Chapter 66
Using Handheld Applications to Improve the Transitions of Students with Autism Spectrum Disorders

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ABSTRACT

While the knowledge that has been gained from previous studies has accelerated the understanding of the difficulties facing individuals with Autism Spectrum Disorders (ASDs), there is concern regarding the speed with which and the overall lack of translation of research into interventions that make differences in the everyday lives of individuals with ASDs (Gresham, et al., 2001; Volkmar, et al., 2004; Volkmar, Reichow, & Doehring, 2011). For example, the symptoms of ASDs can greatly impair an individual's ability to navigate independently through everyday events. Translating this knowledge into instructional practice requires, then, the design of methods for easing students' transitions within the school, home, and community. While research has validated the use of low-tech visual supports (e.g., National Autism Center, 2009), little has been done to analyze the utility and appropriateness of high-tech assistive technology, such as those interventions administered through smartphones, tablets, and other handheld devices, which are devices that are being used more frequently in education settings (Gray et al., 2010). This chapter presents the results of federally funded research to determine whether the use of iPrompts–a software application for iOS and Android-based smartphones and tablet computers–assists teachers and other educational professionals as they help students with ASD transition from one activity to the next or from one setting to another.

CHARACTERISTICS OF AUTISM SPECTRUM DISORDERS

Children with autism spectrum disorders (ASD) have difficulties with social interactions and social communication, and have restricted, repetitive, or stereotyped behaviors (American Psychiatric Association, 2013). Once thought to be a rare condition, the most recent prevalence estimates for autism spectrum disorders from the Centers for Disease Control and Prevention (CDC, 2012) estimate that 1 in 88 children in the United States has an autism spectrum disorder. Although it is common and recommended practice for students with ASDs to be educated in general education settings with their like-aged peers, modifications and adaptations are needed to optimize learning opportunities in general education settings for these students. Major difficulties in social interactions are consistently identified as a central feature of ASD (Carter et al., 2005) and can be a powerful predictor of educational outcomes (Malecki & Elliot, 2002; Myles et al., 2005; Welsh et al., 2001). Thus, the underlying social deficits in ASD likely hinder the developmental, cognitive, communicative, academic, social, behavioral, and functional outcomes of students with ASDs (Loveland & Tunali-Kotoski, 2005).

When entering new or unfamiliar social and physical environments, individuals with autism spectrum disorder (ASD) often experience a high level of anxiety that may result in inappropriate behavioral manifestations (e.g., tantrums, crying) and/or social withdrawal. The high level of anxiety and resulting inappropriate behaviors make it difficult for these students to transition to a new environment or setting and to immediately engage in educational and social tasks. Moreover, students with ASD may feel lost or anxious, if daily activities are not clearly indicated, or if the sequence of events is not understood. Students may become prompt-dependent if adults are constantly required to move them from activity to activity, and students may want to shut down (Hume, 2009).

Students with ASDs struggle with the rapid comprehension required for spoken communication. The fleeting nature of verbal language (i.e., once spoken, the words disappear) is especially problematic, when the information is complex and/or lengthy (Hume, 2009). On the other side of the equation, research has consistently shown that individuals with ASD have superior visuo-spatial skills, and learn easier and faster with visual presentation of materials (Garreston, Fein, & Waterhouse, 1990). Therefore, in order to accommodate students with ASD in classroom settings, visual supports will be necessary.

Therefore, developing methods to assist students with ASD transition has been a major focus of educational interventions for individuals across the autism spectrum. There is not one specific intervention that will be effective at reducing problem behavior and social withdrawal during transitions for all students with ASD, and there has not been a great deal of research focusing specifically on transitions. However, our clinical experience and knowledge of how individuals with ASD best learn leads us to believe that visual supports, including visual schedules, "first/then" displays, social narratives, and countdown timers can be used effectively for this purpose. All of these supports can be delivered using both low- and high-tech mediums, the latter of which will be the focus of this chapter.

ASSISTIVE TECHNOLOGY

Visual supports can be considered assistive technology using the definition of assistive technology (AT) provided in the Individuals with Disabilities Education Act (IDEA) of 2004, 20 U.S.C. § 1401:

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