

Harnessing the Power of Information Technologies for the Visually Impaired

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In August 2011, the DoD/VA Vision Center of Excellence Consensus Conference on Technology for the Visually Impaired addressed the opportunities and challenges related to digital information technologies, the impact of current federal regulations, and tips for ensuring information technologies are accessible and usable to all persons with a disability.

Communication is essential to all humans for life, health, relationships, and employment. Our need to access text and other visual inputs makes communication one of our most important visually guided behaviors. The advent of increasing reliance on the personal computer and smart phones and the ubiquitous need for access to the Internet, e-mail, texting, and other forms of video communications have made digital information technologies (IT) a major new source of our visual communications. Persons with blindness or vision loss due to injury, disease, or aging can be aided by these new technologies but may also experience additional challenges in their communications with IT.

Rapid expansion in IT technical capabilities not only offers innovative communication solutions, but also presents visually impaired individuals with new challenges. Providers and therapists have a responsibility to be aware of the ways vision impairments affect patient's lives, their work, and their ability to participate as active

partners in their health care. This update is for providers across the federal health care system on critical issues in IT that were addressed at an August 2011 DoD/VA Vision Center of Excellence (VCE) Consensus Conference on Technology for the Visually Impaired. Presented are highlights from the conference, including opportunities and challenges for the blind and visually impaired IT users, the impact of current federal regulations, and tips for ensuring IT is accessible and usable by all persons with a disability.

BACKGROUND

There are many optical and nonoptical accommodations and rehabilitative measures that enable a person with a vision impairment to be productive in work and life activities. The power of computers has long been used in low-vision therapy to adaptively modify visually presented materials on a video screen, including magnifying text, changing contrast, as well as converting text to speech. A classic example of a text-to-speech screen reader is JAWS (Job Access With Speech), a software product used successfully by many individuals with blindness or severe vision impairments who require access to computer-based communications.¹ This software works best with simple text,

but as computer operating systems are upgraded, text-to-speech software often lags behind in compatibility, causing a sudden lack of access for the user with a vision impairment.

Even when text-to-speech programs work properly, the graphic user interface may be too complex to allow translation of every feature. This is because computer displays are largely creative uses of visually-based screen tools that are designed for the normally sighted. Access accommodation programs like JAWS may not be able to translate each screen feature. This can be very challenging to and confusing for the user with a vision impairment who may lose access to information in drop-down menus and other features that rely on screen navigation and mouse pointing. This problem has led to the development of additional software programs that detect special screen features, such as tickers, tabs, and other field expansions, enabling the user to better interact with dynamic screen features.^{2,3} However, these solutions are add-ons that are only reactive to a built-in lack of accessibility. Better, proactive solutions, offered earlier in the design of software, are needed.

Problems like these have created an accessibility gap that is actually widening with advancing IT capabil-

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ity and complexity. Even when there is technical access, the practical usefulness of a new IT product can be reduced by the complexity of its visual, auditory, and tactile requirements, which are often too much for the visually impaired individual to handle.⁴ This is especially true where there are cognitive or physical comorbidities associated with a vision impairment. The confusion element is prevalent in individuals who have limited technology skill. In this case, simpler solutions may often be better. Therefore, it comes as no surprise that the rates of computer use and Internet access for visually impaired individuals are far lower than for normally sighted persons, and that persons with low vision frequently prefer more traditional low-tech assistive devices compared with adaptive computer technologies.^{5,6}

It is important to remember that each person with a vision impairment will use differing types and formats of IT depending on individual factors, such as remaining usable vision, other comorbid conditions such as a hearing loss, and the ability to learn and operate the device. The challenge in rehabilitation is to teach and train each consumer in the appropriate technology to use with each of these variations in mind. The current explosion of applications is daunting, making it difficult for therapists to remain current in the proper uses and accessibility of each technology. This problem is becoming even more complicated since, in order to better serve their client bases, many federal agencies have embarked on the use of telehealth or video teleconferencing, with some using applications (apps) or social media, as well as information kiosks to enable better consumer access. With these apps come technical issues to resolve. The key is to keep up with IT change by designing new apps with accessibility and usability for consum-

ers experiencing vision impairments.

Thus, the problem at hand is that visual information can be powerfully manipulated via IT solutions to the benefit of the visually impaired, but this requires creativity beyond the basic IT development, which is usually not a primary goal of the developer. There is a governmental regulatory approach to close this gap, but as with all disability mitigation scenarios, the problem remains difficult and requires continued attention to resolve. Dealing effectively with these problems by responsible federal agencies is not only good policy, but also the law. Federal agencies are required to ensure the accessibility and usability of all IT systems and programs in use by their employees and clients. Understanding the law and where to go for further guidance is important for all agencies using and developing new software and other IT solutions to provide health care, research, education, and administrative services.

REGULATORY ISSUES

There are 4 key pieces of legislation related to IT for persons with disabilities:

The Rehabilitation Act of 1973. This act prohibits discrimination on the basis of disability in programs conducted by federal agencies, in receiving federal financial assistance, in federal employment, and in the employment practices of federal contractors. This law was amended in 1998 to require accessible IT in federal procurement and implementation and published technical standards of compliance for accessibility.⁷

The Telecommunications Act Section 255. This act, amended in 1996, requires manufacturers of telecommunications equipment and providers of telecommunications services to ensure that their products and services are accessible to and usable by persons with disabilities.⁸

The Twenty-First Century Communications and Video Accessibility Act.

This act was passed on September 28, 2010. The Federal Communication Commission recently released Section 717, which expands the requirement for persons with disabilities to have access to advanced communications services, equipment, and the Internet with mobile telephone devices.^{9,10}

Americans With Disability Act (ADA).

The ADA of 1990 is a wide-ranging civil rights law that prohibits, under certain circumstances, discrimination of a person with a disability.⁷

In order to assist federal agencies and others impacted by these laws and regulations, Section 504 of the ADA created an Access Board. The purpose of the Board is advisory in nature, developing accessibility guidance and standards for the development of regulatory functions by end-user federal agencies of electronic and information technology. The Access Board is currently revising its recommendations in response to the most recent legislation and the rapidly changing technology environment. Whatever the outcome of this analysis, the recommendations can be expected to move in the direction of requiring greater effective access by persons with vision and other impairments.^{11,12}

So, one may question why with all this guidance is IT that is accessible and useful to the consumer so difficult to provide? The answer lies in the ability of the technical compliance of the IT product to produce a usable outcome. This problem is exemplified by the mobile phone, which has quickly morphed into a mobile mini-communicator/computer. While similar in purpose, each model of phone uses visual, auditory, and tactile interfaces that differ widely from one another, often to help distinguish them in the marketplace. It is the interplay

of these technical differences with the specific disabilities of the individual and the environment of use that will affect the ultimate usability of each mobile phone. Usability is the ultimate goal for the consumer, which is difficult to obtain until a technology has been tested by the target group in their environment for a period of time.

This leads to another hidden issue that an IT product may be designed as compliant but be based on program codes and technical languages that are not. For example, an agency may purchase software that, on the surface, meets the legal and technical guidance of accessibility, while it has yet to be discovered that the programming language is not compatible with adaptive screen reader software, causing the adaptive application to fail. To correct this problem would require the company to rewrite the software and result in a significant additional cost and a delay to a project. Complicating matters further, the 508 compliance process is bureaucratic by nature and rarely keeps pace with the pressures of the IT explosion. By the time the change has been regulated, technology will have advanced and the process starts again. Solving the gap will require greater anticipation of user needs and technologic capabilities by both the regulators and industry on behalf of those with a vision impairment. Proactive solutions incorporated at the initial stages of software and applications design would be the optimal approach.

These are just a few challenges facing all federal agencies as technology changes and advances. In order to avoid these issues, when conducting market research or developing a software program within the federal system, one should start by contacting the 508 Compliance Office. The 508 Compliance Officers can be a valuable

source of early advice in how to proceed in developing IT that is not only accessible, but also usable to consumers. There is a complete list of all 508 Compliance Coordinators by federal agency available on the Section 508 website.⁸ In addition, there are overviews of the technical standards available on the Access Board and ADA websites.

SUMMARY

Regarding new IT, the VCE subject matter experts identified that a significant technology gap exists between technical accessibility and the visually impaired consumer's ability to use the products. The ideal solution would be to have mainstream IT products readily available that are automatically accessible and usable. This would require industry to consistently develop products with the end user in mind, always considering that the person may have a vision impairment. This is critically important, because accessible and usable IT is vital to enabling communications for the visually impaired. Because of its legislative mandates, the federal government has been influential to this process, leading the way in requiring accessible technology to all consumers. In order to maintain this impact for all consumers, the 508 regulations need to better anticipate how technologic change will impact the user with a vision impairment, and we must all remain proactive in seeking to maintain 508 compliance. ●

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