Employers Guide to Assistive Technology

Qatar Edition November 2011

Contents

This Guide

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About the Authors

Mada

Mada center is the Qatar Assistive Technology and Accessibility center based in Doha, Qatar. Mada, established in 2010, exists to support people with a disability or limitation to connect with technology and improve access in education, employment and quality of life. Mada offers a range of free services including assessments of needs, training, consultancy and support. Mada also advises and consults on the development of accessible content to support people with special needs.

Full details of Mada services and news and how to contact the center can be found at www.mada.org.qa

Enable Ireland

Enable Ireland is an Irish national disability service provider whose mission is to enable those using its services to achieve maximum choice, independence and inclusion in their communities. Its National Assistive Technology Training Service provides a range of supports to people with disabilities, their families, carers and professionals which include: accredited and customised training, assessment support, information and networking opportunities. A key feature of this service is its partnership activity with the corporate and education sectors. Its partners include: Microsoft, Dublin Institute of Technology and IrishJobs.ie.

Introduction

Assistive Technology is a tool, not just for new employees with disabilities, but for all employees who wish to maximize their potential at work. It is about supporting employees at work, preventing the development of work-related injury such as Repetitive Strain Injury, and promoting good practices in a wide range of work settings.

Technology has transformed the lives of all workers, but it has been particularly important for people with disabilities because it often represents the best way - or the only way - for people with disabilities to perform certain jobs that people without disabilities do in other ways.

Assistive Technology can be harnessed in a variety of ways. It can help in compensating for loss of dexterity, eyesight or other limitations. For example, a worker who is blind may need visual support software to access a computer or a worker who is experiencing a mobility-impairment may need voice recognition software which allows them to use their voice instead of using a mouse or keyboard. Often people with disabilities simply need a specific device to maximize their ability to do the job.

AT can sometimes appear to be complicated or difficult, but with the right advice and support, it is in fact, no more or no less than a tool to assist the employee at work.

Assistive Technology encompasses everything from alternative ways of using computers to communication aids that use synthetic speech, power chairs operated by switch-controlled interfaces and environmental-control systems offering total remote control of lights, doors and windows. Assistive and Accessible technology is relevant to all employees, so an entire section has been devoted to Ergonomics. Good ergonomics in the workplace enables workers to do their job efficiently while poor ergonomics can expose employees to the risk of injury and ill health. Included in the guide are details of a range of different equipment on the market from chairs that have adjustable back supports and footrests to ergonomic keyboards and keyboard wrist supports.

If disabled people are to find purposeful and meaningful employment, the need for Assistive Technology that facilitates entry into the workplace is huge. Your organization can hire a diverse workforce that includes people with disabilities. To successfully hire and place people with disabilities, managers must become familiar with the needs assessment process. This includes the various types of accommodations and the current technology available in today's environment.

Getting started

Disability awareness

Employing people with a disability is about more than the individual concerned. Successful employment will rely upon positive attitudes and understanding both from other employees and from managers within the company. Some basic understanding of disability and how it impacts upon people can be extremely useful to promote successful employment. Of course, such knowledge has a wider impact in that it can help a company support disabled customers, clients or citizens, increasing the business opportunities with this sector of society.

A good outline for disability awareness training might include:

- Basic Disability Facts and the Social Model of disability
- Barriers and Accessibility
- Strategies to increase inclusion
- Disability Insights and case studies
- Planning to take action

Many organizations include a half day or full day disability awareness course as part of new staff induction to help ensure that everyone has insight into the experience of colleagues with disabilities.

Useful resources for disability awareness are available from the Mada center in Doha.

Communicating with disabled people

Many people without a disability have hidden concerns about how they approach disabled people and communicate with them. Mostly these concerns and anxieties spring from lack of direct contact with disabled people, and a worry that they might do something "wrong", and cause offense. Often these anxieties are misplaced but offering some simple advice to employees on how to approach disabled colleagues and customers can be beneficial.

Communication skills are vital in developing relationships with disabled and non-disabled customers and employees alike.

As a result some simple guidelines include:

- Be patient and listen attentively
- Use a normal tone of voice when extending a verbal welcome

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- Exercise patience when listening
- Do not attempt to speak, or finish a sentence, for the person you are speaking to
- Never ask, "What happened to you?". Restrain your curiosity
- Address a person with a disability by their first name only if addressing everyone with the same familiarity
- Speak directly to a person with a disability, even if accompanied by an interpreter or companion
- Never make assumptions about what anyone can do
- If you don't know the correct term to describe someone's needs, ask what the person with a disability prefers.
- Don't be anxious about common usage phrases, for instance people who are blind are rarely concerned at you using a phrase such as "as we can see" "let's look at this" or "let me show you" although they might make a joke of it!

A list of resources and guidance on communicating with disabled people is available from Mada.

The business case for inclusive employers
There are many reasons why it is beneficial for employers to have a diverse and inclusive workforce. These have been divided into four broad categories:

1 Legal
In Qatar there is a requirement for employers to have a minimum of 2% of disabled people in the workforce. By incorporating access to technology into the workplace you can help ensure that this part of your team is as productive and purposefully employed as any other.

2 Economic
People with disabilities include those who are elderly and have a significant disposable income in Qatar. One of the best ways for business to understand the needs of these customers is to include people with a disability into the workforce. Major international companies have shown how people with a disability are capable of working to a very senior level within the company, and in addition bring a life experience that adds considerably to the development of products and services.

Examples could include construction where designs need to be suitable not only for disabled people but for families with young children, both of whom might need step-free access to buildings. Alternatively understanding the needs of writing documents clearly for people who are blind and/or visually impaired might assist in ensuring that forms and information are written in a clearer way for people for whom Arabic or English are not a first language.

Many people acquire their disability during their working life, either as a result of a trauma or through the natural process of aging. Investment in assistive technology allows an employer to retain those people in the workplace with the breadth of experience and knowledge that they have gained at work. This process of retaining experienced and skilled people can help reduce staff turnover and costs of recruitment and training.

3 Social
The social case for including people with a disability is also a strong one and is clearly linked to the corporate and social responsibility policy of the employer. Encouraging people with a disability to enter and remain within the workforce is an effective way by which an employer can contribute to the well being of a community.

4 Moral
The final case for inclusion of people with a disability in the workforce is fundamentally a moral one. It is based on the belief that that in a well balanced caring society it is right that all members of a community have the opportunity to demonstrate their capabilities in both education and employment, contributing directly to the success of companies, governments and organizations whilst achieving their own aspirations.

For any employer the importance of any one factor/criterion may vary, but overall there are strong reasons for increasing the representation of people with a disability in your workforce.

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What is Assistive Technology?

Assistive technology is any device or process that assists a person with a disability to do something that could otherwise be difficult or impossible to accomplish.

Many of us use computers at work to send e-mails, to write letters and reports, or simply to surf the web. Most computers have standard keyboards, mice and monitors. There are a wide range of alternative options which can make using a computer easier; hardware and software products that enable persons with disabilities to access, interact with, and use computers at work.

Computer access devices include modified or alternative keyboards, touch screens, text to speech software and screen magnification software. There is a wide range of assistive technology currently being used in the workplace today which can be useful for meeting a variety of needs.

Built In Accessibility Features in Microsoft Windows and others
If access is something that would benefit your employees, they can try out the free built -in accessibility features within both Windows and other computers. Every modern operating system comes with accessibility features that allow users to customize their keyboards, their mice, and even the appearance of icons on their desktops.

Operating Systems are noted for their accessibility features. Any user can adjust the operating system's settings to enlarge icons or cursors, and to customize it according to personal preferences. For example, including visual warnings for system sounds or making the keyboard ignore inadvertently repeated keystrokes.

These features are important to someone with limited sight, hearing or dexterity.

Accessibility features and utilities built into most operating systems will include:

Display and Readability
Computers includes a wide array of options to increase visibility of items on the computer screen. Options that can be adjusted include:

- Font style, colour and size of items on the desktop
- Icon size - make icons larger for visibility, or smaller for increased screen space.
- Screen resolution - change pixel count to enlarge objects on screen.

- High contrast schemes - select colour combinations that are easier to see.
- Cursor width and blink rate - make the cursor easier to locate, or eliminate the distraction of its blinking.
- Magnification – enlarging a portion of screen for better visibility.

Basic and High Contrast Themes (6)

Windows 7 Basic   Windows Classic   High Contrast #1   High Contrast #2   High Contrast Black

High Contrast White
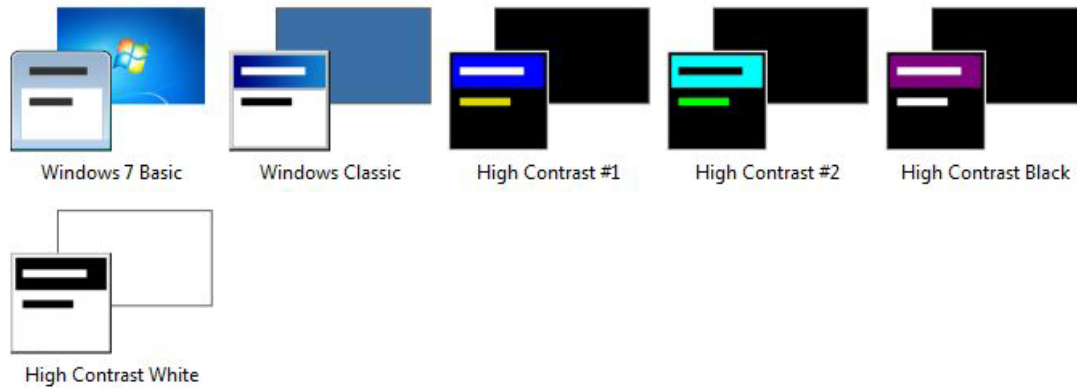
Sounds and Speech

Computers often include options to make computer sounds easier to hear or distinguish – and provide visual alternatives to sound. A variety of speech-to-text options are also available. Options that can be adjusted include:

- Sound Volume - turn computer sound up or down.
- Sound Schemes - associate computer sounds with particular system events.
- ShowSounds - display captions for speech and sounds.
- SoundSentry - display visual warnings for system sounds.
- Notification - Get sound or visual cues when accessibility features are turned on or off.
- Text-to-Speech - Hear command options and text read aloud.

Keyboard and Mouse

In the operating system there are a number of options to make your keyboard and mouse faster and easier to use.

Options you can adjust include:

Mouse Options:
- Double-Click Speed - choose how fast to click the mouse button to make a selection.
- ClickLock - highlight or drag without holding down the mouse button.
- Pointer Speed - set how fast the mouse pointer moves on screen.
- SnapTo - move the pointer to the default button in a dialog box.
- Cursor Blink Rate - choose how fast the cursor blinks or if it blinks at all.
- Pointer Trails - follow the pointer motion on screen.
- Hide Pointer While Typing - keep pointer from hiding text while typing.
- Show Location of Pointer - quickly reveal the pointer on screen.

- Reverse the function of the right and left mouse buttons - reverse actions controlled by the right and left mouse buttons.
- Pointer schemes - choose size and colour options for better visibility.

Keyboard Options
- Character Repeat Rate - set how quickly a character repeats when a key is struck.
- Dvorak Keyboard Layout - choose alternative keyboard layouts for people who type with one hand or finger.
- StickyKeys - allow pressing one key at a time (rather than simultaneously) for key combinations (eg: Ctrl, Alt + Delete)
- FilterKeys - ignore brief or repeated keystrokes and slow down the repeat rate.
- ToggleKeys - hear tones when pressing certain keys.
- MouseKeys - move the mouse pointer using the numerical keypad.
- Extra Keyboard Help - get ToolTips or other keyboard help in programmes that provide it.

Touch devices including the iPad or iPhone from Apple

Over the past two years there has been increasing use of smartphones and tablet devices in business as portable tools, including rapid note taking and access to email, intranet etc. These devices contain a number of features that make them accessible to individuals with a disability.

The most widely used of these are developed by Apple. By default Apple includes some assistive technology in these products as standard. For example, iPhone, iPad, iPod, and Mac OS X include screen magnification and VoiceOver, a screen reading technology, for the blind and visually impaired. For those with learning disabilities, there is an alternative, simplified user interface. And, for those who find it difficult to use a mouse, features including Mouse Keys, Slow Keys, and Sticky Keys adapt the computer to the user's needs and capabilities.

These devices are considerably lighter than traditional laptops, which can be beneficial to those who struggle with physically moving devices. Employees who require additional assistance holding their iPad can use a stand and can choose whether to have the screen at an angle or whether to view in Portrait or Landscape formats. The touch-sensitive display that requires little physical force to activate, and the simple relationship between action and event can also be helpful for those with learning disabilities.

Built-In Assistive Technologies and functions

VoiceOver
VoiceOver screen reader is available on both iPhone and iPad. With VoiceOver, gestures are used to interact with items on the screen, rather than the traditional use of key strokes or using the arrow or tab keys to navigate. Not all Apps on the device will work with VoiceOver and these should be checked prior to implementation.

Zoom
Many applications let the user zoom in and out of specific elements such as images in Mail or web page columns in Safari. Zoom will magnify the entire screen of any application being used to help see what is on the display.

White on Black
Higher contrast can useful to anyone with low vision. The display on the device can be changed to white on black a reverse-video effect which works in all applications and on the Home, Lock, and Spotlight screens, and it can be used with Zoom and VoiceOver.

Tactile Buttons
The devices includes several easy-to-press physical buttons: the Sleep/Wake button, located on the top edge; the silent and volume control buttons, located on the upper-right edge; and the Home button, centered below the display.

Onscreen Keyboard with Predictive Text Entry
The onscreen keyboard appears when needed, and adapts by displaying convenient keys such as ".com" and "@," saving keystrokes. The QWERTY keyboard includes technologies such as autocapitalization and autocorrection that make it easier to type and avoid typos and misspellings. The autocorrections and capitalizations can be spoken aloud to further assist.

External Keyboards
For those who require them, physical keyboards are an option. The operating system (iOS) supports the Apple Wireless Keyboard and most other Bluetooth wireless keyboards that use the Apple keyboard layout. Other Bluetooth keyboards may work too, although some unique or specialized keys may not be supported or work as expected.

FaceTime
Newer devices feature FaceTime video. FaceTime is suitable for those who communicate using sign language. Like other high quality video chat programs, FaceTime over a fast connection allows a deaf person to clearly see both hand and finger gestures in detail, so the deaf person can communicate from afar with the same range of emotion as when in the same room as their conversation partner.

FaceTime is not yet consistently effective over 3G for such conversations.

Visual Alerts
Visual alerts are available in addition to audio alerts. For example, visual alerts for calendar invitations as well as push notifications can be activated. Apps such as Mail and the App Store also display visual badges indicating the number of unread messages and updates available. Important status information

such as network connectivity, time of day, and battery level are communicated visually on the screen at all times.

Although such devices are in increasing use, it remains that for most employers Microsoft Windows will be the majority operating system. Windows includes some specific resources that are of great value. This information is available from the Mada center, or from the Microsoft "Enable" website:

www.microsoft.com/enable

Meeting individual needs in the workplace

Support for people with a Visual Impairment

Many people experience problems with seeing the display used by various forms of technology. The problem can be mild, and acknowledged as an irritant rather than a total barrier, or it can be severe, resulting in the technology being unusable.

A mild barrier might be characterized by an employee who finds it difficult to track the mouse cursor on a computer screen, constantly trying to track the pointer onscreen and peering at the screen to find the focus point. A worker with a more severe visual impairment may be totally unable to access text on the screen at all, and be totally dependent on Audio output or Braille to access such information.
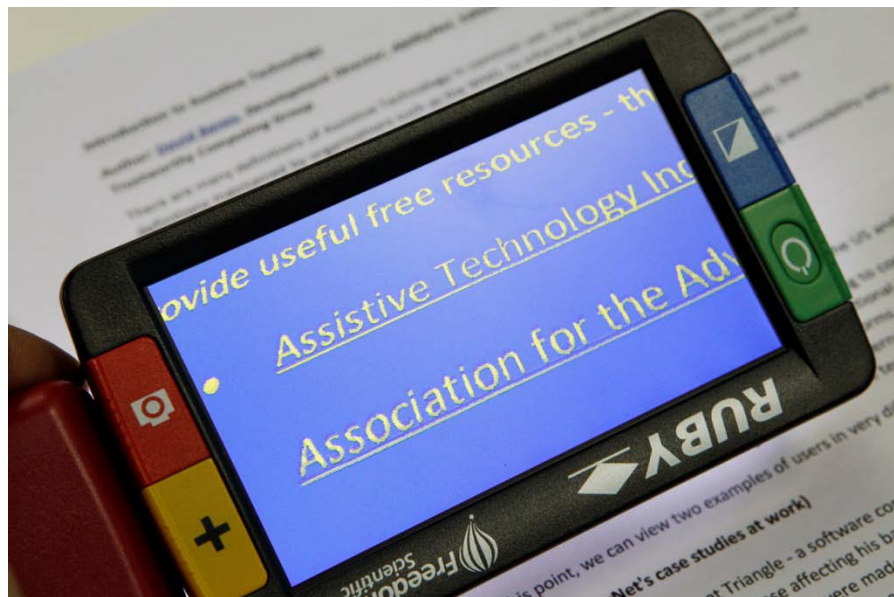
Software such as screen enlargers can help people with low vision. Also called screen magnifiers, they act like a magnifying glass, enlarging part or all of the screen. For people with lower vision, technologies which speak out everything on screen are useful. Screen readers are software programs which allow both voice and Braille output from both software applications and the Web. A screen reader allows employees who are blind to hear what is happening on their computer by converting the screen display to synthesized speech. Ibsar and JAWS are examples of screen readers.

Open Source and free technologies to make computer screens easier to see

There are a number of free and open source technologies that enhance the operating system. Examples of these include:

- NVDA for Windows (a free screen reader with Arabic options under development)
- Orca for Linux (a free screenreader for Linux operating systems)
- Voiceover for iOS (a free screenreader built into iPhone and iPad)

Commercial options

Commercial software solutions can offer either a specific solution such as magnification or screen reading, but increasingly combine these to allow users to mix and match features to meet their personal needs

Examples of such programs include:

- Jaws (very widely used screen reader with support for Arabic and English)
- Supernova (integrated screen reader and magnification package)
- Ibsar (Arabic screen reader)

Support for people with Physical needs

Similarly, physical access to technology can present more or less severe challenges. For some employees a keyboard and mouse can be manipulated, but as a result of design, size or layout, mistakes are made when typing or attempting to point at icons or links. Such frustrations can lead to a lack of confidence in the worker's own abilities and a corresponding lack of motivation to learn new skills and master new competencies. For others with more severe physical needs, a standard keyboard and mouse may be a complete barrier to access. Completely new solutions may be required, ranging from alternative mouse options and keyboards to touch screen, voice recognition, or alternative systems related to movements and gestures, such as eyes, tongue or head.

Open Source and free solutions to make text entry and mouse control easier
- Dasher (on screen alternative keyboard with text prediction)
- FXC Software (suite of utilities for increasing accessibility and ease of use on a PC)
- Click N Type (On screen keyboard with word prediction in English only)

Commercial options

There are a wide range of commercial solutions designed to assist with ease of access. People with physical impairments may need to use a range of solutions. Some of these include:

Voice recognition Software
Voice technology allows almost entirely hands-free use of a computer and is therefore particularly useful for those employees who dislike or are slow using the keyboard for typing; for example those with manual dexterity problems or those suffering from a Repetitive Strain Injury.

Voice Recognition software allows people to use their voice instead of using a mouse or keyboard to control all aspects of the computer, from sending emails to saving files and surfing the web. Voice recognition is built into Windows Vista and Windows 7, as well as within Apple technologies. In addition commercial solutions such as Dragon Naturally Speaking are very popular, although currently Arabic is not supported.

Alternative to the standard keyboard and mouse
These devices enable individuals to control their computers through means other than a standard keyboard or mouse. Examples include smaller or larger keyboards, eye, head and foot-controlled mice and switches. A Switch is an electronic connection which allows an individual to control a computer or other assistive technology device, and is used in place of standard keyboards, mice, etc. A switch can be designed to be operated by the individual's head, foot, elbow, etc. The choice of switch depends on the individual's personal preferences.

Switch accessible software

An example of such software is an on-screen keyboard, which is used by people who are unable to use a standard keyboard. They allow the user to select keys using methods such as an alternative mouse, switch or Morse code input system.

Alternative Mice
These include:-
- Joystick Mouse - This allows the user to control the cursor on screen by moving a joystick in any direction. Items are selected by either using 'click' and 'drag' buttons on the joystick.

- Touchpads are pointing devices, or mice commonly used in laptops.
- Headmouse - This can be operated through the use of a reflective dot being placed on the user's forehead/glasses. When they move their head, the movement of the headmouse is recognised by an infrared receiver which translates the head movements into cursor movements on screen.
- Eye Gaze – An access system that controls the mouse by tracking the movement of the user's eyes. Eye movement is reflected in the movement of the cursor on screen.
- Footmouse - This allows hands-free mouse operations using feet instead of hands.

Alternative keyboards

These come in diverse shapes and sizes. They may be designed for single-handed use, and may be smaller, or they may be differently contoured or have alternative layout to optimise typing speed.

Reading and Communication
Many of us take for granted that access to technology is based upon an ability to read and to write. Yet for some employees, such as those with dyslexia, traditional forms of text are in themselves a barrier. For some users it may be that careful selection of the shape and size of text will have an impact upon ease of reading and legibility; for others blocks of text may be entirely impossible to read, and the ability to translate text into other formats such as audio or graphical symbols may be the only way to ensure that key messages and concepts are communicated and understood.

With this diversity of needs, it will be no surprise to discover that there is an equally wide range of solutions that assistive technologies offer. It is useful to consider how information is communicated through text, graphics, audio and video. A good example of content that is accessible to users with learning disabilities is:

 http://www.bbc.co.uk/blogs/bbcinternet/2009/12/us5_bbc_online_videos_help_peo.html

Other factors to take into account include attention disorders, memory deficit, and difficulty in generalizing information. A useful resource in this area can be found at

http://www.bltt.org/cognitive/

Solutions for people with Dyslexia or barriers to reading and writing

Open Source and Free technologies to enhance literacy
There are a number of additional resources that support reading. These can be divided into tools that change the way text is presented on screen, amending the font, colors, style etc and tools that are designed to be applied to the text as additional tools.

Tools to amend the style of text include

- RapidSet (from fxc Software) Allows quick and easy changing of the background and font colours
- Washer(from fxc software) renders everything underneath its window in a grey scale format, thus addressing a high proportion of colour blindness issues.
- ssOverlay (tints the screen a single colour which can help people with reading problems)
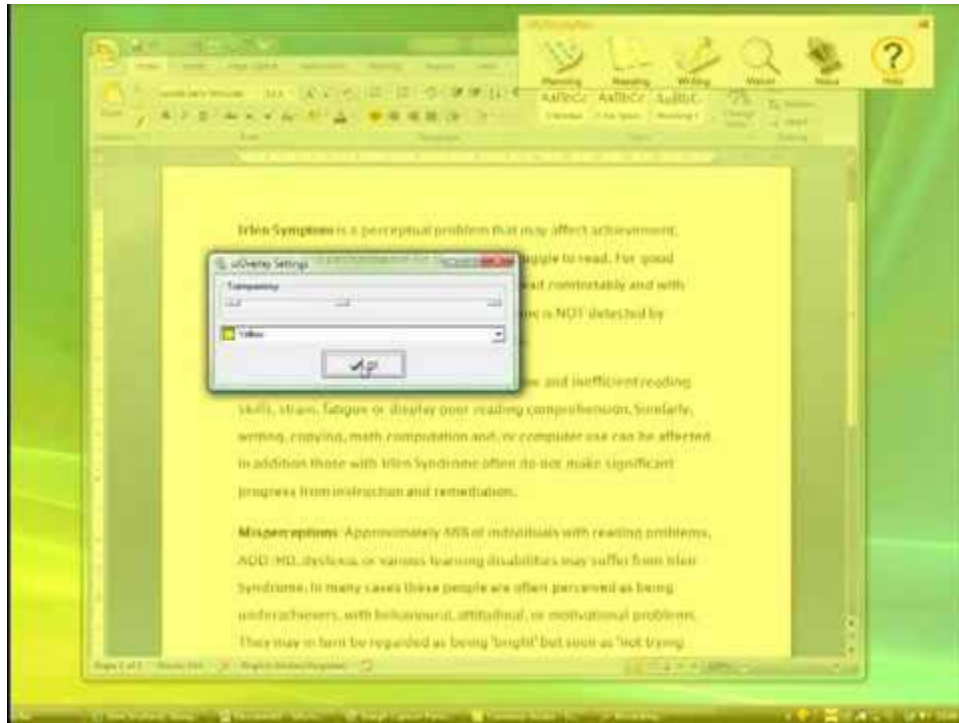
Solutions that add extra tools to the computer to support reading include
- VuBar (a reading ruler utility which isolates individual lines of text when reading)
- Speak and See Suite – includes Reading and Writing Support Toolbar, Screen Magnifier, Reading Toolbar and voice recognition
- ReadPlease2007 (Free text to speech in English only)
- Natural Reader (free text to speech in English only)
- BookReader (simple software to scroll, read and highlight text as reading)
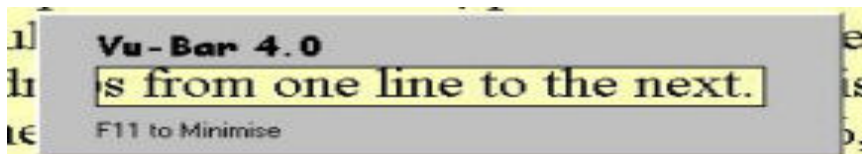
Commercial Solutions to make reading easier

There are a number of commercial solutions that enhance the computer with specialised features. These include both hardware and software tools.

Hardware

- BookCourier - A portable Daisy format reader for Daisy and mp3 files (Daisy is a file format to create talking books and documents)
- Kurzweil Screen Reader– Combines scanning, Optical Character Recognition and speech output to read print materials to people who are print impaired
- Ebook readers – Devices such as the Amazon Kindle have a range of features to help people who find traditional text inaccessible.

Software

- TextHelp Read and Write Gold - Software for people with reading and writing difficulties, including talking spell checkers, word predictors and screen readers
- ClaroRead – A suite of software that is valuable for people with Dyslexia
- Dragon Naturally Speaking – Voice recognition software for dictation and computer control.

Hearing Impairment

Deafness or hearing impairment can impact upon the ability of an employee to access all the features of technology and digital content.

Information on access to technology for people with a hearing loss can be found at

http://www.bbc.co.uk/accessibility/guides/hearing_index.shtml and at
http://www.abilityhub.com/hearing/index.htm

Useful technologies for people with hearing loss can include Induction loops and Face to face communicators.

Induction loop systems are used to assist the employee with a hearing impairment by transmitting sound from a sound system, microphone, television or other source, directly to a hearing aid equipped with a telecoil or 'T' position. Induction loops may be portable or permanently installed. Face to Face communicators . Face to face communicators work by connecting two keyboards and monitors together to allow real time chat through text. These can be specialized devices such as the Ubiduo or can take the form of handheld devices connected together by Bluetooth such as BTchat for the iphone and ipad.

A Pain in your Workplace

The main causes of workplace injury today are back strain and repetitive strain injury (RSI). RSI has other names; "Occupational overuse syndrome" and "work-related upper limb disorder" (WRULD) are two of the more formal descriptions. Tendonitis, tennis elbow, carpel tunnel syndrome – there are many manifestations of this occupational hazard. It affects hands, wrists, arms, elbows, shoulders, back and neck.

Repetitive Strain Injuries are a major problem in the workplace and a significant cause of lost production.

Whilst figures are not available in Qatar it is interesting to note that according to the RSI Association (UK), 1 in 50 of all workers in the UK has reported an RSI condition. 5.4 million working days were lost in sick leave due to the condition last year. The cost to UK industry is likely to be between £5 billion and £20 billion annually. Treatment and recovery are often unsatisfactory especially in more chronic cases. The end result can be permanent disability.

Although ergonomics can be particularly important when accommodating employees with disabilities, the benefits of implementing such a programme apply to all workers. Solutions to ergonomic problems may include anything from mechanical aids to voice recognition software for computer users to changing the design or layout of the workstation or work area so that awkward postures, repetitive movements and forceful actions are eliminated.

"30 percent of workers complain of backache; 17 percent (25 million workers) complain of muscular pains in their arms and legs and 45 percent report working in painful or tiring positions." (RSI Association)

RSI and Work-related upper limb disorder (WRULD)

These conditions are widespread across a range of industries and jobs. Any type of work that involves a worker using their arms to carry out tasks can lead to WRULDs. Computer use and assembly work are frequently associated with the problem, but there are many other tasks that may have higher risks including cake decorators, postal workers, hairdressers, musicians, journalists, dentists and dental technicians. Those in the meat and fish packing industries, as well as those using vibrating tools like chain saws or drills, are also at risk.

Employers whose staff develop RSI conditions as a result of work face a range of costs, some evident, others hidden. These include:
- Loss of production
- Poor worker morale
- Sickness payments for those unable to work
- "Presenteeism", staff at work when they are not fit to be there, but are afraid to be absent
- Ill-health retirement costs for those permanently unable to work
- Injury benefits payments in some industries
- Recruitment and retraining costs as skilled and experienced workers need to be replaced. The average cost of replacing employees due to injury, long-term illness or early retirement is approximately 20-25,000 QR per employee
- Bad publicity

In some cases, the total cost to an employer of an ill-managed RSI condition can be the equivalent of up to 50 percent of the employee's salary.

Because anyone who works at a computer is particularly at risk of developing such a condition, employers need to be aware of any legislation covering Display Screen Equipment.

Display Screen Equipment Guidelines
These are guidelines which deal with computer workstations. They lay down the requirements on how a computer or VDU should be set up at the workstation so the worker can work both safely and in a comfortable manner, minimizing the risk of upper limb pain or discomfort, eye strain or fatigue and stress.

In most legislation employers are encouraged to carry out "Risk Assessments" for all VDU users and ensure compliance with the requirements. Assessments should be carried out on an annual basis.

Ergonomic Keyboards
The increased number of people using computers has provoked a surge in ergonomic keyboards and mouse pads. There are many different types of "ergonomic" keyboards that reduce the risk of pain and make it easier to type and interact with a computer. Some are split in half to make it easier to reach the keys, others place the keys on shaped panels so fingers can touch them more readily, and others simply rearrange the letters. Still others install a soft bar between the user and the keyboard to ensure the wrist stays straight while typing. It is also possible to buy or download software that reminds you to take regular breaks and gives on-screen examples of the exercises you can do to stretch and protect against discomfort.

An ergonomic keyboard is an Assistive Technology that can provide Repetitive Stress Injury relief. The wrist-friendly ergonomic design of Microsoft's Natural Multimedia keyboard has made it very popular. This device takes the ergonomics of the natural keyboard, with its split keypads, shaped surface and wrist rest, and adds a lot of extra function keys, making it more comfortable to type with, even for long periods.

Employer Guidelines
The following guidelines will ensure that you have reduced the risks both for employees and the company:-

- Sitting with the chair too low and too far from the desk encourages a slouched posture with no support from the chair back. The head is tilted forward. Feet are hooked around the chair base restricting blood circulation in the legs.
- If the monitor is set too low, this encourages the employee to tilt the head downwards. As a result, the whole body tends to lean forward, moving away from the support of the chair back and encouraging slouching.
- Move the chair close to the desk and sit back on the seat. Adjust the chair back so that the upper body is relaxed and supported. Raise the chair seat so that, with the upper arms vertical, the elbows are level with or just above the desk.
- Use a foot rest if the feet do not touch the ground. Height-adjustable chair arms provide additional support for the upper body when not keying. If the armrests restrict desk access, consider removing them altogether.

The typing style of a employee may mean that the workstation is set up in a specific manner to help that individual

- Touch Typists can raise the monitor so that the visible screen top is just below eye level. Any document holder should be at screen height and in the same focal plane to minimise head twisting and tilting.
- Copy Typists may prefer the screen to one side and the document holder directly in front.
- Hunt and Peck Typists who need to look at the keyboard will probably position the monitor slightly lower than touch typists to minimize "nodding" between the two.

The document holder should be placed between the monitor and keyboard to avoid twisting.

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Implementing Assistive Technology in the workplace

Having taken a decision to implement assistive technology into the workplace, there are a number of actions you can take to ensure that implementation is well delivered.

1 Initial Review

At as an early a stage as possible it is worth reviewing your technology platform and supported technologies for accessible solutions. A review of the hardware used and operating system etc can confirm that you have a sound basis for reasonable adjustment for employees with a disability. From this basis strengths and weaknesses of the system and implications for employees can be noted, and areas of risk highlighted, such as locking down the Ease of Access Centre in Windows, which can be avoided.

Ideally, employees should be facilitated to adjust their computers to their own needs and preferences through the Ease of Access or Accessibility settings. This will result in employees maximizing their own productivity and effectiveness.

2 Gap Analysis

Many organizations have an approved list of Assistive Technologies that are supported by occupational health or IT teams. A review of that list can provide a benchmark of best practice of solutions that are recommended, and supported in the future. This is generally completed in three stages:

- List of current technologies
- Updated list and benchmark for current platform
- Updated list and benchmark for any new desktop platform

This allows identification of any upgrades and patches required for the new platform and those solutions that were incompatible, to guide any recommendations for alternatives at implementation.

3 Initial Interventions

Initial interventions for individuals can then be planned. These interventions can be delivered in three stages

- Telephone Screening exercise

This exercise offers background on the individual with specific needs and allows the team to confirm that a current suitable solution is available. Where this is the case details can be shared with the IT team to initiate implementation. However, often the solution identified may not resolve all of the needs of the employee, or may need significant revision so that the employee can work to his/her full potential. Where appropriate, the intervention can be escalated to a personal consultation.

- Personal Consultation

At the personal consultation, the reviewer can review the employee's current setup, identify and trial possible alternative hardware and/or software solutions and assess for compatibility with the network

set up. A further stage of assessment may be required as new needs had been identified or the current AT solution is not fully compatible with the network.

- Training Needs Analysis

The final stage of this process is to complete a Training Needs Analysis with the individual to see if they need further training on the new solution, particularly if it represents a significant change from current technology being used.

It is interesting that the visibility of the level of support provided may encourage some employees who had not disclosed that they were having problems with access to their desktop in the past to come forward and find a solution.

Many organizations lack the expertise internally to conduct such a review and implement such as plan. Organizations such as Mada can assist a company to complete such a review in a systematic and professional manner.

Once such planning is complete it is also useful to implement a plan to support the rollout of new technologies for disabled employees.

Support for implementation could include having an AT specialist or champion available to "walk the floor" to check that all is well for employees. As technology is rolled out within a department and to individuals with disabilities, support should be made available on site to assist with any unanticipated problems that emerge.

4 User Acceptance /Testing of new solutions

As technology across a workplace is rolled out it is important to ensure that new solutions, including those identified in the gap analysis are fully compliant with the new desktop. Products reviewed might include major packages such as Dragon Naturally Speaking, Zoomtext or Jaws. It will then be important to maintain ongoing reviews of solutions, so that as patches and upgrades are released that they are implemented. With the range of solutions that are available constantly increasing, an AT specialist can usefully maintain a list of supported solutions.

Other issues to consider

Website and Content Accessibility

Maintaining an accessible website or intranet is an essential element in ensuring the workplace is inclusive for all employees Website design features that help users with disabilities navigate a website easily include

- Bypassing Navigation Bars

To skip over the top and left navigation bar to the main page content, users can follow the link marked "Skip to main content" or "Skip to job search" provided at the start of each page. This will take them to the main content page.

- Using the Tab key to jump between links

Users can use the tab key on their keyboard to jump from one link to the next. All navigation bars in the site provide a logical order for this.

- Zooming in and font sizes

The main content on each page of a website can allow for flexible resizing of fonts to meet user requirements. If a user finds that font sizes are too small, they can simply increase the default font size used on their web browser software (for example, in Internet Explorer, font sizes can be changed in the View Menu under Text Size).

An additional guide to ensuring accessible content will be launched in this series in early 2012

Procurement of Accessible Technologies

One of the actions that any employer can take to prepare to support a person with a disability in the workforce is to be proactive in their procurement plans to make sure that no additional barriers are created for the future. Areas of procurement that benefit from accessibility consideration include

- Hardware such as PCs and laptop computers
- Mobile phone handset models
- Managed services
- Operating system and network configuration
- Web Presence
- Software/Cloud Solutions
- Learning Platforms
- Assistive technology software and hardware
- Building design and furniture

Different factors can be taken into account depending on the items being procured. For instance when purchasing hardware one can consider the ease of attaching peripherals, compatibility with access software, screen size and laptop weight, battery life, or ease of opening. Similarly, the purchase of software or the development of a web presence could consider inclusion of any accessibility options that are available in the operating system, the availability of third party access software, how non-keyboard users might log into the system and whether the platform chosen is accessible in terms of both framework and content.

Most effectively procurement can identify clear standards for accessibility that potential suppliers are asked to fulfill.

Useful standards to refer to include

- World Wide Web Consortium (W3C) Web Content Accessibility Guidelines (WCAG)
- RNIB "See it right"
- IBM Software Accessibility Guidelines
- Irish NDA Accessibility Guidelines
- ISO 16071 Guidance On Software Accessibility
- Section 508 VPAT (Voluntary Product Accessibility Template)

In seeking a response from potential suppliers against standards it is not always enough to accept their word as to how they will meet accessibility standards. It is often useful to ask if their solution has been tested by people with disabilities, and how they plan to involve disabled people in the development of the solution. Furthermore purchasers can make specific requests for reference sites and importantly the vendor can be asked to grant permission for the purchaser to conduct their own tests on the solution, supported by an independent advisor such as Mada.

This process of checking against standards can be summarized in a simple flowchart with only four key questions. Taking a proposed product or service, the evaluation team can ask:-
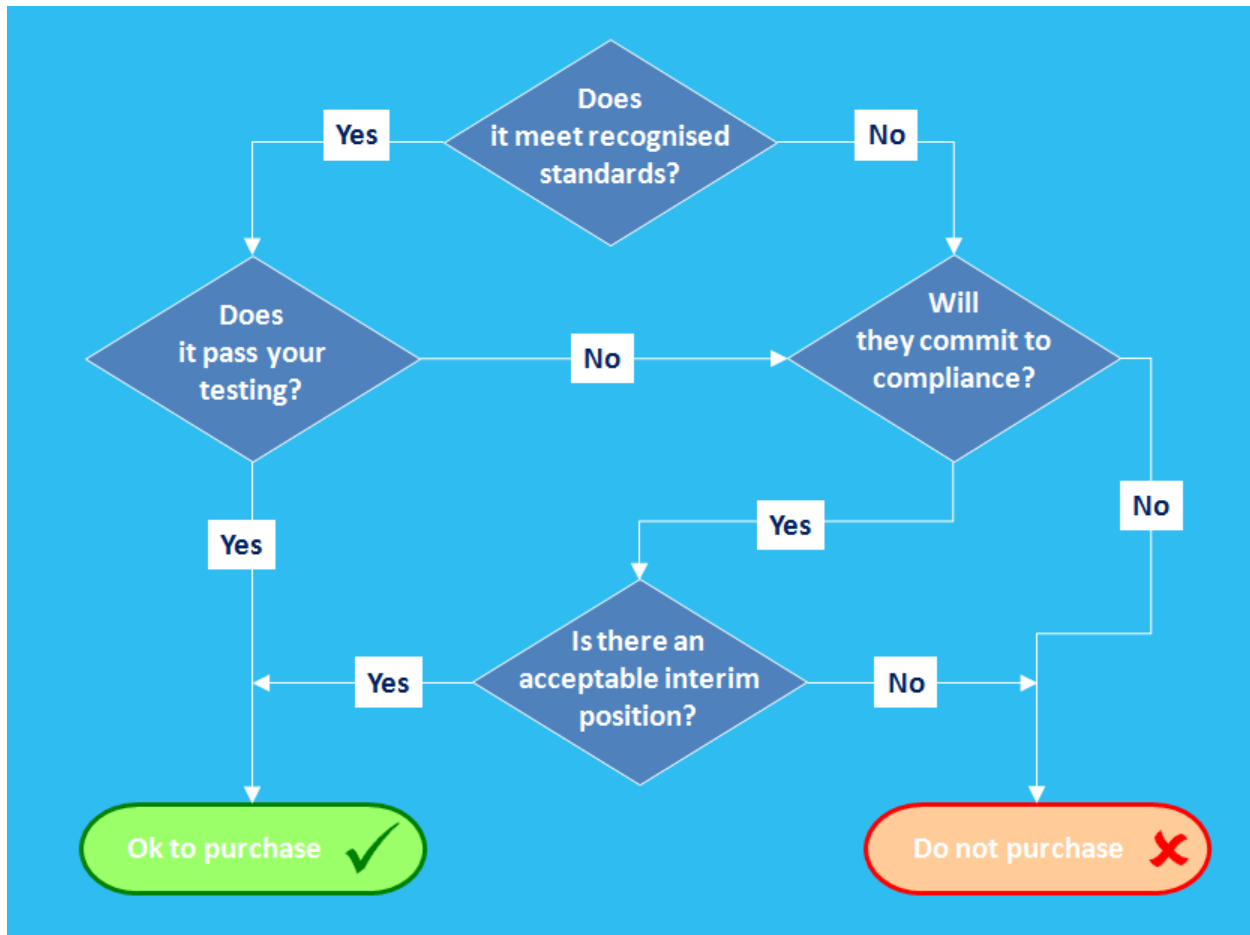
In summary in seeking to procure accessible technologies the customer should always bear in mind the need to :-

- Explicitly state the need for compliance with accessibility standards in RFP/RFT documents
- Make suppliers aware that scoring and selection will include responses to accessibility
- Perform due diligence on responses
- Get suppliers to commit in the contract to remediation and future compliance
- Have the confidence to take the business elsewhere if suppliers say "no"

A more detailed guide to procuring accessible technologies will be published by Mada in 2012

Case Studies

Introduction

The Case studies demonstrated below are based upon a number of sources. The initial outlines are drawn from the AEGIS project user scenarios for user testing. These were then developed to reflect the experiences of people in Qatar, and appropriate technologies recommended based in the information and setting suggested.

Once drafted the implementation and other setting issues were outlined based upon the experience of 10 years of delivering employment assessments and supporting implementation in both the private and public sector.

Name: AH

Age: 36

Location: Doha

Job: Unemployed

Impairment: Dyslexic and colour blind

AH (36), lives in a quiet area of Doha. He has applied for some jobs in the oil and gas sector but has become frustrated at the low expectations of his abilities as a result of his disability. AH studied at Qatar University where he obtained a Degree in Islamic Studies; AH has minor to medium sight problems: he is dyslexic, and problems with certain colours; but is able to read a newspaper.

Technology usage
At home AH owns a PC with Windows Vista and a 21" screen (which makes it easier for him to read text on the screen). At the moment he is using his PC a lot to fill his time and keep contact with friends who have travelled abroad through email and instant messaging. He is surfing the web to get to know different companies better, and to find out what they are exactly looking for. AH occasionally makes use of speech output and screen magnification (Zoomtext). He spent 2 hours trying to install these assistive technologies; luckily, he now knows how these work. AH knows he can be impatient sometimes, but everything considered he really believes that all this technology should work a lot better so he can get what he needs faster. To entertain himself, he uses his PC to play DVD"s. He would like to get more creative on his PC, but the graphical programs he has tried are not compatible with his assistive technologies. AH is quite happy with his mobile phone which he has been using for two years know. His mobile was recommended by a friend, and he never regretted making this choice. His mobile is very important to him

since it is his main hub to his friends and family, so he uses it several times a day, wherever he is. The phone is compatible with his speech output software and contains some preset high contrast visual themes. It also has a camera which he mainly uses to take pictures when he goes out with his friends.

Personalised Solution
Technology
AH's AT will be based upon the solutions that he is familiar with as his assessment outlined only minor changes to improve his usage. His employer has agreed to provide him with a
Laptop with docking station keyboard and mouse.Windows 7 Home Premium with accessibility features enabled to allow text to speech

Assistive technology
- AI squared Zoomtext v9.1 with support for English and Arabic
Zoomtext is a magnification and basic screenreading solution that supports both English and Arabic
- Text Help Read and Write Gold
Text Help read and write gold is a word and phrase prediction package that will help AH write more accurately and to type more productively. The software does not have current compatibility with Arabic so he will also utilize Google Scribe, a free word prediction solution that supports Arabic

Key issues in implementation
- Security
The additional solutions for installation onto business machines had not been approved by the employer's IT dept. It will be essential that such technologies are packaged and tested by the IT team to ensure that they do not contravene any security standards used by the employer.

- Training
AH will require training in the use of ZoomText with the company software solutions, he will also require training in both word prediction packages. Standard company induction and application training will be provided to augment these.

Additional training in the use of Photoshop was identified as beneficial to help AH make the most of the package at work.

- Technical support
The IT team at the employer have been given basic training in the potential issues arising with the AT provided. It has been agreed that Mada will provide first line escalation and will liaise with the vendor for remote technical assistance if required

- Sharepoint accessibility testing

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The Sharepoint intranet was tested with a range of Assistive technologies and against W3C WAI standards. It was found to meet the needs of disabled users in most regards although recommendations to improve the navigation and tabbing sequence were made, and the employer undertook to purchase the Sharepoint accessibility toolkit from HiSoftware to further enhance accessibility.

Issues for other settings
- Screen output

The solutions identified worked well within the personal environment. It was noted that should AH move into a shared environment such as open plan office or supported employment center, then he would require a headset to ensure that the noise from his screen output did not interfere with other employees. In addition due to the large monitor his solution would be difficult to implement within a hot desking or fully open setting as he needs to have access to it at all times.

- Distraction free environment

AH benefits from working in a relatively distraction free environment. The amount of visual and audio background and clutter is carefully reduced at home to help him stay focused upon the tasks at hand.

Name: AL

Age: 43

Location: Doha

Marital status: Married with two children

Job: Employed as HR manager until his condition made office work impossible

Impairment: Multiple Sclerosis, Tiredness, memory loss, reduced dexterity

AL (43) suffers from short term and long term memory loss and from muscle weakness and spasms in his arms and legs due to Multiple Sclerosis. He faced the need to stop working at the age of 42 because of his medical condition. His employer has allowed him to be absent from work for the past 9 months. AL is married and lives in a house near West Bay. AL receives support and help from family and friends but would like to return to being more productive and contributing to the team he managed. He reads a lot about his condition so he realizes that, as time passes, his mental health may deteriorate.

Technology usage
AL owns a desktop PC which he has setup in his study at home. The PC is running Windows XP which AL likes as it was the same OS as at work. He knows his way around the system and has all his favourite icons enlarged and close by. AL likes general surfing and he especially enjoys helping people who want to obtain information on MS, especially where they want information in Arabic. From time to time he visits the website of his favourite football team, made in Flash. He finds it really disappointing that this website is hard to navigate because of the lack of keyboard support. AL has difficulties with handling the mouse due to muscle weakness in his hands and occasional spasms in his arms.

AL has a regular cellphone that he mainly uses for calling friends and relatives. He has programmed his buttons so he can use the speed dialling option. He has a list of all the names and corresponding speed dials taped to his coffee table. Texting takes too long due to his condition. From time to time he uses the calendar functionality, to remember appointments he makes.

Personalised Solution
Technology
AL AT will be based upon the need to amend his solutions according to the cycle of his condition. This means that he will at times be working from home to reduce tiredness. His employer has agreed to provide him with
  - Laptop with docking station keyboard and mouse
  - Windows XP professional with accessibility features enabled to allow text to speech and keyboard tuning

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To facilitate the weekly team meeting and to support communication between the office and home office his employer have agreed to install Microsoft Office Communicator to enable text, voice and video calls across the five person team

Assistive technology
- 19" Monitor

To reduce strain on AL eyes
- Xmind Mindmapping software

Xmind is free software which can be used to create mindmaps of plans which can be helpful for people with memory loss
- Cirque Touch pad

The touchpad can be used with only the movement of one finger if mounted suitably within reach this is combined with the Comfort on Screen keyboard with English and Arabic layouts for use when AL cannot use the keyboard provided
- Maltron single handed keyboard

AL found during the assessment that the use of a single handed keyboard on his right hand was far less tiring and allowed him to type for longer periods than standard keyboard allowed. The keyboard response rate was tuned using windows accessibility features
- Outlook 2003 Tasks and To do lists

AL has begun to use the tasks and to do lists available in Outlook to help overcome his memory difficulties, these are also used to help him keep track of the status of individual recruitment issues.

Key issues in implementation
- Timetabling

In order to help AL accommodate his working from home a shared diary and the ability to assign tasks to the team was essential. In order to use this effectively training needed to be provided to his team as well as permission to implement these features from the IT dept.

- Security

In order to facilitate access to the company intranet which was not web based a VPN was installed onto the system to allow remote access to the resources. In addition the company had to permit the use of the USB ports to plug in the new devices including touch pad and keyboard.

- Training

AL required specific training on the use of Xmind and the features within it. He also needed training on the additional features of Outlook, Microsoft Office Communicator and the use of the VPN. The team and his manager also undertook the training on Outlook and MOC.

- Family Issues

As AL has two children at home, a set of house rules were drawn up that the children agreed to. These included not using the new computer provided at any time, and appreciating that when in his study they should view their father as being at work

- Technical support

The VPN link to the main office allowed the company technical support team to also establish remote access to the home PC for the majority of the support needs. The team undertook a one day training course with Mada to understand the new software and hardware. AL also connected directly to Mada for specific support needs that fell outside of the remit of the IT dept. such as features of Xmind

- Intranet accessibility testing

Prior to implementation the company intranet was tested with the assistive technology. Although the intranet was found to have serious accessibility issues which would have prevented a blind user being employed, the hardware solutions recommended did not have the same level of requirements.

Issues for other settings
- Confidentiality of tasks

Because AL was working at a management level, there could have been issues if he was required to work in a shared setting, some of the issues he would deal with were sensitive and it would have been inappropriate for this information to be potentially viewed by others in a shared setting. If AL was established in a supportive environment some form of cubicle would be required to allow a degree of privacy.

- Distraction free environment

Because of AL's memory and concentration issues he needs a relatively quiet and controlled setting. The home environment or a private office were ideal for this, however if he was in a shared setting a cubicle would again be necessary

SAN
Age: 22

Location: Doha

Marital status: Single

Job: Unemployed

Impairment: Cerebral palsy

SAN lives in an apartment designed to support her needs at home with her parents and brothers family where she is also supported by a number of care assistants. She has not been able to progress further in education because of the limitations caused by her disability. Due to cerebral palsy, SAN has severe motor and speech impairments. She is a wheelchair user and non-speaking. She has almost daily epileptic seizures. Her severe athetosis limits her hand functionality as well.

Technology usage
SAN communicates by controlling voice output software by means of two hand switches. This computer can also allow her limited access to the Internet and she communicates with friends by email. She uses on-screen scanning keyboards with symbols and auditory scanning support to communicate with others and control her computer. SAN would like to have access to a mobile phone.

Personalised Solution
Technology
SAN AT will be based upon the need to meet her needs through the use of an onscreen keyboard with suitable switching mounted on her wheelchair. Her employer has agreed to provide her with
- Laptop with docking station keyboard and mouse
- Windows 7 Business with accessibility features enabled to allow text to speech and keyboard tuning

Assistive technology
- Button switches and wheelchair mounting

During the assessment it was found that the switches and positioning of SAN's switch solution had not been updated for four years. A review identified a better position for her switches and new switches with a smaller target area which has increased her typing speed by 20%
- Onscreen Keyboard with integrated text prediction

An upgrade to SAN's OSK as allowed the layout to be reconfigured to support frequency of use of letters and had introduced a word prediction option in English initially that would allow her to respond to enquiries quickly and effectively
- Natural Reader Text to Speech

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This software has allowed SAN to have emails and text read out to her which she find useful when she is uncomfortable as it reduces her need to sit in the same position for long periods of time

- Click2Phone Mobile phone switch solution

SAN has been provided with a windows mobile phone solution with click2Phone software installed. This software allows SAN to navigate through menus and use an on screen keyboard to access the main functions of the phone. She finds this useful in her role as she has a better understanding of the functions customers are now seeking

Key issues in implementation

- Training

SAN undertook to complete an ICDL course as part of her work preparation, this increased her overall confidence with all aspects of technology. She also received training from the Mada center in using her new mobile phone features and the upgraded on screen keyboard. Both of these have had significant impacts on her daily life as well as at work.

- Flexible working

Because SAN has a high level of support need it was agreed with her employer that her 8 hour day could be spread across an 11 hour period. This allowed her to take longer rests for personal care needs, rest periods and daily physiotherapy exercises.

- Technical support

The technical support team received additional training in the use of the technologies and addressed any issues of incompatibility across the system with the new technologies. One key area that was addressed was the need to include in daily backups the prediction files that were being created as SAN used the software. These files were continuously learning the most common words and phrases that SAN typed and including these as being most likely to be required. This increased typing speeds significantly over time, and if lost due to a hard disk failure would have reduced SAN's productivity

- Oracle accessibility testing

MADA and the employer received a VPAT from Oracle confirming that the system was section 508 compliant. A test was done by Mada to confirm this with the software solutions and no significant issues were reported.

Issues for other settings

- Social needs

Although SAN found the work environment very supportive to her personal needs, it need not address her sense of social isolation. It was felt that working in a supported employment center would have provided her with both the personal support and environment she requires but would also allow her to meet a circle of colleagues every day which would reduce her feelings of remoteness.

Name: MAR
Age: 27
Location: Doha
Marital status: Single
Job: Unemployed
Impairment: Blind

MAR (27) was born blind, and lives in Doha. Due to her visual impairment, she was unable to find a job after finishing University, where she graduated having studied English and Arabic. The only job opportunities she had required her to move, which MAR and her family didn't like. She started taking piano lessons and by now she can play quite well. But it wasn't easy in the beginning. She can't read regular music scores, so she had to resort to music Braille.

Technology usage

MAR uses her PC (Windows Vista) on a daily basis for the text editor to write letters and emails, and to visit News websites and check her emails using Internet Explorer. She uses Hotmail which works quite well with her Ibsar screenreader. She also uses OCR software, and a Braille embosser. The combination of all these technologies enable her to use her PC to a satisfactory degree. The Internet was also an enormous help in finding information, Braille music scores, and mp3 music. MAR bought herself a smartphone she uses practically all the time. Her choice for a smartphone had a lot to do with the ease of use and the recommendation of a friend, who is also blind. The device has large enough keys that provide lots of tactile feedback when pressed. MAR uses it to call friends & family, texting, maintain her calendar and listen to audiobooks she downloads from the internet.

Personalised solution
Technology

MAR AT will be based upon her need to access information in both English and Arabic and her ability to use both speech output and Braille. Her employer has agreed to provide her with

- Laptop with docking station keyboard and mouse
- Windows 7 Business with accessibility features enabled to allow text to speech and keyboard tuning

Assistive technology

- Ibsar

Ibsar is a combined screenreading and magnification package for the PC which both supports English and Arabic text to speech and can output to Braille.

- Portable Braille Display

Sometimes MAR finds the speech output tiring and hard to follow, a portable Braille display allows her to continue to read articles and mail by simply switching to Braille output as required

- Mobile phone with Talks software installed

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This software has allowed MAR to have emails and text read out to her which she find useful when she is Mobile as it allows her to stay connected to other employees at all times

- BrailleSense Portable Braille Notetaker

As MAR's confidence increases it is envisaged that she may begin to review concerts and other cultural events, or interview artists. The ability to take notes using a Braille notetaker allows her the same flexibility as any other journalist in maintaining a record of observations and issues.

Key issues in implementation
- Training

MAR uses a range of technology and has needed not only formal training but an ongoing mentoring service from MADA where she can request advice on an ad hoc basis as and when she needs it. Her past experience has given her the foundation skills she requires and her training has focused upon implementing those skills at work and learning some advanced functions.

Mada has also helped MAR find some user forums for the Braillesense which she has found very helpful to learn from Peers experience

- Technical support

Because the solutions that were in use for MAR were quite complex it was agreed with her employer that a named support officer should undertake a weeks intensive training with the Mada center. The named officer was then the first and main point of contact with MAR for any technical issues she encountered. The officer undertook to share his knowledge with a colleague to cover his annual leave and should he be away from work in the future.

Issues for other settings
- Mobility

The final issue that MAR faced was personal mobility. She had a driver available to her as required, but this augmented with a mobile phone application for navigating maps with speech output. She found this helpful when needing to explain to a driver or companion exactly where she needed to go and is increased her sense of control over the situation.

Conclusion

Assistive Technology has been pivotal in enhancing access to work, and to the workplace, for people with disabilities, enabling countless employees and potential employees to undertake the same tasks as their colleagues, including using computers - a key piece of technology for the 21st century workplace. AT allows people with disabilities to work more independently; it has opened up dozens of new career fields, and put jobseekers with disabilities on a more equal footing with other applicants.

Armed with knowledge of the potential of Assistive Technology in the workplace, your organization will be well placed to support employees with disabilities, whether they are new to the organization or are currently employed, or acquire a disability in the future. Key personnel in your organization should also know enough about these issues to be able to discuss their effectiveness with an employee who might benefit from using them now or in the future.

References

- Adjustments which Improve Access to Employment – The National Council for the Blind of Ireland
- Building an Inclusive Workplace – The Equality Authority
- Caring with Minimal Lifting – The Health & Safety Authority
- Disability in the UK – Employers Forum on Disability – www.employers-forum.co.uk
- Disability Resource Pack – The Equality Authority
- Disabled People as Workers – Employers Forum on Disability
- Handle with Care – The Health & Safety Authority
- Manual Handling Regulations – Statutory Instrument SI44 of 1993
- Microsoft Accessibility: Technology for Everyone – www.microsoft.com/enable/
- Posture Guidance - Osmond Group Limited – www.ergoergo.info/
- RSI Facts and Figures – The Repetitive Strain Injury Association – www.rsi.org.uk

Appendix 1

Workstation Checklist

Office arrangements:

	Yes	No	Accommodations made:
Is there a minimum 4.65 sq meters of space at the workstation?			
Is the furniture arranged in such a way that employees can move around freely?			
Have all trailing cables been tidied away?			
Is all equipment (particularly phones) within easy reach?			
Is the ventilation/temperature comfortable?			
Are lighting levels comfortable and monitor free from glare?			
Is noise and vibration kept to a minimum?			
Are cushioned floor mats provided if the person is required to stand for long periods of time?			
Is the office and work station designed to reduce the amount of bending, twisting, reaching and extending the arms where possible?			

Chair/seating:

	Yes	No	Accommodations made:
Is the chair comfortable and does it give enough support in different work positions?			
Are the chair back and seat adjustable?			
Is the chair stable?			
Can the chair move easily?			
Is it at the correct height? (Elbows should be level with or 1" above the work surface)			
Is the lumber support in the right place (it should support the curve of your lower back)			
Is the depth of the seat base sufficient to support thighs and allows clearance behind the knees?			
Are arm rests positioned so that they do not interfere with pulling into the table?			
Is there a footrest if feet don't touch the ground?			

Desk/work surface:

	Yes	No	Accommodations made:
Is the underside of the desk/workstation high enough to give sufficient thigh clearance?			

Is the desk/workstation surface large enough for the tasks being performed?			
Is there sufficient space for the user to change position? (i.e. if they have to write something, is there space for a notebook etc.)			
Are there document holders, desk tidies, in/out trays provided if required?			
Is the phone placed in a position where easily reached?			
It the computer screen directly in front of the user?			

Monitor Position and size:

	Yes	No	Accommodations made:
Is the monitor positioned directly in front and approximately finger tip (18-30") distance away?			
Is the top of the monitor aligned to eye level? (a monitor stand can be used if the screen is too low)			
Is the image on the screen stable, without flicker?			
Can the colour, brightness and contrast of the screen be adjusted by the person?			
Is the screen free of reflections/glare and at right angles to light sources?			
Is the screen easily readable to the person?			

Keyboard:

	Yes	No	Accommodations made:
Is the keyboard placed on a flat surface, close to the person?			
Does the keyboard have adjustable feet to allow for a tilted position?			
Is a wrist rest required for breaks in typing?			
Are the wrists able to move freely, without being anchored to the desk surface?			
Are all keys legible?			
Does keyboarding require minimal force?			
If the number pad is not used regularly, has a smaller (mini) keyboard been considered?			
If there a large volume of typing required, has an ergonomic keyboard been considered?			
If the person is having difficulties typing accurately, have the inbuilt (free) accessibility features been investigated?			

Mouse:

	Yes	No	Accommodations made:

Is the mouse placed as close to the person as possible, to prevent excessive reaching?			
Can the mouse be moved easily on the surface? Is a mouse mat required?			
Is the hand relaxed while using the mouse, without tension in the fingers?			
If the mouse is being used extensively, has an ergonomic mouse been considered? (e.g. trackball, track pad, roller mouse)			
Have the inbuilt accessibility feature been investigated? (Eliminating double clicking, increasing cursor size, change mouse speed, adjusting mouse buttons for left handed users)			

Telephones:

	Yes	No	Accommodations made:
Is a headset provided for use in longer calls/when note taking is required during a call?			
If using mobile phones, are headsets/hands free kits provided?			

Document holders:

	Yes	No	Accommodations made:
Are document holders provided for reading materials when typing?			
Are document holders positioned in proximity to the computer screen to minimize the amount of head movement required to look from the document to the screen?			

Software:

	Yes	No	Accommodations made:
Is the software suitable for the task?			
Is the software easy to use/training provided?			
Can repetitive actions be avoided/ done in differing ways?			

Rest Periods:

	Yes	No	Accommodations made:
Are breaks from intensive typing/mousing taken regularly? (5 minutes for every half hour.) This may involve carrying out a different task for a few minutes before returning to the computer.			
Is break reminder software installed on the computer?			
Is there a stretching programme in place for during			

typing breaks? (neck, shoulders, back; wrists, hands and arms; legs; and eyes)			
Is there an awareness of the signs of potential physical problems/repetitive strain injuries?			

Appendix 2

Further Sources of Support for People with a disability

Vendors with a history of sales within Qatar

Vendor	Product Specialization	Contact
Nattiq Technologies	Arabic/English AT for people with Low vision, and Blindness	**Auda Hazeem** CEO Crsytal Tower 1202 Buheira Corniche Sharjah United Arab Emirates **Tel:** 00971 6 574 9995 **Fax:** 00971 6 574 9955
Consort World FZE	Arabic/English AT for people with Communication and Learning Difficulties	**Camille Matta** Managing Director **Mobile** +97150-6592900 **Office** +9714-4212400 **PO Box** 282404, Dubai, United Arab Emirates **Email** cmatta@consortworld.com **Website** www.consortworld.com
eSolutions	Arabic AT for people with Low vision, and Blindness	**Elsheikh Mohammed Aboidri** Managing Director **Email:** mohd@esolutionsme.com **Tel:** + 974-44662412 **Fax:** +974- 44553846 **GSM:** +974- 55236406
Sight & Sound Technologies	English AT for people with Low vision, Blindness, Reading and Writing Difficulties	**Glenn Tookey** Chief Executive Officer Welton House North Wing Summerhouse Road, Moulton Park Northampton, NN3 6WD **Email:** Glenn.Tookey@sightandsound.com **Telephone:** +44 845 6347979 **Telephone 2:** +44 1604 798070 **Fax:** +44 1604 798090 **Web**: www.sightandsound.co.uk
Sensory Software	Arabic/English AT for people with Communication and Learning Difficulties	**Paul Hawes** Managing Director Sensory Software International Ltd. **Email:** paul@sensorysoftware.com **Tel:** + 44 1684 578868 **Fax:** +44 1684 897753
Crick Software	Arabic/English AT for people with Learning Difficulties	**Jonathan Reed** Regional Sales Manager **Email:** johnathan.reed@cricksoft.com **Tel:** +44 1604 671691 **Fax:** +44 1604 67192
SoundBeam	Interactive Technologies to help people with disabilities make	**Adrian Price** The Soundbeam Project Ltd

		music	Unit 3, Highbury Villas Kingsdown Bristol BS2 8BY UK **Email:** adrian@soundbeam.co.uk **Tel:** +44 11 79237075 **Fax:** +44 11 79706241
Claro Software	English AT for people with Reading & Writing Difficulties		**Alex Houghton** Claro Software Ltd Lancashire House 24 Winckley Square Preston PR1 3JJ **Email:** alex.houghton@clarosoftware.com **Tel:** +44 (0) 1772 978425 **Fax:** +44 (0) 870 132 7471 www.clarosoftware.com
Vendor	**Product Specialization**		**Contact**
Sakhr Technology	Arabic/English AT for people with Low vision, and Blindness		**John Naeem** Manager - Sakhr & Ultimus Products PO Box: 5711 Doha-Qatar Mob: 55 754 478 Dir: 44 191 124 **Email:** john@qcs-qatar.com **Tel:** + (974) 44 191 111 **Fax:** + (974) 44 191 110 Web: www.qcs-qatar.com
Medialog	Arabic AT for people with Low vision, and Blindness		**Ilhem Boulaiche** Medialog Accessibilities Sales Manager 54, avenue Hoche 75008 Paris France **Tel:** +33 1 56 60 50 1 **Fax:** +33 1 56 60 56 00 **Email:** ilhem.boulaiche@medialog.ws www. medialog.ws
Widgit	English AT for people with Communication and Learning Difficulties		**Martin Fisher** SEN Consultant Widgit Software 26 Queen Street Cubbington LEAMINGTON SPA CV32 7NA **Mobile:** +44(0)7795 440400 **Office:** +44(0)1926 333680 **Email:** martin@widgit.com **Website:** www.widgit.com
51 East	Interactive Presentation Technologies (e.g. Interactive Whiteboards & Displays)		**CHADY HADDAD** Brand Manager Professional Electronics Division Modern Home - BD&P P.O.Box: 615 Doha-Qatar **Telephone:** +974 44257829 **Mobile:** +974 66159526 **Facsimile:** +974 44314700 **E-mail:** CHaddad@Darwishholding.com

Issist	Arabic/English AT for people with Low vision	**Namita Joshi** Sales Manager 18 Grist Mill Drive, Georgetown, ON, L7G 6C2, Canada **Email:** namita@issist.com **Phone:** +1 (888) 909-2544 **Fax:** + 1 (866)-499-2921 **Website:** www.issist.com
Osmond Group Ltd	Ergonomic Furniture and Computer Accessories	**Guy Osmond** Managing Director Osmond Group Limited, 21 Johnson Road Ferndown Industrial Estate, Wimborne BH21 7SE, UK **Email:** guy.osmond@ergonomics.co.uk **Phone:** + 44 (0)1202 850555 **Mobile:** + 44 (0)7831 770777 **Website**: www.osmondgroup.co.uk
ianSyst Limited	AT & Ergonomic Accessories Supplier	**Robert Cowan** Senior Account Manager, Strategic Accounts iansyst Limited **Email:** robert.cowan@iansyst.com **Phone:** +44 (0)1223 436 662 **Mobile:** +44 (0)7718 342 351

Solutions listed in Guide

This list is indicative only and does not represent a full list of available technologies for any need

For further information please contact the Mada center for Advice

Vision
- NVDA for Windows www.nvda-project.org
- Orca for Linux live.gnome.org/Orca
- Voiceover for iOS www.apple.com/accessibility/voiceover/
- Jaws www.freedomscientific.com/
- Supernova www.dolphinuk.co.uk/
- Ibsar www.nattiq.com

Physical
- Dasher **wol.ra.phy.cam.ac.uk/dasher**
- FXC Software www.fxc.btinternet.co.uk/
- Click N Type cnt.lakefolks.com
- Dragon Naturally Speaking nuance.com/dragon/index.htm
- Joystick Mouse
- Touchpads
- Headmouse www.orin.com/access/headmouse/
- Eye Gaze (Tobii Technologies) www.tobii.com
- Footmouse www.footmouse.com

Literacy and Dyslexia
- RapidSet www.fxc.btinternet.co.uk/
- Washer www.fxc.btinternet.co.uk/
- ssOverlay www.fxc.btinternet.co.uk/
- VuBar www.fxc.btinternet.co.uk/
- Speak and See Suite www.clarosoftware.com/
- ReadPlease2007 www.readplease.com
- Natural Reader www.naturalreaders.com
- BookReader www.rudenko.com/ebook.html
- BookCourier www.bookcourier.com
- Kurzweil Screen Reader www.kurzweiledu.com
- Amazon Kindle www.amazon.com
- TextHelp Read and Write Gold www.texthelp.com
- ClaroRead www.clarosoftware.com