

The Role of Assistive Technology for Veterans

Evonne Osorio

It is estimated that for every military personnel killed, at least sixteen are wounded (Frain, Bishop, & Bethel, 2010). These wounded warriors will return to the United States with some type of disability. An assistive technology device can be used to compensate for a veteran's impairments or to adapt to the veteran's environment. Assistive technology devices are necessary to alleviate challenges posed in the veteran's work environment as well as to break down barriers to employment and increase the variety of career choices for veterans with disabilities. It is imperative for rehabilitation professionals to have an understanding of the role of assistive technology for veterans in past, present and future. With an understanding of the past, rehabilitation professionals can have a clearer understanding of the benefits and limitations in the present, and can create strategies for improving access to assistive technology for the future.

A kitchen timer ticks away on the counter. A mother is in the other room paying bills and using a calculator to add up expenses. Meanwhile, her son is outside observing a caterpillar through a magnifying glass. The kitchen timer, the calculator and the magnifying glass are devices used to accomplish a task in the home, work, or leisure setting. These are also examples of Assistive Technology (AT). Loosely defined, AT is a tool, apparatus, device, or machine use to maintain or improve an individual's functional capabilities (Blake and Bodine, 2002). Its formal definition is found in the Assisted Technology Act of 1998, defining an AT device as "any item, piece of equipment, or product system, whether acquired commercially, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities" (Assisted Technology Act of 1998; P.L. 105-394).

In the past, soldiers were left to their own resources upon returning home from war. They referred to as dependent and without purpose or function. AT devices were not readily accessible for use because of availability or cost (or both). Current technological advances have provided more opportunities for veterans with disabilities to gain more independence, to integrate into the community and into the workforce. Today, a veteran, blinded in combat, may benefit from a screen reader to "read" instructions at work. A veteran that lost her lower leg during a grenade explosion may rely on a prosthetic leg to stand up and walk. AT devices adapted for the brake and gas pedals of an automobile allow a veteran with a complete T10 spi-

nal cord injury to commute to and from work as well as navigate his community more independently.

As case managers, rehabilitation professionals may encounter veterans with disabilities that benefit from an AT device appropriate to the veteran's specific needs. Rehabilitation professionals may be involved in recommending AT, obtaining AT, in training and helping veterans become comfortable using AT, and in judging the effectiveness of AT solutions. They can also allocate resources, present cases to payers and supervisors, as well as coordinate AT and other services (Merbitz, Merbitz, & Sherer, 2005).

Considering the impending gap in the workforce as the Baby Boomers enter retirement age, rehabilitation professionals can take an active role in providing services to veterans with disabilities to help fill the gap. In August 2009, approximately 2.8 million veterans, or 13% of all veterans surveyed, reported having a service-connected disability (Current Population Survey, 2009). An estimate of 1.64 million U.S. military personnel have deployed as part of Operation Enduring Freedom (OEF) in Afghanistan and Operation Iraqi Freedom (OIF) since October 2001 (Tanielian & Jaycox, 2008). Additionally, there is an estimate: for every military personnel killed, at least sixteen are wounded; these wounded warriors will return to the United States with some type of disability (Frain, Bishop, & Bethel, 2010). The United States Department of Labor predicted in 2008 that over 200,000 veterans with disabilities will flood the civilian job market each year as they leave the military. By providing services to veterans with disabilities, rehabilitation

professionals can prove our veterans to be the next great workforce, especially in the fields of technology and AT (Ruh, Spicer, & Vaughan, 2009; Frain, Bishop, & Bethel, 2010).

The purpose of this article is to provide rehabilitation professionals with an understanding of the role of AT for veterans. To accomplish this, the areas that will be discussed include:

- (a) historical events that have led to legislative action to pave the way for veterans as well as individuals with disabilities to access AT today,
- (b) categories of AT with examples of how veterans benefit from AT
- (c) issues of disuse and abandonment
- (d) barriers to accessing AT
- (e) strategies for the rehabilitation professional
- (f) summary as well as a discussion on moving forward with the information given in this paper.

With an understanding of the past, rehabilitation professionals can have a clearer understanding of the benefits and limitations of AT in the present, and can create strategies for improving access to AT for the future.

Historical Events

World War I

Access to AT was not always available to military personnel with disabilities and veterans. Before this benefit may be considered, one must look at the period of time when the government recognized its obligation to veterans injured while serving this country: the National Defense Act (1916). The event during which this Act was passed was World War I (1914 - 1918). The Smith-Sears Veterans Rehabilitation Act, also referred to as the Soldier's Rehabilitation Act (1918) enabled World War I veterans with disabilities to receive training to return to the workforce as well as placement (Obermann, 1965). This Act was an expanded role of the Federal Board of Vocational Education, which was created the previous year through the Smith-Hughes Act (1917) (Patterson, Bruyere, Szymanski, and Jenkins, 2005).

As a result of the Soldier's Rehabilitation Act, training for individuals with disabilities was extended to civilians two years later through the Smith-Fess Act (1920), also referred to as the Civilian Rehabilitation Act (Patterson, Bruyere, Szymanski, and Jenkins, 2005). Note that this civilian training was limited to individuals with physical disabilities. Services were not expanded for those with mental disabilities or mental illness until 1943 through the Barden-LaFollette Act. The Civilian Rehabilitation Act was established as a Federal-State vocational re-

habilitation program to provide services that included: vocational guidance, training, occupational adjustment, placement services and prostheses. The veteran that lost her lower leg, mentioned in the introduction of this paper, is an example of the access to AT given to veterans as a result of the Soldier's Rehabilitation Act.

World War II

As a result of World War II (1939 - 1945), the Service-men's Readjustment Act of 1944, more commonly referred to as the G.I. Bill, was passed providing veterans with home loans as well as college education and vocational education/ training. Chapter 31 of the Montgomery G.I. Bill includes a vocational rehabilitation program, known today as the Vocational Rehabilitation and Employment VetSuccess Program. This program (also referred to as Chapter 31) offers five Track Options: 1) Reemployment with Previous Employer, 2) Direct Job Placement Services for New Employment, 3) Self-Employment, 4) Employment through Long Term Services, and 5) Independent Living Services (ILS) (U.S. Department of Veterans Affairs, 2010). In the first of the four Track Options, the rehabilitation counselor may include an AT needs assessment for areas related to work adjustment services, job accommodations, and job modifications. The fifth option is for veterans with severe disabilities, who are unable to pursue an employment goal. The veteran may require rehabilitation services to live more independently with or without AT and independent living skills training, and to raise their potential to return to work. (U. S. Department of Veterans Affairs, 2010)

Civil Rights Movement

If not for Rosa Parks and the boycott of the Montgomery bus (1955), segregation laws might still remain intact. The Civil Rights Movement helped lead the way for gaining rights of other minority groups. If not for the Civil Rights Movement, other minorities such as women, gays and lesbians, and individuals with disabilities would not have the legal grounds to seek protection of their rights (Mondak, 2000).

As a result of the Civil Rights Movement, Title VII of the Civil Rights Act of 1964 was passed, prohibiting employment discrimination based on race, color, religion, sex, or national origin. As a result of the Civil Rights Act, the Rehabilitation Act of 1973 was passed, prohibiting discrimination against qualified individuals with disabilities. However, this was limited to those working for the federal government. Not until the Americans with Disabilities Act (ADA) of 1990 was passed, was employment discrimination prohibited against qualified individuals with disabilities in state and local governments as well as in the private sector, under Title I and V. Also under the Americans

with Disabilities Act (ADA) of 1990 was the requirement of employers to make reasonable accommodation to "the known physical or mental limitations of otherwise qualified individuals with disabilities, unless it results in undue hardship." (U.S. Department of Justice, 2005).

Technological Advances

The advances in technology have made these opportunities possible for individuals with disabilities. The Telecommunications Act of 1996 was passed to provide telecommunications products and services that are accessible and readily achievable, to individuals with disabilities (Patterson, Bruyere, Szymanski, and Jenkins, 2005). At the close of 2010, the Telework Enhancement Act was passed, allowing eligible Federal employees to telecommute (Telework Enhancement Act of 2010, H.R. 1722). Although the Telework Enhancement Act, Rehabilitation Act, ADA, and the Telecommunications Act, and amendments were designed and passes to give opportunity to individuals with disabilities, access to AT was still lacking.

To allow for better access to AT devices and services for individuals with disabilities, the Technology-Related Assistance for Individuals with Disabilities Act (also referred to as the Tech Act) was passed in 1988 to develop a nationwide delivery system for AT. The nationwide system allowed program development in nine states with the size of the grant funding dependent upon the population, size of the state and nature of activities. The Tech Act was later revised in 1994, and by 1995 all states received grant funding (Bryant and Seay, 1998).

The Assistive Technology Act of 1998 was passed to improve availability and access to AT. This included more awareness of the laws, policies, and procedures related to AT devices and services. In this act, alternative funding systems for AT included a low-interest loan fund, an interest buy-down program, a revolving loan fund, and a program to buy, lease or acquire AT devices and services by other means (ATA; P.L. 105-394).

USERRA

Rehabilitation professionals may be called upon to work with employers regarding another piece of legislation related to employed military service men and women, the Uniformed Services Employment and Reemployment Rights Act of 1994. Also referred to as USERRA, under this Act an individual may be absent from work for military duty and retain reemployment rights for a cumulative length of five years (with exceptions for National Guard and Reserve training duty and during a time of national emergency). Additionally, USERRA provides protection for disabled veterans, requiring employers to make reasonable ef-

forts to accommodate the disability (Civilian Personnel Management Service, 2006). The screen reader for the blind veteran mentioned in the introduction of this paper is an example of an accommodation.

Without a firm understanding of the current legislation, the definition of a disability and reasonable accommodations, employers may pass over the opportunity for a veteran to demonstrate his or her skills. In working with employers, advocacy for the veteran may be needed to ensure compliance with current legislation as well as to make recommendations that may include AT devices as part of the accommodation efforts. The next section will discuss categories of AT and how veterans benefit from AT.

Categories

With the many technological advances, AT may be categorized by its type (either "high tech" or "low tech") or by its purpose. "High tech" devices tend to be complex and sophisticated in design. On the other hand, AT devices categorized as "low tech" are considered, easy to use, inexpensive, and commercially available (Falvo, 2009). When categorized by its purpose, AT can be used to compensate for his/her impairment (Scialfa & Fernie, 2006). For example, a veteran with hearing loss uses a signaling device to increase his safety while working in construction. AT can also be categorized by the way it is used to adapt to the veteran's environment to accommodate his/her impairments (Scialfa & Fernie, 2006). Making an employee restroom accessible (by installing grab bars, raising the toilet height, and enlarging stall size) is an example of adapting to the environment to accommodate for impairments, and also complies with the 2010 ADA Standards for Accessible Design (U.S. Department of Justice, 2010).

A study by Hedrick et al. (2006) on employment issues and AT among veterans and civilians listed six categories of AT devices. The first are the mobility and independent living devices. These are devices used for getting around such as wheelchair, canes, or motor vehicle device. Second are the prosthetics & orthotics. These include an artificial leg to replace an amputation, leg brace, hand splint or orthotics. The third category is the assistive computer technology. For example, a veteran with a traumatic brain injury may benefit from an electronic organizer to manage his daily schedules and appointments to compensate for short term memory loss. Other examples are voice recognition software or a mouth sticks to type on a keyboard for a veteran that has lost the use of his or her hands. The fourth are the assisted listening devices, e.g. amplified telephones, Tele Typewriter, or a speech converter that converts into both text and video sign language. The fifth are the assisted seeing devices such as a magnification device or a screen reader for veterans with low vision or blindness. The sixth are

the augmentative and alternative communication devices such as phone equipment or writing equipment.

Other technologies, such as online/virtual job training and telecommuting have been beneficial to veterans with disabilities, including veterans with Post Traumatic Stress Disorder (PTSD). While there are no "standard" patterns of reaction to the traumatic experience of war, common PTSD reactions displayed in postsecondary education and in the workplace include difficulty attending to a task, difficulty with concentration and memory, and feeling detached from others (Ruh, Spicer, & Vaughan, 2009; Parish, 2008). Some veterans respond immediately, while others have delayed reactions. Bryant (2004) reported 40% of veterans with chronic PTSD did not initially show Acute Stress Disorder. In the workplace, a noise canceling headset may be useful to maintain concentration, memory aids may be useful to compensate for memory deficits, and electronic schedulers may be used to help with time management (Whetzel, 2010). Alternatively, telecommuting can allow a veteran to work from the "safe" and secure environment of his or her own home (Ruh, Spicer, & Vaughan, 2009) and is supported by the previously mentioned Telework Enhancement Act (Telework Enhancement Act of 2010, H.R. 1722).

Many veterans with difficulties or impairments with dexterity, vision, and/or hearing, excel when introduced to AT (Ruh, Spicer, & Vaughan, 2009). In the workplace, assistive technologies may be useful to compensate for his or her impairments as well as provide alternatives that take their knowledge, skills and abilities to a level that can provide equal opportunities for veterans. With advancements in technology, choosing the appropriate AT device can be overwhelming and confusing. The next section will discuss current issues related to AT, including barriers to accessing AT and issues of disuse and abandonment.

Current Issues

Barriers to Accessing AT

With the wide range of assistive technologies on the market, unclear guidelines, limited access and financing can create barriers for veterans to obtain the needed assistive technologies. While the AT resources and services for veterans are available by the federal government, the guidelines between service-related and non-service related injuries and illnesses still remain unclear and continue to have inconsistencies. The AT Network (2010) points out that the federal government covers prosthetics and rehabilitative devices for both service-related and non-service injuries. On the other hand, adaptive equipment for vehicles and vocational training are limited only to veterans with service-related injuries. Another inconsistency

that veterans may find confusing is how to justify obtaining a computer. For example, a veteran with a spinal cord injury can obtain a computer through vocational training or as part of an environmental control unit, but would not have a computer covered if exclusively as a rehabilitative device.

Access to AT may be another problem for veterans. In order to obtain veteran services and resources, they are required to follow bureaucratic procedures. First, the veteran must go to a military or veteran's medical center for medical review, followed by a visit to a center that specializes in the type of AT the veteran needs (AT Network, 2010). These procedures may create a barrier for veterans living in rural areas where there is little or no access to veteran services. For example, if the veteran with a complete T10 spinal cord injury mentioned previously lived in a rural area, it would be challenging to arrange participation in the VA Driver Rehabilitation available at the veteran's medical center located in an urban area.

Veterans residing in rural areas have the option to either (a) travel to the existing military and veteran sites or (b) use local medical and AT services. Outside the existing military and veteran sites, there community-based outpatient clinics and the federal government contracts out to a few private sector organizations as well. However, it is impossible for veteran services to reach *all* parts of the rural areas. In addition, if veterans choose the second option and use local services, the costs are not be covered by the federal government (AT Network, 2010).

Whether living near or far from the military medical centers, wait time for AT may pose a problem for veterans requesting services. For instance, a veteran who is blind may have easy access to a VA center, but may wait up to nine months to receive assistance. When the requests for services are high, the wait time increases. Additionally, the specific type of injury or specialization may affect the wait (AT Network, 2010). While unclear guidelines, limited access in rural areas or prolonged wait times remain as barriers, another issue is whether the veteran will use the AT device once it is obtained.

Disuse and Abandonment

Statistics on AT abandonment vary. In a survey of servicemembers and veterans with major combat-associated unilateral lower-limb loss, abandonment was found in 11% of those from the Vietnam War, 4% of the Operation Iraqi Freedom/Operation Enduring Freedom (OIF/OEF) conflicts (Gailey, et al., 2010). On the other hand, abandonment was more frequent among veterans with upper-limb loss: 30% of those from the Vietnam War and 22% of the OIF/OEF groups (McFarland, Winkler, Heinemann, Jones, & Esquenazi, 2010). The results of a survey on technology abandonment found that 29.3% of all devices ob-

tained were abandoned (Phillips & Zhao, 1993). This is close to Scherer's (1996) estimate who approximates one-third of all assistive devices are abandoned.

Reasons for abandonment or disuse vary as well. Poor fit, lack of functionality, poor comfort, and pain were reasons for abandonment of the prosthetics (Gailey, et al., 2010; McFarland, Winkler, Heinemann, Jones, & Esquenazi, 2010). A study done by Scherer & Galvin (1996) included interviews with people with disabilities and therapists, and found those with acquired disabilities (as a result of an illness or accident) tend to view AT as reminders of what they could no longer do on their own. Those with acquired disabilities are often forced into using AT devices prematurely, and consequently are readily discarded.

Reasons for disuse or continuing use depend upon proper and usable fit (Patterson, Bruyere, Szymanski, and Jenkins, 2005). If the AT device is too difficult to use the motivation and success rates decrease (King, 1999). Specifically, disuse or continuous use of the AT device was hypothesized by Riemer-Reiss and Wacker (2000) to be related to the user's involvement, and modifications while setting goals or during the decision making process, support, compatibility, relative advantage, and, trialability. The next section offers strategies to address the issues of abandonment and disuse as well as strategies for keeping up with technology and searching for alternative funding sources.

Strategies

Funding

If the assistive device cannot be justified for vocational training, it may be helpful for rehabilitation professionals to have some awareness of alternative funding sources, including federal, state, and private funding, credit financing, as well as resources within the local community (Wallace, 1995). Rehabilitation Services Administration (RSA) administered the Assistive Technology Alternative Financing Programs and Access to Telework Loan Programs that has provided \$38.9 million in Assistive Technology loans for 3,801 adults and children with disabilities (Rehabilitation Engineering and Assistive Technology Society of North America, 2006). Other possible searches are computer reuse programs, centers that offer hands-on free trials or loans, and centers that offer used durable medical equipment, such as the Washington Assistive Technology Act Program in Washington state, the Finger Lakes Independence Center in Ithaca, NY, or other AT demonstration and trial centers listed on USA Tech Guide at www.usatechguide.

Staying Current

With the rapid advances in technology, Merbitz, Merbitz, and Scherer (2005) offer strategies to help keep up-to-date with the latest assistive technologies. The first strategy is to have a basic foundation of knowledge and vocabulary. The second is to form relationships with various Assistive Technology Professionals (ATPs) that specialize particular areas (software, seating and positioning, communications, etc). The third is to attend conferences to meet vendors and form contacts.

The fourth strategy offered by Merbitz, Merbitz, and Scherer (2005) is to perform computerized searches to find current information. Databases of AT devices are offered on websites such as the Abledata at www.abledata.com (maintained for the National Institute on Disability and Rehabilitation Research of the U.S. Dept. of Education), and on the National Public Website on Assistive Technology at www.assistivetech.net (created with funding from NIDRR and the Rehabilitation Services Administration). The National Public Website on Assistive Technology also provides links to nationwide locations for AT reuse and AT exchange programs. The Job Accommodations Network provides a resource on AT and job accommodations at www.askjan.org.

Merbitz, Merbitz, and Scherer's (2005) last strategy is to consider consumers as experts in the field. The Centers for Independent Living, and State Assistive Technology Projects are examples of places where an experienced consumer can share his/her experience. Knowledge of AT that is currently available will also serve as a valuable resource for rehabilitation professionals. Riemer-Reiss (2003) found that rehabilitation professionals that engage in continuous training in AT will increase the likelihood of recommending it to their clients.

Include These Considerations

Whether making recommendations or performing evaluations and training for AT, considerations must be made regarding the whole individual and AT. Some of the following considerations were listed by Falvo (2009), Phillips & Zhao, (1993), and Scherer (2000):

- (a) the user's preferences and needs,
- (b) the user's functional abilities,
- (c) environmental support required to use the AT,
- (d) amount of energy and time needed to use it,
- (e) amount of cognitive effort needed to use it,
- (f) where the AT device will be used,
- (g) long-term needs,
- (h) durability,
- (i) stigma (increasing the visibility of the disability),

- (j) aesthetics (cosmetic appearance is linked to self-image and self-esteem),
- (k) cultural factors (affecting acceptance and willingness to use AT),
- (l) chronological age,
- (m) motivation,
- (n) coping skills,
- (o) patience,
- (p) self-discipline, and
- (q) pride.

These considerations are vital because addressing the individual's needs are related to disuse/ abandonment or continuous of the AT device (Scherer, 2002).

Active Participation

A veteran's involvement is essential to every step of the rehabilitation process. Active participation allows the veteran to be involved in goal setting, choosing the appropriate device, training in how to use it, and be involved in revisions as needed. Allowing involvement places attention on a veteran's personal need, and avoids abandonment or disuse, wasting of monetary resources, and wasting of the rehabilitation professional's time (Merbitz, Merbitz, & Scherer, 2005).

The Matching Person and Technology (MPT) is an assessment process that provides a personalized approach to matching the individual with technology (Scherer, Sax, Vanbiervliet, Cushman, & Scherer, 2005). In this approach, the user and provider work together to uncover feelings and attitudes, reluctance to using AT devices, and identifies comfortable levels of the user. For each limitation, a goal is created with an intervention that include accommodations and AT. Scherer, Sax, Vanbiervliet, Cushman, & Scherer (2005) completed a study with over 150 vocational rehabilitation counselors revealing those exposed to training in the MPT Model reported a boost in their AT services delivery outcomes. With an awareness of abandonment and disuse, rehabilitation professionals can utilize models such as the MPT Model to provide a personalized approach to successfully linking the veteran with the appropriate AT device.

Discussion and Conclusion

This article began with a discussion on the legislative actions in the past that paved the way for veterans with disabilities to access AT devices that are available today. The legislative acts listed in this paper were not inclusive of all the laws, but provided some evidence of the opportunities that have evolved for veterans with disabilities. Even with existing legislation in place, follow up is still required in educating the public, educating and advocating for veterans

with disabilities and those in contact with the veterans with disabilities.

Examples of different types of AT and how AT can relieve the challenges posed in the veteran's work environment were given as well as various resources of databases and AT programs. The strategies proposed by Merbitz, Merbitz, & Scherer (2005) will equip rehabilitation professionals with ways to keep up-to-date with the latest technologies. Issues of abandonment and disuse were discussed as well as barriers to accessing AT.

Knowing what causes abandonment and misuse, rehabilitation professionals can utilize this knowledge to steer clear of these issues by considering the whole person and encouraging active participation and involvement from the veteran throughout the entire rehabilitation process. In order to break down barriers such as unclear and inconsistent guidelines and improve future access for veterans, efforts need to be made to establish uniform guidelines as well as ensuring awareness of these guidelines. In addition, efforts need to be made to accelerate the claims process, increase services for veterans by increasing the number of community-based outpatient clinics, including rural areas, and contracting out more of the services with other vendors and service providers (AT Network, 2010).

Veterans with disabilities were once viewed as dependent upon society, without purpose or function. Due to advances in technology and improvements to veteran's benefits, AT has opened doors for eligible veterans with disabilities to return to work, and function more independently in the workplace, and in activities that are meaningful to them. AT can alleviate challenges posed in the veteran's work environment as well as break down barriers to employment and increase the variety of career choices (Ruh, Spicer, & Vaughan, 2009). Since rehabilitation professionals carry knowledge about different types of AT, they can assist veterans and employers to attain the needed AT to function in the workplace, as well as support the effort in improving access for all veterans that may benefit from AT.

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Author Notes

Evonne Osorio is a master's student in rehabilitation counseling at Western Washington University and a Certified Occupational Therapy Assistant, working with a variety of clients with physical disabilities and utilizing Assistive Technologies to increase client's independence in their activities of daily living.

Correspondence concerning this article should be addressed to Evonne Osorio, Western Washington University Rehabilitation Counseling Program-Everett, University Center of North Puget Sound, Gray Wolf Hall 254, 2000 Tower Street, Everett, WA 98201. Email: osorioe@students.wvu.edu

NOTE: Added book title, edition, pages to Patterson ref. Author had 2005. Only ref that I could find online was 2005 so changed to 2004.