# How can the use of technology benefit a child with autism?

Based on a literature review of 21 studies

Evidence Level:
Weak
Moderate
Strong

## Learning

A few studies have investigated the use of a virtual-learning environment to improve cognitive skills in individuals with ASD. One study found that using VR results in an increase in memory performance for children with ASD (Hsu & Teoh, 2017). In their study, they analyzed the use of a novel avatar interviewing aid during memory interviews, scavenger hunts, and intelligence assessments, and found that using an avatar was a more “ASD friendly” method of improving recall memory in young children with ASD when compared to using a human interviewer.

Using a virtual-learning environment has also been found to be effective for teaching school curriculum to adolescents with ASD. Research has found that using 3D virtual learning as a means of distance education increases social competence through knowledge and social practice for youth with ASD (Stichter et al., 2014). Likewise, another study found that the use of the same distance teaching program increases embodied presence and copresence (the sense of one’s own avatar, the sense of proximity of other user’s avatar, and the sense of the social actor “behind” the other avatar) in almost all of the online activities (Wang et al., 2016).

## Social Skills

It has been shown that the use of virtual learning environments have potential to improve social functioning among individuals with ASD. Many studies have found that children with ASD are able to improve their social skills, understanding of empathy, and decision-making when using an educational program through virtual environment such as a 3D computer game (Rice et al., 2015; Cheng et al., 2010; Cheng, Chian, Ye & Cheng, 2010; Cheng, Huang, & Yang, 2015; Didehbani et al., 2016; Chung, Han, Shin, & Renshaw, 2016). More specifically, research has shown that VR-based programs can cause an increase in communication skills such as initiation, greeting, and conversation-ending in children with ASD (Ke & Im, 2013). Previous studies have also displayed that using VR systems to target improving play skills results in a significant advancement in play abilities, an improvement in collaborative play, and an increased frequency and duration of effective social interactions in children with ASD (Herrera et al., 2008; Gal et al., 2016; Ozen, 2015; Bai, Blackwell, & Coulouris, 2015).

Using a virtual environment can also improve emotion recognition and enhance empathy with others in individuals with ASD. Previous studies have illustrated that the use of a human-like avatar (i.e., characters on the screen) in a virtual-learning-environment can help individuals with ASD to better recognize emotions and respond to them appropriately (Moore et al., 2005; Chen, Lee, & Lin 2015; Kim et al., 2015). Researchers have also observed that using video modelling in a VR environment can help children with ASD to maintain their attention while simultaneously helping them to understand facial expressions and emotions (Chen, Lee, & Lin, 2016).

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## Daily Skills

A few studies have found benefits in the use of a virtual reality systems to improve specific daily skills. For example, using a VR café system was found to be beneficial in teaching teenagers with ASD how to sit or how to maneuver through tables and chairs while in a restaurant (Parsons et al., 2004; Mitchell et al., 2007).

Alternatively, it has also been found that VR can be used to teach safety skills, such as street-crossing (Self, Scudder, Weheba, & Crumrine, 2007), fire safety, and tornado safety (Goldsmith, 2009). One study even found that using a fully-immersive virtual room is an effective treatment for addressing some phobias or fears in individuals with ASD (Maskey et al., 2014).