ENTREPRENEURS WITH DISABILITIES: THE ROLE OF ASSISTIVE TECHNOLOGY, CURRENT STATUS AND FUTURE OUTLOOK

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ABSTRACT

Small business is a growth industry in the United States. Persons with disabilities are among those who are taking part by starting up businesses, especially home-based businesses.

Assistive technology is a key break through which has enabled people with disabilities to compete as small business owners. Assistive technology includes rehabilitative, adaptive, and assistive devices and the procedure for selecting them. The different types of assistive technology available to a small business owner with learning, hearing, visual, or physical disabilities are discussed.

INTRODUCTION

Small businesses (firms with fewer than 500 employees) dominate the U. S. economy. There were approximately 22.9 million small businesses in the U.S. in 2002 (SBA Office of Advocacy, 2003). A more recent estimate by the U. S. Small Business Administration puts that number at 25.8 million ("Small business effects", 2006). In addition, there were 647,914 new businesses and 565,351 business deaths for the period 2003-2004, a net increase of 82,563 firms (U.S. Census Bureau, n.d.). Estimates by New Business USA for the year 2000 show that more than 900,000 home-based and 600,000 commercial-site businesses were started (Lambing & Kuehl, 2007).

Persons with disabilities are among those who are starting businesses. They are nearly twice as likely as a non-disabled person to be self-employed. A 1995 U.S. Census Bureau report showed that 1.7 million of 9.4 million sole proprietors in the U.S. indicated they had some sort of disability (Nelton, 1998).

The 2002 U.S. Census Bureau indicated that 18 percent (51.2 million) of the U.S. population had a disability (U.S. Census Bureau, 2002). There are no accurate data on the number of self-employed persons with disabilities. Persons with disabilities are nearly twice as likely as non-disabled persons to be self-employed. According to the 1990 Census of Business 12.2 percent of persons with disabilities were self-employed in contrast to 7.8 percent for non-disabled. The Rural Institute of Disability at the University of Montana found that more than 500,000 persons with a disability reported owning their own business (The Abilities Fund, 2007). Also, the Rehabilitation Services Administration (RSA) statistics for 1997 show that 27 percent of 223,668 vocational

rehabilitation clients with successful closures became self-employed or started a small business (Mathis, 2003).

PURPOSE

New research and design in assistive technology are rapidly removing physical barriers and providing significant opportunities for disabled entrepreneurs to pursue their goals of self-employment. This paper examines the latest developments in assistive technology and how they can be used by disabled entrepreneurs in running a business.

DISCUSSION

Assistive technology (AT) is a generic term that includes rehabilitative, adaptive, and assistive devices and the procedure used in selecting and using them (Assistive technology, Wikipedia, n.d.). Assistive technology helps a person with a disability to perform an everyday task. It can be as simple as a jar opener, a remote for a television set or a magnifying glass. For a person with a disability, assistive technology can improve the quality of life for that person as well as perform business functions. Assistive technology as related to disabilities is considered next.

The ability to communicate with others is critical to the operation of a small business. Technology has played an important role in facilitating communication for individuals with hearing loss. Some persons with a hearing loss may need amplification to hear what the caller is saying. Others use a Telecommunication Device for the Deaf (TDD) more commonly known as a Teletypewriter (TTY), to access the telephone. The TTY consists of a keyboard and small screen and connects to a standard telephone. Some TTYs may have the phone built into the unit. Persons using a TTY can communicate directly with others who have a TTY. The two parties take turns typing their conversation as opposed to speaking.

For small business owners who have to communicate with others who do not have a TTY, the relay service can be used. The relay service is a free service provided nationwide. A TTY user calls the relay service and asks the communication assistant to call the person without a TTY. The user types the conversation and the communication assistant tells the hearing party what the user has typed. The hearing party responds and the communication assistant types the response. More recently, the Internet has created greater opportunities for persons who communicate through sign language. The Video Relay Service is similar to the traditional relay service; however, it allows a hearing impaired caller to conduct conversations with a hearing party through a sign language interpreter instead of text on a TTY.

Cell phone technology has made text messaging commonplace. This is very helpful to people with hearing disabilities to communicate anywhere, anytime, without the assistance of a third party. Data and text messaging options can be added to many cell phone plans and are usable on many types of cell phones.

FM amplification systems can enhance an individual who is hard of hearing to participate in meetings, conferences, and one-on-one or small group conversations. Realtime Captioning is a service that allows a transcriptionist to transcribe a lecture or conference for a deaf or hard of

hearing participant. The transcription can be viewed on-screen during the session and can be e-mailed later to the deaf or hard of hearing participant.

Persons with hearing loss can benefit from signaling devices. These devices turn audio cues into visual cues. For example, flashing lights can indicate that a telephone is ringing, that someone is knocking at the door, or that the fire alarm has been set off.

Technology has also played an important role in accessing paper and electronic documents for individuals with vision loss. There are several devices that can assist small business owners with a vision loss to read incoming mail, faxes, and other documents. For persons with low vision, some may benefit from the use of hand-held magnifiers and magnifying lamps. If greater magnification is needed, a closed circuit television (CCTV) or electronic magnification system can be used. The CCTV allows the person to magnify both text and images. Material is placed under a camera that magnifies the image, which is then displayed on a monitor. CCTVs are typically designed as desktop units. Electronic magnification systems are similar to CCTVs in that they consist of a camera and screen; however they are compact and small enough to fit in a pocket or purse. These hand-held electronic magnification devices are often quite versatile in that they are portable, but can have the option of connecting to a larger screen, such as a television.

Another option for reading printed materials is to use an optical scanner and specialized software that turns the computer into a reading machine. This software can enlarge and display the scanned materials or use speech to read the materials. This specialized software makes use of a scanner or digital camera to take a picture of the printed material. The picture is then converted into text using Optical Character Recognition (OCR) technology. The software then uses synthetic speech to read the material aloud.

Small business owners with vision loss can access the computer in several ways. Those with low vision can benefit from larger monitors or changing the operating system's display settings within the computer. If greater magnification is needed, a screen magnification software may be used to enlarge the image that appears on the computer screen. Others may use a screen reading software with synthetic speech to have information from the computer screen spoken aloud. Still others may use refreshable Braille displays to access the information on the computer screen by touch. All of these accommodations assist the small business owner in using standard business software (such as the Microsoft Office), using the Internet, and making use of e-mail.

Assistive technology devices have also enhanced opportunities in the operation of small businesses such as a vending stand. Audio feedback has been added to cash registers, thermometers, scales, and vending machines. Specialized bar code scanners have speech output which helps identify merchandise and maintain inventory. Handheld devices can announce the denomination of paper money or the color of an item.

Many of today's small business owners have mobile offices. Screen magnification and screen reading software can be carried on USB drives to make computers in locations outside of the office accessible. Some cell phone cameras with the addition of specialized OCR software can allow the device to serve as a portable reading machine. Screen magnification and screen reading software are also available to make cell phones and Personal Digital Assistants (PDA) accessible. The addition of Global Positioning System (GPS) software to certain PDAs or cell phones can enhance independent travel by providing auditory information regarding one's current location and a suggested navigation route to a destination.

Technology can also assist the small business owner with limited mobility. Motorized wheelchairs and scooters assist in moving about. Vans can be modified with lifts. The work environment itself can be arranged so that needed files, books, and equipment can be easily accessed from a seated position. Page-turners are available which turn the pages in a book for the person with limited mobility.

There are several ways to accommodate a computer for individuals with conditions that limit the use of their hands such as carpal tunnel syndrome, arthritis, injury to one hand, or quadriplegia. Software programs can modify the computer keyboard for one who cannot press two or more keys simultaneously. Many of the settings for the keyboard can be changed within the operating system of the computer without any additional cost.

Keyboards now come in a variety of styles and sizes. There are left-handed keyboards, one-handed keyboards, ergonomically designed keyboards, keyboards with non-standard key layouts, and keyboards that break into several sections so that they can be arranged for the computer user's convenience. There are oversized keyboards for people that cannot make fine movements with their hands. There are small keyboards for people that cannot move their hands within the range of the standard keyboard layout.

Keyguards are plastic sheets with holes for each key that fit over a keyboard to make selection of a particular key easier. Keyguards can be of significant benefit to people with shaky hand movements or limited strength in their hands and fingers. Keyguards can also be of benefit to those who press unintentional keys by accident. Trackballs and alternative mouse pointing devices help reduce stress in pointing and clicking functions.

Word prediction programs are also helpful in reducing the number of keystrokes required. These programs attempt to predict what the computer user is trying to type and prompts the user to press one keystroke to complete the word.

Voice recognition systems allow the small business person to operate the computer with one's voice. The person may use speech to either enter commands to the computer or type text into the computer.

Small business owners with learning disabilities, attention deficit disorder, or other health concerns can make use of the computer's writing tools. Software programs can assist with reading, grammar, spelling, and composition of documents. Persons with learning disabilities also benefit from technology to that used by those with limited vision, such as screen reading and specialized OCR software that allows text to be read aloud.

CONCLUSION

Entrepreneurship is becoming a most popular employment alternative for persons with disabilities. Business ownership has long appealed to them. Practical considerations are a flexible schedule, independence, and a work environment fitted to their needs, e.g., a home-based business.

Technology has certainly improved things. Today's technology is smaller, faster, portable, and in some cases less expensive than predecessor products. Assistive technology developers are combining specialized software with off-the-shelf cell phones, personal digital assistants, and digital cameras to produce assistive technology for today's business world. The widespread use of the

Internet has made the world a smaller place and has allowed small business owners with disabilities to reach distant markets despite transportation and mobility challenges.

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Two Roles for Technology: Assistive Technology and Universal Design for Learning. When most people imagine the role of technol-ogy for students with disabilities they think of AT. Relatively low-tech AT (like canes, wheel-chairs, and eyeglasses) have been in place for a century, but the high-tech AT that has emerged. Universal Design/Rose, Hasselbring, Stahl, & Zabala 507. Â The National Instructional Materials Accessibility Standard: An Example of the Current Linkage Between Universal Design for Learning and Assistive Technology. New developments in policy and practice are illuminating the educational landscape ahead and shaping the operational linkage between AT and UDL. Discover top examples of assistive technology for students with disabilities in the classroom that are making an impact. Keep Reading!Â This difference often referred to as the disability gap, is a result of a failure of many educational institutions to provide adequate resources to support differently-abled learners. To mitigate this crisis, itâ€™s critical to find a way to provide equal opportunities to students with disabilities. Assistive learning technology in the classroom represents an ideal solution. WHO fact sheet on assistive technology. Assistive technology enables people to live healthy, productive, independent, and dignified lives, and to participate in education, the labour market and civic life.Â â€˜Leaving no one behindâ€™ means ensuring the people with disabilities, the older population and those affected by chronic diseases are included in society and enabled to live a healthy and dignified life. WHO response. WHO is coordinating the Global Cooperation on Assistive Technology (GATE), which exists to improve access to high-quality affordable assistive technology for everyone, everywhere. The GATE initiative is developing 4 practical tools to support countries to address the challenges described above.