable and we’re beta testing smart phone apps at the moment.”

If enough people are signed up to use an on-demand service, interpreters could be standing by to answer calls within seconds for short jobs, McWhinney says.

It would also be useful to have a standard system between hardware and software manufacturers to display a flashing light when a video call comes in, he says.

There is a role too for apps that are or will be able to use voice recognition to automatically convert speech into text live for deaf people to read, in an extension of services like Siri, McWhinney says. “There has been a big jump in quality and accuracy recently and the potential is there to be very useful, though the technology is not perfect yet, we are still some way off getting the right quality for that.”

Other tools that can be useful in some circumstances are dictation apps like Dragon Dictation, Vlingo or INXS Dictation. Someone else can then record their speech and have it converted into a chunk of text to relay to a deaf person by email, social media or another means, or a deaf person can record speech themselves for it to process. These kinds of apps tend to work in chunks, so it is not good for live communication, but can work as a back-up.

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4.5: TV and other home controls

With the continued convergence of technologies such as phones, computers and TVs the future of mobile apps could be closely linked to the use of devices around the home, with major benefits for people who face problems accessing or using any of these devices.

Trials have shown that many people including older people are more comfortable accessing digital information through their TV set, and technologies are now emerging to allow home devices like TVs to be controlled by a smartphone or tablet app, with all the potential extra adaptability and accessibility that can bring, from speech control to magnification.

For TV viewing, the problem can be addressed from two angles: either a person can view TV directly on their tablet or mobile device, which can then allow more accessible control, or you can use Wi-Fi to establish a link between the mobile device and TV set-top box or internet radio, to allow you to use the mobile device as an enhanced remote control unit (see for example the "Dijit" app that controls a universal remote controller called "Beacon", from US supplier R J Cooper www.rjcooper.com/remote-controller/).

Systems like this can be linked directly with electronic programme guides, allowing accessibility features such as speech synthesis or large print to be brought to bear without ever changing the guide on the set-top box.

This kind of feature will hit the mainstream with the launch later this year of YouView, the subscription-free internet-connected TV service now in development. A partnership between the BBC, ITV, BT, Channel 4, TalkTalk, Arqiva and Channel 5, YouView has pledged not only to build in accessibility features to its own services, set-top boxes and remote controls, but to include an Application Programming Interface (API) which will emulate remote control keys for use on external connected devices such as smartphones and tablet computers.

Developments like these will add an interesting twist to the ongoing battles by disability charities and others to try to ensure everyday devices like TVs are accessible, says Kevin Carey, chair of RNIB.

"Technology is moving so fast it's unrealistic to campaign for every piece of consumer electronics to have synthetic speech if you are blind person. But rather than having a control in a dedicated device, it can now come in a suite of apps and run off your mobile phone or tablet. It's a lot easier to do that than to persuade a TV company to make their remote controllers talk – mobile devices already talk.

What it does is it takes the accessibility out of the thing in the corner and puts it in your hand, so if you don't hear very well it takes it out of your TV speaker and puts it in your ear, and if don't see very well, it moves it from something you are far away from to something you can hold an inch away."

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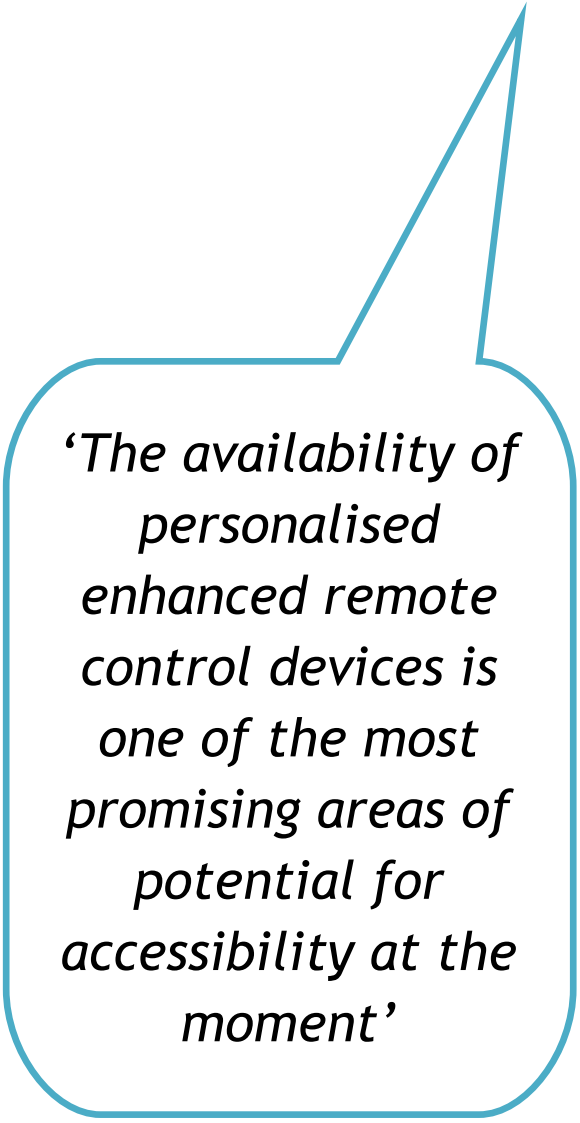
The principle of the personal controller for a range of electronic devices holds huge potential for the future, says Tim Pennick, accessibility research consultant at BT.

“Because of its computing power and flexible interface, you could use a tablet or smartphone for controlling all sorts of different devices and it can be personalised to know your needs profile and your likes and dislikes”, Pennick says.

“Even if you were in someone else’s house you could use it to contact the TV in the house that you are in and quickly find your favourite programmes. It’s a huge amount of personalisation and power that you can just carry around in your pocket. I think the availability of personalised enhanced remote control devices is one of the most promising areas of potential for accessibility at the moment.”



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4.6: Mobility and travel

As well as the possibilities for accessible maps and navigation systems mentioned in section 4.3, many other localised information and advice services are made possible by mobile apps, far more easily and cheaply than traditional methods like requiring hardware devices to be sited in many locations like talking signs or beacons.

One example is Assist-Mi (http://assist-mi.com/), an app developed by British firm DisabledAccess4All which could be used by disabled people to let participating sites such as shopping centres, railway stations and airports know when they are on their way and when they have arrived, while conveying all their access needs so they can be met by staff and properly accommodated.

Currently for air travel, for instance, under European regulations the airport must provide assistance to people with reduced mobility free of charge, recouping the money from the airlines.

But Gary McFarlane, creator of Assist-Mi, says “they struggle to know where and when people are going to arrive – at a big London airport there are 1,500 disabled people coming every day, and no way of knowing where they are. I can tell someone I’m coming, but then it gets passed onto someone else and it’s Chinese whispers – they only have accurate information 50% of the time.”

With a location-aware tool like his app, passengers can be reassured that staff will not only know their needs using an inbuilt travel profile but they will be able to find them at any time within the airport, McFarlane says.

“The problem with airlines is they don’t keep data – so if I book again and go next week, they will ask the same information – and then they ask me three times again in the airport. We can store a profile voluntarily, that is managed by the disabled person, for travel operators to access.”

Another type of mobile app emerging is one that allows people to tag locations with information which might be of use or interest to people with access needs, for others to access.

One such is “GoGenie”, an award-winning trial online platform including an app to help disabled and deaf people find access information online for any location such as a shop, cinema, cultural event or town centre, based on the recommendations and comments of others.

Alison Smith, director of GoGenie developer Pesky People, says the project is aimed at “taking the best of social media and using it for the benefit of everyone in planning a visit. We are not replacing existing social networks, we are working with them and enhancing them.”

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Go Genie is currently available for Symbian, iOS and Android. Features include access information, contact, maps and facilities to add reviews, photos and videos. It also allows people to complain directly to local businesses with a “report it” button.

“I'd like to think that it will influence change, be a tool to empower disabled people and anyone with access needs to get the information they need,” says Smith.

“The potential of apps is huge. It offers people the opportunity to access knowledge and connect with people in a way we couldn't have imagined 10 years ago. It will make us more mobile and improve the quality of lives by the power of information.”

Other types of app that can help disabled people out and about include speaking compasses like TalkingCompass for Android or A+ Voice Compass for the iPhone – another capability that until recently would have cost a great deal of money to own as a separate specialist device.

The future of information linked to place lies with the field known as “augmented reality” – apps that will overlay all kinds of information onto live images or maps. For disabled people such as blind people or wheelchair users, this could greatly enhance the experience of navigating an area like a high street: with the latest offer displayed or spoken when they are near a shop according to their own profiles and interests, for example, they could decide whether or not to make the effort of going in.

4.7: Social media and crowdsourcing

As we have seen with information-sharing about accessibility of map locations, a key area of apps for assistance are those that draw on the power of a group to help individuals.

This kind of app is not confined to information sharing by place, it can allow people to access very specialised help on demand from a pool of volunteers or assistants who could be anywhere in the world.

For example, the free iPhone app VizWiz allows users to take a picture of something, record a voice message (like “what temperature is this freezer set to?” and then crowdsource an answer from Amazon’s “Mechanical Turk” live marketplace for online workers.

Users say a response does not always come, but in general an accurate answer is received within a few minutes.

There are apps that use crowdsourcing to help organisations that work with disabled people as well, such as “Do Some Good”, an app developed by Orange in

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partnership with a range of charities and inclusion organisations including Mencap, Leonard Cheshire Disability and Race Online 2012.

This free app for most mobile devices offers “micro-volunteering opportunities” whereby anyone can donate their time there and then to short tasks (less than five minutes) that can be carried out online. Examples include tagging places or services on a map and rating them for accessibility.

Combinations like these of mobile devices and social networks are particularly powerful in helping people when and where they need it, and allowing people to provide that help at their convenience, as well: expect more to appear in the coming months.

Other apps are developed to provide a more accessible interface for certain user groups into existing or new social networks, making use of the fact that social networks like Twitter have APIs which developers can use to create alternative interfaces.

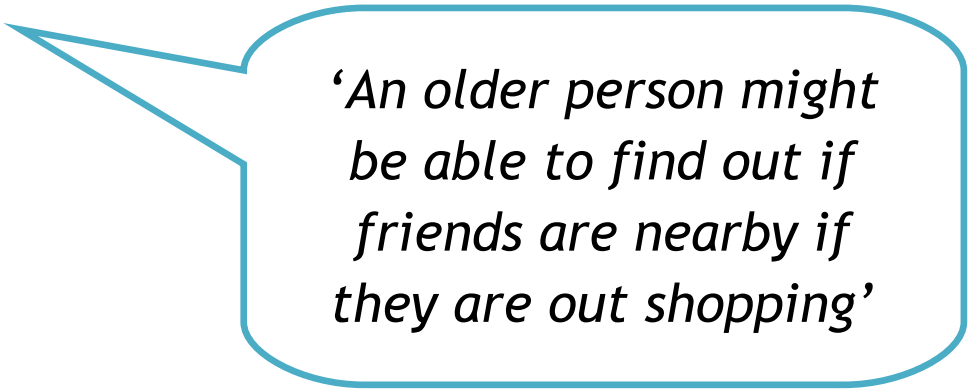
Some interesting research in this field is being carried out by Go-myLife (www.gomylife-project.eu), a project researching ways to make it easier for older people to participate in existing social networks, and to see if it might be better sometimes to set up separate networks tailored specifically for older users.

“Usability, style and language of social networks is often geared to younger people, and older people may be less comfortable in an environment where a large part of their life is made public,” says Michael Mulquin, director of Go-myLife partner IS Communications.

“But as well as having the same social needs as everyone else, isolation and loneliness are key problems for older people. How can we make online social networks more friendly and more useful for older people?”

One answer might be to develop apps that interface with social networks in a way that is highly tailored to them, at a time and place they want – not just with greater accessibility of the interface with easier and bigger text but in style and content, Mulquin says.

“Mobile is very important. An older person might be able to look at places and find comments from other older people, or find out if friends are nearby if they are out shopping.”



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5: Conclusions

The future of computing is mobile.

Robin Christopherson, head of digital inclusion at the technology access charity AbilityNet, says that while his job used to focus on web accessibility most of the time, “now it’s one third web and two-thirds mobile”. And the trend is not slowing down.

As with the web, there is a need to campaign for greater accessibility to be considered in the development of all mobile devices, apps and systems, Christopherson says, but on the positive side, the barriers to achieve this appear to be lower.

“The extent to which you have to push to create change is much less with app developers than it is with websites,” he says. “With the web it is quite a complicated process to change a site, but with apps, there is always a new version in the pipeline.”

As with the web, it is vital to build accessibility in from the earliest stages of the design process for a mobile device or app. Accessibility features that are built in by the manufacturer of a mobile device, mobile operating system or app are preferable to optional extras or workarounds added later by a struggling user.

However, this is not yet happening sufficiently. More awareness is needed, and more work is needed.

Clearly, the speed of emergence of new mobile devices, new operating system version and new apps means developers need to put in a fair amount of effort to keep up with new accessibility features. From the user side, there is work to be done as well: with new apps supporting or claiming to support disabled people being published all the time, how can users and organisations that work with disabled people assess their relative value?

In the field of augmentative and alternative communication (AAC) for example, there have been problems reported with some schools, charities or parents buying mobile devices and support apps for children or other users without the kind of detailed guidance they might have received in the past relating to specialist equipment.

Although some apps are cheap or free, and can be obtained in a matter of seconds, they can serve a very important role in a child or adult’s development and life and need to be used where possible with the right assessment, guidance and support.

Such guidance is available, and growing: but it is scattered here and there, and in today’s world of huge volumes of information, from formal standards to guidelines, articles and blogs, it can be hard to keep up. Clearly some effort is needed to find

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good reliable sources of information that suit the particular needs of each user, group of users or organisation serving a group of users: but once these are found, the potential rewards are great.

Below, we set out a few key recommendations for different groups of people, from app manufacturers to developers, retailers and groups that work with children and adults with a wide range of access needs. This is by no means an exhaustive list of recommendations, and everyone should use this report and other resources to think carefully about their own work or needs and find other ways to advance the cause of accessibility. But like our seven steps for accessible mobile apps set out in Appendix 1: Seven Steps to Accessible Mobile Apps, they are a good place to start building our shared mobile future.

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Appendix 1: Seven Steps to Accessible Mobile Apps

by Peter Abrahams, One Voice for Accessible ICT Coalition.

Creating mobile apps that are accessible to the widest possible set of users is a journey without an end, as developments in app technology and the platforms they run on create new accessibility challenges and also opportunities to make mobile apps more easily accessible.

Although it never ends, however, it does have a logical beginning!

Below, we set out seven initial steps that will improve accessibility and by charting the direction make the rest of the journey easier.

The seven steps are addressed to designers and implementers but should be understood by the commissioners of mobile apps. We have taken care to choose steps that apply to everyone, in as many situations and for as many users as possible; that are not too hard to take; and that will have maximum effect.

The seven steps are described in much more detail with supporting resources – including a list of further reading with guides and maps to help you make accessibility an integral part of your apps – on our website:

http://www.onevoiceict.org/first-seven-steps-accessible-mobile-apps

Although they should all be early steps in your journey, the steps do not need to be carried out in the order described below. But when you have completed the first seven steps, in whatever order, you should have:

- An app that is more accessible;
- An understanding of the benefits of accessibility;
- A view of the following steps;
- A view of the continuing journey.

The seven steps are relevant to all mobile apps irrespective of the form factor, hardware or operating system, but because different platforms implement accessibility in different ways the steps do not include detailed instruction on implementing the recommendations on specific platforms.

The seven steps to accessible mobile apps:

1. Learn about accessibility.

Learn how a user with a disability may use your app. Learn how to make apps accessible on your chosen platform. Use standard controls where possible as they will be accessible and familiar.

2. Quick accessibility check.

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Get an estimate of how accessible you app is now. Continue these tests throughout the development process to ensure the final product is as accessible as possible.

3. Publish an Accessibility Statement.

Express your intent to be accessible. The statement must be easily available to potential clients as well as existing users.

4. Provide a Contact Us function.

Enable users to tell you about accessibility issues, so that you can act on this user feedback.

5. Ensure reading sequence is logical and comprehensible.

Ensure the information the app provides is simple to understand and assimilate and the controls on a page are easy to find and understand.

6. Create a user interface that is easy to understand and operate.

General usability is an underpinning of accessibility and many users prefer the simple layout of mobile apps to desktop applications. Do not make your app the exception.

7. Ensure text formatting can be altered

Allow users to read text using a size and theme that meets their requirements. This is key for significant quantities of text, such as ebooks but also product or service descriptions.

These seven steps should significantly improve the accessibility of most apps, but they are only the first few steps to good accessibility practice. Use them to start your journey, and keep going!

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Appendix 2: Selected resources

Developer resources

Software development kit (SDK) for Apple iOS: includes tools and guidance to help people create accessible apps for Apple devices. Search for 'Accessibility programming guide for iOS' at the online developer centre:

http://developer.apple.com/devcenter/ios/

Software development kit (SDK) for Android: includes tools and guidance to help people create accessible apps for Android devices. "Designing for accessibility" is found in the Best practices section of the developer's guide:

http://developer.android.com/

BlackBerry accessibility resources: Official information page for accessibility features of BlackBerry devices including smartphones and tablets:

http://www.blackberry.com/accessibility/

Inclusive Design Toolkit: Resources relating to inclusive design of all mainstream products including digital devices, developed by the University of Cambridge and sponsored by BT:

http://www.inclusivedesigntoolkit.com/

W3C Mobile Web Best Practices (MWBP) guidelines: guidance from W3C (see glossary) on best practice for delivering web content to mobile devices, with a focus on usability:

http://www.w3.org/TR/mobile-bp/

W3C Accessible Rich Internet Applications Suite: W3C guidelines covering ways of making dynamic and multimedia web content more accessible to people with disabilities:

http://www.w3.org/WAI/intro/aria

Introduction to BS 8878: Independent resources relating to the British Standard for developing accessible websites as compiled by the standard's original author, including summary; training courses; tools; news; a link to buying the standard; and discussion on implementation:

http://www.hassellinclusion.com/bs8878/

BS 8878: Web accessibility code of practice, a British Standard (see also glossary). Official site to buy the standard:

http://shop.bsigroup.com/bs8878

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App lists and user resources

Accessible Apps: Lists of accessible apps for Android, from the "Eyes-Free" project to make Android speak. Focus is on visual impairment:

http://eyes-free.googlecode.com/svn/trunk/documentation/android_access/apps.html

The Mac-cessibility Network: website devoted to connecting, compiling, and providing easy access to the best resources for blind, visually impaired, and other disability groups using Apple products:

http://www.maccessibility.net

AppsForAAC: Independent, comprehensive UK-based collection of links and reviews of AAC (Alternative & Augmentative Communication - see also glossary) apps for Apple devices, compiled by access worker Will Wade:

http://appsforaac.net

AppleVis: Popular online community for blind and vision-impaired users of Apple devices, sharing information on the accessibility of apps developed for the iPhone, iPad, iPod Touch and the Mac plus guides, tutorials and tips:

www.applevis.com

Apps for Blind and Visually Impaired: Another Apple-focused independent listing site:

http://appadvice.com/applists/show/apps-for-the-visually-impaired

Top iPhone and Android apps for people who are deaf and hard of hearing: Compiled by the California-based Center for Accessible Technology:

http://atcoalition.org/category/deaf

VIPhone mailing list: Google Group mailing and discussion list about app and phone accessibility for visually impaired people:

http://groups.google.com/group/viphone?pli=1

Vodafone Foundation Smart Accessibility Awards: Annual international competition to find new Android apps to support disabled people, with links to winners:

http://developer.vodafone.com/smartaccess2011/

YouView accessibility: Accessibility features, commitments and advice relating to the forthcoming YouView free, personalised multimedia TV service:

http://www.youview.com/accessibility/

Smart accessibility – articles and resources from the *Guardian* newspaper on accessible apps, with a focus on Android:

http://www.guardian.co.uk/smart-accessibility

NY Times article: Finding good apps for children with autism:

http://gadgetwise.blogs.nytimes.com/2011/11/29/finding-good-apps-for-children-with-autism/

E-Access Bulletin: free independent monthly email newsletter on access to digital technology by disabled people:

http://www.headstar.com/eab

Ability Magazine: the UK's leading publication on technology for disabled people (subscription only):

http://www.abilitymagazine.org.uk/

Mobile Devices And Communication Apps: White paper from Pennsylvania State University's Rehabilitation Engineering Research Center, focusing on AAC apps (see glossary):

http://aac-rerc.psu.edu/index.php/pages/show/id/46

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Glossary

AAC - Augmentative and Alternative Communication: communication methods such as use of signs, symbols or software tools to help people who have problems with the use of speech or written language to express themselves and communicate.

Accelerometer – used in a smartphone or tablet computer to detect tilt and motion.

Android – open source operating system for mobile devices developed by a group of organisations led by Google (see also open source).

API - Application Programming Interface: an interface that allows one piece of software to interact with another, allowing developers to add new functions on top of existing software.

App – short for application, used to refer to mobile applications – small self-contained software applications running on mobile devices.

Apple iOS – Apple's proprietary operating system running on its mobile devices including the iPhone, iPod Touch and iPad.

Application Programming Interface – see API.

BBC – British Broadcasting Corporation

BlackBerry – brand name for type of smartphone made by Canadian company Research in Motion (RIM), and the BlackBerry PlayBook tablet computer. The smartphones use the operating system BlackBerry OS, and the tablets use a version of the operating system QNX – also owned by RIM.

BlueTooth – a standard for sending information wirelessly over short distances.

BS8878 – British Standard 8878, Web accessibility code of practice - a standard outlining a framework for accessibility when designing or commissioning websites or web products.

Crowdsourcing – the use of the internet or other digital technologies to tap into the knowledge, expertise or work of a large number of people, for example by completing a large task with many small tasks undertaken by different people.

Geo-location – identification of the precise live location of a mobile device and hence a person or object using satellite technology.

Haptic – Technology that interacts through the sense of touch, including haptic feedback, which buzzes, vibrates or creates pressure for example when a finger touches or crosses a certain area on a screen.

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HTML5 – the latest version of HTML, or Hypertext Markup Language, the standard language used to encode web pages. It is designed to handle video and audio elements better than previous versions of HTML.

Intranet – an internal network run by an organisation for its staff, using the same standards as the external internet in a closed, private environment.

iOS - see Apple iOS

Makaton – a communication system of signs and symbols used by people with learning disabilities or communication difficulties, whose development is overseen by the Makaton Charity.

Open source software – software whose source code is published, developed and shared openly and publicly. There are various types of open source licence, some with no cost or restrictions on use, others with some terms or restrictions attached.

Operating system – a set of programs that provide basic operating functions for hardware devices, like starting up the device and running other software applications. All consumer devices come pre-installed with an operating system.

OS - see Operating system

Out-of-the-box – used to describe the functions of a device that run when you first buy it and start it up, without the need to purchase or install any additional software or hardware.

Podcast – a series of audio or video files released to be downloaded and viewed or listened to on a computer, mobile device or media player at regular intervals.

QNX – see BlackBerry.

RIM – see BlackBerry.

RNIB – Royal National Institute of Blind People, major charity offering support and advice to blind and partially sighted people in the UK.

Screen reader, screenreader – software application that converts text on a computer screen or mobile device or mobile phone screen into spoken words.

SDK – Software development kit: a set of software tools that enable a developer to create applications for a specific operating system or other software environment.

Siri – “intelligent assistant” feature on Apple’s newer mobile devices, allowing users to interact with the device using voice questions or commands.

Smartphone – mobile phone with advanced computing features, usually including a media player, and the ability to run mobile apps. There is no single fixed definition of a smartphone.

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Switch – in the context of disability, used to refer to a device with a simple control (such as a toggle switch) and a limited number of outputs, often used with specialist software to control other digital or electronic devices, from computers to household implements.

Symbian – Mobile device operating system, originally open source but latterly controlled by Nokia and largely used on Nokia smartphones.

Tablet computer – mobile computer based around a flat touchscreen, operated by finger or stylus.

VoiceOver – name of the screenreader supplied as part of the operating system for Apple mobile products including the iPhone and iPad (see also 'screenreader').

W3C – World Wide Web Consortium, an open, collaborative international community of technology organisations, academic bodies and others which creates and maintains the web's core technical standards. Website: www.w3.org

WAI – Web Accessibility Initiative, a project of workstream of the W3C (see above) that develops guidelines and techniques to make the web more accessible. Website: www.w3.org/WAI

WCAG – Web Content Accessibility Guidelines, a series of guidance documents drawn up by the WAI (see above) to help developers make web content more accessible to people with disabilities.

Wi-Fi – Technology used to connect devices wirelessly to the internet or to each other over a range of around 20 metres or so, via a transmitter.

Widget – small application that can be embedded inside a web page or larger application, or simply run in a range of devices or situations. For example a YouTube widget allows you to embed a YouTube video in your web page.

Windows Phone/ Windows Mobile – Microsoft's operating system for mobile devices, which began as a pared-down of its Windows operating system for desktop and laptop computers.

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About the authors

Dan Jellinek is Director and co-founder of Headstar, a digital publishing company specialising in technology and social issues. Headstar's publications include E-Access Bulletin, the world's leading email newsletter on access to technology by people with disabilities, and it runs the annual eAccess conference on the same topic.

Dan is former chair of the Sussex Community Internet Project, a non-profit body helping community groups use the internet; and a member of the Society of IT Management's 'Better Connected' team which reviews every UK council web site annually. He has also worked as a freelance journalist for The Guardian and BBC Online.

Peter Abrahams started in IT as a sandwich student in 1966 with IBM; he continued to work for them until 2003. His final role at the company was as a Consultant Architect in IBM's Financial Markets Practice. His speciality was STP, which enables financial institutions to connect diverse systems within their own organisation and in their partner's to process complex transactions without human intervention.

He joined Bloor in 2003 and built on his knowledge, gained as a consultant, to research the integration market place. In 2004 his experience with some disabled friends and a report by the Disabilities Rights Commission prompted him to start research into IT accessibility for the disabled. Recognising the growing importance of this area he set up Bloor's Usability and Accessibility practice and now devotes most of his research to this area.

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One Voice for Accessible ICT Coalition

One Voice is an umbrella organisation, bringing together like-minded people from the public, private and third sectors to act as one voice in promoting ICT accessibility and usability. Our goal is to develop a shared agenda for change, to allow all sectors of business, organisations and society to fully benefit from ICT. We share our experience and expertise, in the belief that together we have greater impact and a stronger voice.

One Voice is a pragmatic delivery focused organisation, aiming for achievable steps moving towards a clear vision of success. We have three main themes:

- **Campaigning** to increase the awareness of ICT accessibility.
- **Promotion** of what already exists to help disabled users with technology.
- **Professionalism** to focus on introducing and establishing accessibility as an integral part of training provided to IT and other professionals.

For more information, visit www.onevoiceict.org

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