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Abstract: Presents an overview of legislation, rehabilitation agency programs and federal agency programs that have an impact on the distribution and use of assistive technology (AT) for persons with visual impairments. Technological barriers to employment; Concept of AT; Services offered by state vocational rehabilitation agencies in the U.S.; Role of the Americans with Disabilities Act of 1990 and the Rehabilitation Act of 1973 in ensuring accessibility issues for employees with disabilities.

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Employment Barriers: Access to Assistive Technology and Research Needs

Persons with visual impairments (that is, those who are blind or have low vision) continue to be substantially underrepresented in the competitive labor market. The unemployment rates of those aged 21-64 who are visually impaired and actively looking for employment range from 66% to 78%, depending on the severity of vision loss and the database used to compute the data (Leonard, 1999; McNeil, 2000; Turpin, Sebesta, Yelin, & LePlante, 1997). These figures are significantly higher than the 5.6%-17% rates estimated for the general population (Turpin et al., 1997; U.S. Department of Labor, 2002). Ongoing progress and innovation in technology and access to information is improving the quality of life for all, including persons with visual

impairments, but there is concern that individuals with disabilities will be unable to use the expanding technology because of access problems. Only 33% of persons with work disabilities aged 15-64 have computers in their homes, compared to 56% of those without disabilities (Kaye, 2000).

Persons with visual impairments have been one of the most difficult populations to accommodate in the area of assistive technology (AT) (Mondak, 2000). The authors believe that if the high unemployment rate of persons with visual impairments is to be reduced, it is imperative that barriers to technology be resolved.

Although there are innovative programs to bridge the gap between technology and employment barriers for persons who are visually impaired, there is typically a lag between implementation of these programs and the dissemination of information about their effectiveness in the professional literature. In addition, some innovative programs are never profiled in the literature. This article presents an overview of legislation, public and private rehabilitation agency programs, and federal agency programs that have an impact on the distribution and use of AT.

TECHNOLOGICAL BARRIERS TO EMPLOYMENT

AT is defined as "any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities" (RESNA, 1998, Introduction, paragraph 3). It is easy to identify a variety of products that can be used to increase the functional capabilities and the employability of persons with disabilities. However, it is not so easy for those who are visually impaired. Computer-related AT, in particular, is a specific area of concern for persons who are visually impaired. Mondak (2000) found that the lack of knowledge and funding are two of the greatest limiting factors on the use of AT to increase the employability of individuals with visual impairments. Timeliness in receiving equipment, evaluation procedures, and collaborative evaluations are also ongoing concerns of consumers (Crudden & Fireison, 1997; Crudden, McBroom, Skinner, & Moore, 1998). The most noted technological barriers include the lack of awareness and expertise (for consumers and service providers), the lack of a universal design in the development and dissemination of AT, and lack of comprehensive and coordinated funding (as a result of gaps in laws and policies) (Johnson, Wolffe, Candela, & Stiteley, 2001; Kaye, 2000; National Council on Disability, NCD, 2000). Consumers (Crudden & Fireison, 1997; Crudden et al. 1998) and employers (Crudden, Williams, Moore, & McBroom, 2002) have reported that delays in acquiring AT have had a negative impact on their employment outcomes.

LEGISLATION

The federal government has acknowledged the need for the distribution and use of AT through the passage of such legislation as the Rehabilitation Act, Workforce Investment Act, Medicaid, Medicare, the Telecommunications Act, and the Assistive Technology Act of 1998 (NCD, 2000).

As a result, individuals are able to access services that provide assistance in finding employment, receiving job-site accommodations, gaining access to assistive devices and technology, and identifying funding sources to assist in the purchase of expensive products.

STATE VOCATIONAL REHABILITATION AGENCIES

State vocational rehabilitation (VR) agencies have addressed the employment needs of persons who are visually impaired since the passage of the Smith-Fess Act (1920). While each state operates in compliance with guidelines specified by the Rehabilitation Services Administration, states have some flexibility in implementing these guidelines. Consequently, there are various levels of efficiency and effectiveness among the states and in different aspects of the rehabilitation process.

Since the Technology-Related Assistance for Individuals with Disabilities Act of 1988, all 50 states and 6 territories receive grants to develop comprehensive, statewide AT programs specific to their needs and collaborate with state VR agencies to coordinate AT services. Some policies that have resulted from this effort include state purchasing policies, Medicaid policies, low-interest loan programs, and compliance with Section 508 of the Rehabilitation Act and other civil rights acts (RESNA, 1998). However, it is not known if these projects have sufficient personnel to address the AT needs that are specific to persons with visual impairments. If they do not, then there would be a need to increase the number of trained computer AT personnel specific to visual impairments.

State VR agencies provide a range of services culminating in employment. Because AT and job-site modifications are vital to state VR consumers' acquisition and retention of jobs (Crudden & Fireison, 1997), and AT services are ranked fourth among rehabilitation services received by consumers with visual impairments (Cavanaugh, 2000), training and experience in these issues is imperative for VR counselors and AT professionals. Since state VR agencies seek payment for AT from other sources (Hagar, 1999; Vocational Rehabilitation Services General Provisions, 2000), when possible, an appropriate state model for addressing AT issues should be examined to identify exemplary programs that will serve as models for other state VR agencies (Crudden & Fireison, 1997).

PRIVATE AGENCIES

The mission of most private agencies is to create and provide independence and economic opportunities for individuals who are visually impaired or visually impaired and have additional disabilities through marketing and manufacturing products and providing services to consumers. These agencies are funded through fees for services, various grants, private donations, and endowments. Typical services include computer training, employment services, professional training, consultation services, orientation and mobility, low vision evaluations, information and referral, and/or media production.

Although the services of private agencies seem to be similar to those of state VR agencies, private agencies also provide additional services and opportunities. Because of the Javits-Wagner-O'Day Act (JWOD) (1971) as amended, the federal government is required to "purchase certain goods and services from nonprofit agencies that employ the blind or visually impaired" (McElveen, 2000, p. 22). Thus, private programs can provide training and employment opportunities in managerial, supervisory, service, and professional positions. As of 2000, about 34,000 individuals were employed through JWOD, and with advancements in technology, increases in employment opportunities are anticipated (McElveen, 2000; Wilson, 2000).

FEDERAL AGENCIES

The Americans with Disabilities Act of 1990 and Section 508 of the Rehabilitation Act of 1973 have played an important role in ensuring that federal agencies become more aware of accessibility issues for their employees and members of the public with disabilities. A report by the U.S. Department of Justice's Civil Rights Division (2000) confirmed that certain barriers still exist in federal agencies. However, Section 508 prohibits federal agencies from developing, producing, or maintaining materials, including those in electronic format, that are inaccessible to people with disabilities; thus, advancements in the accessibility of information and employment opportunities are expected to increase for people who are visually impaired.

Coordination between individuals/agencies with technological expertise and those who are knowledgeable in the field of rehabilitation remains a challenge in federal agencies. In addition, there are still barriers in accessible web site design, accessible software packages, and accessible office equipment (i.e., fax machines and copiers) (U.S. Department of Justice, 2000).

Some federal programs have developed AT stations on-site to give employees the opportunity to have hands-on experience with a variety of assistive devices (RESNA, 1998). The work stations simulate the actual work area, so an employee can try various assistive devices to see what works with his or her disability. These programs may provide other services, including consultation with managerial and procurement officials, evaluation for AT and ergonomic solutions, technical assistance on disability issues, in-service training, demonstrations of AT, or coordinating group purchases of AT.

RECOMMENDATIONS FOR FURTHER STUDY

Further research on the development of models for addressing AT issues should be considered. The need for adequately trained AT personnel and the impact of agency collaboration on individuals who require AT at work in a timely manner must be addressed. Which state agencies, private agencies, and federal agencies have the most successful outcomes? Can innovative programs be replicated in other parts of the country? What makes these programs effective? Researchers also need to identify and investigate how state VR agencies, private agencies, and federal agencies overcome technological barriers to improving employment outcomes for

individuals who are visually impaired.

Furthermore, state VR programs, private agencies, and federal agencies address unique technological barriers to employment faced by individuals who are visually impaired; however, some states and programs are particularly successful in addressing these issues. Thus, it is essential to consider programs that have higher competitive employment outcomes and to explore what each exemplary program practices to reach this goal.

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