Chapter 15
Let's Play!
The Use of Educational Games as an Intervention Tool for Autism Spectrum Disorder

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ABSTRACT

The purpose of this chapter is to summarize the potential and current use of digital educational games as an intervention tool for autism spectrum disorder (ASD). It provides an overview of educational games, as well as the potential benefits of using educational games as an intervention tool. Second, this chapter reviews a selection of digital educational games designed for addressing targeted skill areas applicable to ASD, including social interaction and communication skills, facial and emotion recognition skills, and adaptive behavior. Supporting research related to educational games is reviewed. This chapter concludes with recommendations for the future of designing and evaluating educational games as an intervention tool for ASD.

"In play a child always behaves beyond his average age, above his daily behavior; in play it is as though he were a head taller than himself." Lev Vygotsky, 1978, p. 102

Autism spectrum disorder (ASD) is a complex and lifelong neurodevelopmental disorder that is defined by persistent deficits in the core domain areas of social communication and interaction and the presence of restricted and repetitive patterns of behavior, interests, or activities (American Psychiatric Association, 2013). Deficits in social communication and interaction include difficulties with social-emotional reciprocity, nonverbal communicative behaviors, and developing, maintaining, and understanding re-

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lationships. Restricted and repetitive patterns of behavior, interests, or activities include stereotyped or repetitive movements, use of objects, or speech, insistence on sameness, inflexible adherence to routines or ritualized patterns, highly restricted and fixated interests, and hyper- or hyporeactivity to sensory input. ASD currently includes several conditions that were previously diagnosed separately: autistic disorder, pervasive developmental disorder not otherwise specified, and Asperger syndrome (American Psychiatric Association, 2013).

ASD is a heterogeneous disorder in which no two individuals with ASD exhibit the same symptom profile. Moreover, the degree of impairment among individuals with ASD is variable (Newschaffer et al., 2007). Individuals diagnosed with ASD are often categorized as "low-functioning" (LF) or "high functioning" (HF). However, these labels are not an official diagnosis, and there is not an agreed-upon definition of these terms. Nevertheless, previous literature suggests that LF and HF categories relate to the individual's cognitive functioning, with individuals that are referred to as LF having below-average measured intelligence scores (Corbett & Gunter, 2011).

Approximately 1 in 59 children has been identified with ASD in the United States (U.S.; Baio et al., 2018). Current methodologies and statistics indicate that ASD is about four times more common among males than females and is reported to occur in all racial, ethnic, and socioeconomic groups (Baio et al., 2018). Research has found that over 95% of children diagnosed with ASD have at least one co-occurring medical or behavioral condition (Soke, Maenner, Christensen, Kurzius-Spencer, & Schieve, 2018). Frequently reported co-occurring conditions include intellectual disability, attention-deficit/hyperactivity disorder (ADHD), anxiety, specific phobias, mood disorders, behavioral problems, chronic sleep difficulties, sensory processing difficulties, epilepsy, and gastrointestinal issues (Corbett & Gunther, 2011; Mannion, Leader, & Healy, 2013; Matson & Nebel-Schwalm, 2005; Shattuck et al., 2007; Simonoff, Pickles, Charman, Chandler, Loucas, & Baird, 2008; Tomchek & Dunn, 2007). There is currently no known cause for ASD and, in fact, is likely related to multiple different causes. Research suggests that ASD is related to a combination of genetic and environmental influences (Corbett & Gunther, 2011).

There is also currently no known cure for ASD. However, early intervention treatment can significantly improve an individual's development and achieve benefits across the lifespan (National Research Council, 2001; Corbett & Gunther, 2011). Many interventions and treatments have been designed for people with ASD to address the core and related symptoms of ASD. These interventions often include behavioral, communication, and educational approaches, such as applied behavior analysis, cognitive behavior therapy, social skills training, picture exchange communication system, video modeling, occupational therapy, sensory integration therapy, and speech therapy, as well as pharmaceutical approaches. Contemporary interventions have shown varying degrees of success, highlighting the importance of recognizing the factors and methods that influence symptom improvement in the treatment of ASD (Corbett & Gunther, 2011; Shattuck et al., 2007).

One method that researchers and clinicians have started to explore takes advantage of the individual's innate interests, abilities, and skills. Specifically, previous research has found that individuals with ASD are comfortable with emergent digital technologies and often enjoy playing video games (Mazurek & Wenstrup, 2013; Abirached, Zhang, & Park, 2012). A 2011 national survey (National Longitudinal Transition Study – 2) found that 41% of U.S. adolescents diagnosed with ASD spent most of their free time playing electronic or computer games (Mazurek, Shattuck, Wagner, & Cooper, 2012). This rate is more than twice the frequency of gaming seen in their neurotypically developing peers (18%).

Using emergent digital gaming technologies offers several benefits. For example, the delivery of traditional interventions can present challenges due to the interventions' specialized and often time-intensive