Chapter 8
The Use of Robotics in Enhancing Social Skills in School and Therapeutic Settings in Children and Adolescents With Autism Spectrum Disorder

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ABSTRACT

The current review focuses on the approaches that have been implemented in the development of the appropriate communication skills to children and adolescents with ASD (autism spectrum disorder) through their interaction with therapeutic robots. This study aims to emphasize the importance of the fact that robots can play a major role in enhancing social skills in students with ASD. The authors present the latest evidence on research and the most popular robots which have been used in developing social and communicational skills to children and adolescents with ASD. In particular, they focus on the use of robots in imitation, attention, eye contact, emotional regulation, initiative, and language development. It is crucial to realize that the use of robots cannot be the only educational or therapeutic procedure for ASD, but they can be used in combination with therapy and education. Robots can be a valuable tool in order to assist educators and therapists to help students with ASD developing their communication and social skills.

INTRODUCTION

Autism Spectrum Disorder (ASD) involves a variety of difficulties including social and communicational deficits that can provoke several obstacles in their everyday life (Plexousakis et al., 2020). Current literature review aims to describe the role of technology and in particular the role of the robotics in the development of social skills for students who have been diagnosed with Autism Spectrum Disorder (ASD). Specifically, children in the autism spectrum seem to have a unique developmental path, presenting various degrees of complexity in stereotypical behaviors, lack of social interests, and challenges in the emotional and social domain (American Psychiatric Association [APA], 2013).

Research has shown that children with ASD have difficulty acquiring conventional and symbolic meaning through actions of joint attention (Kasari, et al., 2006; Leekam & Ramsden, 2006) and symbolic play (Kasari et al., 2006; Keen & Halle, 2016). Additionally, research on emotional processing provides evidence for individuals' with ASD difficulties in emotional reactivity and emotional regulation (Samson et al., 2012) and challenges in describing the emotional content of verbal, auditory, and visual stimuli (Allen, et al, 2013). Challenges in reciprocal communication usually impact language acquisition and further deprive young children with autism of learning new skills through interacting with people in their environment (Mundy & Neal, 2001). This is because reciprocal interactions, either at the preverbal or verbal stage of communication of the child, may lead to enhanced episodes of social initiations, jointly engaged time on a shared activity, and overall advancements on children's play skills, language, and social skills (Shire et al., 2016; Venker et al., 2012). Gradually, young children acquire shared meaning and social experiences through such spontaneous actions and interactions with others in their everyday lives. As such, offering contexts for learning that are engaging and promote the interplay between children and their social environment are of critical importance for young children with ASD and constitute an important target for intervention.

The scope of current review is to highlight the significant role of technology and robotics in the enhancements of the social skills and other lacking areas of students with ASD. More specifically current chapter emphasizes the beneficial aspects of robots which can deliver the appropriate cognitive and behavioral interventions to teach communication and social skills and bring a positive change to their lives. Chapter illustrates the significance of robots in offering rich stimuli like different kind of sounds and pictures which facilitate a kind of simulation with real life stimuli and act as vehicle to improve ASD children's functionality (expression of feelings, verbal expressions, social skills) and benefit their lives.

BACKGROUND

Children with ASD could be benefited from cognitive and behavioral interventions which include teaching of the appropriate communication and social skills so as to improve several aspects of their emotional and social deficits and consequently to be able to live a more functional life. Several studies (Scassellati et al., 2012), emphasize the significance of early initiation of therapeutic intervention programs so as to achieve better results. Toys and other activities which resemble games could bea useful tool so as to stimulate and facilitate the interaction of children with other people. Although studies (Scassellati et al., 2012) emphasize the general goals like the improvement of social and communication skills it is important that children receive different and more rich stimuli like different kind of sounds and pictures which operate as a vehicle to their shift of emotions and skills (Pennisi et al., 2016). Recent studies at-

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