Access to Technology for Individuals with Disabilities:
Recent Trends and Issues

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INTRODUCTION

For the past two decades individuals with disabilities have become increasingly active participants of technology utilization. Due to federal legislations that ensure access to Assistive Technology (AT) and the contribution from professionals involved in developing and providing AT services to individuals with disabilities for their learning and quality of life, the field of AT has seen an explosion of technology utilization. In addition, with the advancement of recent technology such as social media and Internet of Things (IoT), access to technology is now more of the rule than the exception. Individuals with disabilities utilize AT which functions as a technological medium for accessing information via computer and the internet. The extent to which individuals need AT for computer and internet access varies depending on their residual abilities and preferences. Results from a school of empirical studies point to the effectiveness of AT for individuals with disabilities in accessing learning and daily life activities (Edyburn, 2013; Okolo & Deidrich, 2014). While a large body of studies exists in AT utilization, very few focus on supporting individuals with disabilities in their access to recent technologies such as social media and IoT. Providing AT for individuals with disabilities is not only the intent of the federal laws but also consistent with the principles of Universal Design for Learning (UDL). The core intent of the federal laws including Americans with Disabilities Act (ADA, 1990), Individuals with Disabilities Education Act (IDEA, 2004) and Tech Act (2004), is to narrow the disparity between individuals with and without disabilities by ensuring access to technologies needed for equal employment. The purpose of this chapter is to provide an overview, recent trends, and issues of technology access for individuals with disabilities. Legislations relevant to technology access for individuals with disabilities, AT service delivery models, principles of UDL, effectiveness of AT utilization for individuals with disabilities, recent trends, issues and solutions, and future directions for research will be discussed.

BACKGROUND

Federal Legislations for Technology Access for Individuals with Disabilities

Federal legislations such as the Americans with Disabilities Act (ADA) and the Individuals with Disabilities Education Act (IDEA) have been the major force for equal access to technology for all individuals regardless of their abilities or disabilities. According to the Technology-Related Assistance for Individuals with Disabilities Act (Tech Act, 1998) and the IDEA amendments of 1997, AT device is defined as *any item, piece of equipment, or product system that is used to increase, maintain, or improve the functional*

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capabilities of a child with a disability. Recently, the U.S. Department of Justice Civil Rights Division published "2010 Standards" which has revised regulations for Titles II and III of the ADA in order to provide information and technical assistance for newly designed public and commercial facilities to be accessible to and usable by individuals with disabilities. AT devices are typically categorized as low technology, medium technology, or high technology depending on the existence and level of sophistication in the included electronic components (Blackhurst & Lahm, 2000). The intent of these federal laws is that schools, rehabilitation, and health care professionals consider AT as an option for individuals with disabilities. Once the challenge of evaluating individual needs for technology and identifying the appropriate AT items that will increase their functional capabilities in accessing information, these AT items can function as an equalizer, enhancing the independence and freedom of individuals with disabilities.

Universal Design for Learning (UDL)

The concept of universal design was developed in 1997 by Ronald Mace and a group of professionals in multiple disciplines to ensure that the design of products and environments are accessible by the widest range of individuals possible (http://www.universaldesign.com/about-universal-design.html). With the concept of open architecture, Section 504 of the Rehabilitation Act (1973), and changes in the operating system by computer manufactuers, UDL is one of the four factors that contributed to removing hardware barriers and enabling accessibility to technology for individuals with disabilities. The concept of UDL stemmed from research in neuroscience, the learning sciences, and cognitive psychology with a focus on understanding individual differences and the pedagogies required for addressing them (http://www.cast.org/). From the UDL perspective, individuals with disabilities are viewed on the continuum of individuals with various degrees and types of abilities instead of focusing on the disability itself. This perspective helps teachers and other professionals to design instructional and related service activities focusing on the strengths of individuals with disabilities. An item or product with universal design is such that it can be used by individuals with or without disabilities and without any additional adpatation. Examples include curb cuts, elevators, and automatic doors. The seven principles of universal design are (1) equitable use, (2) flexibility, (3) simple and intuitive, (4) perceptible information, (5) tolerance for error, (6) low physical effort, and (7) size and space for approach and use. To ensure access and participation in general education for individuals with disabilities, these principles have been applied to educational practices and yielded the Universal Design for Learning (UDL) framework by the Center for Applied Special Technology (CAST). A key characteristic of the UDL curriculum is that it presents multiple options for access respecting the diverse learning styles of learners (Weymeyer, 2006; Messinger-William & Mariano, 2010). The UDL curriculum also recognizes the need to provide approriate challenges to all individuals by understanding state and national standards (Hitchcock, Meyer, Rose, & Jackson, 2002). Evidences based on experimental studies supporting the benefits of utilizing UDL guidelines are well documented by research results organized by the National Center for UDL (http://www.udlcenter.org/). Results of these studies show the benefits of providing multiple means of representation, action and expression, and engagement in designing and implementing instructional activites.

AT Service Delivery Models

While considering a continuum of assistive technology items and services for individuals with disabilities is a mandated practice in the field of education. Due to the vagueness of the current laws and lack of clear, consistent guidelines on how the services should be provided, service providers are faced