Using Augmentative and Alternative Communication Interventions To Increase Functional Communication for Children with Autism Spectrum Disorder

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Abstract

Individuals with autism typically display inefficiencies in communication. With increasing numbers of children being diagnosed with Autism Spectrum Disorder, it is necessary to find effective methods of communication for these children. Augmentative and alternative communication interventions develop communication skills using unconventional techniques. The Picture Exchange Communication System and using Apple iPads as speech-generating devices are two of the most effective interventions available to develop functional speech for children with autism. There are advantages and disadvantages to each intervention, although both interventions use picture communication symbols to increase requesting skills in individuals with Autism Spectrum Disorder.

Autism is a neurodevelopmental syndrome characterized by impairments in social and communicative behaviours (Bernier & Gerdts, 2010; Lord, Cook, Leventhal, & Amaral, 2000). The syndrome is steadily increasing in numbers and, as of 2014, approximately 1 in 68 children are diagnosed with Autism Spectrum Disorder (ASD, Centers for Disease Control and Preventions, 2014, "Who is Affected," para. 1). Children with ASD typically display impairments in verbal and nonverbal communication, receptive communication, and expressive communication (Manitoba Education, Citizenship and Youth, 2005). Although numbers vary, approximately one-third to one-half of children with ASD do not develop functional speech (Dundon, McLaughlin, Neyman, & Clark, 2013, p. 1; Hill, Flores, & Kearley, 2014, p. 1; Lorah et al., 2013, p. 637). Without functional communication, autistic children are not able to express their thoughts, needs, or wants (Dundon et al., 2013). Finding an effective way for individuals with ASD to communicate is imperative to enable them to reach their potential (Hill & Flores, 2014). The Picture Exchange Communication System and using iPads as speech-generating devices are two interventions that can be used to achieve this goal.

Background

Augmentative and alternative communication (AAC) methods develop communication skills of autistic children (Lorah et al., 2013). AAC is the replacement of natural speech with unconventional communicative methods (Boesch, Wendt, Subramanian, & Hsu, 2012). Most AAC interventions use picture symbols because individuals with ASD are visual learners (Manitoba Education, Citizenship and Youth, 2005). In order to cultivate their visual strengths, pictorial supports are used as often as possible to help children with ASD learn (Bernier & Gerdts, 2010). AAC provides autistic children with a means to communicate with others (Dundon et al., 2013).

Picture communication systems and speech-generating devices are types of AAC strategies to develop the functional communication abilities of autistic children (Hill & Flores, 2014). Most picture communication symbols use cartoon-like images to represent specific objects (Gillespie-Smith, Riby, Hancock, & Doherty-Sneddon, 2014). One of the most popular picture communication interventions is the Picture Exchange Communication System (PECS). PECS is an effective system for developing the functional communicative skills of children with ASD (Boesch et al., 2012; Hill et al., 2014). Speech-generating devices (SGDs) are electronic devices that require their users to tap picture icons for the SGD to voice commands (Lorah et

al., 2013). Recently, Apple iPads have become highly popular for their effectiveness as SGDs (Dundon et al., 2013). AAC interventions, such as picture communication systems and SGDs, teach autistic children functional communication skills (Hill & Flores, 2014).

Picture Exchange Communication System

PECS is a picture-based communication system designed specifically for children with ASD (Barnes, Dunning, & Rehfeldt, 2011; Hill et al., 2014). The system was created to teach individuals with verbal language impairments how to exchange picture cards for preferred items (Cummings, Carr, & LeBlanc, 2011). The difference between PECS and other picture communication systems is that the student literally exchanges the picture card with the teacher, for his/her desired item (Boesch et al., 2012). PECS is based on the belief that in order for communication to occur someone's attention must be gained, and that simply pointing to a picture is not considered communication (Autism Canada Foundation, 2011). The goal of PECS is not to teach children with ASD to communicate verbally, but to have them understand why communication is essential within a social environment.

PECS is taught in six phases, with each phase building upon the skills learned in the previous one (Boesch et al., 2012). The first phase teaches a student how to exchange a picture card with a communication partner in return for a desired item. The second phase has the student retrieve the picture card, walk to his/her communication partner, and acquire his/her partner's attention before making the exchange. Phase three has the student differentiate between preferred and non-preferred objects, and between two or more preferred objects. With the addition of an "I want" card, the fourth phase teaches the student how to compose a sentence strip (Cummings et al., 2011). Phases five and six teach the student how to answer basic questions such as "What do you want?" and "What do you see?" For an individual with severe developmental disabilities, research has suggested that the completion of the first three levels, rather than all six, may be a more realistic goal (Barnes et al., 2011).

PECS is successful in developing purposeful communication for children with ASD. An evaluation of research studies, regarding individuals with developmental disabilities, revealed that 29 out of 36 participants increased their functional communication skills by using PECS (Hill et al., 2014). PECS has been known to instigate positive changes in communicative behaviour such as increases in requesting, symbol use, and initiating communication independently (Gillespie-Smith et al., 2014). Improvements in social-communicative behaviours have also been noted (Cummings et al., 2011). Although the goal of PECS is not verbal communication, several studies have reported that spoken language has been acquired by children through the use of PECS (Bernier & Gerdts, 2010; Gillespie-Smith et al., 2014; Hill & Flores, 2014). Research has demonstrated that PECS is successful in improving purposeful communication skills in individuals with ASD.

The simplicity of PECS makes it easy to use (Cummings et al., 2011). Few prerequisite skills are necessary for a student to begin training with PECS. Children with ASD, of all abilities, are capable of communicating effectively with this system (Hill et al., 2014). Depending on the abilities of each child, some children are able to excel through the PECS stages in a fairly short amount of time (Cummings et al., 2011). Others, typically with more extreme developmental impairments, need to progress at a much slower pace but are still able to see improvement in their functional communication skills (Hill et al., 2014). The simplicity of PECS makes it easy for children with ASD to use.

There are advantages to using PECS, when compared to other systems, as a means of communication. PECS is an inexpensive way to communicate with others (Cummings et al., 2011). The system is also lightweight and portable (Boesch et al., 2012). It is not physically demanding to carry, as the cards are easy to handle and transport. Low-cost and portability are advantages to using PECS.

PECS does have some notable disadvantages. The cards often become worn from daily use and need to be re-created regularly (Boesch et al., 2012). Advanced PECS users may have difficulty carrying their booklets as more and more picture cards are added to it. PECS also lacks speech output. Therefore users have to gain the attention of their communicative partner before communication can occur. The communicative partner also needs to be trained on how to apply PECS properly so that the communication exchange is successful. This reliance on the knowledge of PECS reduces the users' independence and narrows the population with whom they can communicate.

Using IPads as Speech-Generating Devices

With the introduction of tablet devices such as the Apple iPad, their abilities as an AAC intervention are being recognized (Boesch et al., 2012). Software has been developed specifically for the iPad, to enable it as a communication tool (Hill & Flores, 2014). Programs can be installed that display picture communication symbols on the iPad screen (Achmadi et al., 2012). Because the iPad has a touch screen, the user simply touches the picture icon and the iPad emits the command in synthesized speech. The iPad offers a variety of programs that have been developed specifically for its use as a communication device, therefore opening an abundance of opportunities for children with ASD (Dundon et al., 2013).

Teaching a child with autism to use an iPad as a means of communication is typically done using the model, lead, and test (MLT) error correction procedure. This procedure consists of the teacher modelling the correct response, followed by the teacher and student doing it together, and then finally the student responding independently (Dundon et al., 2013). If the student responds correctly, then the teacher can move on to another task or encourage the child to complete the same task again. If the student does not perform independently, or does so incorrectly, then the MLT error correction procedure is applied again until the student is able to perform the task independently and correctly. In most cases, the assignment needs to be completed correctly, by the student, a certain number of times before a new assignment is attempted. The MLT procedure has been successful in teaching autistic children to communicate using an iPad.

IPads, used as SGDs, have been proven effective tools in developing communication skills of children with ASD. In a study conducted by Lorah et al. (2013), children had higher rates of independent requesting skills (85%) while using iPads as SGDs versus using picture exchange (64%) (p. 647). Using iPads, the children were also able to reach mastery criterion, of requesting specific items, in fewer training sessions than using picture exchange. The extra verbal modelling that iPads provide is believed to enable children to acquire language skills faster (Boesch et al., 2012). When used as SGDs, iPads are successful in developing communication skills of autistic children.

People of all ages and abilities are capable of using iPads (Hill & Flores, 2014). Even a preschool student with ASD was able to use an iPad independently (Dundon et al., 2013). The picture communication icons on iPads can be customized to suit the needs of specific individuals. People can have a variety of different icons and normally display commands that they use frequently. For individuals with severe language impairments, a limited number of single-command icons can be displayed to make it easier for them to discriminate between icons. For individuals with higher-functioning abilities, iPads are able to hold several pages worth of icons, including multistep commands. Even the size of the icons can be altered to make them larger for people with fine-motor impairments (Achmadi et al., 2012). IPads are communication devices that can be used by individuals of all ages and abilities.

Apple iPads are socially acceptable and enjoyable devices to use. Technology has made its way into modern classrooms, and most schools incorporate iPads into their educational settings. Many students look forward to using iPads and view them as a fun and engaging activity (Dundon et al., 2013). In the study by Lorah et al. (2013), four of the five participants

preferred using iPads, as SGDs, instead of picture exchange methods of requesting (p. 647). IPads may also be the most socially appropriate method for students with autism to communicate, as our society is accustomed to viewing people carrying tablets and other portable devices. Using iPads, autistic children can communicate to anyone within hearing distance of the tablet, similar to verbal communication. Unlike PECS, special training is not required to communicate using an iPad, therefore promoting independent communication by its user (Boesch et al., 2012). IPad tablets are socially acceptable devices that are enjoyable to use.

There are several practical advantages to using an iPad as an SGD. The Apple iPad is fairly small and lightweight, making it easily portable (Achmadi et al., 2012). The tablet is also inexpensive when compared to some SGDs (Hill & Flores, 2014; Lorah et al., 2013). There are also several free apps available to develop functional communication skills (Dundon et al., 2013). In addition, the synthesized voice output of the iPad is of high quality (Achmadi et al., 2012). These benefits of the iPad give it an advantage over other SGD devices.

Teaching autistic children to use iPads better prepares them for the future. IPads have the potential to develop students' existing skills and encourage their independence in regards to functional communication (Achmadi et al., 2012). Once children are able to use iPads for communication, however, they can also use them for other developmental needs (Lorah et al., 2013). There are several apps, tailored to varying abilities, in all different subject areas that can be downloaded and used. These apps, depending on the children's abilities, can advance their skills in areas other than communication. Technology is a part of our everyday life. Therefore having the skills to navigate it effectively makes autistic children better prepared for the future.

A disadvantage of the iPad is that it is an electronic device and is susceptible to technological problems. As with any form of technology, malfunctions can occur (Boesch et al., 2012). It would be beneficial to have a backup iPad as a replacement just in case the original breaks down. There is also the necessity of charging an iPad regularly to prevent it from completely depleting its battery, therefore leaving its user without any form of communication. Software updates also need to be installed as they become available. An iPad is fragile. Therefore a sturdy case is necessary to prevent it from being damaged. A weakness of the iPad is its vulnerability to technological problems.

Conclusion

PECS and using iPads, as SGDs, are useful AAC interventions for increasing functional communication in individuals with ASD. In several studies, participants were able to request specific items using both methods with comparable effectiveness (Boesch et al., 2012). It has been discovered that when exposed to both AAC interventions, individuals with autism develop a preference for either PECS or the iPad (Lorah et al., 2013). One set of researchers recommended using both systems, in progression, to teach communication (Hill & Flores, 2014). They proposed introducing picture communication symbols using PECS, and once learners master phases one to three, then have them progress to using iPads. Communication goals and intellectual functioning of the learners need to be considered before determining which AAC intervention will be most effective (Boesch et al., 2012). AAC interventions are, and will continue to be, effective in teaching individuals with ASD how to communicate functionally.

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