Students with Disabilities and Technology

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INTRODUCTION

America's schools are required to meet all federal laws and regulations for special education including the Individuals with Disabilities Education Act (IDEA), which requires that students are included in the Least Restrictive Environment (LRE), and Section 504 of the Rehabilitation Act.

Each student who is identified with a disability that affects them academically has either an Individual Education Plan or a Section 504 Plan which is created by a collaborative team (e.g., the parents, child, regular and special education teachers, therapists, and the school psychologist). They determine the goals, objectives, and accommodations that need to be made in the classroom setting. IDEA requires that assistive technology, which includes products, tools, and devices that can make a particular function easier or possible to perform, needs to be considered for every student who has an individualized education program (IEP) (Blackhurst, 2005).

Teachers of students with disabilities are utilizing techniques such as universal design to make adaptations to the regular education curriculum to help them garner access and understanding (Hitchcock, Meyer, Rose, & Jackson, 2002; Rose & Meyer, 2000). Also teachers in inclusive environments are using differentiated instruction which takes into account every student's interests, ability levels, and learning profiles regardless of disability (Dodge, 2006; Drapeau, 2004; Tomlinson, 2001). Often technology plays a vital role as special education teachers seek to individualize teaching methods to meet the needs of their students.

BACKGROUND

Blackhurst and Edyburn (2000) have suggested that four different forms of technology are relevant to special education and rehabilitation: the technologies of teaching (pedagogy and learning environments), medical technology (e.g., wheelchairs and lifts), instructional technology (software and hardware used in the classroom), and assistive technology. Assistive technology devices are defined in the Technology Related Assistance for Individuals with Disabilities Act of 1988 (Pub. L. 100-407) and the Assistive Technology Act of 1998 (Pub. L. 105-394) 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" (Title 29, Chapter 31, § 3002(a)(3) (Braddock, Rizzolo, Thompson, & Bell, 2004).

Computer innovations such as enlarged text, spell checking, and text-to-speech are examples of appropriate accommodations that help students with exceptionalities. Digital versions of books provide a variety of modifications that are simple for the student to employ. Students who have physical disabilities can manipulate the display to turn pages by small movements (even, literally, the blink of an eye); those with vision impairments can display the text in larger font, have the book read aloud or printed on Braille paper; students with learning disabilities can highlight or click on a word they are struggling with to hear the word or its definition while using a digital book (Behrmann, 2001).

Virtual Reality Simulations

Smedley and Higgins (2005) explained the benefits of utilizing virtual reality, which includes a text- and graphics-based environment that is simulated by a computer (Auld & Pantelidis, 1999) with students with disabilities:

"Technology-based applications give students access to worlds and environments that are inaccessible, too expensive, or too dangerous in a classroom setting; enable students with disabilities to experience laboratories and field trips at their own pace; and allow them to repeat the experience as many times as necessary" (p. 114).

Virtual reality can be experienced through the use of either a desktop virtual reality system (on a typical computer with a device like a mouse to manipulate through the environment) or an immersive reality system (images are displayed that provide front, side, and back views through a head mounted display and audio is fed in through headphones) (Powers & Darrow, 1994; Smedley & Higgins, 2005). Research is beginning to support the idea that children with exceptionalities can learn skills in virtual reality that transfer to real-world situations, yet there still needs to be more research conducted in this area (McComas, Pivik, & LaFlamme, 1998).

Assistive Technologies: AD/HD

The *Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV)* (2004) published by the American Psychiatric Association (2004) is the handbook used most often in diagnosing mental disorders in the United States. This handbook describes three sub-types of the neurobehavioral disorder AD/HD: (a) inattentive (difficultly focusing or staying focused on a task or activity), (b) hyperactive-impulsive (very active and compulsive), and (c) combined (inattentive, impulsive, and overly active). Assisted technology for students with AD/HD can include personal organizers, books on tape, and computer software that helps with outlining and note taking.

Autism Spectrum Disorder

Autism spectrum disorder is a neurological condition that can include a person who is very low functioning to one with Asberger's Disorder. Asberger's Disorder is a pervasive developmental disorder in which the person may have a great discrepancy between his or her intellectual and social abilities. A lack of social skills, including the ability to spontaneously play, is a defining feature of autism (Goldstein, 2002; Wolery & Garfinkle, 2002). Students with autism spectrum disorder often need structure and do not react well to change or a great deal of stimuli. When utilizing virtual technology with this population to teach a variety of skills (how to function in a social situation, for example), the number of stimuli has to be lessened (Max & Burke, 1997). Also, because the need to keep to a regimented schedule is vital for this population,

computer-mediated video-enhanced activity schedules and video modeling can be utilized (Kimball, Kinney, Taylor, & Stromer, 2003).

Speech and Language Disorders

Speech and language disorders are defined by the National Dissemination Center for Children (2004) as,

"...problems in communication and related areas such as oral motor function. These delays and disorders range from simple sound substitutions to the inability to understand or use language or use the oral-motor mechanism for functional speech and feeding" (p.1).

Touch pads, communication boards, and text-to speech help students who have severe issues in communication.

Mental Retardation

The American Association on Mental Retardation's (AAMR) (2002) definition of mental retardation is "a disability characterized by significant limitations both in intellectual functioning and in adaptive behavior as expressed in conceptual, social, and practical adaptive skills." Students with cognitive issues utilize technology that ranges from low-tech devices, for example, adapted eating utensils or pictorial communication boards, to high-tech devices, which would include voice output devices with adapted software that synthesizes speech (Technology and Media Division, 2003).

Learning Disabilities

It is important to emphasize that a person who has a learning disability has an average to above average IQ, yet a discrepancy exists between their intelligence and their academic performance. Technology can be used to support instruction of students with learning disabilities through electronic books, computer-assisted instruction, anchored instruction, electronic spellers, reading pens with text-to-speech capabilities, and network-based learning (Okolo, 2000).

A specific software package that has made an impact on students with learning disabilities includes Hasselbring's *Read 180,* wherein the computer reads a passage, highlights the words to be learned, and the

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