Chapter 32
The Promise and Limitations of Assistive Technology Use among Children with Autism

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ABSTRACT

The use of assistive technology to enhance skill development among children with autism continues to expand. To date, this technology has been primarily used to remediate deficits in language, social skills, and, to a lesser extent, academic skills. Despite the growing body of literature examining the use of these technologies among children with autism, the success of these interventions has been mixed. The authors review findings concerning available forms of assistive technology and the factors that impact their efficacy among children with autism such as developmental level and severity of impairments.

INTRODUCTION

According to the newly redacted and released Diagnostic Statistical Manual of Mental Disorders-V (American Psychiatric Association, 2013), meeting the criteria for a diagnosis of autism spectrum disorder (ASD) requires that individuals show symptoms early in childhood that collectively limit and hinder everyday functioning. The scope of symptoms must include deficits in social communication and interaction not caused by general developmental delays. These manifestations of ASD include deficits in social-emotional reciprocity (such as an inability to participate in the give-and-take of a conversation), nonverbal communication, and in creating and maintaining social relationships (including imaginative play and a general interest in others). Individuals with ASD also show repetitive behaviors as reflected

in perseveration or echolalia in speech, highly specific routines and ritualized patterns of behaviors (such as putting items of clothing on in a specific order), and heightened sensitivity/reaction to sensory input (American Psychiatric Association, 2013). Efforts to address these behaviors often require behavioral treatments, most notably applied behavioral analysis [ABA], which uses the techniques and principles of positive reinforcement and structured situations to bring about meaningful and positive change in behavior. Antipsychotic drugs have been used at times to treat related symptoms such as seizures and self-injurious behaviors (CDC, 2013).

One increasingly used form of treatment for mitigating some of the symptoms is that of technology in general and educational or assistive technology in particular (see Goodwin, 2008), these include any form of technology that can be used to enhance the functional independence and quality of life of individuals with disabilities (National Research Council, 2001). These technological interventions have involved, for example, the use of video games designed to improve memory function among children with special needs (See Durkin, 2010; Durkin, Boyle, Hunter, & Conti-Ramsden, 2013). Interest in the promise of technology as a mode of intervention for children with ASD and the limited body of research pertaining to its efficacy have been highlighted in recent reviews of literature by Ploog, Scharf, Nelson, and Brooks (2013) and Ramdoss et.al (2011).

The demands on these technologies are high as they must be adapted for individuals with differing levels of autism severity and of differing development levels. Further, some forms of assistive technology are designed as tools for life-long use, such as augmentative and alternative communication devices (AAC) which are used to facilitate and enhance communication. Others are introduced as a temporary instructional aid to modify or improve behavioral functioning, such as a pictorial schedule of activities to be completed during the day (Goldsmith & LeBlanc, 2004). Although such pictorial schedules commonly make use of notebooks or placards with pictures cueing a sequence of activities, increasingly such interventions are including technological supplements, such as video-enhanced modalities (Kimball, Kinney, Taylor & Stromer, 2004) and computer-based schedules delivered through Microsoft PowerPoint (Rehfeldt, Kinney, Root, Stromer, 2004).

Although the use of technology to ameliorate the symptoms of autism has met with qualified success, it continues to become a more prevalent form of treatment. For example, individuals with autism may now receive computerized instruction concerning how to decode facial expressions of human emotion, practice turn-taking in the context of social interactions, and learn how to establish eye contact. Additionally, technology is used to help improve organizational skills and maintain pace with the classroom curriculum (Charlop-Christy, Le, & Freeman, 2000; Goldsmith & LeBlanc, 2004; Goodwin, 2008; Koch, 2012; Ritterfeld & Weber, 2005). This technology is found in both the school and home environment. To be eligible for use of this technology in the school setting, a child must be given a diagnosis of autism, and the Individualized Education Program (IEP) must stipulate that assistive technology is needed. Briefly, an IEP guides the delivery of special education supports and services for students with disabilities and creates an opportunity for teachers, parents, school administrators, related services personnel, and students (when appropriate) to collaborate to improve children's educational outcomes. According to the National Center for Learning Disabilities (2013), by law, the IEP must include certain information about children such as current performance, annual goals, special education and related services, accommodations, participation in state and district-wide tests, needed transition services, measured progress, and an educational program designed to meet his or her unique needs. The specific types of educational

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