5-2024

Communication Strategies for Children Who Have Autism Spectrum Disorder in Early Childhood

Barbara Eaton

Communication Strategies for Children Who Have Autism Spectrum Disorder in Early Childhood

by

Barbara Eaton

A

Starred Paper

Submitted to the Graduate Faculty of

St. Cloud State University

In Fulfillment of the Requirements

For the Degree of

Master of Science in Early Childhood Special Education

May 2024

Starred Paper Committee:
Frances Kayona, Chairperson
Melisa Brever
Deborah Wheeler

Table of Contents

Chapter I: Introduction

According to the National Institute on Deafness and Other Communication Disorders (NIDCD) (2020), the word "autism" has its origin in the Greek word "autos," which means "self." The NIDCD describes children with autism spectrum disorder (ASD) as being often self-absorbed and existing in a private world in which they have limited ability to successfully communicate and interact with others. The NIDCD also describes children with ASD as having difficulty developing language skills and understanding what others say to them. Children with autism also often have difficulty communicating nonverbally, such as through hand gestures, eye contact, and facial expressions (2020). The ability of children with ASD to communicate and use language depends on their intellectual and social development. According to the NIDCD (2020), some children with ASD may not be able to communicate using speech or language, and some may have limited speaking skills. Others may have rich vocabularies and be able to talk about specific subjects in detail. Many have problems with the meaning and rhythm of words and sentences. These children may also be unable to understand body language and the meanings of different vocal tones. Taken together, these difficulties affect the ability of children with ASD to interact with others, especially people their age (National Institute on Deafness and Other Communication Disorders, 2020).

This starred paper is written to identify communication strategies available to children in early childhood diagnosed with autism spectrum disorder (ASD), primarily nonverbal or limited verbal abilities. This paper will specifically compare low-technology and high-technology options. The closing chapter will include a variety of communication strategies that are considered highly effective for practitioners to implement.

Background of the Study

Early childhood is a period of a child's life that spans from birth until age eight years. It is a time of critical growth and development, and a time when a child's brain is sensitive to the environment around them. The United Nations International Children's Emergency Fund (UNICEF, 2015) identifies that the period of early childhood is paramount for cognitive, social, emotional, and physical development. This period is marked by developmental milestones, and it requires a specialized educational approach to ensure that children learn key skills and foundational concepts to prepare them for later life (UNICEF, 2015). Autism spectrum disorder (ASD) is a neurological and developmental disorder that affects how people interact with others, communicate, learn, and behave. Although autism can be diagnosed at any age, it is described as a "developmental disorder" because symptoms often appear in the first two years of life (UNICEF, 2015). According to the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM–5; American Psychiatric Association, 2013), people with ASD often display difficulty with communication and interaction with other people; restricted interests and repetitive behaviors; and symptoms that affect their ability to function in school, work, and other areas of life. Autism is known as a "spectrum" disorder because there is wide variation in the type and severity of symptoms people experience (American Psychiatric Association, 2013).

Communication skills are particularly important for one's future, the quality of life, and success (Wahyuni, 2018). The author explains that effective communication skills are important for all children, so they express themselves and convey their feelings (Wahyuni, 2018). According to Psychology Today (2023), if children do not have effective communication skills, then many are at risk of hiding their feelings rather than expressing them. This is concerning

because such children may develop disorders such as depression, low self-esteem, and social withdrawal (Psychology Today, 2023).

According to UNICEF (2015), communication challenges are common among children diagnosed with autism spectrum disorder (ASD), as social communication deficits are a primary characteristic of the disorder. The National Institutes of Health (2017) declare that early intervention and educational support are essential to help children with ASD develop the social communication skills necessary for success in school and life. Communication is a vital skill that develops in early childhood and links to later academic and social success (UNICEF, 2015). However, some children, such as those with autism spectrum disorder (ASD), struggle to develop sufficient social communication skills and may require speech-language therapy and targeted support from educators to achieve functional communication (National Institutes of Health, 2017). With that, educators and paraeducators may have limited knowledge and skills to best support the social communication needs of students with ASD (Douglas et al., 2019).

Some of the augmentative and alternative communication (AAC) tools available to educators include technologies that can be classified as low- and high-technology (Drager et al., 2010). Augmentative and alternative communication (AAC) is multimodal, permitting a child to use every mode possible to communicate messages and ideas. The authors, Romski and Sevcik (2005), identify augmentative and alternative communication (AAC) as an intervention approach that uses manual signs, communication boards with symbols, and computerized devices that speak and incorporate the child's full communication abilities. Augmentative and alternative communication (AAC) is divided into two broad groups, known as unaided and aided forms of communication (Romski et al., 2005). Unaided forms of communication consist of nonverbal means of natural communication (including gestures and facial expressions) as well as manual

hand signs. Aided communication consists of those approaches that require some additional external support, such as a communication board with symbols or a computer that “speaks” for its user (Romski et al., 2005). The authors, Romski and Sevcik (2005), identify four roles that AAC can play in early intervention. The role(s) an AAC system plays will vary depending on an individual child's needs. These roles are as follows: augmenting existing natural speech, providing a primary output mode for communication, providing an input and an output mode for language and communication, and serving as a language intervention strategy (Romski et al., 2005).

Baxter et al. (2012) describe low-technology (low-tech) systems or devices, usually considered communication books or boards (non-powered), written words, photographs, line drawings, and pictograms. High-technology (high-tech) systems are commonly distinguished by being powered (Baxter et al., 2012). Professionals must recognize that the power of technological intervention is driven by the needs of individuals, rather than by the device itself. Furthermore, those involved in augmentative and alternative communication (AAC) research and development activities must ensure that the design of AAC technologies is driven by an understanding of motor, sensory, cognitive, and linguistic processing, to minimize learning demands and maximize communication power for individuals with complex communication needs across the life span (Light et al., 2013).

Rationale of the Study

This starred paper topic is significant because effective communication is built through interaction and connection, which is the basis of two-way communication. Communication plays a pivotal role in our daily lives. To articulate our ideas, feelings, emotions and skills we communicate not only with verbal but also non-verbal methods (Wahyuni, 2018). These are essential in teaching learning process too. According to Wahyuni, non-verbal children have difficulty verbalizing because they have some difficulty interacting with others. This makes developing communication skills more challenging (2018). To have successful interactions, children need to respond to others' communication attempts and initiate communication attempts with others. Vollmer (2020) adds that an important link is collaboration between speech-language pathologists, early interventionists, paraeducators, and family members to help provide consistency to children with autism, who have limited verbal abilities, across educational and home settings. Nonverbal individuals can live fulfilling lives and can contribute to society with assistive technology (Vollmer, 2020).

Therefore, the purpose of this starred paper is to examine a variety of low-technology to high-technology communication tools, which may contribute to the expressive and receptive communication skills of children in the early childhood years who are on the autism spectrum.

Research Questions

This investigation will examine and address the following research questions by reviewing the current academic literature:

1. How does autism spectrum disorder (ASD) affect communication in early learners?
2. What social communication and interaction skills are impacted by autism spectrum disorder (ASD)?

3. What low-technology communication strategies are available for children with autism spectrum disorder (ASD) to positively affect language development?
4. What high-technology communication strategies are available for children with autism spectrum disorder (ASD) to positively affect language development?

Literature Review Organization

The Literature Review in Chapter Two is designed to incorporate findings from many studies. The literature review is primarily designed to answer the research questions posed above. EBSCO Host: Academic Search Premier and Google Scholar were used to identify articles. Keywords used to search included: importance of communication, communication strategies, autism spectrum disorder, nonverbal, early intervention, augmentative and alternative communication, assistive technology, low-technology communication strategies, and high-technology communication strategies. Key authors utilized throughout this literature review include Susan Baxter, Susan McCorkle, Marjorie Charlop-Christy, Kathryn Drager, Akhtim Wahyuni, MaryAnn Romski, and Rose Sevcik. The journals primarily used for this search are the Journal of Pediatric Rehabilitation Medicine, Journal of Applied Behavior Analysis, Journal of Special Education, and International Journal of Advanced Research in Education and Society.

Key Studies in Literature Review

Below are some key empirical studies, which will be used in further developing chapter two of this starred paper:

Authors, Date, Title	Study Design	Variables	Findings
Drager et al. 2010 *Effects of AAC interventions on communication and language for young children with complex communication needs*	Infants, toddlers, and preschoolers Disabilities include ASD, cerebral palsy, and Down syndrome, and acquired disabilities such as those resulting from TBI and stroke Early intervention	Impact of significant communication disabilities Effects of AAC interventions with young children	Research suggests benefits of AAC interventions on the functional communication skills, challenging behaviors, language development (both receptive and expressive skills), and speech production of young children with complex communication needs (CCN) Most research with children has focused on AAC interventions with preschoolers who require AAC (ages 3–5) rather than children with CCN under the age of three More research is required to ascertain the effectiveness of all types of AAC options with the youngest children with CCN
Sani Bozkurt, Sunagul; Vuran, Sezgin 2014 *An analysis of the use of social stories in teaching social skills to children with autism spectrum disorders*	Social stories were used for teaching social skills to individuals with autism spectrum disorders (ASD) The present study includes a descriptive review and meta-analysis of single-	The following criteria were considered in the selection of articles included in the research: - articles published in peer-reviewed journals between 1991 and 2011, - experimental studies related to individuals	Social stories are written to provide information in a particular situation, and include social cues, social meanings, and appropriate behavioral-social responses The teaching of social skills to young children

	subject studies that met the criteria In all studies, social validity, maintenance, and generalization data were collected in 56.25%, 50%, and 31.25% of the respective studies	showing ASD were examined, - dependent variables of social skills and independent variables related to social stories were examined, - articles that presented social stories alone and social stories with additional interventions were examined, - articles about studies on the effectiveness and efficacy of social stories using a single-subject design were examined, and - case studies conducted with social stories were examined.	with ASD is just as important as the teaching of social skills to adults with ASD Targeted social skills in the examined research were seen to be mostly for initiating communication, social interaction, conversational skills, play skills, and reducing inappropriate behavior Social skills are the skills by which an individual will have an increased acceptance by others in the contexts in which they find themselves It is importance that while deciding on the target skills to be taught, the views of the people around the individual are considered as well as the individual's own expectations within their own social context Results suggest that social stories should not yet be considered as evidence-based practice for teaching social skills to individuals with ASD
Charlop-Christy et al. 2002 *Using the picture exchange communication system (PECS) with children*	Three boys with autism Biweekly sessions at an afterschool behavioral treatment program All children had an extensive history of	Several factors included in the PECS training procedure may explain the relatively quick skill acquisition for these children: - children with autism frequently learn tasks	These children demonstrated some ability to imitate or produce spontaneous speech during and after PECS training

with autism: assessment of PECS acquisition, speech, social-communicative behavior, and problem behavior	verbal speech training that had been ineffective in teaching the children to communicate These children were chosen for the study because they were the first 3 children in the program after the initiation of the study that did not speak or rarely spoke and needed language programming	presented in a structured concrete format more easily than tasks presented in a more abstract format, - the structured context and concrete nature of the physical exchange is perhaps better suited for learning for children with autism than traditional spoken language of an item's label, - the use of picture cards in PECS provides a visual representation for communication and incorporates visual discriminations as part of the communication exchange, which may enhance the speed of learning for children with autism	The children's social communicative behaviors increased after learning to use PECS Eight social-communicative behaviors were observed with initiations and requests increasing the most, concomitant with PECS training Joint attention also increased in all 3 children, although not as much as initiations and requests Increased communication skills occurred in conjunction with decreases in problem behaviors
Baxter et al. 2012 *Interventions using high-technology communication devices: A state-of-the-art review*	Evidence-based information Electronic databases were searched from 2000 to 2010, together with reference lists of included papers and review papers The review considered the work of any design which reported an intervention using high-tech AAC with people who have communication difficulties (excluding those with solely hearing or visual loss) published in peer-reviewed journals	Sixty-five papers reporting interventions using high-tech AAC were identified There was evidence that high-technology AAC may be beneficial across a range of diagnoses and ages The evidence is currently drawn from studies using designs considered to be at considerable risk of bias AAC interventions may be beneficial across a range of diagnoses and ages	Augmentative and alternative communication (AAC) systems have enormous potential to enhance the lives of individuals with communication difficulties by promoting interlinked elements of independence, social relationships, and education An important level of individual variation in outcome requires a greater understanding of characteristics of clients who may or may not benefit from this technology

			More research and work are needed in the field to establish what a 'good outcome' from intervention may be
Wahyuni, A. 2018 *The power of verbal and nonverbal communication in learning*	Application of both verbal and nonverbal	Relationships with others will determine the quality of someone's life Verbal and nonverbal communication is a unity that cannot be separated Communication is related to culture Nonverbal communication is influenced by behavior Nonverbal communication plays a key role in human social interaction	Communication skills are important for one's future, the quality of life, and success Teachers' verbal and nonverbal communication have a key role in supporting educational success Teachers who understand the importance of this communication will be able to become qualified educators and create meaningful learning Teachers should do that with extra effort by doing positive communication involving verbal and nonverbal communication Communication in education is a specific communication done specifically so that the teacher can understand the students and the entire school community
Romski, M. and Sevcik, R. 2005 *Augmentative communication and*	Examination of myths Overview of how language and communication skills emerge in typically developing children	Patterns of early language development Benefits of augmentative and alternative communication (AAC)	AAC is a first line of intervention AAC needs to be linked to early language and communication development

early intervention myths and realities	Roles AAC may play in facilitating the development of young children with significant communication disabilities Examination of realities	Training Transitions Assessment tools Partnering with families	AAC can provide a foundation for the production and comprehension of spoken language
Gevarter et al. 2020 *Teaching preschoolers with autism to use different speech-generating device display formats during play: intervention and secondary factors*	Five preschoolers with ASD (and prior experience with simpler aided augmentative and alternative communication) Taught to use grid and visual scene display speech-generating devices during play-based intervention Acquisition of functional responding was assessed using a single-case experimental design Secondary variables included error types, antecedents for communication, preferences, and generalization	All participants increased their use of functional target vocabulary using both the grid and the simple visual scene display Of the five participants, three showed similar performance with both formats Of the five participants, two had slightly higher rates of functional responding with the grid Individualized differences across participants and formats were apparent across secondary variables (e.g., preference, error types, generalization)	Both simple grid and visual scene displays may be viable options when teaching functional use of speech-generating devices to children with ASD who have prior aided augmentative and alternative communication experience Analyzing secondary variables beyond device acquisition (e.g., generalization, preference) may have implications for individualizing intervention

Definitions

Early Childhood: A pivotal period of child development that begins before birth through age eight. This is a period of rapid brain and body development. The process of child development includes everything from sensory awareness and motor skills to language acquisition and socialization (Psychology Today, 2023).

Early Intervention (EI): Providing intensive early intervention is critical to maximizing developmental outcomes for children with disabilities, and evidence suggests that the earlier intervention can begin, the better the outcome (Woods & Wetherby, 2003).

Autism Spectrum Disorder (ASD): A complex developmental condition involving persistent challenges with social communication, restricted interests, and repetitive behavior. While ASD is considered a lifelong disorder, the degree of impairment in functioning because of these challenges varies between individuals with autism (Suhaila et al., 2022). Social communication/interaction behaviors may include making little or inconsistent eye contact; appearing not to look at or listen to people who are talking; infrequently sharing interest, emotion, or enjoyment of objects or activities (including infrequent pointing at or showing things to others); not responding or being slow to respond to one's name or other verbal bids for attention; having difficulties with the back and forth of conversation; often talking at length about a favorite subject without noticing that others are not interested or without giving others a chance to respond; displaying facial expressions, movements, and gestures that do not match what is being said; having an unusual tone of voice that may sound sing-song or flat and robot-like; having trouble understanding another person's point of view or being unable to predict or understand other people's

actions; difficulties adjusting behaviors to social situations; and difficulties sharing in imaginative play or in making friends (National Institute of Mental Health, 2023).

Early Intervention for Autism: Autism spectrum disorder (ASD) can sometimes be diagnosed in children before they are two years of age. Early interventions occur at or before preschool age, as early as two or three years of age. In this period, a young child's brain is still forming, meaning it is more “plastic” or changeable than at older ages. Because of this plasticity, treatments have a better chance of being effective in the longer term (National Institutes of Health, 2017).

Assistive Technology (AT): Any item, equipment, software program, or product system used to increase, maintain, or improve the functional capabilities of persons with disabilities (ATIA, 2015).

Expressive Communication: The “output” of language is the ability to express your wants and needs through verbal or nonverbal communication. It is the ability to put thoughts into words and sentences in a way that makes sense and is grammatically correct (Vollmer, 2020).

Receptive Communication: The “input” of language is the ability to understand and comprehend spoken language that you hear or read (Vollmer, 2020).

Verbal Communication: Refers to the use of sounds and language to relay a message, and it serves as a vehicle for expressing desires, ideas, and concepts and is vital to the processes of learning and teaching (Fer, 2018).

Nonverbal Communication: The transfer of information from one person to another without words or spoken language. Nonverbal communication can occur in several ways,

including through facial expressions, gestures, and body posture or position (Britannica, 2023).

Augmentative and Alternative Communication (AAC): *Augmentative* means to add to someone's speech. *Alternative* means to be used instead of speech. A means of all the ways that someone communicates besides talking (ASHA, 2019). A multimodal intervention approach that uses manual signs, communication boards with symbols, and computerized devices that speak and incorporate the child's full communication abilities. These abilities may include any existing speech or vocalizations, gestures, manual signs, communication boards and speech-output communication (Romski et al., 2005).

Low-technology: Methods of communicating that are not battery-powered and are usually inexpensive to make. Options include things like gestures and facial expressions, writing, drawing, spelling words by pointing to letters and pointing to photos, pictures, or written words (ASHA, 2019).

High-technology: Systems that rely on electricity and rechargeable battery packs as they use lighted dynamic displays and synthesized voices. Systems run sophisticated software vocabularies, and multiple voices, are fully accessible, and can be thoroughly customized (Liberator Pty Ltd, n.d.). ASHA identifies *high-tech* options that include things like using an app on an iPad or tablet to communicate and using a computer with a "voice," sometimes called a speech-generating device (2019).

Chapter II: Literature Review

The United States Department of Education identifies that the Individuals with Disabilities Education Act (IDEA) is a law that makes available a free and appropriate public education to eligible children with disabilities throughout the nation and ensures special education and related services to those children. The IDEA governs how states and public agencies provide early intervention, special education, and related services to more than 7.5 million (as of school year 2020-21) eligible infants, toddlers, children, and youth with disabilities. (U.S. Department of Education, 2017).

This literature review identifies the importance of early intervention, determines how and what communication skills may be impacted by a young learner with autism spectrum disorder (ASD), and the use and benefits of augmentative and alternative communication (AAC). In addition, this literature review will address a variety of best practice communication strategies, from low-technology to high-technology, that may positively impact young learners who have a diagnosis of autism spectrum disorder (ASD).

Verbal and Nonverbal Learning

Verbal learning involves acquiring and processing information through language, such as words, written text, or spoken language. It relies on linguistic abilities, including reading, writing, speaking, and listening (Wahyuni, 2018). Nonverbal learning involves the acquisition and processing of information through means other than language. This includes visual, spatial, tactile, and auditory modalities. It focuses on understanding and interpreting nonverbal cues, such as facial expressions, body language, gestures, images, and spatial relationships (Wahyuni, 2018). Both verbal and nonverbal learning are important aspects of cognitive development and

can complement each other in various learning contexts. Individuals often have a preferred learning style, but effective learning typically involves a combination of both verbal and nonverbal approaches (OpenAI, 2024).

Early Intervention

Providing intensive early intervention is critical to maximizing outcomes for children with autism spectrum disorder (ASD), and evidence suggests that the earlier intervention can begin, the better the outcome. Most young children develop speech and language skills rapidly and seemingly effortlessly (Drager et al., 2010). In the early childhood years, the author states that developing children learn to participate actively in social interactions with others, acquire thousands of words, learn to use complex sentences to communicate their thoughts and ideas with others and begin to develop phonological awareness skills and sound-symbol correspondences necessary for reading and writing (2010). Authors Romski and Sevcik explain that young children use language for many purposes, including to meet their wants and needs, to gain knowledge about the world around them, to develop and maintain social relationships, and to exchange information with others (2005). For young children to develop functional language and communication skills, they must be able to comprehend and produce language so that they can take on the reciprocal roles of both listener and speaker in conversational exchanges (Romski and Sevcik, 2005).

Typically developing children begin building the foundations for communicative development at birth and usually say their first words at approximately one year of age (Drager et al., 2010). During the first three years of life, children are neurologically primed for rapid and vast amounts of learning. Authors Romski and Sevcik indicate that delaying communication intervention for children with complex communication needs (CCN) during this time means they

may forever try to “catch up” for the valuable years of learning lost (2005). Romski and Sevcik go on to explain that early language interventions must consider how receptive and expressive experiences can be incorporated into intervention strategies during the beginning developmental period through the means of augmentative and alternative communication (AAC) (2005). Drager et al. recognize that early intervention using AAC can maximize opportunities to enhance the development of children with CCN, minimize the potential for continued delay, and provide support and assistance to the family (2010). Additionally, the earlier intervention begins, the better the outcome may be, resulting in increased quality of life for individuals and decreased cost(s) of later intervention (Drager et al., 2010).

Augmentative and Alternative Communication (AAC) as Early Intervention

Communication is fundamental to all aspects of living and learning (Drager et al., 2010). Romski and Sevcik define communication in the broadest sense as "any act by which one person gives to or receives from another person information about that person's needs, desires, perceptions, knowledge, or affective states" (2005). Without access to functional communication, children with complex communication needs (CCN) fall further and further behind their peers and have limited opportunities for communication, language, literacy learning, and socialization (Drager et al., 2010). A challenge identified by Drager et al. is to provide children who have CCN with access to the magic and power of communication at the earliest possible age to circumvent the negative effects of communication disabilities (2010).

Benefits of Augmentative and Alternative Communication (AAC) Interventions

Baxter et al. explain that interventions that utilize augmentative and alternative communication (AAC) approaches may allow children with complex communication needs

(CCN) to develop functional communication skills, as well as promote cognitive/conceptual development, provide the foundation for literacy learning, and improve social participation, and allows for increased independence in activities of daily living, such as choice making, thereby enhancing overall quality of life (2012). However, despite the demonstrated benefits of AAC, many young children with significant disabilities are not identified or referred for AAC services until they are older and have already missed out on valuable years of learning.

To communicate effectively to meet a wide range of goals, young children need to develop language skills (e.g., have vocabulary available to express different purposes and use this vocabulary in different ways and within interactions) (Drager et al., 2010). Research shows that augmentative and alternative communication (AAC) interventions can have a positive effect on all aspects of the language skills of young children with complex communication needs (CCN). These positive effects include facilitating the development of pragmatics, or the social uses of communication, including using language for different purposes and following rules and conventions such as turn-taking (Drager et al., 2010). AAC interventions can also facilitate the development of semantics (the meanings of words and sentences), and syntax/morphology (the order and combination of words to form sentences, and the construction of word forms such as plurals or tenses). Drager et al. suggest that the goal of building functional communication skills should be a priority not only for professionals but also from the perspective of individuals who use AAC (2010).

Authors Romski and Sevcik acknowledge that most AAC interventions focus on the development of expressive communication skills (producing language). In recent years, there has been increased attention to the use of AAC as augmented input to enhance comprehension or receptive language (understanding language) (2005). As in the use of visual schedules,

augmented input involves the use of AAC symbols by the child's communication partner to supplement speech (e.g., the adult combines speech with sign, or combines speech with pointing to a picture symbol on a communication board or speech generating device). The authors go on to say that the use of AAC by a communicative partner benefits the child by providing a model for the child of how AAC can be used to communicate, and visual language support that may permit the individual who uses AAC to extract previously unobtainable spoken words from the language learning environment (2005)

Unaided and Aided Forms of Communication

There are two forms of augmentative and alternative communication (AAC) known as *unaided* and *aided* (Romski and Sevcik, 2005). Unaided forms of communication consist of nonverbal means of natural communication, including gestures and facial expressions, as well as manual signs and American Sign Language (ASL), which can be employed by children who can use their hands and have adequate fine motor coordination skills to make fine-grained production distinctions between handshapes (2005). A caveat is that communication partners must have a basic understanding of the signs for communication to take place (Romski and Sevcik, 2005).

Technological advances have produced a range of opportunities for aided forms of communication (OpenAI, 2024). Aided forms of communication consist of those approaches that require some additional external support, such as a communication board with symbols, including pictures, photographs, line drawings, symbols, and printed words, or a speech-generating device (Romski and Sevcik, 2005). These boards and devices typically display visual-graphic symbols that stand for, or represent, what the child wants to express (2005). Some children create messages using print. Access to aided forms of communication can be via direct selection or scanning. Direct selection techniques include pointing with, for example, finger,

hand, head (through a head stick), eyes, or feet. Scanning is a technique in which the message elements are presented to the child in a sequence either by a person or the device. The child specifies his or her choice by responding yes or no to the person or the device after each element is presented. Scanning can be, for example, linear, circular, or row-column and encoding (OpenAI, 2024).

Communication Interventions in Early Childhood Education

Every day, children who cannot speak face social and educational isolation as well as significant frustration because they are unable to communicate their necessities, desires, knowledge, and emotions to their parents, siblings, extended family members, peers, and teachers (Romski and Sevcik, 2005). There is strong evidence that early intervention (EI) can improve outcomes for children with autism spectrum disorder (ASD), and consequently, the importance of EI has been widely promoted to families of children with ASD (Edwards et al., 2016). The authors Drager, Light, and McNaughton identify that children with complex communication needs (CCN), who require augmentative and alternative communication (AAC), are at considerable risk in many aspects of their development, such as functional communication skills, speech development, language development, cognitive/conceptual development, literacy development, social participation, access to education, and overall quality of life (2010). Early intervention is critical to address these areas and provide successful and functional outcomes. AAC offers the potential to enhance communication, language, and learning for children with significant communication disabilities (OpenAI, 2024).

Visual schedules

Visual schedules can help students with ASD by reducing anxiety and unpredictability in their day. They also provide emotional regulation while reducing the challenge of short-term memory (McCorkle, 2012). Visual schedules can occur in many formats, using photographs, line drawings, written words, and sometimes accompanied by auditory cues, and it is important to augment any visual strategy with vocal communication as reinforcement of spoken language (OpenAI, 2024). McCorkle suggests having items attached to schedules or folders with Velcro so students can physically move items from one place to another as they complete the activities. Visual schedules should tell what events are going to occur, when they occur, the order of activities, and any changes that are going to happen in daily routines (2012). The author goes on to say that changing a student's routine helps teach him/her to deal with change. If the schedule reflects a change, then a student will learn to follow the schedule instead of a typical routine for the day (2012).

Picture Exchange Communication System (PECS)

The picture exchange communication system (PECS) is a pictorial system that was developed for children with social-communication deficits (Charlop-Christy et al., 2002). The system uses basic behavioral principles and techniques such as shaping, differential reinforcement, and transfer of stimulus control via delay to teach children functional communication using pictures (black-and-white, color drawings, or authentic photographs) as the communicative referent. The pictures are kept in a binder (PECS board), often with Velcro (Charlop-Christy et al., 2002). A child is taught to scaffold a single word thought eventually into a sentence using a series of pictures (e.g., “I want” card plus “juice” card) and delivering the cards to a communicative partner as a request for a desired item. Charlop-Christy et al. (2002)

emphasize that PECS teaches a child to initiate requests (for seen and unseen items), respond to questions (e.g., “What do you want?”), and make social comments (e.g., “I see [object]”).

There are many benefits to using the PECS system with young children with autism spectrum disorder (ASD). Charlop-Christy et al. (2002) identify the PEC system as appealing for several reasons. First, the system requires a few complex motor movements on the part of the speaker and does not require the listener to be familiar with an additional language such as sign language. Second, the PECS system is low-cost, portable, and suitable for use in many settings. Third, the system can be taught rapidly and build momentum over a short amount of time. Finally, the PECS system incorporates functional communicative responses that promote meaningful interactions between the child and the environment. The PECS system is unique among alternative communication systems in that it requires the child to approach a listener and initiate interaction before emitting a referential communicative act (Charlop-Christy et al., 2002).

Social Stories

A social story is an individualized short story that can assist individuals with interpreting and understanding challenging or confusing social situations (Sani Bozkurt and Vuran, 2014). Social stories are short stories that explain cues and appropriate responses to significant situations in a social context, and the stories are written from the perspective of the student using person-first language.

The DSM-5 (Diagnostic and Statistical Manual of Mental Disorders, 2013) highlights the importance of social relatedness as being a key core deficit in autism spectrum disorder (ASD). Children with ASD display limitations with the nonverbal behavior necessary for social interaction. They tend to not develop age-appropriate peer relationships, and they show

limitations in their interest, success, and pleasure with others, and they display limited social-emotional behaviors (American Psychiatric Association, 2013). Sani Bozkurt and Vuran identify that one of the most pronounced deficiencies of children with autism spectrum disorders (ASD) is with social skills such as initiating and responding to conversation, changing a routine, understanding how other people may feel or think, and responding appropriately in a social situation, as these things hinder social interaction with peers and those in their environment (2014). The authors go on to say that inappropriate social behaviors might also adversely impact a student's ability to carry out tasks and engage with others. The deficits in social behaviors might become more apparent, more distinctive, and more critical when individuals with ASD reach school age (Sani Bozkurt and Vuran, 2014). Social skills are an important aspect of routine living, and improving social functionality is one of the most important intervention measures for individuals with ASD (OpenAI, 2024).

Speech Generated Devices (SGDs)

Increasingly, mobile technology devices (e.g., tablets and smartphones) with augmentative and alternative communication (AAC) apps are being utilized as speech-generating devices (SGDs) for learners with complex communication needs (CNN) (Gevarter et al., 2020). AAC apps can provide a variety of options for displaying vocabulary. In addition to apps with traditional grid-based displays (in which graphic symbols are presented in row-column arrays), other apps allow for the use of photographic-based visual scene displays (VSDs). VSDs integrate a set of contextually relevant elements (e.g., actions, objects, people) into a coherent image (photograph or drawing) of a place, activity, or experience (OpenAI, 2024).

Speech-generating devices (SGD) can improve the quality of life for a child with autism spectrum disorder (ASD) by providing them with a reliable means to communicate their needs,

thoughts, and feelings. It enhances their ability to interact with others, participate in daily activities, and access educational opportunities, fostering independence and self-confidence. Appropriate SGD interventions can positively affect the functional communication skills of young children with complex communication needs (CCN) with a wide range of disabilities. The improvement of functional communication skills (i.e., communication necessary to participate in each environment) is a primary goal of AAC interventions (Gevarter et al., 2020).

Proloquo2Go

Proloquo2Go is a symbol-based augmentative alternative communication (AAC) application designed for iOS devices like iPads. It offers customizable communication grids with symbols, pictures, and text, making it suitable for preschoolers with autism spectrum disorder (ASD) to express their needs and thoughts through touch-based interactions (AssistiveWare, 2019).

TouchChat HD

TouchChat HD is an augmentative alternative communication (AAC) application available for iOS devices, providing various communication tools, including symbol-based grids, keyboard layouts, and word prediction features. It is designed to meet the communication needs of preschoolers with autism spectrum disorder (ASD), offering intuitive and customizable options (*TouchChat – TouchChat HD - AAC*, n.d.).

AACorn AAC

AACorn AAC is an augmentative alternative communication (AAC) application specifically designed for preschoolers and young children with autism spectrum disorder (ASD). It offers simplified communication grids with age-appropriate symbols and vocabulary, as well

as customizable options to support language development and social communication skills (*AACORN Assistive Speech App - Assistive Technology at Easter Seals Crossroads*, 2020).

Speak for Yourself (SfY)

Speak for Yourself is an augmentative alternative communication (AAC) application utilizing a core vocabulary approach, focusing on essential words and phrases commonly used in everyday communication. It is designed to be user-friendly and intuitive for preschoolers with autism spectrum disorder (ASD) to navigate and use effectively (*Speak for Yourself AAC | Augmentative and Alternative Communication (AAC) App: Changing the World, One Voice at a Time.*, n.d.).

Literature Summary

For young learners who have autism spectrum disorder (ASD), early speech and language development plays a pivotal role in overall growth and development. It serves as the cornerstone for effective communication, enabling young children to express their needs and desires, engage socially to form friendships and connections, gain information about their surroundings, enhance cognitive abilities, and lay down the groundwork for later language and literacy skills. Through speech and language, children not only convey their thoughts and feelings but also absorb knowledge from their environment, fostering their understanding of the world around them.

Early intervention and support are crucial to address the challenges that young learners with ASD face regarding optimal development in speech, language, and literacy. By identifying and addressing these obstacles early on, interventions can be tailored to meet the individual needs of each child, providing them with the necessary tools and strategies to navigate their communication journey effectively. Through targeted interventions and a supportive environment, children can overcome barriers, unlock their potential, and thrive in their communication and learning endeavors.

Chapter III: Results

For young learners who are diagnosed with autism spectrum disorder (ASD), providing access to communication systems is essential for promoting social, emotional, cognitive, and overall well-being. Communication empowers children to interact effectively, can reduce frustration, enhance learning opportunities, foster self-advocacy, and improve quality of life. There is a plethora of interventions from low-technology to high-technology interventions, and professionals must become familiar with the full range of options.

Conclusions

The information from the chapter two literature review was guided by the following four questions that will be directly answered below:

1. **How does autism spectrum disorder (ASD) affect communication in early learners?**

Autism spectrum disorder (ASD) significantly affects communication in early learners in many ways. Many children with ASD experience delays in language development, such as delayed onset of speech, limited vocabulary, and difficulties with grammar and syntax (NIDCD, 2020). Social communication poses challenges, including understanding social cues, initiating and maintaining conversations, and interpreting nonverbal communication like facial expressions and gestures (OpenAI, 2024). Echolalia, the repetition of words or phrases spoken by others, is common, as is a literal understanding of language, making abstract concepts, humor, and idiomatic expressions difficult to comprehend (AHSA, 2019). These communication barriers can lead to frustration, social isolation, and difficulties in forming relationships, underscoring the importance of early intervention and tailored communication support for children with ASD (NIDCD, 2020).

2. **What social communication and interaction skills are impacted by autism spectrum disorder (ASD)?**

Autism spectrum disorder (ASD) can impact various social communication and interaction skills. Individuals with ASD may experience challenges in understanding social cues, such as facial expressions, tone of voice, and body language, which can affect their ability to interpret others' emotions and intentions accurately (Wahyuni, 2018). They may also struggle with initiating and maintaining conversations, often exhibiting difficulties in taking turns, staying on topic, and understanding the nuances of social language, such as sarcasm or humor (NIDCD, 2020). Additionally, individuals with ASD may find it challenging to engage in reciprocal social interactions, share interests, and establish friendships due to difficulties with perspective-taking and empathy (OpenAI, 2024). Joint attention, the ability to share attention with others on a common object or topic, may also be impaired in individuals with ASD, affecting their ability to engage in shared activities and collaborative play (NIDCD, 2020). Overall, ASD can impact a wide range of social communication and interaction skills, making it challenging for individuals to navigate social situations, build relationships, and participate fully in social activities.

3. **What low-technology communication strategies are available for children with autism spectrum disorder (ASD) to positively affect language development?**

Low-technology communication strategies play a vital role in supporting language development in children with autism spectrum disorder (ASD) (Baxter et al., 2012). One such strategy is the use of visual supports, including picture exchange systems (PECS). PECS allows children to communicate their needs, desires, and preferences by exchanging pictures or symbols with a communication partner, promoting language acquisition through concrete visual representations (Charlop-Christy, et al., 2002). Visual schedules provide a structured visual

representation of daily activities or routines, helping children with ASD understand expectations, transitions, and sequences, which can enhance their language comprehension and expression (McCorkle, 2012). Another low-tech strategy is the use of social stories, which provide personalized narratives to teach social skills, routines, and expectations clearly and sequentially, aiding in language comprehension and pragmatic skills development (Sani Bozkurt and Vuran, 2014). Additionally, augmentative, and alternative communication (AAC) devices, such as communication boards or books with symbols or words, can serve as effective low-tech tools to support language development and communication skills in children with ASD, offering them alternative means to express themselves and engage in social interactions (OpenAI, 2024). Overall, these low-technology communication strategies provide valuable support for children with ASD, fostering language development, social communication, and interaction skills.

4. **What high-technology communication strategies are available for children with autism spectrum disorder (ASD) to positively affect language development?**

High-technology communication strategies offer innovative solutions to support language development in children with autism spectrum disorder (ASD). One prominent example is the use of speech-generating devices (SGDs) or dedicated communication apps on tablets or smartphones (Gevarter et al., 2020). These devices allow children with ASD to generate spoken language by selecting symbols or typing text, providing them with a voice to express their thoughts, needs, and emotions. SGDs can be customized to accommodate individual communication needs and preferences by promoting language acquisition and fostering social interaction (OpenAI, 2024). Additionally, interactive software programs and games designed specifically for children with ASD can engage them in language learning activities in a fun and motivating way, promoting vocabulary acquisition, sentence structure, and conversational skills

(Gevarter et al., 2020). Overall, high-technology communication strategies offer versatile and dynamic solutions to enhance language development and communication skills in children with ASD, providing them with opportunities for self-expression, social engagement, and academic success.

Discussion and Reflections

The author's perspective on the topic is presented in this section of the article. The findings from chapter two literature review, along with my personal experiences, led to these concepts.

Augmentative and alternative communication (AAC) is not a last resort but rather a first line of intervention that can provide a firm foundation for the development of spoken language comprehension and production. It can set the stage for further language and communication development during the child's preschool and early school years (Romski and Sevcik, 2005). It also can open the door for the child's overall developmental progression. Technological developments have offered many new opportunities for young learners with complex communication needs (CCN). Along with the attraction of modern technologies, there is a danger that people with CCN will be forced to adapt to the demands of technology, rather than ensuring that the technology responds to their needs, skills, and preferences (Light and McNaughton, 2013). Furthermore, there is a danger that intervention will be limited to the provision of a device, without providing appropriate training and support to maximize communicative competence (Baxter et al., 2012). Educators must ensure that we are a profession devoted to people who require AAC, not the field of AAC; that ours is a field not overly focused on technology but rather one that recognizes the need to maximize the communication and

participation of individuals with complex communication needs, utilizing technology as one tool towards this end goal (OpenAI, 2024).

Although there are still challenges to confront (e.g., the cost of augmentative and alternative communication (AAC) systems, issues of portability, durability, etc.), existing research provides evidence of the positive effects of AAC for young children with complex communication needs (CCN) (Drager, 2010). Early intervention is critical to maximize these positive effects. Pediatricians and other medical and rehabilitation professionals may be among the first professionals with an opportunity to identify children with CCN and refer children and their families to programs that can support access to AAC and functional communication (Kent et al., 2013). Early intervention can serve as the foundation for their lifelong learning and success. The research suggests the benefits of AAC interventions on functional communication skills, challenging behaviors, language development (both receptive and expressive skills), and speech production of young children with CCN.

Recommendations for Future Research

There is a need for continued research regarding communication strategies for children who have autism spectrum disorder (ASD) in early childhood. Recommendations for future studies are listed below based on identified gaps in the literature that are supported by other researchers.

1. Further examine augmentative and alternative communication (AAC) interventions with children under the age of three who have complex communication needs (CCN) (Drager et al., 2010).
2. Further understanding how to arrange early augmented language intervention to be able to capitalize on the communicative roles family members may typically play (Romski and Sevcik, 2005).
3. Apart from individuals diagnosed with autism or Asperger's syndrome, groups with different diagnoses could be featured in studies on the use of social stories for teaching social skills (Sani Bozkurt and Vuran, 2014).
4. Further evaluation of the difference between sequential and non-sequential routines in the use of social stories as well as the use of visual schedules coupled with social stories (McCorkle, 2012).
5. There is limited research suggesting that navigating through speech-generated device (SGD) grids may require developmental or cognitive skills that could be absent in young children or those with cognitive impairments (Gevarter et al., 2020).

Recommendations for Practice

As early childhood special educators, we must know a variety of low-technology and high-technology strategies available to the youngest learners with complex communication needs. Suggestions for parents, direct service providers, and early childhood special education teachers are as follows:

1. The goal of selecting assistive technology tools should be to enhance the natural abilities of children with autism spectrum disorder (ASD) rather than merely focus on deficiency ability skills for the student to be proficient with their own unique talents (Suhaila and Nordin, 2022).
2. Augmentative and alternative communication (AAC) practitioners must ensure that the selection of AAC systems is driven, not by the technology but rather by the individual's needs and skills, to maximize the person-technology fit (Light and McNaughton, 2013).
3. To ensure that augmentative and alternative communication (AAC) services and supports can be provided to children receiving early intervention services, training about AAC must be included for professionals and families (Romski and Sevcik, 2005).

References

AACORN Assistive Speech App - Assistive Technology at Easter Seals Crossroads. (2020, December 3). https://www.eastersealstech.com/2020/12/03/aacorn-assistive-speech-app/

American Psychiatric Association. (2013). Cautionary statement for forensic use of DSM-5. *In Diagnostic and Statistical Manual of Mental Disorders (5th ed.)*. Washington, DC: Author. http://dx.doi.org/10.1176/appi.books.9780890425596

ASHA. (2019). *American Speech-Language-Hearing Association | ASHA*. Asha.org.

Assistive Technology Industry Association. (2015, October 11). *What is AT?* Assistive Technology Industry Association (ATIA).

AssistiveWare. (2019). *Proloquo2Go - AAC app with symbols - AssistiveWare*. Assistiveware.com. https://www.assistiveware.com/products/proloquo2go

Baxter, S., Enderby, P., Evans, P., & Judge, S. (2012). Interventions using high technology communication devices: a state-of-the-art review. *Folia Phoniatrica et Logopaedica, 64*(3), 137-144.

Britannica (2023). *Encyclopedia Britannica*. https://www.britannica.com

Charlop-Christy, M. H., Carpenter, M., Le, L., LeBlanc, L. A., & Kellet, K. (2002). Using the picture exchange communication system (PECS) with children with autism: Assessment of PECS acquisition, speech, social-communicative behavior, and problem behavior. *Journal of Applied Behavior Analysis, 35*(3), 213-231.

Douglas, S. N., & Gerde, H. K. (2019). A strategy to support the communication of students with autism spectrum disorder. *Intervention in School and Clinic, 55*(1), 32-38.

Drager, K., Light, J., & McNaughton, D. (2010). Effects of AAC interventions on communication and language for young children with complex communication needs. *Journal of Pediatric Rehabilitation Medicine, 3*(4), 303-310.

Edwards, A., Brebner, C., McCormack, P., & MacDougall, C. (2017). The early intervention message: Perspectives of parents of children with autism spectrum disorder. *Child: Care, Health & Development*, *43*(2), 202–210.

Fer, S. (2018). Verbal Communication as a Two-Way Process in Connecting People. *Available at SSRN 3128115.*

Gevarter, C., Horan, K., & Sigafoos, J. (2020). Teaching Preschoolers with Autism to Use Different Speech-Generating Device Display Formats During Play: Intervention and Secondary Factors. *Language, Speech & Hearing Services in Schools*, *51*(3), 821–838.

Kent, R. G., Carrington, S. J., Couteur, A. L., Gould, J., Wing, L., Maljaars, J., Noens, I., & Leekam, S. R. (2013). Diagnosing Autism Spectrum Disorder: Who will get a DSM-5 diagnosis? *Journal of Child Psychology and Psychiatry, 54*(11), 1242-1250.

Liberator Pty Ltd. (n.d.). *Low-tech & high-tech AAC.* *https://liberator.net.au/support/education/*aac/low-tech-vs-high-tech#:~:text=Low-Tech%3A%20These%20systems%20are%20methods%20of%20communicating%20that

Light, J. & McNaughton, D. (2013). Putting people first: Re-thinking the role of technology in augmentative and alternative communication intervention. *Augmentative and Alternative Communication, 29*(4), 299-309.

McCorkle, S. L. (2012). Visual strategies for students with autism spectrum disorders. *LC Journal of Special Education, 6*(1), 4.

National Institute on Deafness and Other Communication Disorders. (2020, April 13). *Autism spectrum disorder: Communication problems in children*. NIDCD. https://www.nidcd.nih.gov/health/autism-spectrum-disorder-communication-problems-children

National Institutes of Health. (2017, January 31). *Early Intervention for Autism*. https://www.nichd.nih.gov/health/topics/autism

National Institute of Mental Health. (2023). *Autism spectrum disorder*. https://www.nimh.nih.gov/health/topics/autism-spectrum-disorders-asd

OpenAI. (2024). *ChatGPT* (3.5) [Large language model]. https://chat.openai.com

Psychology Today (2023). *Early Childhood.* https://www.psychologytoday.com/us/basics/child-development/early-childhood

Romski, M., & Sevcik, R. A. (2005). Augmentative communication and early intervention: Myths and realities. *Infants & Young Children*, *18*(3), 174–185.

Sani Bozkurt, Sunagul & Vuran, Sezgin. (2014). An Analysis of the Use of Social Stories in Teaching Social Skills to Children with Autism Spectrum Disorders. *Educational Sciences: Theory & Practice*, *14*(5).

Speak For Yourself AAC | Augmentative and Alternative Communication (AAC) app: Changing the world, one voice at a time. (n.d.). Speakforyourself.org. https://speakforyourself.org/

Suhaila, N. A., & Nordin, N. M. (2022). Assistive technology for autism spectrum disorder: Systematic literature review. *International Journal of Advanced Research in Education and Society*, *4*(2), 25-39.

TouchChat – TouchChat HD - AAC. (n.d.). https://touchchatapp.com/apps/touchchat-hd-aac

UNICEF. (2015). *Early childhood development overview*. https://data.unicef.org/topic/early-childhood-development/overview/

U.S. Department of Education. (2017). *Individuals with Disabilities Education Act*. IDEA. https://sites.ed.gov/idea/

Vollmer, E. (2020, January 14). *Expressive vs. Receptive Language*. TherapyWorks.

Wahyuni, A. (2018, January). The power of verbal and nonverbal communication in learning. In *1st International Conference on Intellectuals' Global Responsibility (ICIGR 2017)* (pp. 80-83). Atlantis Press.

Woods, J. J., & Wetherby, A. M. (2003). Early Identification of and Intervention for Infants and Toddlers Who Are at Risk for Autism Spectrum Disorder. *Language, Speech, and Hearing Services in Schools*, *34*(3), 180–193.