



# Using Apps to Develop Social Skills in Children With Autism Spectrum Disorder

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## Abstract

Social skills are critical to later success in school and adult life. Typically, children build these through interaction with caregivers and peers. However, some students, especially those diagnosed with autism spectrum disorder (ASD), demonstrate delays in this domain and require additional interventions. While there are a number of interventions that are effective for young children with socioemotional delays, there remains a paucity of research on the use of technology as a socioemotional intervention in early childhood. This column suggests that applications on mobile devices can allow students to learn the social and play expectations for a given dramatic play scenario, such as “Grocery Store.”

## Keywords

technology, early childhood, autism spectrum disorder, social skills interventions

During early childhood, children learn about themselves and the world around them through playful interaction with their environment as well as through social interaction and communication (Jung & Sainato, 2013; Office of Head Start, 2015). From these early social interactions, children are able to build the foundation for other learning. Socioemotional skills are intricately linked with development of communication skills and intelligence (More, 2008; Radley, Jenson, Clark, Hood, & Nicholas, 2014). In fact, the National Association for the Education of Young Children (NAEYC, 2009) stated that social skills have been shown to be predictors of later academic success. To extend, there are certain cross-curricular behavioral expectations required of students to maneuver successfully through the school day (Moody, 2012; More, 2008; NAEYC, 2009). Specifically, independence, self-regulation, and cooperative play are highly predictive of success during the early grades (NAEYC, 2009).

Some young students, especially those with autism spectrum disorder (ASD), may experience delays in socioemotional development. In 2012, there were 750,131 students between the ages of 3 and 5 years receiving special education services under the Individuals With Disabilities Education Act (1990) in the United States (U.S. Department of Education, 2014). Of these early childhood students, 7.8% were labeled with ASD. This makes ASD the third

most prevalent disability category for young children. Historically, a diagnosis for ASD has been based on a child consistently demonstrating difficulties in the social use of communication (American Psychiatric Association, 2013). Students with ASD typically spend less time engaged in interactions with peers and have lower quality of interactions, spending more time engaged in repetitive, stereotypical behaviors (Hampshire & Hourcade, 2014; Jung & Sainato, 2013). Additional delays may include difficulty interacting and forming relationships, communicating, and using appropriate behavioral responses (Cihak, Smith, Cornett, & Coleman, 2012; Moody, 2012). These characteristic delays of students with ASD often manifest themselves in decreased opportunities to develop socioemotional skills (Jung & Sainato, 2013).

Unaddressed socioemotional delays can lead not only to difficulties in school but may also have lasting effects on overall quality of life. For example, Moody (2012) and Radley et al. (2014) stated that social skills affect personal and work relationships. In addition, a lack of social skills

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can lead to later mental health issues, unemployment, and decreased levels of achievement (Baggett et al., 2010; Radley et al., 2014). Baggett et al. (2010) suggested that intervening early could counterbalance general risks like poverty as well as exposure to harsh environments. Radley et al. (2014) reaffirmed that the early years are in fact a critical time for social skills intervention because social and behavioral skills have such a dramatic impact on academic, interpersonal, and later professional life.

There are a variety of different interventions shown to assist with the development of social skills in young students requiring additional intervention, especially those with ASD. Suggested strategies for students with ASD include using the picture exchange communication system (Cihak et al., 2012); video modeling (Barton, Lawrence, & Durling, 2012; Cihak et al., 2012; Jung & Sainato, 2013); visual supports, cues, and schedules (Barton et al., 2012; Jung & Sainato, 2013; Moody, 2012); peer tutoring and peer-mediated strategies (Barton et al., 2012; Jung & Sainato, 2013; More, 2008); social stories (Jung & Sainato, 2013; More, 2008, 2012; Radley et al., 2014); utilizing visual processing (Hampshire & Hourcade, 2014); as well as sociodramatic play or improvisation games (Jung & Sainato, 2013; O'Neill, 2013).

While some of the suggested socioemotional skill interventions incorporate technology, most used with young children are very low tech or do not allow students direct access to technology as the intervention. Instead, caregivers use the technology to create or learn about an intervention that then gets applied to the child, thus creating a degree of separation. For example, the extant research on using technology in the early childhood classroom included Baggett et al. (2010) who suggested using the Internet to facilitate the development of a nurturing environment and provide high-quality, responsive interactions with caregivers. These researchers offered play and learning strategies over the Internet to provide intervention to a wider range of families, but involved no direct student interaction with technology. Similarly, Simpson and Oh (2013) recommended that teachers use a computer program to create what they called *circle time* books. These allow students to stay engaged in the daily circle time routine by selecting appropriate icons and attaching it to a corresponding section of their book. Again, the technology was utilized by adults, rather than children. Finally, More (2008) developed the idea that teachers use technology to support students with special needs by composing a *social story* themselves, adding digital pictures, and then using presentation software to create and print the social story for the child.

### Using Apps as an Intervention

Contemporary children are accessing technology to learn and play (More, 2008). Children are becoming technology literate at younger ages, as exemplified by a young child

playing with the iPad or mom's mobile phone (More & Travers, 2013). There is research to suggest that technology can be effective in building social emotional skills, albeit not necessarily in young children. According to Cumming, Strnadova, and Singh (2014), technology has been found to increase student engagement and to facilitate independent learning. In addition, Clements and Sarama (2003) indicated that technology motivates and engages students as it has the potential to spark interest in social interaction and to develop emotional growth. Furthermore, although there was concern that computers may isolate children, research has shown that children spend more time talking to peers about what they are doing while engaged in a computer activity and show more collaborative work. In fact, the cooperation required when engaged with technology mirrors that used in block play or other dramatic play areas. Thus, technology may actually assist with facilitating and improving communication (Clements & Sarama, 2002, 2003).

It is important to highlight that the use of a mobile device, such as the iPad, is an easy transition into technology use. Many young children are surrounded by this particular technology in their day-to-day lives as families already own and use mobile devices, regardless of age and socioeconomic status (NAEYC, 2012). Because of this universality, mobile devices are an easy technology to incorporate as a first option into the school environment (More & Travers, 2013). Draper Rodriguez, Strnadova, and Cumming (2013) have also indicated that parents, students, and professionals were highly satisfied with the iPad as an educational tool. In addition, Vismara and Lyons (2007) suggested that students with ASD are more likely to engage in activities they prefer, like technology applications. Furthermore, McConnell (2002) indicated that interaction, a key element of social skill development, is more likely to occur without requiring high levels of teacher intervention when the activity is more highly structured, as a mobile device game would be. Because of its alignment with current research, the use of apps on tablets is suggested to build social skills with young children, especially those diagnosed with ASD. Table 1 provides a list of suggested options and their relation to the dramatic play, a center typically associated with socioemotional learning in the early childhood classroom (McConnell, 2002; NAEYC, 2009).

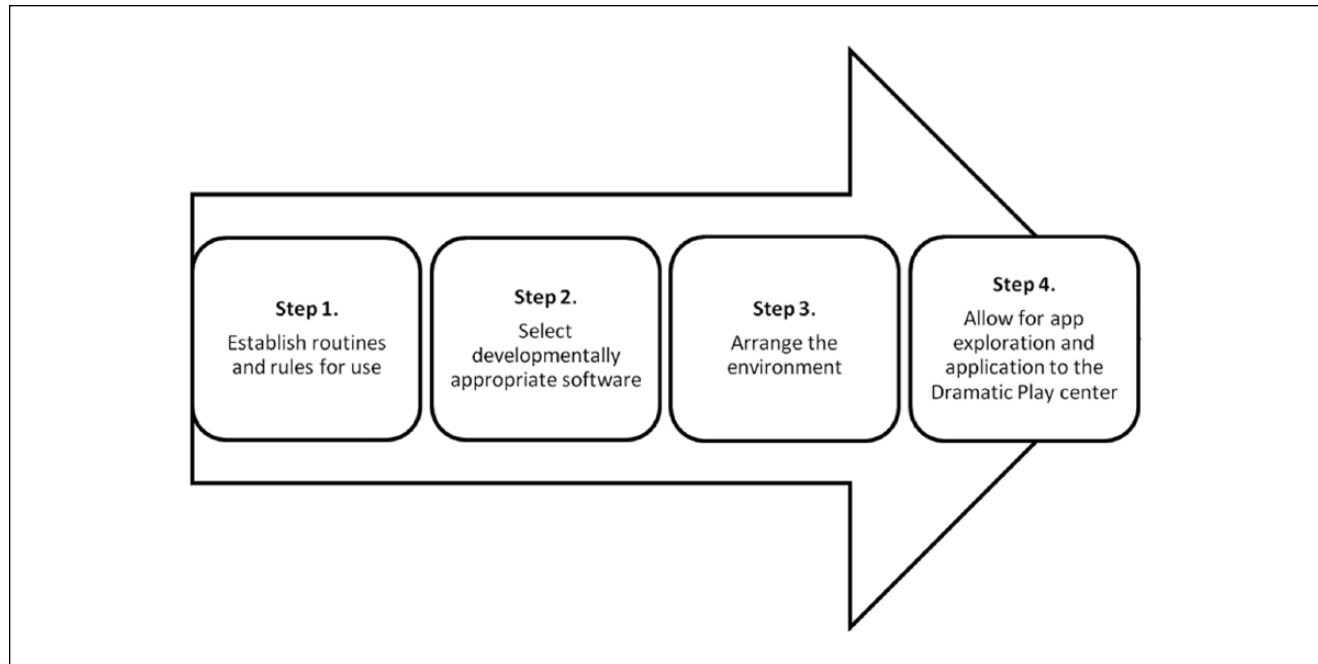
The use of an app to facilitate socioemotional development can be implemented in the classroom following the guidelines in Figure 1. The first three steps are part of teacher preparation or background work, while the fourth details the intervention in action.

### Establish Routines and Rules for Use

The first step when implementing apps as an intervention to build socioemotional skills is to establish rules and routines that will guide technology use in the classroom. When

**Table 1.** Apps and Related Dramatic Play Scenarios.

App	Related Dramatic Play Scenario	Materials
Toca Store	Grocery store	Merchandise, cash register, shopping carts, money
Toca Kitchen	Kitchen	Food, utensils, plates, place settings, appliances
Toca Pet Doctor	Veterinarian clinic	Stuffed animals, cotton swabs, bandages, X-rays, stethoscopes, blood pressure monitors
Toca Tea Party	Kitchen	Food, utensils, plates, place settings, appliances

**Figure 1.** Steps for Inclusion of Apps to Teach Socioemotional Skill Interventions.

doing so, professionals must analyze their daily schedule and explicitly embed opportunities for app use in the daily routine. One obvious opportunity to build socioemotional skills in the early childhood classroom is during center time. In addition to vertical analysis to embed technology throughout the routine, the Division for Early Childhood of the Council for Exceptional Children (2014) suggested that practitioners should also think horizontally. This means that they must consider incorporating technology across multiple settings or activities. For example, if a practitioner has analyzed the schedule and decided that technology could be used during center time, he or she should not just add a computer center and stop there. Instead, the practitioner should look across all established centers for additional opportunities. In this case, it is suggested that an app be used specifically within the *dramatic play* area.

When establishing rules and routines, teachers must also predetermine how many students they will allow to use the device at one time (Clements & Sarama, 2003; Draper Rodriguez et al., 2013). For example, an app like Toca Boca Store (Toca Boca AB, 2013) lends itself to two users. This

is important when using an app to develop socioemotional skills because interaction is key not only to operating the app's full functionality but also to building the skills overall. McConnell (2002) found that peer engagement helps to increase social interaction and other generalizable social skills for students with ASD.

Finally, professionals must directly teach the rules of use (Cihak et al., 2012; Draper Rodriguez et al., 2013; Lyons & Tredwell, 2015; More & Travers, 2013). For example, the practitioner should ensure that students are aware that (a) the iPad or portable device is to stay within the given center, (b) it should be used for the stated purpose, and (c) it should not be mistreated, but handled with care.

### Select Appropriate Software

The second step is to find appropriate software. It has been suggested that some available apps are no better than worksheets or flashcards that are not developmentally appropriate; they lack design, content, and accessibility (More & Travers, 2013). For an app to be an effective socioemotional

intervention, practitioners must use the same professional judgment about developmental appropriateness and elements of universal design as it relates to any curricular element (Lyons & Tredwell, 2015; More & Travers, 2013; NAEYC, 2012). There are many rubrics or decision matrices available to assist with this selection process (Draper Rodriguez et al., 2013; More & Travers, 2013).

Beyond ensuring that the app selected is high quality, Clements and Sarama (2003) strongly suggested the use of open-ended technology for young children. Such technology allows for free exploration of an imaginary world, rather than having a prescribed set of steps that must be followed, like a board game. This open-ended exploration fosters collaboration and communication, two important foci of social emotional intervention. In fact, NAEYC (2012) supported this idea of open-ended or child-controlled technology in the Position Statement on Technology.

Not only should an app be high quality and open-ended, it must be aligned with curricular goals (NAEYC, 2012). For young children with special needs, the app must be aligned both with a child's individualized education program (IEP) goals as well as with the core unit of investigation and common curriculum standards (More & Travers, 2013). As an example, the Toca Boca Store app (Toca Boca AB, 2013) aligns with possible socioemotional IEP goals, such as interacts or shares with peers. It also relates to a common preschool theme of grocery store or nutrition. Furthermore, the app works on common early childhood standards related to other areas, such as gaining a concept of counting (Office of Head Start, 2015).

### **Arrange the Environment**

The next step for implementation is for practitioners to arrange the environment. This process is not only critical to implement the incorporation of a mobile technology intervention, but is also a critical component of numerous interventions to be used for students with ASD (Hampshire & Hourcade, 2014). Clements and Sarama (2003) advised that students using technology must be positioned close to each other to allow for the sharing of ideas. Because of this, the iPad or other tablets are ideal. The one screen is just large enough for two students to use, but they would need to be next to or across from one another. Practitioners must also plan to be nearby and accessible to facilitate the learning (Clements & Sarama, 2002, 2003; NAEYC, 2012).

In addition, NAEYC (2012) suggested that computer activities yield optimal results when coupled with off-computer activities. When the technology used is integrated into other opportunities within the curriculum, children are able to learn through the technology, think about what they are doing, then apply their skills across environments (Clements & Sarama, 2002). Because of this, teachers should prepare the dramatic play center to align with the selected app. For

example, when using Toca Boca Store (Toca Boca AB, 2013), the classroom teacher should stock the dramatic play center with merchandise, a cash register, shopping carts, and money.

### **Allow for App Exploration and Application**

After ensuring that all background steps have been taken, the fourth step of implementation is to introduce students to the app and allow students to play together. The app itself actually acts as an intermediary through which students learn the play expectations of a given dramatic play scenario, like grocery store, as well as generalizable play skills via the fixed scenario offered through the app. This is similar to the idea of a play script, a common intervention for students with ASD (Jung & Sainato, 2013). Essentially, it is a structured play scenario typical of ASD interventions because an app only allows certain functionalities. Thus users of the app can only do what is expected in that play scenario. For example, if the app has established the play scenario of grocery store, students can only move through expected motions of selecting grocery items, ringing them up, paying the cashier, and bagging them. The app does not offer any other nonproductive option.

After experimenting with the app to learn the play expectations, students then should be able to immediately apply and practice these newly acquired skills in the hands-on, less structured dramatic play center. For students with ASD, structured sociodramatic play has been used to increase social skills (Jung & Sainato, 2013). Although the students will have learned the expectations of the social play, the practitioner should be there to prompt and cue children to use the ideas learned through the app to help them navigate and understand social situations as they arise (McConnell, 2002; More, 2012).

Figure 2 contains a guide for evaluating effectiveness. This guide is a checklist that incorporates the key aspects of successful implementation of this social skills intervention. Using the guide, early childhood educators can ensure that all steps in the process have carefully been considered prior to introducing students.

### **Conclusion**

Socioemotional and behavioral skills are foundational to school success and independent life functionality. Although some students, especially those with ASD, demonstrate delays in this area, successful, research-based interventions exist. Extant interventions often neglect that mobile technology is now an integral part of students' daily lives. Instead of being excluded, it should be employed to support socioemotional development. Certain carefully selected apps can actually act as a scripted social model

Implementation Checklist		
<b>Directions:</b> Use this tool to ensure that that all steps in the process have carefully been considered prior to introducing students. If an element is not present, return to the step to complete the process.		
0: Not Present 1: Present	Rating	
<b>Establish rules and routines</b>		
Opportunities for daily use have been embedded in the schedule	0	1
Opportunities for daily use have been designed across multiple settings or centers	0	1
Number of students to be allowed have been determined	0	1
Rules for use have been taught	0	1
Needed accessibility features have been accessed	0	1
<b>Find appropriate software</b>		
App selected is high-quality (rubric has been used)	0	1
App is open-ended	0	1
The app is aligned with the core unit of investigation	0	1
App addresses target child(ren)'s IEP goals	0	1
<b>Arranging the environment</b>		
Students have been positioned in close proximity with one another	0	1
Practitioners are located nearby to facilitate and assist	0	1
Arrange dramatic play center with materials related to selected app	0	1
<b>Notes:</b>		

**Figure 2.** Guide for Evaluating Successful Utilization of Social Skills Apps in Early Childhood.

through which students have the opportunity to learn acceptable rules of interaction and play. They are then able to generalize these learned skills to a less structured setting in the dramatic play center, wherein further socioemotional development can occur.

The intervention described synthesizes current research-based best practices for the education of young children. First, it suggests teachers preplan and prearrange the environment. After this, students meaningfully interact with and learn from the materials teachers have intentionally included in the classroom (NAEYC, 2009). In addition, apps are carefully selected following guidelines of universal design and developmental appropriateness, and are linked to both the preschool curriculum as well as individualized educational goals (More & Travers, 2013; NAEYC, 2012).

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### References

- American Psychiatric Association. (2013). *Autism spectrum disorder*. Retrieved from <http://www.dsm5.org/Documents/Autism%20Spectrum%20Disorder%20Fact%20Sheet.pdf>
- Baggett, K. M., Davis, B., Feil, E. G., Sheeber, L. L., Landry, S. H., Carta, J. J., & Leve, C. (2010). Technologies for expanding the reach of evidence-based interventions: Preliminary results for promoting social-emotional development in early childhood. *Topics in Early Childhood Special Education, 29*(4), 226–238. doi:10.1177/0271121409354782
- Barton, E. E., Lawrence, K., & Deurloo, F. (2012). Individualizing interventions for young children with autism in preschool. *Autism and Developmental Disorders, 42*, 1205–1217. doi:10.1007/s10803-011-1195-z
- Cihak, D. F., Smith, C. C., Cornett, A., & Coleman, M. B. (2012). The use of video modeling with the picture exchange communication system to increase independent communicative

- initiations with autism and developmental delays. *Focus on Autism and Other Developmental Delays*, 27, 3–11. doi:10.1177/1088357611428426
- Clements, D. H., & Sarama, J. (2002). The role of technology in early childhood learning. *Teaching Children Mathematics*, 8, 340–343. Retrieved from <http://www.jstor.org/stable/41197828>
- Clements, D. H., & Sarama, J. (2003). Young children and technology: What does research say? *Young Children*, 58(6), 34–40.
- Cumming, T. M., Strnadova, I., & Singh, S. (2014). iPads as instructional tools to enhance learning opportunities for students with developmental disabilities: An action research project. *Action Research*, 12, 151–176. doi:10.1177/1476750314525480
- Division for Early Childhood. (2014). *DEC recommended practices in early intervention/early childhood special education 2014*. Retrieved from <http://www.dec-sped.org/recommend-edpractices>
- Draper Rodriguez, C. D., Strnadova, I., & Cumming, T. (2013). Using iPads with students with disabilities: Lessons learned from students, teachers, and parents. *Intervention in School and Clinic*, 49, 244–250. doi:10.1177/1053451213509488
- Hampshire, P. K., & Hourcade, J. J. (2014). Teaching play skills to children with autism using visually structured tasks. *Teaching Exceptional Children*, 46(3), 26–31.
- Individuals With Disabilities Education Act of 1990, 20 U.S.C. § 1400 *et seq.* (1990).
- Jung, S., & Sainato, D. M. (2013). Teaching play skills to young children with autism. *Intellectual and Developmental Disability*, 38, 74–90. doi:10.3109/13668250.2012.732220
- Lyons, C. D., & Tredwell, C. T. (2015). Steps to implementing technology in inclusive early childhood programs. *Computers in the Schools: Interdisciplinary Journal of Practice, Theory, and Applied Research*, 32, 152–166. doi:10.1080/07380569.2015.1038976
- McConnell, S. R. (2002). Interventions to facilitate social interaction for young children with autism: Review of available research and recommendations for educational intervention and future research. *Autism and Developmental Disorders*, 32, 351–372.
- Moody, A. K. (2012). Family connections: Visual supports for promoting social skills in young children: A family perspective. *Childhood Education*, 88, 191–194. doi:10.1080/00094056.2012.682554. Retrieved from <http://dx.doi.org/10.1080/000940562012.682554>
- More, C. (2008). Digital stories targeting social skills for children with disabilities: Multidimensional learning. *Intervention in School and Clinic*, 43, 168–177.
- More, C. M. (2012). Social stories and young children: Strategies for teachers. *Intervention in School and Clinic*, 47, 167–174. doi:10.1177/1053451211423816
- More, C. M., & Travers, J. C. (2013). What's app with that? Selecting educational apps for young children. *Young Exceptional Children*, 16, 15–32. doi:10.1177/1096250612464763
- National Association for the Education of Young Children. (2009). *Developmentally appropriate practice in early childhood programs serving children from birth through age 8*. Retrieved from <https://www.naeyc.org/files/naeyc/file/positions/PSDAP.pdf>
- National Association for the Education of Young Children & Fred Rogers Center for Early Learning and Children's Media. (2012). *Technology and interactive media as tools in early childhood programs serving children from birth through age 8*. Joint position statement. Washington, DC: Authors. Retrieved from [http://www.naeyc.org/files/naeyc/file/positions/PS\\_technology\\_WEB2.pdf](http://www.naeyc.org/files/naeyc/file/positions/PS_technology_WEB2.pdf)
- Office of Head Start. (2015). *Head Start early learning outcomes framework: Ages birth to five*. Retrieved from <http://eclkc.ohs.acf.hhs.gov/hslc/hs/sr/approach/pdf/getting-started.pdf>
- O'Neill, B. E. (2013). Improvisational play interventions: Fostering social-emotional development in inclusive classrooms. *Young Children*, 68, 62–69.
- Radley, K. C., Jenson, W. R., Clark, E., Hood, J. A., & Nicholas, P. (2014). Using a multimedia social skills intervention to increase social engagement of young children with autism spectrum disorder. *Intervention in School and Clinic*, 50, 22–28. doi:10.1177/1053451214532350
- Simpson, L. A., & Oh, K. (2013). Using Circle Time Books to increase participation in the morning circle routine. *Teaching Exceptional Children*, 45(6), 30–36.
- Toca Boca AB. (2013). *Toca store*. Retrieved from <http://tocaboca.com/app/toca-store/>
- U.S. Department of Education. (2014). *Thirty-sixth annual report to Congress on the Implementation of the Individuals with Disabilities Education Act*. Retrieved from <http://www2.ed.gov/about/reports/annual/osep/2014/parts-b-c/36th-idea-arc.pdf>
- Vismara, L. A., & Lyons, G. L. (2007). Using perseverative interests to elicit joint attention behaviors in young children with autism: Theoretical and clinical implications for understanding motivation. *Positive Behavior Interventions*, 9, 214–228.