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Technical Assistance Guide on Accessible Technology for People with Disabilities

A Corporate Partner Benefit of the
National Business & Disability Council (NBDC)
at The Viscardi Center

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National Business & Disability Council (NBDC) at The Viscardi Center: Accessible Technology for People with Disabilities

The National Business and Disability Council (NBDC) at The Viscardi Center is pleased to share with its corporate partners the following technical assistance guide, Accessible Technology in the Workplace for People with Disabilities. This technical assistance guide provides useful information about the types of accessible technology used in the workplace, as well as how it contributes to effective productivity in the workplace for people with disabilities. The use of accessible technology in the workplace ensures a diverse workforce and helps streamline Human Resource ("HR") policies to address the employment needs and abilities of all employees. The bottom line: improving access to accessible technology in the workplace improves employment outcomes for people with disabilities and makes good business sense.[1]

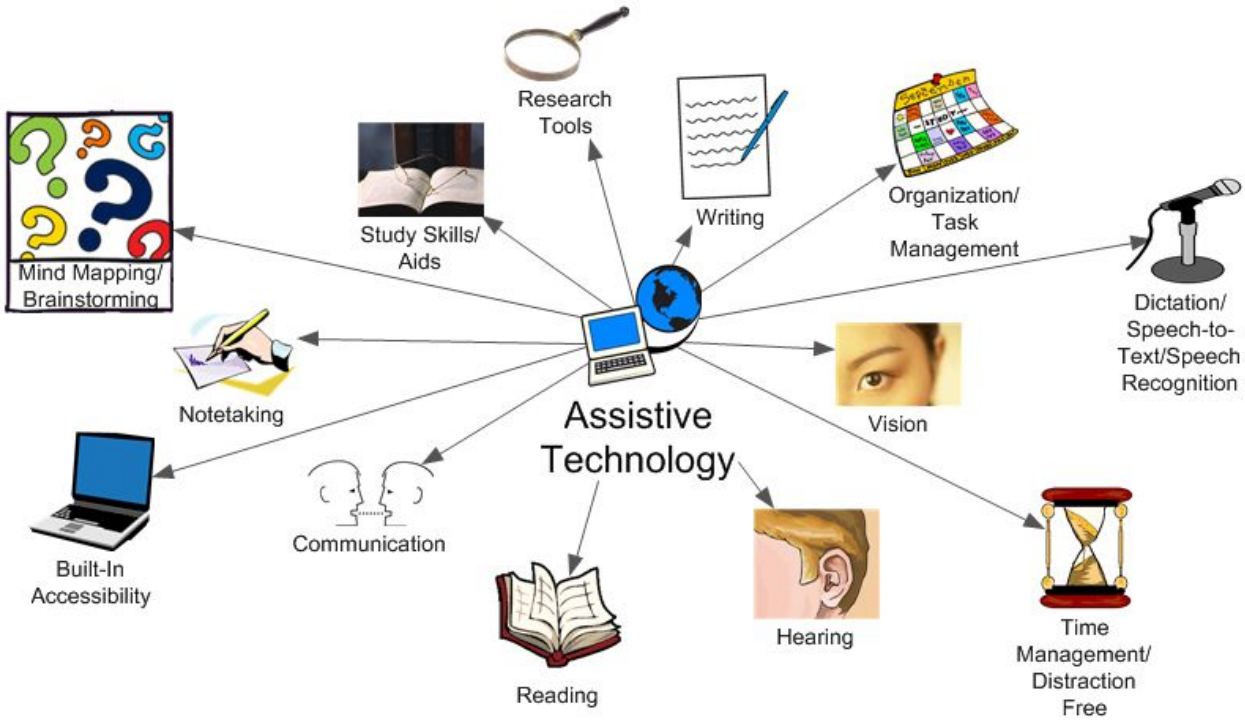

Photo Source: Augsburg College - CLASS Office

There are many free or low-cost Accessible Technology for everyone. These Accessible Technology tools can be used by anyone, anywhere! All programs, apps, and software on this list are free or cost less than $25.[2]

http://web.augsburg.edu/classprogram/Free%20or%20Low%20Cost%20Assistive%20Technology%20for%20Everyone

Disclaimer…

The technical assistance guide is not intended to provide legal advice to NBDC corporate partners, but rather to share relevant information, resources and tools. The content herein does not serve as an endorsement of any commercial product or service, but rather an outlet to share information and opinions about accessible information and communication technologies.

[1] Technology for All: The Need For A More Accessible Workplace (accessed May 10, 2016); available from http://www.nextgov.com/technology-news/tech-insider/2015/12/technology-all-need-more-accessible-workplace/124138/
[2] Compiled by Augsburg College - CLASS Office (Disability Resources); Updated: October, 2015.

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What is Accessible Technology?

Background & History

Technology in the workplace is becoming more commonplace than ever. With an increase in the use of technology, it is important that recruiters, hiring managers and Human Resource (HR) professionals are aware of the latest types of accessible technology, as well as ensure that employees with disabilities have access to these types of technology. Evidence suggests that larger companies are significantly more likely to use accessible technology that enables them to complete HR functions. These include tasks such as: interviewing, hiring, and securing reasonable workplace accommodations for employees with disabilities.[3]

[3] Workplace Visions: Disability in a Technology-Driven Workplace (accessed April 26, 2016); available from http://www.edi.cornell.edu/publications/TechDrivenWorkplace.pdf

Use of Accessible Technology for People with Disabilities in the Workplace

Accessible technology is technology that can be used by people with a wide range of abilities and disabilities. Users should be able to interact with the technology in ways that work best for them. For example, a user who interacts using a communication device should be able to independently navigate and select options in conjunction with their communication device.[4] It is important that HR professionals and others involved in providing workplace accommodations actively engage in problem-solving, as well as interact directly with people with disabilities, as the individual is often the most knowledgeable about his or her accommodation needs. This is the best way to ensure that a specific type of accessible technology meets the needs of an employee. Active engagement and problem solving also allows for customization and improvements that can lead to an increase in work productivity.[5]

Access to Accessible Technology in the Workplace

Awareness of Accessible Technology Among Human Resource Professionals

New technologies are continuously being developed to enable employees with disabilities to actively engage in the workplace, and it is essential that HR professionals increase their awareness of the kinds of accessible technologies used in the workplace. A lack of awareness by many HR professionals of even the most common accessible technologies used to adapt computers or IT applications is a significant part of the problem of the growing digital divide with employees with disabilities.[6]

The Society of Human Research Management ("SHRM") conducted a research study that revealed that less than half of HR professionals were familiar with screen magnifiers; only a third reported being familiar with speech-recognition software; and only one out of four respondents were familiar with video captioning – most often used to make media, such as training videos accessible to individuals with hearing disabilities.[7] Many HR departments, for both large and small companies are dealing with their lack of awareness for accessible technology by creating training forums and realizing the importance of training their staff on the use of different types of accessible technology and how it allows an employee with a disability to remain productive in the workplace.[8]

To download a copy of the 2003 report, "Disability in a Technology-Driven Workplace," go to http://www.edi.cornell.edu/publications/TechDrivenWorkplace.pdf.

[4] Accessible Tech.Org: What is Accessible Technology in the Workplace (accessed April 26, 2016); available from http://accessibletech.org/access_articles/index.php#General
[5] Workplace Visions: Disability in a Technology-Driven Workplace (accessed April 26, 2016); available from http://www.edi.cornell.edu/publications/TechDrivenWorkplace.pdf
[6] Workplace Visions: Disability in a Technology-Driven Workplace (accessed April 26, 2016); available from http://www.edi.cornell.edu/publications/TechDrivenWorkplace.pdf
[7] Workplace Visions: Disability in a Technology-Driven Workplace (accessed April 26, 2016); available from http://www.edi.cornell.edu/publications/TechDrivenWorkplace.pdf
[8] Workplace Visions: Disability in a Technology-Driven Workplace (accessed April 26, 2016); available from http://www.edi.cornell.edu/publications/TechDrivenWorkplace.pdf

Section 255 of the Telecommunications Act
The Telecommunications Act's Section 255 ensures that telecommunications equipment and facility equipment is usable for a customer and employee, as well as designed and developed to be accessible when it is readily achievable to do so.[9] "Readily achievable" means it can be accomplished without significant difficulty or expense. Rules under Section 255 of the Telecommunications Act cover telecommunications equipment and hardware, including telephones, fax machines, answering machines, telephone calls, caller ID, call waiting and call forwarding. Interconnected Voice over Internet Protocol ("VoIP") providers must also comply with Section 255 of the Telecommunications Act. The Telecommunications Act ensures that people with disabilities including members of the public gain access to useable, accessible telecommunications that are necessary to perform basic tasks.[10]

The 21st Century Communications and Video Accessibility Act
The 21st Century Communications and Video Accessibility Act ("CVAA") provides information on new regulations aimed at telecommunication technology providers. Most of these were designed to move accessibility into the digital age. For example, CVAA regulations cover VoIP, and all forms of electronic, video and internet communications, ensuring that most internet and telecommunication service providers are accessible for employees with disabilities.[11] CVAA ensures that most modern workplaces have the latest phone and video conferencing systems. CVAA also covers web browsers that are built into mobile devices, electronic messaging, and interoperable videoconferencing. The CVAA is enforced by the Federal Communications Commission (FCC), which provides funding for the latest accessible telecommunications, as well as clarification on new regulations.[12]

Types of Accessible Technology Used by People with Disabilities in the Workplace

The following summarizes a few of the types of accessible technology:

Screen Reader Software for Individuals Who Are Blind or Have Low-Vision
Accessible technology used by individuals who are blind or have low vision can vary based on an individual's specific needs. In some cases, an assessment may be necessary to determine which type of technology would be best for the user. It is important that the user, including those who are blind or have low-vision, be able to make adjustments to the settings when using any kind of accessible technology including screen readers. Screen reader software is the most common type of accessible technology used by individuals who are blind and have low-vision.[13]

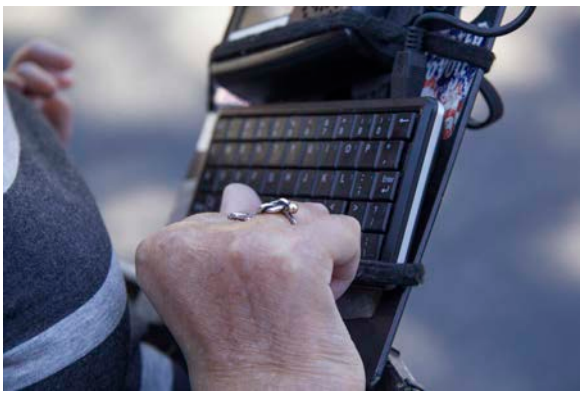
[9] Partnership on Employment and Accessible Technology: Accessible Technology and the Law (accessed April 26, 2016); available from http://peatworks.org/content/accessible-technology-and-law
[10] Partnership on Employment and Accessible Technology: Accessible Technology and the Law (accessed April 26, 2016); available from http://peatworks.org/content/accessible-technology-and-law
[11] Partnership on Employment and Accessible Technology: Accessible Technology and the Law (accessed April 26, 2016); available from http://peatworks.org/content/accessible-technology-and-law
[12] Partnership on Employment and Accessible Technology: Accessible Technology and the Law (accessed April 26, 2016); available from http://peatworks.org/content/accessible-technology-and-law
[13] Accessible Technology in the Workplace: Selecting Assistive technology for someone who is blind or has low-vision (accessed April 26, 2016); available from http://accessibletech.org/assist_articles/general/selectATblind.php

The most common type of screen reader used by individuals who are blind and have low-vision is "Job Access With Speech" ("JAWS"), which is a screen reader program for Microsoft Windows that allows the user to read and access information on the screen with text-to-speech output or other compatible device.[14] JAWS screen reader software has the ability to present graphics and text on a screen using speech output which includes descriptions, names, control buttons, menus, symbols texts and punctuation.[15] The user is provided information as to where specific information is located on a page and can also choose the speed at which this information is read aloud. It should be noted that first-time users may need to be trained on how to use JAWS in order to be able to use it effectively in an employment related setting.[16]

Braille Displays and Screen Magnifiers for Individuals Who Are Blind or Have Low-Vision
Braille displays are electronic devices used to read text tactually that is typically displayed visually on a computer monitor. A braille display is connected to a computer by a serial or USB cable, and produces braille output (with small plastic or metal pins that move up and down to display the braille characters) for the reader. It can be used in conjunction with JAWS, as well as some portable note takers.[17] Additionally, some braille displays are created to work with mobile communication devices.

A screen magnifier however, enlarges text, pictures and graphics using a built-in camera that can be accessed through a computer, laptop or television. They are available in many forms – including portable, handheld, electronic and reading software. Some screen magnifiers also include text-to-speech capabilities. In many cases, the magnifier may require a much larger screen to maximize full viewing. Screen magnifiers are also referred to as Closed Circuit Televisions ("CCTVs") and can also allow the user to view and print different types of media in the workplace.[18]

Speech Recognition Software for Individuals with Mobility, Learning and Dexterity Related Impairments
Speech recognition software is an alternative to traditional methods of interacting with a computer, mobile or electronic device using textual input through a keyboard. It is an effective system that can replace or reduce the reliability on standard keyboard and mouse input. Speech recognition software can assist individuals with learning disabilities who may have difficulties with character or word usage and manipulation in a textual form. It can also assist individuals with physical disabilities that may have difficulty with data entry. Speech recognition software allows "hands-free" control of various electronic devices.[19] The most common type of speech recognition software used by people with disabilities in the workplace is called Dragon Naturally Speaking ("DNS").



[14] JAWS (Screen Reader): Wikipedia, the free encyclopedia (accessed April 26, 2016); available from https://en.wikipedia.org/wiki/JAWS_(screen_reader)
[15] Accessible Technology in the Workplace: What is a screen reader? (accessed April 26, 2016); available from http://accessibletech.org/assist_articles/webinfo/screenReaders_what_is.php
[16] Accessible Technology in the Workplace: What is a screen reader? (accessed April 26, 2016); available from http://accessibletech.org/assist_articles/webinfo/screenReaders_what_is.php
[17] American Federation for the Blind: Refreshable Braille Display (accessed April 26, 2016); available from http://www.afb.org/info/living-with-vision-loss/for-job-seekers/careerconnect-virtual-worksites/retail-worksite-for-blind-users/refreshable-braille-display-3652/12345
[18] Assistive Technology in the workplace (accessed April 26, 2016); available from https://www.cdu.edu.au/sites/default/files/saes/docs/assistive-technology.pdf
[19] Speech Recognition technology for Disabilities Education (accessed April 26, 2016); available from http://www.ece.sunysb.edu/~wtang/papers/tang2005srt.pdf

DNS is dictation software that allows the user to perform tasks such as dictate e-mails as well as a host of other documents. The software can analyze e-mails and documents in order to learn more about the vocabulary that is commonly accessed by the user. At any time, the user can add vocabulary and create new words that stand for specific expressions commonly used. This particular software can allow the user to work more effectively in the workplace and save time typing and accessing information. This is especially true for individuals in the workplace with difficulties with fine motor control, mobility and learning-related disabilities.[20]

Trackball and Alternative Keyboards for Individuals with Mobility and Dexterity Related Disabilities
The keyboard can be the biggest obstacle to computing for individuals with mobility impairment. Fortunately, those who lack the dexterity or range of motion necessary to operate a standard keyboard have a wide range of options from which to choose. There several modifications that can be made to a keyboard to accommodate an individual with a physical disability. For example, the user can change the way he or she interacts with the keyboard.[21] The types of modifications or changes that can be made are:

- Using Sticky Keys to manipulate a keyboard with limited hand use. The user can access the Shift, Control and Alt keys by holding down the modifier key until the next key is pressed.[22]
- Using Filter Keys to alter the length of time a key needs to be held down before it initially appears or repeats on the screen.[23]
- Using Mouse Keys to move the mouse pointer around using the numeric keypad keys.[24]
- Different types of keyboards accessed by the user including small, large or split keyboards can make it easier for those with mobility and dexterity related impairments to complete job tasks.[25]

A trackball is a pointing device consisting of a ball held by a socket containing sensors to detect a rotation of the ball about two axes—like an upside-down mouse with an exposed protruding ball. The user rolls the ball with the thumb, fingers, or the palm of the hand to move a pointer. Users with dexterity and mobility related disabilities often find trackballs easier to use since they only have to move their thumb relative to their hand, instead of moving the whole hand, increasing the likelihood of fatigue of the thumb. Individuals with physical or dexterity-related disabilities sometimes have difficulty holding a mouse still while double-clicking; the trackball allows them to let go of the ball while using the button. It allows the user to feel less fatigued particularly if their job involves extended hours using a keyboard.[26]

[20] The Yale Center for Dyslexia and Creativity: Technology Dragon Naturally Speaking (accessed April 26, 2016); available from http://dyslexia.yale.edu/TECH_dragon.html
[21] Working Together: Computers and People with Mobility Impairments (accessed June 1, 2016); available from http://www.washington.edu/doit/working-together-computers-and-people-mobility-impairments
[22] AbilityNet Factsheet: Keyboard and mouse alternatives (accessed June 1, 2016); available from http://www.nhs.uk/accessibilityhelp/Factsheets/Keyboard-and-mouse-alternatives.pdf
[23] AbilityNet Factsheet: Keyboard and mouse alternatives (accessed June 1, 2016); available from http://www.nhs.uk/accessibilityhelp/Factsheets/Keyboard-and-mouse-alternatives.pdf
[24] AbilityNet Factsheet: Keyboard and mouse alternatives (accessed June 1, 2016); available from http://www.nhs.uk/accessibilityhelp/Factsheets/Keyboard-and-mouse-alternatives.pdf
[25] AbilityNet Factsheet: Keyboard and mouse alternatives (accessed June 1, 2016); available from http://www.nhs.uk/accessibilityhelp/Factsheets/Keyboard-and-mouse-alternatives.pdf
[26] Trackball: Wikipedia, the free encyclopedia (accessed June 1, 2016); available from https://en.wikipedia.org/wiki/Trackball

Video Relay Service and Telephone Captioning for the Deaf and Hard of Hearing
Video Relay Service ("VRS") is commonly used in the workplace by individuals who are deaf or have difficulty hearing. It allows individuals with hearing disabilities who use American Sign Language ("ASL") to communicate with voice telephone users through video equipment, rather than through typed text.[27] Video relay calls are made using a high-speed or broadband Internet connection and a videophone connected to a television, or through a personal computer equipped with a Web camera and video relay software. The individual who is deaf signs to a video interpreter who then communicates with a hearing person via a standard phone line by relaying the conversation between the two parties. This allows the user to communicate in real-time using their preferred method of communication.[28] Using VRS provides a platform to quickly and conveniently communicate with clients and coworkers regardless of their location.[29]

A captioned telephone is a telephone that has a built-in screen to display in text (or captions) everything the other person on the call says. Captioned telephones – called CapTel phones – are connected automatically to a Captioned Telephone Service ("CTS").[30] The Communication Telephone Services assistant, repeats or re-voices what that person says and speech recognition technology automatically transcribes the Communication Assistant's ("CA") voice into text (or captions) which is displayed on the captioned telephone for the user to see while the call is engaged. CTS works best for individuals who communicate by speaking, who want to hear what the other person is saying as much as possible, but who may have difficulty understanding everything the other person says.[31]

Assistive Listening Devices for Individuals Who Are Deaf and Hard of Hearing
An Assistive Listening Device ("ALD") is a type of assistive technology that enables an individual to amplify sound while reducing distractions from background noises that can make it difficult to concentrate during a conversation.[32] ALD specific devices include personal assistive listening devices, small and large area FM systems, infrared, and induction loop technologies. An FM system specific type of ALD, works by allowing the speaker to talk into a microphone or transmitter and the listener either uses the T-switch on his/her hearing aid or wears a receiver designed to work with the specific assistive listening device. There are several Bluetooth-enabled ALDs on the market to assist individuals with significant hearing loss.[33]

Bluetooth-enabled ALD's can be used in conjunction with telephones as well as mobile phones. They provide wireless connectivity between hearing aids and Bluetooth-capable mobile phones or listening devices. Use of ALD's in the workplace provides better access for individuals with hearing loss to participate in meetings and discussion forums. Furthermore, ALD's enhance communication between employees with hearing disabilities and those without, as many Bluetooth ALD's can be used in conjunction with a computer or smart device for communication purposes.[34]

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[27] Job Accommodation Network (JAN) Accommodation and Compliance Series:
Employees with Hearing Loss (accessed April 26, 2016); available from https://askjan.org/media/Hearing.html#captel
[28] Job Accommodation Network (JAN) Accommodation and Compliance Series:
Employees with Hearing Loss (accessed April 26, 2016); available from https://askjan.org/media/Hearing.html#captel
[29] Creating Deaf Accessibility in the Workplace (accessed April 26, 2016); available from http://www.huffingtonpost.com/lydia-l-callis/creating-deaf-accessibili_b_5366652.html
[30] National Association of the Deaf (NAD): Captioned Telephone Service (CTS) (accessed April 26, 2016); available from https://nad.org/issues/telephone-and-relay-services/relay-services/captioned-telephone-service-cts
[31] National Association of the Deaf (NAD): Captioned Telephone Service (CTS) (accessed April 26, 2016); available from https://nad.org/issues/telephone-and-relay-services/relay-services/captioned-telephone-service-cts
[32] Job Accommodation Network (JAN) Accommodation and Compliance Series:
Employees with Hearing Loss (accessed April 26, 2016); available from https://askjan.org/media/Hearing.html#captel
[33] Job Accommodation Network (JAN) Accommodation and Compliance Series:
Employees with Hearing Loss (accessed April 26, 2016); available from https://askjan.org/media/Hearing.html#captel
[34] Assistive Technology in the Workplace for People with a Disability (accessed April 26, 2016); available from https://www.cdu.edu.au/sites/default/files/saes/docs/assistive-technology.pdf

Eye Tracking and Speech Enhancement Software for Individuals with Communication and Mobility Related Disabilities

Eye tracking systems are designed for people with mobility, communication and fine motor related disabilities. It can specifically be adapted to a user's needs. A person who uses eye tracking fixes his or her eyes on an icon in front of them. The person he or she talking to sees what his or her eyes fix on through a Plexiglas board. Voice output is sometimes used in conjunction with eye tracking systems leading to autonomous communication for the user.[35] Speech enhancement software is often used in conjunction with a computer or smart device that has a built-in speech synthesizer or is used with a device that can enhance a person's voice or speech.[36] Devices that are often solely used, or in conjunction with speech enhancement software include:

- An artificial larynx device, which allows a person without a larynx to speak loud enough for people to hear. It's lightweight and can be worn around the neck.[37]
- A portable voice saver, which makes the user's voice louder.[38]

These devices enable employees with disabilities to participate in meetings and actively engage with their colleagues without the concern of being left out of workplace conversations.[39]

[35] Workplace Technologies for People with Disabilities (accessed April 26, 2016); available from http://www.iltech.org/workplacetechnologies.pdf
[36] Workplace Technologies for People with Disabilities (accessed April 26, 2016); available from http://www.iltech.org/workplacetechnologies.pdf
[37] Workplace Technologies for People with Disabilities (accessed April 26, 2016); available from http://www.iltech.org/workplacetechnologies.pdf
[38] Workplace Technologies for People with Disabilities (accessed April 26, 2016); available from http://www.iltech.org/workplacetechnologies.pdf
[39] Workplace Technologies for People with Disabilities (accessed April 26, 2016); available from http://www.iltech.org/workplacetechnologies.pdf

Use of Accessible Technology to Accommodate People with Disabilities

The following accommodation scenarios are examples from the Job Accommodation Network ("JAN"), a service funded by the U.S. Department of Labor's Office of Disability Employment Policy ("ODEP"):

Scenario A

An employer had several employees who were deaf or hard of hearing. These employees needed to respond to emergency signals and communicate in emergency. Each employee was provided with a vibrating pager that was connected to the alarm system. When the alarm sounded they were paged. Laminated note cards with communication options and flashlights to assist with signs or lip reading were also provided.

Scenario B

A customer service representative for a financial institution lost his vision and could no longer read his computer screen. The employer provided screen reading software for his computer so that all information present on the screen and all information inputted into the system would be read back to him.

Scenario C

A customer service representative with Parkinson's disease was having difficulty manipulating his mouse, writing, standing to greet people, and communicating effectively. He was accommodated with a trackball, writing aid, stool with lift cushion, and speech amplification.

Scenario D

A baker with Obsessive Compulsive Disorder ("OCD") repeatedly checked ingredients for recipes. The individual was accommodated with a computerized checklist for each baked good recipe on the menu. He was allowed time in the morning to arrange and check off items to be used during the day. When he felt the urge to recheck the ingredients he could do this quickly by using his daily checklist. This checklist was placed in a handheld computer that resembled the two-way radios used by all employees.

The Future of Accessible Technology in the Workplace

Strategies for Promoting the Use of Accessible Technology in the Workplace
Workplace policies and practices will need to focus attention on accessible technology and Web-based HR processes. HR professionals need to ensure greater preparation for employees with disabilities by demonstrating increased knowledge of common accessible technologies used in the workplace.[40] To meet these challenges it will be crucial for HR departments to focus on the following key areas:

- Top-management commitment is necessary to ensure that online/web-based applications used in HR processes will be designed and implemented with accessibility in mind from initial concept through system maintenance.[41]
- The person with the disability should be a key resource in addressing workplace accessibility.[42]
- HR and selected personnel should be trained in workplace accessibility policy considerations.[43]
- Accessible technology training in the workplace for people with disabilities must be emphasized as a critical component of workforce development efforts.[44]
- Information about resources that can assist in addressing accessibility questions should be made readily available throughout the organization.[45]

Addressing the barriers to employment for people with disabilities will take on added significance as the workforce ages. As disability rises with age, the aging workforce is likely to rely more on accessible technology in the workplace. This will give employers further incentive to make sure that technology is accessible to all employees. HR will play a critical role in increasing access to technology for employees with disabilities. HR professionals will need to keep abreast of the latest accessible technologies in order to maintain a diverse workforce and remain productive.[46]

Information and Resources on Accessible Technology

- Accessible Technology in the Workplace
  http://accessibletech.org/
- Guide to Accessible Technology
  https://www.ada.gov/access-technology/index.html
- Partnership on Employment and Accessible Technology (PEAT)
  http://peatworks.org/
- The Job Accommodation Network (JAN)
  https://askjan.org/

[40] Workplace Visions: Disability in a Technology-Driven Workplace (accessed April 26, 2016); available from http://www.edi.cornell.edu/publications/TechDrivenWorkplace.pdf
[41] Workplace Visions: Disability in a Technology-Driven Workplace (accessed April 26, 2016); available from http://www.edi.cornell.edu/publications/TechDrivenWorkplace.pdf
[42] Workplace Visions: Disability in a Technology-Driven Workplace (accessed April 26, 2016); available from http://www.edi.cornell.edu/publications/TechDrivenWorkplace.pdf
[43] Workplace Visions: Disability in a Technology-Driven Workplace (accessed April 26, 2016); available from http://www.edi.cornell.edu/publications/TechDrivenWorkplace.pdf
[44] Workplace Visions: Disability in a Technology-Driven Workplace (accessed April 26, 2016); available from http://www.edi.cornell.edu/publications/TechDrivenWorkplace.pdf
[45] Workplace Visions: Disability in a Technology-Driven Workplace (accessed April 26, 2016); available from http://www.edi.cornell.edu/publications/TechDrivenWorkplace.pdf
[46] Workplace Visions: Disability in a Technology-Driven Workplace (accessed April 26, 2016); available from http://www.edi.cornell.edu/publications/TechDrivenWorkplace.pdf