

**How Educational Technology Trends Benefit Children with Autism Spectrum Disorder  
(ASD)**

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## Abstract

This study explores various educational technology trends used in Autism Spectrum Disorder (ASD) education by examining peer-reviews published investigations. ASD is a neurodevelopmental disorder characterized by an unfortunate lack of social skills and ongoing categorized behavior. These characteristics affect people with the socialization of ASD and present barriers to initiating and engaging in social interactions. As a result, more and more children worldwide are diagnosed with ASD. According to the US Centers for Disease Control and Prevention (CDC), the latest occurrence estimate is 1 in 59 (Pliasa & Fachantidis, 2019). The purpose of the study also includes the "augmentative and alternative communication" (AAC) systems because these methods provide support for the effectiveness of high-tech "electronic speech generating devices" (SGD) and low-tech of "picture exchange communication system" (PECS) (Gilroy et al., 2018, p. 6). As a part of technology trends, this paper also analyzes assistive technology (AT) and how it benefits children with Autism Spectrum Disorder (ASD)

*Keywords:* Autism Spectrum Disorder (ASD), Picture Exchange Communication System" (PECS), Electronic Speech Generating Devices (SGD), Augmentative and Alternative Communication" (AAC)

## **How Educational Technology Trends Benefit Children with Autism Spectrum Disorder (ASD)**

### **Introduction**

" Educational technology involves the disciplined application of knowledge for the purpose of improving learning, instruction, and, or performance." ~ (Spector, 2015, p. 10)

Educational technology has many benefits for children and young adults with autism spectrum disorders (ASD) in various ways but not limited. The following example illustrates its advantages: it enhances their independence, improves their social opportunities, and reduces anxiety. But unfortunately, all these areas can present challenges for people with AS (Hedges et al., 2017, p. 75). On the other hand, assistive classroom technology is in software and Socially Assistive Robots (SARs). To overcome these unique characteristics of ASD, Social Assistance Robots (SAR) can benefit ASD. SAR has essential benefits in developing social skills observed in the ASD population after specific interactions with the robot.

A social assist robot is a system that assists a specific assist context using interactions such as speech, facial expressions, and gestures. This powerful interactive tool supports users in a social context rather than a physical interaction context. As a result, SAR is enhanced with motivational, social, educational, and therapeutic skills. This way, individual care and rehabilitation of large population groups such as the elderly and children with social and developmental disabilities can be promoted, improving quality of life. SAR intersects Assistive Robotics (AR) and Socially Interactive Robotics (SIR). AR refers to a robot that assists people with disabilities through physical interaction. SIR is a robot whose mission is to promote exchange with people to share themselves (Pliasa & Fachantidis, 2019).

In addition, digital technology in special education and learning encourages young people to play with computers and machinery. Mainstream technologies such as mobile apps, computer games, and virtual reality devices are often used to facilitate interpersonal communication between students and intellectuals. Disability and autism. It is often believed that using a realistic-looking first-person computer-generated environment allows students to acquire a functional range of daily life skills that increase their chances of living more independently. While these techniques appear effective, the large gap between the safe and structured environment of computer-assisted interventions and real-world social behavior is the lack of skill in real-world interactions. There are serious concerns that it may result in sufficient relocation (Roberts-Yates & Silvera-Tawil, 2019).

## **Literature Reviews on Educational Technology Trends**

### **PECS Low-Tech Method**

Educating children with autism spectrum disorder (ASD) requires both high-tech and low-tech. An example of low-tech is a picture exchange communication system (PECS). The method of choice must be one in which these two institutions can work together to develop students' compelling communication needs and image exchange communication systems—such a device. PECS is a device/strategy/intervention that helps schools and homework improve and develop practical communication skills for students and children, but it requires both organizations' commitment. This device is primarily used in schools and homes but can be simplified in other environments. PECS is a communication system that teaches nonverbal, reverberant, language-restricted, and incomprehensible people to develop functional and socially acceptable communication skills. Frost and Bondy first developed this communication device in 1985 for students of the Delaware Autism Program. There is no discrimination. It is simple, easy

to use, and can be classified as assistive technology. Assistive technology is a research-based intervention tool used in the classroom as part of the Response to Intervention (RTI) because it is a necessary device based on the Individuals with Disabilities Education (IDEA) research (Virgile, 2018).

### **High-Tech Electronic Devices**

Furthermore, the Speech Generator Device (SGD) is another UK option commonly used by people with ASD. SGD refers to a portable electronic device that displays a variety of graphic symbols or writing languages and produces digitized or synthesized audio output. The advantage of SGD is that it has direct audio results. This makes the message easier to understand and encourages participation in the natural environment, even for untrained communicators. In addition, immediate sound production provides UK users with a language model that facilitates graphic and phonetic symbol pairing, assists language development, increases conversation turns and promotes independence. Tablet devices (iPhone®1, iPod®1, iPad®1, etc.) act as SGD and are becoming more popular due to their low price, portability, social acceptance, and multi-functionality. However, tablet-based SGD is not a versatile solution. Many new mobile devices require advanced motor actions to access (pinch gestures, swipe screens, various touch surfaces. Similarly, many AH applications on these devices can ignore the unique motor, cognitive, and sensory perception needs and abilities of AH users, allowing users with more complex needs to access these solutions. You will not be able to. Dedicated SGD remains the recommended option for these scenarios (Virgile, 2018).

## **iPad Devices**

Moreover, an iPad is a computer that consists only of a touch screen operated with a finger or a dedicated stylus instead of a mouse or keyboard. The iPad is accessible and can be carried from place to place. There are several advantages. Easy-to-use touch screen, screen sizing, controllable multimedia playback, significant volume, and various data acquisition features. New technologies and more positive social attitudes towards people with disabilities provide professionals with multiple opportunities to improve the quality of life of people with disabilities. A normative technical aid to life, the iPad opens new possibilities and promotes equality in different areas of life for people with ASD. It enables active participation and encourages attribution and social inclusion, primarily by being a popular normative tool. The significant advantage of the iPad is high-speed communication and accessibility. The accessibility and availability of iPad help you work together and keeps you learning after school. The iPad creates a personalized learning environment that helps children make learning more engaging, relevant, and accessible. Using the iPad as a learning aid for people with dyslexia can help organize people with disabilities and serve as a play aid. Parents can easily and instantly download various applications to a single device. Children's applications with special needs can be found on Apple's App Store (Yavich & Davidovich, 2019, p. 216).

## **Assistive Technology (AT)**

Moreover, assistive technology (AT) can be essential for intervention in children with disabilities. Assistive technology can potentially change the learning opportunities for people with ASD. The Individuals with Disabilities Education Act (IDEA, 1997), the Technology-related Personal Assistance Act (TRAIDA, 1988), the Americans with Disabilities Act (ADA, 1990), and the Rehabilitation Act (1973) define AT as an "arbitrary item." doing. A

commercially available, modified, or customized device or product system designed to enhance, maintain, or improve the functional capabilities of persons with disabilities. Most studies dealing with children with AT and Autism Spectrum Disorders (ASD) are about imaging systems and their ability to enhance receptive and expressive language skills.

ATs often use pictorial plans to support the development of sensory language to help children in various daily activities and activities. In addition to low-tech imaging systems, studies show that high-tech voice text devices allow children with autism between the ages of 3 and 5 to request food, seek help, and access their favorite activities. It is used to help. Assistive technology (AT) can address the specific needs of children with low motor skills, slight autism, speech disorders, or social interactions. ATs allow them to lead an independent life. AT can be defined as a unique tool enabling people with disabilities to attend school wholly and independently. Assistive technologies include, but are not limited to, non-technical devices, mechanical and electrical devices, computer software, simulation, virtual reality, and extended alternative communication devices. These technologies help children with disabilities like ASD complete difficult or impossible tasks without these tools (Bollin et al., 2018).

### **Alternative Method of Teaching**

On the other hand, educational techniques improve the education and learning of ASD students, and music is also an excellent way to go. Music has universal and cross-cultural characteristics about the origin of languages and signs that can provoke memory, arouse emotions, and enhance social experience. In addition, 65-60% of human communication comes from nonverbal expressions such as pitch, volume, and posture. This shows that non-verbal music can be a supportive learning medium for language, cognition, and the body. It promotes vocabulary, comprehension, movement, and emotional development. In recent years, the

problem of sensory integration disorders in infant behavior has received more attention. Reports have shown that sensory integration disorders are associated with vestibular susceptibility and maturity. The prevalence of sensory integration disorders between the ages of four and six is approximately 15%. Moreover, sensory processing problems interfere with daily life and social participation.

Additionally, the Department of Health's Census and Statistics Bureau has released 108 years of data on the number of people with physical and mental disabilities. A new category for preschoolers aged 3 to six years conflicts with older types of multiple disorders, especially for children with autism spectrum disorder (ASD). Research has shown that children with ASD differ significantly from their peers in response to delays and sensory needs. Therefore, if a child has sensory integration problems, their behavioral responses may not be readily identifiable, limiting the potential for early treatment. Early detection and early treatment are considered more effective. Therefore, there is a need to focus on specialized educational resources and health services for preschool children and children with ASD, which should be tailored to individual needs. In addition, people with ASD demonstrate the ability to hear and distinguish sounds. If long-term memory of sounds is improved, we can conclude that music generally can improve sensory processing and learning in children with ASD (Lee et al., 2022, p. 56).

### **Analysis and Critique**

Overall, literature reviews of educational trends show that educational techniques can help break down the barrier's children with ASD and other disabilities face. Examples include low-tech battery-powered sensory toys, visual timers, and social skills videos. High-tech AT is a digital technology that can consist of anything from extended communication techniques for non-verbal humans to robots built to enhance children's social skills on the spectrum. Low-tech



AT includes everything that doesn't require power. Think of a weighted vest, a sensory ball, or a picture board. At the same time, MedTech AT is relatively cheap and simple enough to use. After all, tech AT is digital technology. That includes everything from extended communication techniques for nonverbal humans to robots built to improve children's social skills on the spectrum.

On the contrary, although the Daisy robot motivates and engages ASD enthusiastically, that technology trend is expensive. It's challenging for average and working-class parents to provide for their children. The outcomes indicated improvement in children's performance after daisy intervention with three practical skills.

### **Practical Application**

Teachers must demonstrate their social responsibility and commitment to education (SCRIP) by performing the following steps:

- Shows the belief that all learners be able to learn
- Indicates fairness, fairness, and justice to all students
- Meets the needs of all diverse learners
- Sympathy for human needs Sensitivity
- Providing learning opportunities and motivations for all students
- Effectively interacting with students to ensure access, success and achievement are

priorities

- Respect commitment
- Take responsibility seriously
- Complete assigned tasks on time
- Attend classes, hands-on experience, meetings, etc. on a regular and timely basis

Teachers should also plan self-discipline to show work ethics, preparatory education, and learning rides and are organized for success. That includes showing a lasting commitment to each student's learning success, carefully considering educational issues and practices, and making decisions based on ideas and experience.

### **Conclusion**

This research examines and summarizes the various educational technology trends for autism spectrum disorder (ASD), and the literature reviews indicate those educational trends promote outstanding skills for ASD. These trends of technologies also come in low-tech and high-tech. The low-tech ranges from small devices operated with or without a battery. As the name implies, high-tech mainly involves mobile devices such as tablets, iPhones, iPods, and iPad, but not limited to. Furthermore, machine learning and artificial intelligence (AI), used in robotics form, showed promising results for enhancing teaching and learning for ASD. These results also provide social and academic guidelines for using technology as a variety of tools to support the education of individuals with ASD. The introduction of effective technology generally positively impacts and outcomes of her ASD education.

However, those educational technologies are not effective unless they meet human needs. Hence, it is vital to tailor learning plans toward individual requirements. Using technology without a well-executed recipe can fail. This trend then needs to be compared to the characteristics of ASD students, and its use needs to be planned appropriately, customized, and personalized for parents, teachers, and managers.

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