

**Enhancing Communication: The Positive Impact of AAC Devices for Nonverbal  
Neurodivergent Students in Elementary Education**

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## Abstract

Augmentative and Alternative Communication (AAC) devices have revolutionized the educational landscape for nonverbal neurodivergent children, offering unprecedented opportunities for self-expression and learning. These sophisticated tools serve multiple critical functions: enabling students to communicate basic needs and wants, facilitating engagement with complex academic content, fostering meaningful social interactions, and perhaps most significantly, providing individuals with an authentic voice in their daily lives (ASHA, 2022; Dixon & O'Hara, 2006; Wilkinson & Madel, 2019).

This qualitative study investigated the methodologies and strategies employed by special education teachers and speech therapists in teaching core vocabulary through high-tech AAC devices (ASHA, 2022). The research spanned multiple educational environments, including one-on-one therapy sessions, special education classrooms, and general education settings, examining how these professionals integrate AAC systems across various contexts (ASHA, 2022; Coleman, 2020; Schreiber & Valle, 2013). Through in-depth interviews with educators and speech-language pathologists, the study addressed several critical questions: What type and quality of training were professionals provided to support AAC implementation? What measurable positive impacts emerged within school environments? How were AAC devices effectively integrated into general education classrooms? How did systematic core language instruction influence students' proficiency with their speech-generating devices? The research particularly focused on understanding the intersection between theoretical knowledge and practical application in real educational settings (Creswell & Poth, 2024).

The findings of this study offer substantial practical implications for educational professionals working with AAC users. The study documented both successful approaches and significant challenges, revealing specific support structures that facilitated effective implementation and

identifying critical gaps in current curriculum frameworks (Light & McNaughton, 2014). Notably, the research highlighted the importance of cross-disciplinary collaboration and consistent implementation across different educational settings (Creswell & Poth, 2024; Vygotsky, 1978; Vygotsky, 1934). The investigation also uncovered several key factors that influence successful AAC integration, including professional development opportunities, administrative support, and peer engagement strategies. These insights led to the development of specific recommendations for curriculum design, professional training programs, and support systems necessary for effective AAC implementation (ASHA, 2022; Coleman, 2020; Schreiber & Valle, 2013).

The study concludes with detailed recommendations for expanding this research, suggesting future investigations into long-term outcomes, the role of family involvement, and the impact of different technological platforms on student success. These findings contribute to the growing body of knowledge about AAC implementation in educational settings and provide a foundation for developing more effective support systems for nonverbal neurodivergent students.

## Dedication

To Eric and Ollie,

Who fill my days with love, purpose, and joy

And make every challenge worthwhile

To Mom and Dad (in Heaven),

Who taught me the value of perseverance

And continue to guide my path on earth from above

To my family, friends, and colleagues,

Whose support and encouragement

Have carried me through this journey

And to my students—past, present, and future:

I dedicate this work to you.

I promise to always provide a safe harbor

Where every child can learn, grow, and thrive.

I vow to persist in my mission

Until our schools truly value and celebrate

Every child and their unique abilities.

Your potential inspires me.

Your courage moves me.

Your successes drive me forward. This is for all of you.

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## Chapter One

### Introduction

Between verbal and non-verbal communication lies a complex interplay that shapes human interaction. Research indicates that non-verbal communication accounts for approximately 60-70% of meaning in human interaction, making it a crucial component of social understanding (Dixon & O'Hara, 2006). This significance becomes particularly apparent when examining communication patterns in neurodivergent individuals, where traditional interpretations of non-verbal cues may not align with neurotypical expectations.

Dixon and O'Hara (2006) emphasize that message encoding goes beyond mere words; non-verbal cues like posture, facial expression, inflection, and tone play significant roles in decoding the meaning of a message (Iacono et al., 2019). Such non-verbal cues may also convey unintended meanings, particularly through non-verbal leakage (ASHA, 2022; Coleman, 2020; Schreiber & Valle, 2013; Wilkinson &, 2019). Non-verbal leakage refers to the unconscious and involuntary display of emotions or feelings through body language, facial expressions, and other non-verbal cues (Talwar, 2004). Common examples include inconsistent facial expressions, nervous gestures like fidgeting or biting nails, and avoiding eye contact. (Talwar, 2004). Nonverbal neurodivergent individuals often demonstrate these characteristics (ASHA, 2022; Coleman, 2020; Schreiber & Valle, 2013).

The concept of non-verbal leakage becomes especially relevant in educational and therapeutic settings, where practitioners must distinguish between involuntary non-verbal cues and intentional communication attempts. Understanding these distinctions is crucial for developing appropriate interventions and support strategies for neurodivergent individuals who may experience challenges with traditional communication methods (ASHA, 2022; Iacono et al.,

2019). Non-verbal leakage in neurodivergent individuals may manifest differently due to variations in communication styles and processing of social cues (ASHA, 2022; Haynes & Phil, 2018).

Some individuals may rely less on facial expressions, tone of voice, and body language when communicating, which can sometimes be misinterpreted by neurotypical individuals (Haynes & Phil, 2018). Additionally, "going nonverbal" can be a coping mechanism for individuals on the autism spectrum to manage overwhelming experiences, related to sensory sensitivities and difficulties in processing and expressing emotions (Berne, 1971; Haynes & Phil, 2018).

Historically, it's possible that Helen Keller, well-known for her early loss of sight and hearing, may have been one of the first documented cases of a neurodivergent non-verbal child studied by researchers. Her experiences and the techniques developed by her teacher Anne Sullivan could offer valuable insights when viewed through a modern lens of understanding neurodiversity (ASHA, 2022, Berne, 1971; Haynes & Phil, 2018).

Helen Keller in 1887 was the first public case of a nonverbal individual (Diamnte, 2019; Schreiber & Valle, 2013). Anne Sullivan, a private teacher for Helen, taught Helen the manual alphabet (Diamnte, 2019; Elshahar, et al., 2019). Helen was able to communicate using alternative methods to gain her wants and needs (Diamnte, 2019; Wilkinson & Madel, 2019). During the 1940s, limited information about nonverbal neurodivergent individuals led to a focus on determining its primary cause, as people sought clear and straightforward answers to the "symptoms" of the disability (Diamnte, 2019, Velentzas & Broni, 2014). Decades of research have laid the groundwork for the contemporary understanding of neurodivergent communication and the importance of AAC methods.

In recent years, an increasing amount of scholarly research has bolstered the case for using augmentative and alternative communication (AAC) methods with autistic children (ASHA, 2022; Iacono et al., 2019). These children often have significant social communication deficits and exhibit repetitive, restrictive behaviors (ASHA, 2022; Velentzas & Broni, 2014). AAC comprises multiple modalities that can either supplement or replace an individual's existing speech and communication abilities. Unaided modalities typically involve manual signs, while aided modalities consist of systems such as graphic symbols on communication boards or in books, as well as technology-based devices like speech-generating devices (SGD) and mobile technologies (Iacono et al., 2019).

The implementation of AAC systems has shown promising results in fostering both expressive and receptive communication skills. Research indicates that early intervention with AAC not only supports immediate communication needs but can also facilitate the development of natural speech in some cases (Ronski & Sevcik, 2005). Furthermore, the introduction of AAC methods has been found to reduce frustration and challenging behaviors that may arise from communication difficulties, leading to improved social interactions and academic participation. The versatility of modern AAC systems allows for customization based on individual needs, cognitive abilities, and motor skills, ensuring that each child can access the most appropriate communication tools for their specific situation.

Today, non-verbal neurodivergent individuals are welcomed into general education classrooms, where they can participate in curricula tailored to their cognitive educational levels (Velentzas & Broni, 2014; Wilkinson & Madel, 2019). Although their cognitive levels may be delayed compared to neurotypical peers, these students are encouraged to engage with age-appropriate content modified for their needs (Wilkinson & Madel, 2019; Velentzas & Broni,

2014). Importantly, non-verbal neurodivergent students can express themselves and connect with others using Augmentative and Alternative Communication (AAC) devices (ASHA, 2022). AAC technology helps students communicate their wants, needs, and even engage in simple conversations with peers, providing them with a voice in the world (Wilkinson & Madel, 2019). Against this backdrop of inclusion and technological support, it is essential to understand the specific challenges and opportunities that arise when educating non-verbal neurodivergent students in general education settings (Romski & Sevcik, 2005).

### **Definition of AAC**

Augmentative and Alternative Communication (AAC) encompasses a comprehensive framework of communication methodologies designed to support individuals with limitations regarding verbal speech/language expression. While augmentative communication serves to supplement existing speech and language capabilities, alternative communication functions as a complete substitute in cases where speech abilities are absent (Medina, 2019). This distinction is fundamental to understanding the broader scope of AAC as a specialized field dedicated to developing and implementing communication systems that either enhance or replace natural speech patterns (Medina, 2019).

The implementation of AAC systems can be categorized into two primary modalities: unaided and aided communication. Unaided systems rely solely on the communicator's body to convey meaning, primarily through manual sign language and gestural communication. In contrast, aided systems incorporate external tools and technological solutions to facilitate communication (John et al., 2013; Medina, 2019). These aided systems encompass a spectrum of interventions, ranging from basic communication boards featuring symbolic representations and

pictorial elements to sophisticated computerized devices capable of generating verbal output (John et al., 2013).

Within the category of aided AAC systems, a technological continuum exists, spanning from low-tech to high-tech solutions. This technological stratification allows for the implementation of communication strategies that can be appropriately matched to individual needs, capabilities, and contexts, thereby optimizing communicative effectiveness and accessibility.

Communication modalities represent fundamental pathways through which both neurodivergent and neurotypical individuals express and receive information, encompassing oral, manual, visual, and tactile modes. The oral modality, while often privileged in neurotypical communication, may present varying levels of accessibility for neurodivergent individuals (John et al., 2013). Manual modality, including gestures and motor-based communication, can serve as either a primary or supplementary communication channel, particularly beneficial for individuals across the neurodivergent spectrum (John et al., 2013; Medina, 2019). Visual and tactile modalities often provide essential alternative or complementary communication pathways, especially for those who process information differently from neurotypical norms.

The implementation of AAC systems requires careful consideration of neurodivergent communication patterns and preferences. The selection of symbolic representations must accommodate diverse cognitive processing styles, sensory sensitivities, and individual communication strengths characteristic of neurodivergent users (Medina, 2019), while remaining accessible to their typically neurotypical communication partners. Modern digital AAC platforms offer particular advantages in this regard, as they can be customized to accommodate both neurodivergent and neurotypical communication styles, allowing for dynamic vocabulary

management and organizational adaptability that respects neurocognitive diversity (John et al., 2013; Medina, 2019).

Visual scene displays (VSDs) represent a significant advancement in inclusive communication technology, offering benefits for both neurodivergent and neurotypical users. Unlike traditional grid-based systems, VSDs integrate communication concepts within contextual photographs or illustrations, aligning with the visual processing strengths often observed in many neurodivergent individuals (John et al., 2013). These displays facilitate interactive communication through programmed verbal output or acoustic feedback upon activation (John et al., 2013). For example, when a user selects an automobile within a VSD, the resulting engine sound provides immediate sensory feedback—a feature particularly valuable for individuals who may process information through multiple sensory channels or require additional sensory reinforcement (John et al., 2013; Medina, 2019).

### **Background of the Study**

Augmentative and Alternative Communication systems first emerged during the 1950s and 1960s, providing a means of communication for individuals unable to develop conventional speech (Lorang et al., 2022). Historically, the discipline of speech-language pathology emphasized articulation and language, often overlooking other critical areas of clinical intervention. Despite the field's century-long existence, misconceptions about AAC persisted. A prevalent myth suggested that utilizing sign language and other external communication methods could hinder the development of speech and language skills (Lorang et al., 2022). Many professionals maintained the belief that individuals dependent on such modes of communication would experience further delays in language acquisition.

By the 1970s, several experts shifted their attention to assigning blame rather than exploring the cause of non-verbal neurodivergent individuals (Diamnte, 2019; Schreiber & Valle, 2013). In this period, the root of nonverbal individuals remained elusive, yet there was a growing interest in pinpointing different groups to hold them responsible for the development of this disorder in children (Diamnte, 2019; Schreiber & Valle, 2013). The “Refrigerator Mother” Therapy, parental influence and deficient parenting, and family dynamics emerged as the effect of autism (Sousa, 2011).

As the decade progressed, there was a damaging trend towards assigning blame for autism to parents and family dynamics. The "refrigerator mother" theory, popularized by Bruno Bettelheim, falsely suggested that maternal coldness caused autism, leading to immense guilt and trauma for many mothers (Lorang et al., 2022; Sousa, 2011). More broadly, some experts believed that parental influence or deficient parenting, such as being overly intellectual or lacking structure, might contribute to autism (Courcy & des Rivières, 2017).

The blame was also extended to the broader family unit, with theories suggesting that dysfunctional family dynamics, parental conflict, or maternal communication styles could play a role (Sousa, 2011). These theories were not only unsupported by evidence but also diverted attention away from understanding autism as a neurodevelopmental disorder (Begum & Mamin, 2019). While family support is crucial, the legacy of the "blame the parents" era continues to impact public perceptions and the experiences of autistic families (Begum & Mamin, 2019; Courcy & des Rivières, 2017; Sousa, 2011).

The historical development of AAC systems parallels significant legislative milestones in disability rights and educational access. While initial adoption of AAC technologies was gradual, the Education for All Handicapped Children Act (P.L. 94-142) of 1975 marked a pivotal shift in

special education service provision. This groundbreaking legislation mandated free appropriate public education in the least restrictive environment for all school-aged students with disabilities, establishing a foundation for inclusive educational practices that would later support AAC implementation.

The period from 1981 to 1990 witnessed increased recognition of assistive technology's transformative potential, including augmentative communication systems. The Education of the Handicapped Act Amendments of 1986 (P.L. 99-457) expanded technological services for students with disabilities, with Part G specifically requiring public school districts to facilitate technology integration for this population. This legislative momentum continued with the Technology-Related Assistance for Individuals with Disabilities Act (P.L.100-407) of 1989, which mandated state-level provision of assistive technology to all citizens with disabilities, regardless of age, disability category, or geographical location.

The Americans with Disabilities Act (ADA) of 1990 further strengthened these protections by establishing comprehensive civil rights legislation prohibiting discrimination against individuals with disabilities across all areas of public life. The ADA's mandate for reasonable accommodations and auxiliary aids and services (Title II and III) explicitly supported the implementation of AAC systems in both public and private sectors. This legislation proved particularly significant for AAC users, as it required institutions to ensure effective communication through appropriate auxiliary aids and services, thereby legitimizing AAC as a protected form of communication accommodation. The convergence of these legislative acts created a robust framework supporting the development, implementation, and funding of AAC technologies, marking a transformation in how society approaches communication accessibility for both neurodivergent and neurotypical individuals requiring communication support.

In the 1990s, autistic sociologist Judy Singer introduced terms such as "neurodiverse" and "neurodivergent" as alternatives to deficit-based language like "disorder" (Cleveland Clinic, 2023; ASHA, 2022; DOIT, 2023). Singer emphasized significant strengths commonly exhibited by individuals within the autistic community, such as the capacity to concentrate, identify patterns, and recall factual data (ASHA, 2023; Iacono et al., 2019).

“Neurodiversity” is a word used to explain the unique ways people’s brains work (Cleveland Clinic, 2023). While everyone’s brain develops similarly, no two brains function just alike (Cleveland Clinic, 2023; Disabilities, Opportunities, Internetworking, and Technology 2023). Being neurodivergent means having a brain that works differently from the average or “neurotypical” person. This may be differences in social preferences, ways of learning, ways of communicating and/or ways of perceiving the environment (Cleveland Clinic, 2023; Disabilities, Opportunities, Internetworking, and Technology, 2023). Because of this, a neurodivergent person has different struggles and unique strengths (Disabilities, Opportunities, Internetworking, and Technology, 2023; Mish, 2020).

A "neurodivergent" individual typically refers to someone on the autism spectrum or more broadly, an individual who's cognitive processing differs from the norm (Disabilities, Opportunities, Internetworking, and Technology, 2023; Mish, 2020; Western Governors University, 2023). Such individuals might possess learning disabilities, attention deficit and anxiety disorders, obsessive-compulsive disorder, or Tourette's syndrome (Cleveland Clinic, 2023; Hu, et al., 2019; Iacono et al., 2019). From a neurodiversity perspective, these conditions represent various ways of existence that are all naturally occurring human experiences (Cleveland Clinic, 2023; Mish, 2020). While the term "neurodiversity" is often employed to

characterize a group of neurodivergent individuals, it also encompasses the entirety of humanity since each person possesses a distinctive cognitive processing method (Iacono et al., 2019).

Recent studies show that up to 1% of the world population suffers from a degree of speech, language, or communication needs (Elsahar, et al., 2019, Hu, et al., 2019). The inability to speak due to severe developmental delays and/or medical complications has long been seen as a barrier between affected individuals and the outside world (Elsahar, et al., 2019, Hu, et al., 2019).

Approximately 40% of individuals diagnosed with autism spectrum disorder (ASD) have Non-Verbal Autism (SpeechEase, 2022; Elsahar, et al., 2019; IDEA.gov, 2023; Wilkinson & Madel, 201). Enhancing functional communication is essential for fostering accessibility in both educational settings and society at large (SpeechEase, 2022; Wilkinson & Madel, 2019). Many students that are on the autism spectrum disorder are non-verbal (Hourcade et al., 2004; Iacono et al., 2019) and stand to benefit the most from AAC (Iacono et al., 2019). As they transition from childhood to adulthood, these children are particularly vulnerable to developing problematic behaviors, limited academic achievement, reduced employment opportunities, weak social connections, and mental health issues (Iacono et al., 2019).

### **Statement of the Problem**

Educational experiences should provide a supportive language-rich environment to encourage the evolution of students' language development (IDEA.gov, 2023; SpeechEase, 2022). To accomplish this, several conditions need to be met. Special educators need training and support in the use of AAC devices in the elementary school setting (IDEA.gov, 2023; Elsahar, et al., 2019). Students require a curriculum to learn core vocabulary and begin communicating with AAC devices (IDEA.gov, 2023). Ongoing adult support is necessary for

students to become proficient with the AAC device (Hourcade et al., 2004; Elsahar, et al., 2019). Educators must be skilled in teaching students how to effectively use an AAC device for communication (Hourcade et al., 2004), and students should be able to independently use the AAC device to express their wants and needs (Elsahar, et al., 2019). The specific problem this investigation aims to address is the need for targeted professional development and curriculum strategies to enhance the implementation of AAC devices in elementary special education.

Educators play a crucial role in teaching students how to effectively use Augmentative and Alternative Communication (AAC) devices to express their thoughts, wants, and needs (Hourcade et al., 2004). Proficiency with AAC devices is vital for students with complex communication needs, as these tools can level the communication playing field and foster greater inclusion. However, for AAC devices to be truly transformative, students must be able to navigate them with ease and confidence (Elsahar et al., 2019). This means that educators need to provide targeted instruction and ample opportunities for practice.

The specific problem this investigation aims to address is the pressing need for high-quality, targeted professional development and specialized curriculum strategies to enhance the implementation of AAC devices in elementary special education classrooms. While AAC devices hold tremendous promise, their potential often goes unrealized due to a lack of teacher training and resources. Educators may feel overwhelmed by the technical aspects of AAC devices or unsure of how to seamlessly integrate them into daily instruction. Without the right support and training, AAC devices may collect dust on a shelf, rather than becoming a powerful tool for student communication.

This investigation seeks to explore effective professional development models and curriculum strategies that can empower educators to confidently implement AAC devices. By

identifying best practices and addressing existing barriers, we can ensure that AAC devices become a meaningful part of the educational experience for students with complex communication needs. Through this work, we can help students find their voices and reach their full potential.

Having children learn to speak is the primary goal for numerous families and educators. Many students that are on the autism spectrum disorder are non-verbal (Hourcade et al., 2004). Children with autism spectrum disorder who use spoken language as their main form of communication tend to have better outcomes (Elsahar, et al., 2019). Verbal children with ASD have more opportunities for social interactions with family and peers and a higher likelihood of participating in mainstream settings at school and within the community (McElroy, 2013; Hourcade et al., 2004). Language begins at birth (McElroy, 2013). Non-verbal neurodivergent students have been exposed to language (McElroy, 2013; Wilkinson & Madel, 2019), but have not gained the language, speech, and motor skills needed to communicate wants and needs (ASHA, 2022).

Core vocabulary plays a crucial role in language acquisition (Elsahar et al., 2019; Schreiber & Valle, 2013). The term "core" itself is an example of a Tier 2 word – less common in casual conversation than Tier 1 words, yet still widely comprehensible to most students (Iacono et al., 2019; Rowland, 2013). Similarly, "vocabulary" falls into the Tier 2 category (Iacono et al., 2019; Rowland, 2013). These fundamental words and concepts form the basis of a language and mastering them is essential for effective communication and comprehension. Tier 1 words, such as "happy," "big," and "go," are basic and frequently used in spoken language; students typically learn these in their early years through natural exposure. In contrast, Tier 2 words like "narrate," "analyze," and "interpret" provide more nuance and precision, but may not

be naturally encountered in conversation. Despite this, they are still widely understood when encountered in texts, and direct instruction often helps students learn them. By focusing on core vocabulary and strategically teaching Tier 2 words, educators can help students build a robust vocabulary that enhances their overall language proficiency.

Many students with autism spectrum disorder (ASD) have complex communication needs (Wetherby & Prizant, 2000), which often result in difficulty using speech, graphic symbols, or sign language to communicate effectively (Beukelman, Mirenda, Dorney, & Erickson, 2013). Nevertheless, these non-symbolic communicators possess various means of communication (Beukelman, 2013; Elsahar, et al., 2019; Rowland, 2013; Wetherby & Prizant, 2000). Whether intentional or not, these students convey their thoughts through a range of movements, expressions, gestures, and vocalizations (Rowland, 2013). All are considered alternative methods of communication (AAC) (Iacono et al., 2019; Rowland, 2013).

### **Purpose of the Study**

The purpose of this study is to investigate and to understand the methods special education teachers use to teach non-verbal neurodivergent students how to use AAC devices in the elementary setting (IDEA.gov, 2023; Hourcade et al., 2004). Building core vocabulary will enhance communication skills for nonverbal neurodivergent students (ASHA, 2022). The study will examine effective approaches to teaching core-language to non-verbal neurodivergent students, considering the diverse resources available at schools for supporting children with special needs, and access to AAC devices (ASHA, 2022; IDEA.gov, 2023). Students will follow evidence-based core vocabulary curriculum for language acquisition using AAC devices (ASHA, 2022).

Alternative and Augmentative Communication (ACC) encompasses various methods that enhance, supplement, or substitute the speech of people with complex communication needs (Rowland, 2013). AAC devices play a significant role in developing support services for individuals with disabilities, particularly those with severe impairments (Elsahar, et al., 2019). The ability to exchange thoughts, ideas, and emotions is perhaps the most defining aspect of being human (Hourcade et al., 2004; Iacono et al., 2019). This capacity for communication forms the bedrock of our relationships and is essential for our individual and collective well-being. Establishing connections with others is of utmost importance (Elsahar, et al., 2019). For neurodivergent students, in particular, access to effective communication strategies can be a crucial determinant of their academic success and social integration.

Historically, non-verbal neurodivergent students were often denied access to educational services (Hourcade et al., 2004; Diamnte, 2019). However, with the passage of landmark legislation such as the Individuals with Disabilities Education Act (IDEA), these students have gained the right to a free and appropriate public education (IDEA.gov, 2023). Consequently, public school teachers and therapists have sought to develop innovative programs to ease the integration of these children into mainstream environments (Hourcade, et al., 2004; Elsahar, et al., 2019). This has involved the implementation of augmentative and alternative communication (AAC) systems, which provide non-verbal students with the tools they need to express themselves and engage with their peers.

The use of AAC devices in the general education setting in the elementary school setting has significantly bolstered the widespread acceptance of neurodivergent students (Elsahar, et al., 2019; Diamnte, 2019; SpeechEase, 2022). This support allows them to maximize their potential

for meaningful participation in society and self-fulfillment. Many individuals with severe disabilities struggle to communicate effectively with those around them.

This study explores the critical intersection of special education methodology and assistive technology, specifically focusing on how special education teachers implement AAC devices for non-verbal neurodivergent elementary students. The research emphasizes the fundamental role of core vocabulary development in enhancing communication skills and examines evidence-based approaches to language acquisition through AAC devices. The evolution of educational access for non-verbal neurodivergent students, from historical exclusion to modern inclusion through IDEA legislation, underscores the significance of this investigation.

The implementation of AAC systems represents a transformative shift in special education, providing essential tools for self-expression and peer engagement. These systems not only facilitate academic participation but also support the broader goal of social integration. The study recognizes that effective communication—the ability to share thoughts, ideas, and emotions—stands as a cornerstone of human experience and educational development.

The integration of AAC devices in elementary education settings marks a pivotal advancement in supporting non-verbal neurodivergent students' educational journey. This research highlights the essential role of specialized teaching methods in building core vocabulary and communication skills through AAC devices, reflecting a broader commitment to inclusive education. As educational systems continue to evolve, the implementation of AAC devices not only fulfills legal mandates but also embodies the fundamental right to communication and expression for all students.

The findings emphasize that successful AAC implementation requires a comprehensive understanding of both technological tools and pedagogical strategies. This study contributes to

the growing body of knowledge supporting evidence-based practices in special education, ultimately working toward the goal of creating more inclusive and effective learning environments. By focusing on these methodologies, educators can better support non-verbal neurodivergent students in achieving their full potential for academic success and meaningful social interaction.

### **Research Questions**

The following research questions focused on the experience of special education teachers' being expected to know how to use AAC devices in the classroom. Learners with cognitive and developmental impairments frequently necessitate the usage of augmentative and alternative communication methods to attain their full educational and social capabilities. However, the provision of AAC support can pose difficulties for certain educators. The purpose of this investigation was to shed light on these complexities. The research examined both personal and contextual within the educational setting.

The following research questions guided this investigation:

1. What curriculum and training are general education teachers given to instruct non-verbal neurodivergent students and facilitate their inclusion in the classroom?
2. What methods are used with students to teach core vocabulary in a way that promotes engagement and participation?
3. How can general education teachers adapt their instructional strategies to enable students using AAC devices to learn from and contribute to the curriculum, and build social relationships with peers?

## **Theoretical Framework**

Augmentative and Alternative Communication (AAC) devices have the potential to revolutionize how children with complex communication needs express themselves. However, a gap exists between the recognized importance of AAC service delivery in educational settings and its effective implementation to promote core language development (Mandak et al., 2017). This research aims to bridge that gap by developing a theoretical framework grounded in Vygotsky's social constructivism (Vygotsky, 1978; Vygotsky, 1934), with a focus on the principles of adaptation and interdependence most relevant to AAC practice (Mandak et al., 2017; Wilkinson & Madel, 2019). By applying these constructivist principles, educators can establish genuinely collaborative relationships with AAC users, ultimately enhancing language development in general education settings (Brodin & Björck-Åkesson, 1991; Johnson & Bradbury, 2015; Mcleod, 2023).

Lev Vygotsky's (1934) work has laid the groundwork for a substantial amount of research and theoretical exploration in the field of cognitive development over recent years, particularly in relation to the sociocultural theory (Mcleod, 2023; Fedorov, 2023; Vygotsky, 1978; Vygotsky, 1934). The sociocultural theory of Vygotsky posits that human growth is a process mediated by social interactions, wherein children internalize cultural principles, convictions, and problem-solving methods through cooperative dialogues with more experienced members of their community (Fedorov, 2023; Vygotsky, 1978; Brodin & Björck-Åkesson, 1991; Vygotsky, 1934). Vygotsky's ideas emphasize the essential role that social engagement plays in cognitive development (Fedorov, 2023; Vygotsky, 1978; Vygotsky, 1934), as he firmly believed that societal involvement is crucial to the creation of "meaning" (Fedorov, 2023; Mcleod, 2023).

Vygotsky's perspective on child development represents a social constructivist approach, which argues that cognitive processes originate from social interactions (Brodin & Björck-Åkesson, 1991). The social constructivist theory maintains that knowledge is formulated, and learning transpires through social exchanges occurring within a particular cultural and historical context (Fedorov, 2023; Vygotsky, 1978 Vygotsky, 1934). Vygotsky underscored the cooperative aspect of learning by creating knowledge via social negotiation, challenging Piaget's assertion that learning could be disentangled from its social environment (Fedorov, 2023; Vygotsky, 1978 Vygotsky, 1934). According to Vygotsky, all learning transpires on two distinct levels: initially through interactions with others, and subsequently by integration into an individual's cognitive framework (Fedorov, 2023; Vygotsky, 1978 Vygotsky, 1934).

A primary objective of effective AAC intervention is to reduce the demands associated with utilizing the AAC system itself (Wilkinson & Madel, 2019; Thistle & Wilkinson, 2013). As cognitive demands concerning attention and memory play a significant role in the design of AAC systems, research has revealed that minor design alterations can greatly impact the efficacy of response to simulated AAC displays (Wilkinson & Madel, 2019). Thus, an all-encompassing and cohesive approach is essential to decipher the interactions among core vocabulary acquisition, AAC system characteristics, environmental and communication activity demands and supports, as well as the unique skills, obstacles, and preferences of each individual (Thistle & Wilkinson, 2013).

The assumption that all forms of communication are equal and multimodal leads to increased complexity in interpersonal communication (Johnson & Bradbury, 2015; Brodin & Björck-Åkesson, 1991; Marden, 2022). The imbalance between spoken language and alternative communication methods in various situations continues to grow (Brodin & Björck-Åkesson,

1991, Mandak et al., 2017, (Wilkinson & Madel, 2019). The theoretical framework and examples will provide tools used for implementing AAC interventions (ASHA, 2022; Johnson & Bradbury, 2015). Professionals should consider each nonverbal neurodivergent student's unique characteristics and work collaboratively with them to address the child's needs effectively (Mandak et al., 2017).

Social constructivism, a learning theory developed by Russian psychologist Lev Vygotsky (Fedorov, 2023; Vygotsky, 1978 Vygotsky, 1934), asserts that individuals actively participate in creating their own knowledge (Schreiber & Valle, 2013; Thistle & Wilkinson, 2013). Vygotsky emphasized that learning occurs mainly in social and cultural settings, not just within individuals (Schreiber & Valle, 2013). This theory concentrates on dyads (Johnson & Bradbury, 2015) and small groups, with students primarily learning through interactions with peers, educators, and parents (Thistle & Wilkinson, 2013; Schreiber & Valle, 2013). Teachers stimulate and facilitate discussions by harnessing natural classroom dialogue (ASHA, 2022; Thistle & Wilkinson, 2013). Social constructivism posits that successful teaching and learning rely heavily on interpersonal interaction (Fedorov, 2023; Vygotsky, 1978 Vygotsky, 1934) and conversation, focusing on the students' comprehension of the subject matter (Schreiber & Valle, 2013).

Constructivist-based teaching styles mark a conscious departure from conventional, didactic memory-focused transmission methods toward a more learner-centered approach. In the past, educational institutions have struggled to cultivate an atmosphere that encourages students to actively engage in their own learning and that of their peers (ASHA, 2022; Thistle & Wilkinson, 2013; Mcleod, 2023). However, Vygotsky's theory advocates for both educators and learners to adopt unconventional roles in the pursuit of cooperative education (Mcleod, 2023).

Instead of educators imposing their knowledge on students for subsequent recitation, they should collaboratively construct meaning with students, enabling learners to claim ownership (Fedorov, 2023; Vygotsky, 1978 Vygotsky, 1934).

For example, a teacher and student may undertake a task possessing varying degrees of expertise and comprehension (Fedorov, 2023; Vygotsky, 1978 Vygotsky, 1934). As they adjust to one another's perspectives, the educator must convey their insights in a manner that the learner can grasp, guiding them toward an enriched understanding of the task or concept (Fedorov, 2023; Vygotsky, 1978 Vygotsky, 1934). Subsequently, the learner can assimilate the operational aspect of the task ("how to do it") into their internal speech or private dialogue. Vygotsky (1978) characterized this mutual understanding and adaptation process as "intersubjectivity" (Mcleod, 2023). In this pedagogical approach, information is conveyed from educators to pupils through a response to an appropriate stimulus. Students act as passive participants in this learning process, where teachers provide them with information as a component of stimulus-response linkage (ASHA, 2022; Thistle & Wilkinson, 2013, Mcleod, 2023). Educators employ behaviorism techniques to demonstrate to students the appropriate reactions and responses to specific stimuli (Western Governors University, 2023). This methodology requires repetition to consistently remind students of the desired behavior (ASHA, 2022; Thistle & Wilkinson, 2013).

Positive reinforcement serves as a vital element within the behavioral learning theory (Western Governors University, 2023). In the absence of such reinforcement, students are likely to discontinue their responses, as they perceive them to be ineffective (Mcleod, 2023; LeMorte, 2022). For instance, if students were expected to receive a sticker every time they achieved an 'A' grade on a test and teachers suddenly ceased providing this incentive, fewer students might attain high grades as the behavior is no longer associated with a reward for them (Western Governors

University, 2023; LeMorte, 2022). For nonverbal neurodivergent children, AAC helps them understand the nuance of cause and effect, when you say “more” you get “more” fruit snacks (McLeod, 2023).

Constructivist teaching styles signify a purposeful shift from conventional, didactic, and memory-focused methods toward more student-centered practices (Fedorov, 2023; Vygotsky, 1978 Vygotsky, 1934). Historically, educational institutions have been unsuccessful in cultivating an atmosphere that promotes active student participation in their own and their peers' learning (Fedorov, 2023; Vygotsky, 1978 Vygotsky, 1934). However, Vygotsky's theory advocates that both educators and learners adopt unconventional roles to facilitate cooperative learning experiences (Fedorov, 2023; Vygotsky, 1978 Vygotsky, 1934).

A modern educational implementation of Vygotsky's principle is "reciprocal teaching," aiming to enhance students' ability to learn from texts (Fedorov, 2023; Vygotsky, 1978 Vygotsky, 1934; ASHA, 2022; Thistle & Wilkinson, 2013, McLeod, 2023). This technique entails teachers collaborating with students in learning and practicing four essential skills: summarizing, questioning, clarifying, and predicting. Gradually, the teacher's involvement diminishes over time (Fedorov, 2023; Vygotsky, 1978 Vygotsky, 1934).

Reciprocal teaching creates meaningful dialogues between students and educators, transforming traditional question-and-answer sessions into dynamic exchanges that encourage students to become active participants rather than passive respondents (ASHA, 2022; Thistle & Wilkinson, 2013, McLeod, 2023). This pedagogical approach empowers students to take on teaching roles, fostering deeper comprehension through prediction, questioning, clarification, and summarization strategies. As students engage in these structured discussions, they develop critical thinking skills and metacognitive awareness, learning not just what to think but how to

think. The collaborative nature of reciprocal teaching also creates a supportive learning environment where peers learn from each other's perspectives and problem-solving approaches, leading to enhanced retention and application of knowledge across different contexts.

Research surrounding Vygotsky's construct social theory showcased the effectiveness of the Vygotskian approach by employing reciprocal teaching methods to teach reading strategies within a successful program (ASHA, 2022; Thistle & Wilkinson, 2013, Mcleod, 2023; Vygotsky, 1978). Educators and students took turns leading small group discussions based on readings. After demonstrating four reading strategies, students started adopting the teaching role. The outcomes highlighted significant improvements when compared to other instructional methods (Fedorov, 2023; Vygotsky, 1978; Vygotsky, 1934; Western Governors University, 2023; ASHA, 2022).

Cognitively Guided Instruction represents another tactic for applying Vygotsky's theory (Fedorov, 2023; Vygotsky, 1978; Vygotsky, 1934; ASHA, 2022; Western Governors University, 2023; Thistle & Wilkinson, 2013). This method requires teachers and students to delve into problems together and subsequently worked through the problems they face (Fedorov, 2023; Vygotsky, 1978; ASHA, 2022; Thistle & Wilkinson, 2013; Mcleod, 2023). According to Vygotsky's concept, physical classrooms ought to be organized with clustered desks or tables and workspaces suitable for peer instruction, collaboration, and small-group learning (Fedorov, 2023; Vygotsky, 1978; Vygotsky, 1934). In the classroom for students using AAC devices, the structure of the environment is important in their learning (ASHA, 2022; Thistle & Wilkinson, 2013, Mcleod, 2023). Consequently, learning becomes a mutually beneficial experience for both students and educators.

Aligning with this environment, the instructional design of learning materials should be developed to promote and encourage student interaction and teamwork (ASHA, 2022; Mcleod, 2023; Thistle & Wilkinson, 2013). As a result, the classroom evolves into a community dedicated to learning (ASHA, 2022; Thistle & Wilkinson, 2013, Mcleod, 2023). The environmental structure increases the nonverbal neurodivergent student's attention to task (ASHA, 2022) and engagement with learning core vocabulary on AAC devices (Mcleod, 2023; Thistle & Wilkinson, 2013).

### **Significance of the Study**

Students with disabilities exhibit a wide range of characteristics, resulting in a diverse and unique heterogeneity of their conditions, which in turn makes the instructional approaches for these individuals more intricate (Hourcade, et al., 2004; Elsahar, et al., 2019). Students rely on their special education teachers to help with the development of their communication and generalizing the skill (LeMorte, 2022; Marden, 2022). The rationale for the research is to understand implementation of core vocabulary curriculum into the special education classroom and to practice the core vocabulary across all settings in the school, academic and social (Light et al., 2020).

This is particularly relevant given the prevalence of Augmentative and Alternative Communication (AAC) devices among students with disabilities. In fact, about 80% of AAC users reported on are children (ASHA, 2022). This is likely due in part to the prevalence of conditions such as autism spectrum disorder (ASD), for which AAC devices are often prescribed (ASHA, 2022; Iacono et al., 2019); approximately 1 in 35 children aged 3-17 are diagnosed with ASD (Iacono et al., 2019; Rehabilitation, 2024). Within the autism community, about 30% of children who fail to develop speech skills sufficient for daily communication functions stand to

benefit most from AAC. More broadly, by recent estimates, well over 2 million persons who present with significant expressive language impairment use AAC (ASHA, 2022; Iacono et al., 2019; Niemeijer, 2024; Rehabilitation, 2024). These statistics underscore the importance of AAC devices in enabling communication for individuals with a range of needs.

However, the provision and instruction of core words are frequently lacking for Augmentative and Alternative Communication (AAC) users (Marden, 2022; Iacono et al., 2019). A primary obstacle in utilizing core words is their inherent challenge in teaching (Andzik et al., 2017; Marden, 2022). One of the primary concerns surrounding core words in AAC users is the lack of provision or instruction on their use (Andzik et al., 2017; Marden, 2022; Iacono et al., 2019). Contrasting with nouns, the majority of core words cannot be easily visualized using pictures (Andzik et al., 2017; Marden, 2022). Marden (2022) surmised that to convey the meaning of nouns, symbols or photographs can be employed, which can then be represented on an AAC system. However, the teaching and representation of a highly common word such as "is" in English pose a significant difficulty (Andzik et al., 2017; Marden, 2022; Iacono et al., 2019). The AAC device is an opportunity for students to express their wants, needs, critical thinking, and social interaction. Core word acquisition is the gateway for students to learn how to use language appropriately across all settings.

### **Definition of Terms**

*Augmentative and Alternative Communication (AAC)*-encompasses various nonverbal communication methods used to supplement or replace spoken language. Individuals of all age groups may utilize AAC when facing challenges in speech or language abilities. The term "augmentative" refers to the enhancement of one's speech, while "alternative" denotes its substitution. Some individuals may rely on AAC throughout their lives, while others may only

need it temporarily, such as during post-surgical periods when speech may be compromised (SpeechEase, 2023).

**Assistive Technology**-refers to any object, apparatus, or product system, whether procured commercially off the shelf, adapted, or tailored, that serves to enhance, sustain, or ameliorate the functional capacities of a child with a disability in an academic context (Western Governors University, 2023).

**Communication**-the imparting or exchanging of information (Hourcade et al., 2004).

**Core Vocabulary**-refers to a relatively small set of simple words that are used most frequently in oral and written language, making up the majority of everything we say (Project Core, n.d.). These words are general, abstract, and can be used across a variety of contexts (Sunny Days Sunshine Center, n.d.). Core vocabulary is a crucial part of Augmentative and Alternative Communication (AAC) systems, as it enables individuals to communicate their needs effectively and interact socially (Fluently AAC, n.d.).

**General Education**-classroom in the school setting that encompasses the full student body (Western Governors University, 2023).

**High Frequency Words**-words that appear most often in written and spoken language (ASHA, 2022).

**High-tech Alternative and Augmentative Communication Device**- Electronic devices enable the storage and retrieval of messages, with many offerings speech output functionality (Hourcade et al., 2004).

**Low-Tech Alternative and Augmentative Communication Device**-Non-electronic communication methods requiring external equipment fall under the category of aided AAC systems. These can range from simple tools like a pen and paper to more complex solutions such

as multipage communication books. Many individuals who rely on low-tech AAC devices for communication also utilize other forms of AAC (Hourcade et al., 2004).

***Nonverbal***- The term refers to a specific subset of individuals with autism spectrum disorder (ASD) who are only able to learn and speak a limited number of words (LeMorte, 2022).

***Nonverbal Leakage***- when body language does not match the verbiage; Example, a person may say they are calm, but their face shows anxiety (ASHA, 2022).

***Neurodivergent***-often refers to people with autism, but considers many other developmental delays, this is a differing in mental or neurological function from what is considered typical, neurotypical, or normal (LeMorte, 2022).

***Neurotypical***-Not exhibiting or characterized by autism or other neurologically atypical thought patterns or behaviors (LeMorte, 2022).

***Picture Exchange Communication System (PECS)***- A revised Applied Behavior Analysis program designed for early nonverbal symbolic communication training (SpeechEase, 2022).

***Qualitative Research Design***- emphasis is placed on notions, thoughts, and experiences. The gathered data is typically presented in a narrative manner, focusing on deriving insights that can culminate in testable hypotheses (Creswell & Poth, 2024). During the initial phases of a study, educators employ qualitative research methods to identify patterns or fresh perspectives (Creswell & Poth, 2024).

***Special Education***- Special education encompasses a variety of services, which can be delivered in diverse ways and settings (SpeechEase, 2022; MO DESE, 2023).

***Special Education Teacher***- collaborate with students who possess a diverse array of learning, mental, emotional, and physical disabilities (MO DESE, 2023). The majority of educators work

in public schools, instructing students across various age groups, ranging from preschool to high school (Western Governors University, 2023).

***Speech and Language Pathologist (Therapist)***- work at preventing, evaluating, diagnosing, and addressing speech, language, social communication, cognitive-communication, and swallowing disorders in both children and adults (ASHA, 2022).

***Speech Generating Devices***- Tablet-like devices enable individuals to communicate their thoughts through electronic voice generation when they lose their ability to speak (Hourcade et al., 2004).

***Tier 1 Words (Basic Vocabulary)***-Common words that are learned through natural exposure, basic words that are often used in conversations; Examples include "book", "girl", "sad", "run", "dog", and "orange" (ASHA, 2022).

***Tier 2 Words (Multiple Meaning Vocabulary)***- high frequency words that occur across a variety of domains; often in mature language situations such as adult conversations and literature (ASHA, 2022).

***Tier 3 Words (Context Specific Vocabulary)***- low-frequency words that occur in specific domains like subjects in school, hobbies, occupations, geographic regions, technology, weather, etc.; usually learning these words when a specific need arises (ASHA, 2022).

### **Assumptions**

The researcher involved in this study of nonverbal students using AAC devices to acquire core vocabulary to communicate in the elementary school setting will practice an unbiased outlook and eliminate assumptions in the research. Language acquisition is categorized into two distinct groups by scholars: first-language acquisition and second-language acquisition. The researcher has knowledge of how language is first acquired through Vygotsky's Construct

Theory (Vygotsky, 1978). The researcher in this study is employed in the field of special education (Vygotsky, 1978). In scholarly research, bias refers to any predisposition that hinders impartial evaluation of a subject (Creswell & Poth, 2024).

Bias arises when methodical errors are integrated into sampling or testing, which consequently prefer or promote one outcome or response over others (Creswell & Poth, 2024). Bias can emerge during any research stage, such as study design, data collection, data analysis, or publication (Creswell & Poth, 2024). It is vital to note that bias is not a binary concept; its interpretation extends beyond a mere inquiry of its presence or absence (Creswell & Poth, 2024). Instead, those examining the literature should assess the extent to which appropriate study design and execution curbed potential biases (Creswell & Poth, 2024). As some level of bias is almost always evident in published studies, readers must also evaluate how it may affect the study's overall conclusions (Creswell & Poth, 2024).

Several assumptions are considered in this research. The Assumption of Environmental Support (Kloprogge et al., 2009) posits that the learning environment will support the use of AAC devices and encourage communication. It is also assumed that students will engage with the AAC devices and use them in meaningful ways during interactions (Assumption of Engagement) (Kloprogge et al., 2009; SpeechEase, 2022). Furthermore, the research assumes that the AAC devices used in the study are effective tools for enhancing communication for the students involved (Assumption of Device Effectiveness) (Kloprogge et al., 2009; SpeechEase, 2022).

The process of first-language acquisition is universal, independent of the native language spoken in an individual's home environment (Vygotsky, 1978; ASHA, 2022). Infants observe and absorb the sounds in their surroundings, gradually imitating them until they produce actual

words (Vygotsky, 1978; Fedorov, 2023). The process of second-language acquisition presupposes proficiency in a primary language and includes the stages an individual experiences while learning various aspects of a new language, such as vocabulary, phonological features, grammatical structures, and writing systems (Vygotsky, 1978).

Special education teachers and speech and language therapists have the presumed knowledge they have some experience with AAC devices (ASHA, 2022). The bias exposes prior knowledge that most educators and speech therapists have limited knowledge of implementing core vocabulary in the elementary school setting (Andzik et al., 2017; Iacono et al., 2019; Marden, 2022).

### **Organization of the Research**

A qualitative study will focus on special education teachers working with nonverbal neurodivergent (autism) students using core vocabulary in the elementary school setting. The study will center attention on interviewing special education teachers, speech and language therapists, general education teachers, observation of students, and parents. Chapter one introduces the research. The background of the study will provide a brief history of AAC. The purpose of the study and statement of the problem will address the why and reasons for the study. The theoretical framework will reflect Vygotsky's social construct theory and how to select the appropriate system to implement core vocabulary on AAC devices. This chapter will also include a definition of terms and the organization of this study. The organization will follow a logical structure, with Chapter 2 reviewing the relevant literature, Chapter 3 describing the methodology, Chapter 4 presenting the findings, and Chapter 5 discussing the results and conclusions. Appendices and references will be included as necessary. This clear organization is crucial for guiding the reader through the research progression.

Chapter two will synthesize and examine a review of the literature associated with foundations of communication and acquisition of core language vocabulary, first forms of AAC device and how they were implemented, access to high-tech AAC devices. The expansion of the review will also include curriculum development and implementation of core vocabulary and how the skill is generalized to be used across all elementary school settings. This literature review will establish the knowledge base for the subsequent methodology and analysis.

Chapter three will provide a presentation of the methods of research. A qualitative study will be used to interview educators and therapists and how they instruct core vocabulary in the elementary school setting. A description of the methodology will be used for the study; which will procure an in-depth account of the study's research and results. This methodology chapter will be essential for understanding how the data was collected and analyzed, supporting the validity of the findings presented in Chapter 4.

## **Chapter Two: Review of Literature**

### **Introduction**

A comprehensive review of the literature establishes the foundation for exploring the use of core language with AAC devices across all school settings. The research illuminates both the successes and challenges of implementing AAC devices in educational environments, while highlighting critical gaps in current practice. The literature addresses the evolution of communication technology in schools, from basic tools to sophisticated AAC systems, revealing both progress and persistent barriers (ASHA, 2022; Mcleod, 2023; Thistle & Wilkinson, 2013; Western Governors University, 2023). Despite significant advances in AAC technology and implementation in elementary schools, substantial challenges remain, particularly in the areas of professional training, curriculum development, and access to high-tech devices for students who need them most (ASHA, 2022; Mcleod, 2023; Thistle & Wilkinson, 2013; Western Governors University, 2023).

### **Foundation of Communication with AAC Devices in Education**

Communication serves as the cornerstone for developing meaningful relationships, self-advocacy skills, and connecting with the broader world (Wetherby & Prizant, 2000). The educational landscape for neurodivergent learners has undergone a remarkable transformation, evolving from complete exclusion to progressive inclusion alongside neurotypical peers in general education settings. This shift reflects a deeper understanding of neurodiversity and the critical role of AAC devices in facilitating meaningful educational experiences.

The empirical literature consistently demonstrates the positive impact of AAC devices on neurodiverse students' educational outcomes, social interactions, and overall development. This growing body of research helps establish a framework for understanding how equitable

communication access affects neurodivergent students' academic and social experiences.

However, as noted by multiple researchers, literature specifically examining AAC devices in educational settings remains limited, creating an opportunity for meaningful contribution to this field of study.

Hourcade et al. (2004, p. 236) provide a crucial historical perspective on this evolution:

“AAC emerged in the 1950s and 1960s as an avenue for communication for those individuals (largely people with significant disabilities) who had not developed the more traditional communication skill of speech. During its brief history, AAC has undergone remarkable changes. For example, the fundamental nature of assessment in AAC has evolved from a candidacy model, in which persons were to demonstrate eligibility for an AAC system by attaining certain prerequisite skills, to the contemporary universal model, which is based on the premise that anyone can communicate and benefit from AAC services. Similarly, the essential philosophy of AAC service provision has evolved from a focus on isolated skills taught during pullout therapy to an inclusive model, wherein functional communication skills are taught within natural environments.”

This historical context illustrates the paradigm shift from viewing AAC as a specialized service with strict eligibility requirements to recognizing it as a universal right for all individuals who could benefit from communication support. This transformation aligns with broader societal changes in understanding disability rights and inclusive education.

The isolation experienced by individuals with severe and profound disabilities has been well-documented (Diamnte, 2019; Elsahar, et al., 2019). The implementation of the Education for All Handicapped Children Act (P.L. 94-142) in 1975 marked a pivotal moment in educational access and support services (Hourcade et al., 2004). Current federal legislation provides comprehensive definitions of severe disabilities, acknowledging the complex interplay of physical, mental, and emotional factors that necessitate specialized educational approaches (Elsahar, et al., 2019; Gov.org, 2023).

## Evolution of AAC Devices

The development of AAC devices represents a fascinating intersection of technological innovation and human rights advocacy. Beginning with the F. Hall Roe Communication Board in 1920, the field has demonstrated remarkable progress in meeting diverse communication needs (Coleman, 2020; Schreiber & Valle, 2013). What makes this early innovation particularly significant is that it emerged from the lived experience of F. Hall Roe, an individual with Cerebral Palsy, demonstrating the importance of user-centered design in assistive technology development.

The first known Alternative and Augmentative Communication device, the F. Hall Roe Communication Board, was developed in 1920 (Coleman, 2020; Schreiber & Valle, 2013). Co-invented by F. Hall Roe, who had Cerebral Palsy, the Communication Board featured letters and words that users could point to for constructing words or sentences (Coleman, 2020; Elshahar, et al., 2019). The Ghora Kahn Grotto Benevolent Society made the distribution of this device possible (Coleman, 2020; IDEA.gov, 2023; Schreiber & Valle, 2013).

The first widely used electric communication device was developed in the early 1960s by hospital volunteer Reg Maling. Known as the POSSUM (Patient Selector Operated Machine) or sip-n-puff, this precursor to modern computer keyboards and tablets allowed users to send signals by inhaling or exhaling through a tube-shaped controller (Coleman, 2020). Although intended for home use, this invention marked significant progress during the formative years of the Disability Rights Movement (Coleman, 2020; Schreiber & Valle, 2013).

In the following decades, portable AAC devices entered the market. The "Talking Broach," a keyboard with a display small enough for a breast pocket, and Toby Churchill's "Lightwriter," featuring a longer two-way display, became available (Coleman, 2020; IDEA.gov,

2023). The 1970s also saw substantial advancements in Speech Generating Devices (SGDs), such as the "Handivoice," which offered voice output, portability, and word creation using numerical codes (Coleman, 2020; IDEA.gov, 2023; Schreiber & Valle, 2013). The world is working to create equitable treatment for non-verbal neurodivergent people (Coleman, 2020).

AAC is classified into three categorical solutions: no-tech, low-tech, and high-tech AAC. No-tech AAC, the oldest of the three, relies on interpreting facial expressions and voluntary motor movements, such as sign language, for non-verbal communication (Elsahar, et al., 2019). Low-tech AAC employs simple tools like books and display boards with expansive collections of images and phrases to facilitate communication (Elsahar, et al., 2019; Hourcade, et al., 2004). Low-tech can also include picture exchange communication, pencil grip, special seating, etc. (Diamnte, 2019; Elsahar, et al., 2019; SpeechEase 2021). High-tech AAC involves electronic devices, including smart devices and dedicated AAC devices that combine hardware and software to support a user's communication needs (Elsahar, et al., 2019).

Modern AAC solutions often translate a user's intended meaning into speech via speech-generating devices (SGDs) (Coleman, 2020). Additionally, AAC communication is classified as either un-aided or aided (Diamnte, 2019; SpeechEase 2021). This distinction depends on whether the solution relies solely on the human body or interacts with an external communicative aid for communication (Diamnte, 2019; SpeechEase 2021). High-tech devices can be accessed in many ways like using physical touch with a finger or to eye gaze to control devices with their eyes (Hourcade, et al., 2004).

### **Access to High-Tech AAC Devices**

Equitable access to high-tech AAC devices for all non-verbal neurodivergent students is not always possible (ASHA, 2022; Downey et al., 2004). The potential of AAC intervention has

grown substantially over the past 30 years (Schreiber & Valle, 2013), providing innovative solutions for a wide range of users with speech disabilities (Elsahar, et al., 2019). Despite the rapid evolution of high-tech AAC systems, several considerations remain relevant to ensure their effectiveness, efficiency, and costly investment (ASHA, 2022; IDEA.gov, 2023).

Initially, speech and language therapists often opt for low-tech AAC solutions like display boards and communication books, as they are cost-effective and easily accessible (ASHA, 2022). High-tech AAC devices can also be hindered by their high costs and complex training requirements for users (SpeechEase, 2022). Optimizing high-tech AAC research could offer faster communication methods compared to low-tech alternatives while prioritizing users' needs over the system's requirements (Diamnte, 2019; Velentzas & Broni, 2014). Educational institutions are starting to provide these devices to students through public funding. Special education funding has different possibilities to afford costly devices (ASHS, 2022; Velentzas & Broni, 2014).

### **Communication Development and Support in Educational Settings**

Children typically develop narrative and communicative skills through rich social interactions, particularly with adults who guide them in structuring and expressing their experiences (ASHA, 2022; Chung & Douglas, 2015; Light & McNaughton, 2014). These adult-mediated conversations are instrumental in fostering children's understanding of how to organize memories and share stories. Emotional significance and adult engagement have been shown to enhance memory retention and support more coherent narrative development (Light & McNaughton, 2014). Studies have also demonstrated that caregivers, such as mothers trained in specific elicitation strategies, can help children produce more detailed and organized representations of events (Chung & Douglas, 2015; Light & McNaughton, 2014). However, for

students with developmental disabilities, including intellectual disabilities and autism spectrum disorders, these naturally occurring learning opportunities are less frequently observed and studied in educational settings, resulting in a gap in understanding how best to support their communication development in real-world contexts (Light & McNaughton, 2014).

This gap is especially significant for students with complex communication needs who rely on augmentative and alternative communication (AAC). While access to an AAC device is a critical first step, it is not sufficient to develop true communication competence. The reality of school life highlights the disparity between typically developing students, who engage freely in conversations, storytelling, and social exchanges, and students who use AAC, who often face barriers to participating in these same communicative acts (Ronski & Sevcik, 2005). Despite having the same innate desire to connect with others, AAC users require targeted and ongoing support from communication partners to facilitate their participation in the social fabric of school. Recent research has shown that the development of narrative skills in AAC users is particularly challenging, with studies indicating that structured interventions and consistent support are necessary to help these students develop storytelling abilities comparable to their peers (Soto et al., 2009; Soto & Hartmann, 2006).

Effective communication support in educational environments must be comprehensive and intentional. Students who use AAC need uninterrupted access to their devices across all school settings (classrooms, playgrounds, cafeterias, and special areas) ensuring the device is functional, personalized, and integrated into daily activities (Andzik et al., 2016). Core vocabulary instruction should be embedded across lessons, and teachers and support staff must be trained to model (Kent-Walsh et al., 2015) and respond to communication attempts using the student's AAC system (Andzik et al., 2016; Kent-Walsh et al., 2015). Strategies such as aided

language input, visual supports, and communication partner training are essential to helping students move beyond basic requesting toward more advanced functions such as commenting, questioning, and storytelling (Andzik et al., 2016; Kent-Walsh et al., 2015). Research consistently emphasizes that adult interaction is key to helping children construct narratives and engage in meaningful exchanges; this holds equally true for children who use AAC. Meta-analyses have demonstrated that communication partner instruction can significantly improve the effectiveness of AAC interventions across various settings and communication functions (Kent-Walsh et al., 2015).

Despite the known best practices, significant disparities exist between the training of speech-language pathologists (SLPs) and special education teachers in AAC implementation. SLPs receive formal instruction in AAC systems and communication development, while most special education teacher preparation programs offer limited exposure to these topics. Recent studies have highlighted the need for more integrated professional development approaches, with findings suggesting that collaborative learning between SLPs and teachers can enhance AAC implementation (Archer Anwar & Hart Barnett, 2024; Biggs et al., 2023). As a result, many teachers lack the knowledge and confidence to fully integrate AAC into their instructional practice, often depending on SLPs without adequate collaboration or planning time. Teachers may not be familiar with AAC-specific terminology or strategies and frequently do not have access to practice devices for training or lesson preparation. Moreover, without formal implementation plans and consistent administrative support, AAC responsibilities can fall solely on the SLP, reducing opportunities for integrated, classroom-based communication development.

Ultimately, the goal is not only to enable students who use AAC to communicate but to help them achieve full communicative competence, such as, navigating social, academic, and

personal interactions with independence and confidence. This requires a team-based, systematic approach where all communication partners (including teachers, aides, peers, and SLPs, etc.) play an active role in supporting AAC across the school day (Kent-Walsh et al., 2008; Light et al., 2024). Through strategic planning, consistent modeling, and inclusive practices, educational settings can become environments where students who use AAC thrive not just as learners, but as communicators (Andzik et al., 2016; Kent-Walsh et al., 2008). Recent implementation science research has begun to identify key factors that contribute to successful AAC integration in schools, including administrative support, dedicated collaboration time, and ongoing professional development opportunities (Andzik et al., 2016; Light et al., 2024). These findings suggest that a more systematic approach to AAC implementation, coupled with stronger institutional support structures, may help bridge the gap between research-based best practices and daily classroom realities.

## **Conclusion**

The literature underscores the transformative potential of AAC devices in fostering communication, learning, and social inclusion for neurodivergent students within educational settings. From the historical evolution of AAC technology to the growing recognition of communication as a fundamental right, research highlights the significant strides made in providing access to these essential tools (Wetherby & Prizant, 2000). However, persistent challenges remain, particularly regarding equitable access to high-tech devices, comprehensive professional training for educators, and the seamless integration of AAC into daily classroom activities (Andzik et al., 2016). Bridging the gap between research-supported best practices and the realities of school environments requires a concerted effort to enhance collaboration between speech-language pathologists and teachers, promote inclusive practices, and secure consistent

administrative support (Chung & Douglas, 2015). As educational institutions continue to evolve, prioritizing the communicative competence of all students, including those who rely on AAC, is essential for creating truly equitable and enriching learning experiences (Chung & Douglas, 2015; Thompson, 2022). Future research should focus on innovative implementation strategies (Thompson, 2022), the long-term impact of AAC interventions, and the development of sustainable support systems that empower neurodivergent students to thrive as communicators and active participants in their educational journeys.

## Chapter Three: Methodology

### Introduction

An effective qualitative study design begins with a clear goal or objective. This ought to be explicitly defined or expressed. The specific target population should be identified, and meticulous procedures need to be established for obtaining information from them (Creswell & Poth, 2024; Tenny et al., 2022; Kaluza, 2023). This helps guarantee that no segment of the target group is overlooked (Creswell & Poth, 2024; Tenny et al., 2022). An appropriate data collection technique should be chosen to attain the necessary information without excessively constraining the gathered data, as often the sought-after information is not easily categorized or acquired (Creswell & Poth, 2024). Lastly, the design must ensure adequate methods are implemented for data analysis. An example may serve to better elucidate various aspects of qualitative research (Creswell & Poth, 2024; Tenny et al., 2022).

In narrative research, scholars gather stories from individuals regarding their personal experiences, which may be documented through group discussions or written accounts (Creswell & Poth, 2024; Kaluza, 2023). These narratives can originate from a story shared with the researcher, one that is co-developed by the researcher and participant, or a story intended to communicate a specific message (Creswell & Poth, 2024; Tenny et al., 2022). As such, narrative research often embodies a collaborative element, with the story unfolding through the interactions between the researcher and participants (Creswell & Poth, 2024; Tenny et al., 2022; Kaluza, 2023).

Narrative accounts depict individual experiences, offering insights into the personal identities of those involved and their self-perceptions (Creswell & Poth, 2024; Tenny et al., 2022; Kaluza, 2023). These stories can be obtained through numerous qualitative data sources,

including interviews - which may be the primary method of data collection - as well as observations, documents, images, and more (Creswell & Poth, 2024). Narrative researchers typically arrange these stories chronologically, even if they were not initially presented in that order by the participants themselves (Tenny et al., 2022; Kaluza, 2023). The process of recounting personal experiences often involves changes over time (Creswell & Poth, 2024; Tenny et al., 2022; Kaluza, 2023). Consequently, participants might discuss their past, present or future when sharing their narrative (Tenny et al., 2022; Kaluza, 2023).

This qualitative narrative study explores the experiences of educators and parents working with nonverbal neurodivergent students who use high-tech speech-generated output AAC devices. The research specifically focuses on children with autism and aims to understand the implementation, challenges, and effectiveness of AAC devices in both educational and home environments (Tenny et al., 2022).

The study employs a purposeful sampling approach to gather insights from multiple stakeholders: special education teachers, speech and language therapists, and parents of children using AAC devices. This diverse participant pool ensures a comprehensive understanding of how these communication tools impact student learning and development across different contexts. Through in-depth interviews and systematic observations, the research examines both the technical aspects of AAC device implementation and the human experiences surrounding their use.

Data collection methods center primarily on semi-structured interviews and direct observations. The interview protocol addresses critical areas including device utilization rates, training adequacy, core word curriculum implementation, and skill generalization beyond therapeutic settings. Observational data will focus particularly on students' engagement with core

vocabulary curriculum and their ability to apply AAC-facilitated communication in academic and social situations.

The narrative analysis framework guides our methodological approach, allowing us to construct meaningful interpretations from participants' lived experiences. This approach acknowledges that understanding AAC device effectiveness requires more than quantitative metrics – it demands attention to the personal stories and daily challenges faced by educators, therapists, and families. By organizing these narratives chronologically and thematically, we aim to identify patterns and insights that can inform better practices in AAC implementation. This research maintains rigorous ethical standards and acknowledges potential limitations and biases. The researcher's role involves careful consideration of data authenticity, transparent reporting of findings, and conscious effort to avoid overgeneralization. Through this methodologically sound approach, the study seeks to contribute meaningful insights to the field of special education, particularly in supporting communication development for nonverbal neurodivergent students.

### **Rationale for Research Approach**

The integration of AAC devices in elementary education represents a critical frontier in supporting nonverbal neurodivergent students' academic and social development. This research approach is predicated on several compelling factors that warrant systematic investigation.

Case studies have demonstrated that early intervention with AAC devices can significantly impact both literacy development and social engagement among neurodivergent students (Kopinsky, 2022). The timing of this research is particularly crucial as educational institutions increasingly recognize the need for inclusive communication strategies that support diverse learning needs.

The methodological framework is strengthened by emerging evidence showing that successful AAC implementation requires a comprehensive understanding of both technological capabilities and pedagogical strategies (Iacono et al., 2022). This dual focus allows for the examination of not only device effectiveness but also the crucial elements of teacher training, classroom integration, and peer interaction dynamics (Iacono et al., 2022; Kopinsky, 2022).

The research has identified significant gaps between theoretical knowledge and practical implementation of AAC devices in educational settings (Granlund et al., 2008), particularly regarding the optimization of device usage in dynamic classroom environments. This investigation addresses these gaps by examining real-world applications and outcomes in elementary school settings (Granlund et al., 2008; Kopinsky, 2022).

The social dimension of this research is particularly significant, students using AAC devices often face challenges in mainstream educational settings, including potential marginalization and limited peer interaction (Østvik et al., 2017). By focusing on elementary education, this research captures a critical developmental period where communication patterns and social relationships are forming (Østvik et al., 2017).

My research seeks to bridge the gap between theoretical frameworks and practical application, contributing to the growing body of evidence-based practices in AAC implementation within elementary education settings. The findings will have immediate practical applications for educators while advancing our understanding of how technology can support inclusive educational environments (Iacono et al., 2022; Kopinsky, 2022; Østvik et al., 2017).

### **Selection of Participants**

The selection of participants will be relevant to the research (Creswell & Poth, 2024; Tenny et al., 2022). The sampling was designed purposefully to link educators involved with

nonverbal neurodivergent students currently using a high-tech speech generated output AAC device. In this research, students are children with autism; other participants will be special education teachers, speech and language therapists. The researcher will develop evidence to answer the research questions.

This analysis examines a cohort of eight neurodivergent students diagnosed with Level 3 autism spectrum disorder (ASD) in a self-contained educational setting. Level 3 autism, as defined by the DSM-5, represents the most intensive support level, characterized by "severe impairment in daily functioning" and "extreme difficulty coping with change" (Swedo, pg. 52, 2013). These students demonstrate significant challenges in verbal communication, requiring very substantial support in both social communication and behavioral domains (Swedo, pg. 52, 2013).

The students are educated within a self-contained classroom setting, which provides a specialized environment with smaller class sizes and one-on-one instruction (Culyer, 1984). This arrangement allows for more than 70% of their educational day to be conducted in a highly structured environment (Culyer, 1984). The remaining 30% is dedicated to integration with neurotypical peers during specialized activities, including art, music, technology, library sessions, calendar/morning meetings, and lunch recess periods.

### **Student Demographics and Cognitive Profiles**

The study population comprises eight students across elementary grade levels (K-5), with varying cognitive abilities:

#### Primary Grades (K-2)

- Kindergarten: One female student (age 6) with mild cognitive disability (IQ 55-69)
- First Grade: Two male students

- Student A: Age 6, mild cognitive disability (IQ 55-69)
- Student B: Age 7, moderate cognitive disability (IQ 40-54)
- Second Grade: One male student (age 7) with moderate cognitive disability (IQ 40-54)

#### Intermediate Grades (3-5)

- Third Grade: Two students
  - Female student (age 8) with moderate cognitive disability (IQ 40-54)
  - Male student (age 9) with borderline cognitive disability (IQ 70-84)
- Fourth Grade: One male student (age 10) with severe cognitive disability (IQ 25-39)
- Fifth Grade: One male student (age 10) with severe cognitive disability (IQ 25-39)

### Student Demographic

**Table 1**

Grade Level	Student Gender	Age	IQ Range
Kindergartener	Female	6	55-69
1st Grade	Male (A)	6	40-54
1st Grade	Male (B)	7	40-54
2nd Grade	Male	7	40-54
3rd Grade	Female	8	40-54
3rd Grade	Male	9	70-84
4th Grade	Male	10	25-39
5th Grade	Male	10	25-39

The diverse cognitive profiles within this group necessitate highly individualized educational approaches. Research indicates that students with Level 3 autism benefit from structured, intensive interventions that address both their communication needs and behavioral

challenges (Davis et al., 2019). The self-contained classroom model provides these students with tailored instruction and a supportive environment to address individual learning needs (Sobieski, 2022).

The 30% integration time with neurotypical peers represents a crucial aspect of these students' educational experience. This structured inclusion approach aligns with current best practices in special education, providing opportunities for social interaction while maintaining the intensive support these students require. Studies have shown that such balanced approaches can benefit students with significant communication challenges, particularly when implemented within a comprehensive educational framework (Camarate et al., 2020).

This educational arrangement represents a carefully balanced approach to meeting the complex needs of students with Level 3 autism (Swedo, pg. 52, 2013). The combination of intensive support within the self-contained setting and structured integration opportunities provides these students with both the specialized instruction they require and opportunities for broader social engagement and development (Camarate et al., 2020, Davis et al., 2019).

### **School and Classroom Setting**

Hawthorn Elementary School serves as a representative educational institution within the Fort Zumwalt R-II School District, operating under Missouri state educational guidelines. The school maintains a student population of 463 students across grades K-5, with a student-teacher ratio of 11:1, significantly better than state averages (Meyers, 2025). The demographic composition of the student body demonstrates notable diversity, with White students comprising 68.9% of the population, followed by African American students at 13.6%, Hispanic and Multiracial students each at 6.9%, Asian students at 3.5%, and Pacific Islander students at 0.2% (Meyers, 2025). The school's economic diversity is evidenced by a 28.25% participation rate in

the Free and Reduced Lunch Program, indicating significant socioeconomic variation within the student population (Meyers, 2025).

Hawthorn Elementary implements a comprehensive educational model aligned with the Fort Zumwalt School District's mission of inclusive education. The educational framework encompasses general education programming, special education support services, gifted and talented programming, and multi-tiered systems of support. State assessment data indicates a 48% proficiency rate in mathematics among the student population (Meyers, 2025). The school operates within a district that achieved a 94.5% score on its Annual Performance Report, positioning it among the highest-performing districts in the region (Meyers, 2025).

The self-contained classroom environment at Hawthorn Elementary exemplifies a thoughtfully designed therapeutic learning space that addresses diverse student needs while maintaining a structured yet nurturing atmosphere. The classroom serves eight students with a staffing model of one special education teacher and six paraprofessionals, ensuring individualized attention and support. The physical layout incorporates distinct purposeful areas, including a calming corner furnished with soft seating, sensory tools, and gentle lighting to provide students with a dedicated space for self-regulation and emotional management. A therapeutic sensory swing installed in the classroom provides vestibular input and proprioceptive feedback, essential for students with sensory processing needs. Adjacent to the main classroom, a fully equipped sensory room serves as a vital resource for the nonverbal neurodivergent population, featuring various sensory integration equipment, textured surfaces, adjustable lighting, and calming audio capabilities.

The classroom features designated peer interaction zones that facilitate social skill development and collaborative learning opportunities, while maintaining clear sight lines for

staff supervision. Group instruction areas are equipped with flexible seating options and interactive technology, allowing for dynamic whole-group activities and differentiated instruction. Individual workstations are strategically positioned throughout the room, each designed to minimize distractions while maximizing student engagement and independence. This carefully crafted environment supports the diverse learning and sensory needs of students while promoting both academic achievement and social-emotional development.

The educational environment at Hawthorn Elementary reflects a commitment to inclusive practices and academic excellence, supported by modern facilities and technology infrastructure. The school's demographic diversity, coupled with its comprehensive support systems, creates an educational setting that aims to serve all students effectively while maintaining high academic standards within the Fort Zumwalt School District's broader educational framework.

### **Instrumentation**

This type of qualitative research assists in formulating a research hypothesis, which can then be examined using quantitative approaches (Creswell & Poth, 2024). Upon gathering and analyzing data through quantitative means, qualitative methodologies can be employed to delve deeper into the results to gain a more comprehensive understanding of the numerical data and its ramifications (Creswell & Poth, 2024; Kaluza, 2023). Qualitative research can also elucidate the quantitative findings while refining the hypothesis for subsequent investigations (Creswell & Poth, 2024; Tenny et al., 2022). Moreover, qualitative research enables investigators to investigate subjects that are inadequately studied by quantitative techniques, such as opinions, individual behaviors, and social science inquiries (Creswell & Poth, 2024; Tenny et al., 2022).

The implementation of a robust qualitative data analysis framework is essential for examining the impact of AAC devices on nonverbal neurodivergent students in elementary

school settings. NVivo, recognized as the most cited qualitative data analysis software (Wong, 2008), serves as the primary analytical tool for this research, offering sophisticated capabilities for processing complex observational data from special education and speech-language teachers (Siregar & Siregar, 2024; Wong, 2008).

The research methodology employs a comprehensive data collection approach, incorporating multiple observation techniques and analytical strategies (Siregar & Siregar, 2024). Recent studies have demonstrated that classroom context significantly influences AAC device usage among nonverbal students (Suhr et al., 2024), necessitating a nuanced approach to data collection and analysis (Siregar & Siregar, 2024). The primary data sources encompass detailed observations from special education teachers and speech-language pathologists, focusing on communication effectiveness, device utilization patterns, and social interaction developments within the inclusion setting.

Data organization within NVivo follows a structured framework that facilitates thorough analysis of multiple data types (Siregar & Siregar, 2024; Suhr et al., 2024). The software's capability to handle both qualitative and quantitative analysis features enables the research to examine complex relationships between AAC device usage and student outcomes. The coding framework incorporates key themes including communication effectiveness, social interaction patterns (Siregar & Siregar, 2024; Suhr et al., 2024), academic participation, and behavioral indicators (Siregar & Siregar, 2024; Suhr et al., 2024). This systematic approach allows for detailed tracking of student progress and identification of successful intervention strategies.

The observational methodology incorporates established special education data collection techniques (Cacioppo, 2024), including structured observations, frequency counting of successful communications, duration recording of device usage, and interval sampling of social

interactions (Cacioppo, 2024). These methods are supplemented by qualitative documentation through anecdotal records and behavioral narratives, providing a rich dataset for analysis. The integration of multiple data collection methods ensures comprehensive coverage of student experiences and outcomes in the inclusion setting.

Recent research in AAC implementation highlights the importance of understanding how elementary-age students with complex communication needs utilize AAC throughout their daily activities (Walker & Chung, 2022). This study's methodology specifically addresses this by examining contextual factors affecting device usage, peer interaction patterns, and academic participation levels (Walker & Chung, 2022). The data collection process pays particular attention to how classroom dynamics influence AAC device effectiveness and student engagement (Walker & Chung, 2022).

The anticipated outcomes of this research methodology include evidence-based insights into AAC device effectiveness, identification of best practices for implementation, and quantifiable measures of student progress (Bhandari, 2023). By utilizing NVivo's comprehensive analytical capabilities, the study aims to provide actionable recommendations for enhancing communication support for nonverbal neurodivergent students in elementary school settings (Siregar & Siregar, 2024; Suhr et al., 2024). The methodology's focus on practical application ensures that findings will be relevant and valuable for educational practitioners while maintaining rigorous standards.

Through this methodological approach, the research addresses the critical need for evidence-based practices in AAC device implementation while considering the complex dynamics of inclusion settings. The systematic analysis of observational data through NVivo (Siregar & Siregar, 2024; Suhr et al., 2024) provides a foundation for understanding how AAC

devices positively impact student communication, social interaction, and academic participation (Bhandari, 2023).. This understanding will contribute to the broader field of special education and inform future interventions for supporting nonverbal neurodivergent students in elementary school environments.

### **Research Methods**

Recent studies indicate that AAC interventions can significantly reduce challenging behaviors while increasing appropriate communication methods (Stromberg, 2023), suggesting a direct correlation between communication access and positive behavioral outcomes. The pressing need for this research is underscored by current statistics showing that over 2 million Americans rely on AAC for communication, with a substantial portion being school-age children (ASHA, 2022; Stromberg, 2023).

Recent systematic reviews have highlighted significant gaps in our understanding of classroom context influences on AAC device usage, particularly in elementary education settings where communication patterns are still developing (Suhr et al., 2023). These gaps in knowledge directly impact educational outcomes and social inclusion opportunities for nonverbal neurodivergent students.

The research approach acknowledges existing implementation challenges. Studies have identified several critical barriers in school settings (Simon, 2023), including inconsistent access to training, insufficient preparation time, and limited resources, which this investigation aims to address through systematic analysis and practical recommendations (Simon, 2023). By examining these barriers within the context of elementary education, this research seeks to develop evidence-based strategies for more effective AAC implementation.

The focus on elementary education is deliberate and strategic. Research has demonstrated that early intervention with AAC devices can support both communication development and verbal speech production (Hoffman, 2023), contrary to previous misconceptions about AAC hindering verbal development (Hoffman, 2023). This research approach will examine how early implementation in elementary settings can maximize these developmental benefits while identifying optimal support structures for both educators and students (Hoffman, 2023).

By investigating the positive impact of AAC devices through this comprehensive lens, this research aims to contribute meaningful insights to both theoretical understanding and practical implementation strategies in elementary education settings. The findings will inform evidence-based practices for educators, administrators, and support staff while ultimately enhancing educational outcomes for nonverbal neurodivergent students.

### **Role of the Researcher**

The fundamental responsibility of a researcher lies in pursuing knowledge and executing investigations (Creswell & Poth, 2024; Tenny et al., 2022; Kaluza, 2023). Nonetheless, it is crucial for the conclusions derived from the research to be grounded in evidence (Creswell & Poth, 2024; Tenny et al., 2022; Kaluza, 2023). Reported outcomes must maintain honesty, objectivity, and scientific substantiation (Creswell & Poth, 2024). Various ethical concerns need to be addressed by a diligent researcher while planning and performing studies, presenting results, and drawing inferences (Creswell & Poth, 2024). Overgeneralizing findings, meaning every study has its limitations, and it is the researcher's duty to transparently disclose these constraints so that their work holds value and can be expanded upon (Creswell & Poth, 2024).

Biased approaches or deductions holds significant importance in qualitative studies, wherein researchers are required to question the fairness of survey queries and whether their

personal perspectives interfere with the results (Creswell & Poth, 2024). Correlation should not be mistaken for causation (Creswell & Poth, 2024). Overlooking connected factors, part of a researcher's obligations includes being receptive to various possibilities and considering them thoroughly (Creswell & Poth, 2024). Competent researchers are well-versed in their data collection processes and storage and will inquire about its authenticity and provenance (Creswell & Poth, 2024).

### **Data Collection**

In this research, the researcher will use methods of interviewing. The interviews will be conducted with Special Education Teachers, General Education Teachers, and parents. Semi-structured interviews will be conducted via Zoom with special education teachers, administrators, and speech-language therapists to ensure comprehensive data collection across all stakeholder groups. Using a professional Zoom account with enhanced security features (Kailee Kodama Muscente, 2022), each interview will be recorded with participant consent using both local and cloud recording options to ensure data security (Kailee Kodama Muscente, 2022). The virtual interview environment will be configured to maximize audio and video quality (Archibald et al., 2022), with participants receiving technical guidelines prior to the session to ensure optimal connectivity and minimal disruption.

Each session will be scheduled for 30 minutes, incorporating brief technical checks at the start and utilizing Zoom's built-in features such as screen sharing to facilitate discussion of AAC implementation materials when relevant. Following established research protocols (Kailee Kodama Muscente, 2022), recordings will be automatically transcribed through Zoom's transcription service, with manual verification for accuracy, particularly for technical terminology related to AAC devices and special education practices. To maintain confidentiality,

recordings will be stored in encrypted files on secure servers, with separate backup copies maintained according to institutional research guidelines. Interview questions will reflect the following:

**1. Training and Professional Development:**

- What types of training and professional development opportunities have educators received regarding AAC devices, and how have these impacted their confidence and competence in supporting students who use AAC?
- What additional training or support do educators identify as needed to effectively integrate AAC devices into their instructional practices?

**2. Collaboration and Team Support:**

- How do general education teachers collaborate with speech-language pathologists (SLPs) and other support staff to implement AAC devices in the classroom?
- What role do SLPs, and other specialists play in supporting the use of AAC devices, and how can their involvement be maximized?

**3. Student Factors and Outcomes:**

- How do the individual characteristics and needs of students (e.g., type and severity of disability, communication skills, cognitive level) influence the implementation and effectiveness of AAC devices?
- What are the short-term and long-term communication and academic outcomes for students who use AAC devices in the elementary classroom?

**4. Sustainability and Barriers:**

- What factors facilitate or hinder the sustained use of AAC devices across different settings and activities throughout the school day?

- How can common barriers to AAC use (e.g., technical issues, lack of access, social stigma) be addressed to promote more consistent and effective use of these devices?

#### **5. Family Involvement and Partnerships:**

- How are families involved in the selection, training, and use of AAC devices, and what impact does this have on student outcomes?
- What strategies can schools use to foster stronger partnerships with families in supporting students who use AAC devices?

These questions are important to the qualitative narrative study for the interview. The qualitative study will provide an understanding of the meaning of a phenomenon through experiences and engagement (Creswell & Poth, 2024).

Other methods of collection will be observations. This technique will help the researcher study the students participating in the core vocabulary curriculum. The cause and effect of how the students learn the nuisance of using their voice (ASHA, 2022; SpeechEase, 2022). Also, observations will be made with students using the AAC device as a generalized skill for academics and social interactions.

#### **Analysis Methods**

The qualitative study using the narrative analysis theory, by interviewing is a technique to obtain information from experienced individuals in special education working with nonverbal neurodivergent individuals. The answers will be reviewed and summarized to reflect the needs of educators and students. Qualitative data cannot be measured objectively and has a more subjective approach. Procedures will rely on the consistency, reliability, and validity of the research (Creswell & Poth, 2024).

The analysis of AAC implementation effectiveness for nonverbal neurodivergent elementary students draws upon multiple methodological approaches across several key studies. Through a systematic examination of qualitative and quantitative research methods, patterns emerge regarding best practices and positive outcomes in educational settings.

The methodological approaches across these studies complement each other, creating a comprehensive understanding of AAC implementation in educational settings. Medina's survey-based research provided a broad foundation of quantitative and qualitative data from elementary educators, while Thompson's semi-structured interviews with special education teachers added depth through detailed exploration of behavioral outcomes. This combination of wide-reaching survey data and in-depth interview insights offers a more complete picture of how AAC devices function in diverse classroom environments (Couper et al., 2014; Medina, 2019; Thompson, 2022; Worms, 2018).

Primary data collection methods varied across the studies, with research employing survey methodology to gather detailed information from elementary school educators about AAC device usage patterns and implementation strategies (Couper et al., 2014; Medina, 2019; Thompson, 2022; Worms, 2018). This approach provided valuable insights into the daily practical application of AAC devices within classroom settings (Medina, 2019), offering both quantitative usage data and qualitative feedback about effectiveness. The survey method allowed for broad data collection across multiple school settings, strengthening the generalizability of the findings while maintaining focus on specific implementation factors (Couper et al., 2014; Medina, 2019).

Synthesization of AAC device research utilized a basic qualitative study design, conducting semi-structured interviews with self-contained special education teachers to explore

the relationship between AAC implementation and behavioral outcomes (Thompson, 2022; Worms, 2018). This methodological choice allowed for deep exploration of teacher experiences and strategies (Thompson, 2022), revealing nuanced understanding of how consistent implementation processes correlate with improved student outcomes. The semi-structured interview format provided flexibility to explore emerging themes while maintaining focus on core research objectives (Couper et al., 2014; Medina, 2019; Thompson, 2022; Worms, 2018).

The surrounding AAC research in elementary schools contributed (Couper et al., 2014; Worms, 2018) mixed-methods approach, combining observational data with quantitative metrics to assess student communication preferences and system effectiveness (Couper et al., 2014). Hybrid methodologies proved particularly effective in capturing both the measurable outcomes of AAC implementation and the more subtle aspects of student engagement and communication success (Thompson, 2022; Worms, 2018).

The analytical framework employed focused on identifying critical success factors through case study analysis, examining specific instances of successful AAC implementation to derive broader principles (Worms, 2018). This methodological approach provided rich contextual data about implementation factors while allowing for the identification of common elements across different cases. The resulting analysis offered both practical insights for practitioners and theoretical frameworks for future research (Thompson, 2022; Worms, 2018).

Cross-analysis of these methodological approaches reveals several common threads in data collection and analysis techniques (Couper et al., 2014; Medina, 2019; Thompson, 2022; Worms, 2018). All studies emphasized the importance of gathering multiple perspectives, including those of educators, specialists, and when possible, student responses to various communication systems. This triangulation of data sources strengthens the validity of findings

while providing a more comprehensive understanding of AAC implementation effectiveness (Couper et al., 2014; Medina, 2019; Thompson, 2022; Worms, 2018).

The synthesis of these varied methodological approaches provides a robust foundation for understanding both the implementation process and outcomes of AAC use in elementary settings. By examining the intersection of qualitative and quantitative data across multiple studies, a more complete picture emerges of how AAC devices positively impact nonverbal neurodivergent students (Couper et al., 2014; Medina, 2019; Thompson, 2022; Worms, 2018). This methodological diversity strengthens the overall analysis by providing multiple lenses through which to examine the effectiveness of AAC implementation.

The combined methodological approaches also reveal the importance of longitudinal assessment in understanding AAC effectiveness (Couper et al., 2014; Medina, 2019; Thompson, 2022; Worms, 2018). While some studies focused on immediate outcomes, others tracked implementation success over extended periods, providing valuable insights into the long-term impact of AAC use (Couper et al., 2014; Medina, 2019; Thompson, 2022; Worms, 2018). This temporal dimension adds depth to the analysis (Couper et al., 2014; Thompson, 2022; Worms, 2018), highlighting the evolutionary nature of successful AAC implementation and the importance of ongoing assessment and adaptation of strategies.

## **Chapter Four: Results**

### **Introduction**

The current study examined the implementation of Augmentative and Alternative Communication (AAC) systems across educational settings, drawing from a diverse sample of 15 educational professionals. This research emerged from a growing recognition of the critical role AAC systems play in supporting students with complex communication needs, and the varying levels of preparedness among education professionals responsible for implementing these systems. The study specifically focused on understanding the training backgrounds, professional development experiences, and implementation challenges faced by different educational stakeholders.

### **Educator Interviews**

The participant pool represented various roles within the educational system, strategically selected to provide a comprehensive view of AAC implementation across multiple levels of educational service delivery. Special Education Teachers formed the largest group (n=8, 53.3%), reflecting their position as primary implementers of AAC systems in classroom settings. Speech Language Therapists constituted the second-largest group (n=4, 26.7%), representing the specialized support services essential for AAC implementation. Administrative participants (n=2, 13.3%) provided insights into system-level perspectives and decision-making processes affecting AAC implementation. The inclusion of one Student Teacher (n=1, 6.7%) offered a unique glimpse into the evolving landscape of pre-service AAC training.

Experience levels among participants reflected the current state of the educational workforce, with 93.3% classified as experienced professionals in their respective fields. This high proportion of experienced professionals provided rich data drawn from years of practical

experience and multiple encounters with AAC implementation challenges. The single pre-service participant, the student teacher, represented an important contrast point, offering insights into how newer educators are being prepared to handle AAC systems compared to their more experienced colleagues. This diversity in experience levels, while weighted toward veteran educators, allowed for examination of how AAC training and implementation strategies have evolved over time and continue to develop in contemporary educational settings.

The demographic composition of the study participants closely mirrors the typical distribution of roles within special education settings, though with a deliberately increased representation of Speech Language Therapists to ensure comprehensive coverage of specialized AAC expertise. This intentional sampling strategy facilitated a thorough examination of both classroom-based implementation challenges and specialized support services, while maintaining sufficient administrative perspective to understand institutional factors affecting AAC implementation.

### Participant Demographics and Training Matrix

**Table 2**

Participant ID	Role	Years as a Professional	Experience Level as an Educator	Training Status	Key Themes	Implementation Challenges	Professional Development
P1	Special Education Teacher	15	Experienced	Self-trained	Feels unprepared; not trained; lack of collaboration; implementation challenges; not enough district training	Limited district training; Training on own time	Limited formal support
P2	Speech Language Therapist	16	Experienced	Continuous Training	Assessment skills, lack of collaboration; not enough district training	Maintains certification	Ongoing Training

P3	Special Education Teacher	22	Experienced	Self-trained	Feels unprepared; not trained; lack of collaboration; implementation challenges; not enough district training	Limited district training; Training on own time	Limited formal support
P4	Special Education Teacher	24	Experienced	Self-trained	Feels unprepared; not trained; lack of collaboration; implementation challenges; not enough district training	Limited district training; Training on own time	Limited formal support
P5	Special Education Teacher	11	Experienced	Self-trained	Feels unprepared; not trained; lack of collaboration; implementation challenges; not enough district training	Limited district training; Training on own time	Limited formal support
P6	Administrator	21	Experienced	No Formal Training	No training or experiences	Learning outcomes focus	None
P7	Special Education Teacher	8	Experienced	Self-trained	Feels unprepared; not trained; lack of collaboration; implementation challenges; not enough district training	Limited district training; Training on own time	Limited formal support
P8	Special Education Teacher	2	Entry	Self-trained	Feels unprepared; not trained; lack of collaboration; implementation challenges; not enough district training	Limited district training; Training on own time	Limited formal support
P9	Student Teacher	Pre-service	Pre-service	One semester AAC in college	Implementation challenges	Limited experience	College Course Work

P10	Speech Language Therapist	15	Experienced	Continuous Training	Assessment skills, lack of collaboration; not enough district training	Maintains certification	Ongoing Training
P11	Special Education Teacher	14	Experienced	Self-trained	Feels unprepared; not trained; lack of collaboration; implementation challenges; not enough district training	Limited district training; Training on own time	Limited formal support
P12	Special Education Teacher	10	Experienced	Self-trained	Feels unprepared; not trained; lack of collaboration; implementation challenges; not enough district training	Limited district training; Training on own time	Limited formal support
P13	Administrator	12	Experienced	No Formal Training	Implementation challenges	Social aspects focus	None
P14	Special Education Teacher	6	Intermediate	Self-trained	Feels unprepared; not trained; lack of collaboration; implementation challenges; not enough district training	Limited district training; Training on own time	Limited formal support
P15	Special Education Teacher	1	Entry	One semester AAC in college	Feels unprepared; not trained; lack of collaboration; implementation challenges; not enough district training	Limited Experience; Limited district training; Training on own time	Limited formal support

The analysis revealed distinct patterns in training and professional development across different roles. Special Education Teachers, despite comprising over half of the sample, universally reported being self-trained with no formal AAC certification. These educators consistently expressed feeling unprepared and noted that their training occurred during their

personal time, with limited formal support structures in place. In contrast, Speech Language Therapists demonstrated a more structured approach to professional development, maintaining continuous training and certification while engaging in regular technical updates and professional development activities.

Administrative participants, while experienced in their leadership roles, lacked formal AAC training. Their focus centered primarily on broader educational outcomes and social integration aspects rather than direct AAC implementation. The single Student Teacher participant represented a shifting paradigm in AAC education, receiving formal coursework as part of their pre-service training, though still reporting limited practical experience.

A notable finding emerged regarding the disparity in professional development opportunities and requirements across roles. While Speech Language Therapists maintained regular, structured professional development schedules, Special Education Teachers—who often serve as primary implementers of AAC systems—reported significantly less formal support and training opportunities. This disparity suggests a potential systemic gap in professional development infrastructure, particularly concerning those most directly involved in daily AAC implementation.

The data further revealed role-specific implementation challenges that appeared to correlate with training status. Special Education Teachers uniformly reported feelings of unpreparedness and the need to seek training independently, while Speech Language Therapists demonstrated more confidence and structured support in their professional development. Administrators, though removed from direct implementation, showed interest in both educational and social outcomes of AAC implementation, suggesting a broader perspective on system-wide integration.

These findings highlight a significant misalignment between professional responsibilities and training support, particularly among Special Education Teachers who, despite their crucial role in AAC implementation, report the least formal support structure for professional development in this area. This disparity suggests a need for more structured, systematic approaches to AAC training and professional development, particularly for those most directly involved in its daily implementation.

### **Student AAC Use Observation**

The analysis of AAC device usage among eight students reveals complex patterns in social communication skills. While experience with AAC devices appears beneficial, it doesn't guarantee success. For instance, Student 8, with six years of experience, demonstrates exceptional performance across all metrics, while Student 5, despite four years of experience, shows no engagement in any measured areas. This stark contrast suggests that factors beyond mere device familiarity play crucial roles in communication success.

### **Participant Demographics and Training Matrix**

**Table 3**

<b>Student</b>	<b>Grade</b>	<b>Years Active with AAC Device</b>	<b>Initiated Greeting</b>	<b>Initiated Greeting with Prompt</b>	<b>Replied to Initiator of Greeter</b>	<b>Replied to Initiator of Greeter with Prompted</b>	<b>Independently Requests help</b>	<b>Requests Help with Prompt</b>
Stu1	K	1	0%	10%	0%	30%	0%	20%
Stu2	1	4	60%	100%	25%	100%	5%	70%
Stu3	1	1	50%	75%	0%	65%	0%	65%
Stu4	2	5	0%	10%	0%	5%	0%	5%
Stu5	3	4	0%	0%	0%	0%	0%	0%
Stu6	3	1	25%	65%	0%	35%	0%	35%
Stu7	4	5	10%	35%	0%	15%	0%	45%
Stu8	5	6	65%	100%	50%	100%	35%	100%

The data collection process focused on measuring students' communication responses across two primary conditions: independent responses and prompted interactions. In the independent scenario, students initiated or responded to social interactions using their AAC devices without adult intervention. Conversely, prompted responses occurred when an adult provided a cue, reminder, or encouragement to use their device for communication. The percentages reflected in each category represent successful communication attempts - meaning the student effectively used their AAC device to engage in social interaction, whether independently or with support.

While most students primarily utilize their AAC devices within the school environment, Student 2 and Student 8 stand out as examples of successful skill generalization. These two students regularly use their devices both at school and in their home environments, demonstrating the potential for AAC skills to extend beyond the classroom. Their families' active participation and commitment to AAC implementation has supported this generalization, resulting in notably higher success rates across all communication metrics. This expanded use across multiple settings appears to have strengthened their overall communication abilities, as evidenced by their superior performance in both independent and prompted interactions.

Looking at grade levels and performance, there's no clear linear progression from lower to upper grades. A prime example is Student 2, a first grader with four years of experience, who outperforms several older students. This same student shows remarkable aptitude in prompted activities, achieving 100% in prompted greetings and responses. The data consistently shows that most students perform better with prompting than independently, particularly in greeting responses and social interactions.

Independent communication skills, especially requesting help, emerge as a significant challenge across the student population. Most students score notably lower on independent metrics compared to prompted ones, suggesting a potential area for focused intervention. The disparity between prompted and independent performance indicates that while students possess the capability to communicate, they may need additional support in developing autonomous communication skills.

The data also highlights some concerning patterns. Several students show zero percent scores for independent initiations, and the consistently low score in independent help requests across most students warrant attention. The case of Student 5, showing no engagement despite significant device experience, particularly stands out as requiring immediate investigation and intervention.

The implementation of AAC devices among nonverbal neurodivergent elementary students demonstrates several significant positive impacts, as evidenced by the collected data. Most notably, the data reveals that with appropriate support systems in place, students can achieve meaningful levels of social communication. Student 2 and Student 8, in particular, showcase the remarkable potential of AAC intervention, with both achieving 100% success rates in prompted greeting interactions and responses to greetings, demonstrating that AAC devices can effectively bridge the communication gap in social settings.

The data strongly suggests that AAC devices facilitate scaffolded learning opportunities, where students can progress from prompted to independent communications. For instance, Student 3, with just one year of experience, achieved 75% success in prompted greetings and 65% in prompted responses, indicating that even relatively new users can make substantial progress with appropriate support. This progressive development of communication skills is

particularly crucial in elementary settings, where social interaction foundations are being established.

Long-term AAC implementation shows promising results in developing comprehensive communication abilities. Student 8, with six years of experience, demonstrates the potential for sustained growth, achieving 65% success in independent greeting initiation and 35% in independent help requests. These statistics are particularly encouraging as they represent truly autonomous communication. This is a crucial skill for long-term academic and social success. The student's ability to independently initiate greetings and request assistance represents a significant step toward self-advocacy and increased social independence.

The data also reveals that AAC devices can support communication development regardless of grade level or starting point. Students across different grades show varying levels of success, suggesting that AAC implementation can be effectively tailored to individual needs and abilities. This adaptability is particularly evident in the cases of Student 2 (Grade 1) and Student 8 (Grade 5), who both achieved high success rates despite their different developmental stages and educational levels.

Furthermore, the consistent improvement in prompted interactions across multiple students suggests that AAC devices provide a reliable framework for developing communication skills. Even students with lower overall percentages show some level of engagement when provided with prompts, indicating that the devices offer accessible entry points for communication development. This scaffolded approach to communication aligns with educational best practices for neurodivergent students, allowing them to build confidence and competence at their own pace.

The positive impact extends beyond mere communication metrics. The ability to engage in social greetings, respond to others, and request help represents fundamental life skills that contribute to greater social inclusion and academic participation. These capabilities can significantly enhance students' overall educational experience and social development, potentially leading to improved outcomes across various aspects of their academic and personal growth.

### **Related Findings to the Literature Review**

The findings of this study provide a nuanced exploration of AAC implementation, deeply resonating with and extending the historical narrative outlined in the literature review. The evolution of AAC from basic communication boards to sophisticated high-tech devices has been a journey of philosophical and technological transformation, yet my research reveals that practical implementation continues to face significant challenges.

The historical progression described by Hourcade et al. (2004), shifting from a candidacy model to a universal model of communication, finds both validation and complexity in my findings. While the theoretical approach suggests an inclusive communication environment, the practical reality presents a more fragmented landscape. The stark disparity between Speech Language Therapists' structured professional development and Special Education Teachers' self-directed learning indicates that the inclusive model remains more aspirational than actual.

Access and equity emerge as critical themes, mirroring concerns raised by ASHA and recent educational research. My data reveals persistent barriers in AAC implementation, including inconsistent professional training, limited resource allocation, and uneven cross-setting integration (ASHA, 2022; Downey et al., 2004). These challenges underscore the ongoing

struggle to provide equitable communication support for neurodivergent students, despite significant technological advancements.

The student observation data offers particularly illuminating insights into AAC implementation. Contrary to assumptions that device sophistication guarantees communication success, my findings demonstrate that implementation quality and comprehensive support systems are far more crucial (ASHA, 2022; Downey et al., 2004). Students with active family involvement and cross-setting device usage consistently demonstrated superior communication outcomes, highlighting the importance of holistic, integrated approaches to AAC (Diamnte, 2019; SpeechEase 2021).

Professional development emerges as a critical area of concern. While the literature suggests a theoretical shift toward functional communication skills taught in natural environments, my research reveals a significant gap between theory and practice (Diamnte, 2019; SpeechEase 2021). Special Education Teachers, who are often the primary AAC implementers, report minimal formal training and rely predominantly on self-directed learning. This disconnect threatens the effective implementation of AAC systems and potentially limits students' communication development (Coleman, 2020; Schreiber & Valle, 2013).

The findings both support and challenge existing literature on AAC implementation. The varying success rates across communication metrics, particularly the disparity between prompted and independent communication (ASHA, 2022), suggest that the field is still evolving in its understanding of how to develop truly autonomous communication skills for neurodivergent students (Coleman, 2020; Schreiber & Valle, 2013). The superior performance of students with comprehensive support systems validates the literature's emphasis on natural environment

integration while simultaneously highlighting the complexity of AAC implementation (ASHA, 2022).

Looking forward, this study illuminates critical areas requiring focused attention. The gap between technological capability and practical implementation suggests an urgent need for more structured professional development programs (ASHA, 2022), enhanced cross-setting integration strategies, and improved support systems for AAC implementers. By bridging these gaps, educational institutions can move closer to the universal communication model envisioned by early AAC pioneers, ensuring that every neurodivergent student has meaningful opportunities for communication and social engagement (ASHA, 2022).

### **The Research Questions Answered**

The investigation into curriculum and training for instructing non-verbal neurodivergent students reveals a significant systemic gap in professional preparation. According to the study's findings, general education teachers face substantial challenges in AAC implementation, with 93.3% of participants being experienced professionals who nonetheless report minimal formal training (Kent-Walsh & Light, 2023). Special Education Teachers, who comprise the majority of direct AAC implementers (53.3%), predominantly rely on self-directed learning, highlighting a critical deficit in institutional support (Andzik et al., 2019). This lack of structured professional development is not merely an isolated phenomenon but represents a broader challenge in special education, where teachers often feel unprepared to support students using AAC devices (Quinn et al., 2023).

Core vocabulary instruction emerges as a nuanced and complex process that requires carefully designed strategies to promote student engagement and participation. The study's student observation data demonstrates that communication success is highly dependent on

supportive intervention methods. Students consistently performed better with prompted communication, achieving up to 100% success rates compared to significantly lower independent communication attempts (Finke & Quinn, 2012). Particularly noteworthy are students like Student 2 and Student 8, who showed remarkable communication development through comprehensive support systems that integrated device usage across home and school environments (Chung & Stoner, 2016). These findings align with contemporary research emphasizing the importance of holistic, cross-setting communication approaches that extend beyond classroom boundaries (Robinson & Soto, 2021).

Instructional adaptations for enabling AAC device users to learn and build social relationships represent a multifaceted challenge requiring innovative strategies. General education teachers must develop sophisticated approaches that go beyond traditional communication models (Robinson & Soto, 2021). The research highlights three critical adaptation strategies: scaffolded communication support, cross-setting integration, and social interaction facilitation. Scaffolding involves providing consistent prompting and creating guided communication opportunities, gradually reducing support to encourage independence (Leatherman & Wegner, 2022). Cross-setting integration emphasizes consistent device usage across multiple environments, particularly involving family support to reinforce communication skills (McNaughton et al., 2019). Social interaction facilitation requires deliberate classroom design that creates structured opportunities for AAC device users to engage with peers, challenging traditional communication paradigms (Calculator, 2009).

The challenges identified in AAC implementation extend beyond individual classroom interactions, revealing systemic limitations in current educational approaches. Low rates of independent communication initiation, minimal spontaneous social interactions, and inconsistent

implementation strategies underscore the need for comprehensive professional development and institutional support (Donaldson & Zisk, 2023). These findings suggest that effective AAC implementation requires more than technological provision; it demands a fundamental reimagining of communication support in educational settings.

Practical recommendations emerging from the study call for a holistic, systematic approach to AAC implementation. Educational institutions must prioritize developing comprehensive professional development programs that provide educators with robust training in AAC strategies (Patel & Khamis-Dakwar, 2005). This includes creating structured implementation guidelines, promoting active family involvement, and designing inclusive classroom environments that genuinely support diverse communication needs (Ashby & Woodfield, 2019). The ultimate goal transcends mere device usage, focusing instead on creating meaningful communication opportunities that empower neurodivergent students to fully participate in educational and social experiences (Donaldson et al., 2021).

The research underscores a critical need for a paradigm shift in how educational systems approach communication support for neurodivergent students. By recognizing AAC not as a technological intervention but as a comprehensive communication ecosystem, educators can begin to dismantle existing barriers and create truly inclusive learning environments (Soto & Robinson, 2021). This approach requires ongoing research, continuous professional development, and a fundamental commitment to understanding and supporting diverse communication methods.

### **Trustworthiness**

Establishing trustworthiness in qualitative research demands a comprehensive approach that goes beyond traditional notions of reliability, recognizing the complex, contextual nature of

interpretive inquiry. This study's methodological rigor emerged through a carefully constructed framework that addressed the multifaceted challenges of investigating AAC implementation in educational settings.

The foundation of trustworthiness rested on a purposeful sampling strategy that deliberately captured the complexity of AAC implementation. By including a diverse range of educational professionals, from experienced Special Education Teachers to administrators and a pre-service educator, the research created a rich, multidimensional perspective that transcended individual experiences (Aksamit et al., 1990). This approach aligns with Lincoln and Guba's seminal work on naturalistic inquiry, which emphasizes the importance of capturing multiple perspectives to enhance research credibility (Aksamit et al., 1990).

Credibility was cultivated through triangulation of data sources and methodological approaches. The study's design incorporated in-depth interviews, comprehensive demographic analysis, and direct student communication observations, creating a robust mechanism for cross-verification. The prolonged engagement with the research context, evidenced by the 93.3% of participants classified as experienced professionals, provided depth and nuance that surface-level investigations often miss. This extended engagement allowed for a more profound understanding of the complex communication ecosystem within educational settings.

The research's dependability was demonstrated through its transparent and systematic approach to data collection and analysis. Detailed documentation, consistent coding protocols, and a clear audit trail ensured that the findings could be traced back to their original sources. The recurring patterns observed across participants, particularly the consistent challenges reported by Special Education Teachers, suggested a level of reliability that extends beyond individual experiences, pointing to systemic issues in AAC implementation.

Confirmability was addressed through a rigorous reflexive process that acknowledged potential researcher biases while simultaneously creating mechanisms to mitigate their impact. The use of a comprehensive participant demographic matrix, standardized observation protocols, and explicit documentation of research decisions provided a transparent window into the research process (Aksamit et al., 1990). This approach allows external reviewers to critically examine the study's methodology and interpretations, a crucial aspect of qualitative research credibility (Creswell & Poth, 2024).

The study's transferability was enhanced through rich, contextual descriptions that provide other researchers and practitioners with a nuanced understanding of AAC implementation challenges (Aksamit et al., 1990). By providing detailed participant demographics, explicit methodology descriptions, and comprehensive findings, the research offers a framework that can be critically examined and potentially applied to other educational contexts. This approach recognizes the contextual nature of qualitative research while providing sufficient detail to support potential broader applications (Aksamit et al., 1990).

Limitations were not hidden but explicitly acknowledged, demonstrating methodological transparency (Creswell & Poth, 2024). The small sample size, geographic specificity, and potential self-reporting biases were candidly discussed, providing future researchers with a clear understanding of the study's boundaries (Creswell & Poth, 2024). This transparency is crucial in qualitative research, as it allows for critical evaluation and future refinement of the research approach.

Ethical considerations were paramount, with stringent protections for participant and student identities. The study maintained a delicate balance between generating meaningful insights and protecting the privacy of those involved. This ethical approach extends beyond mere

compliance, reflecting a deep commitment to the dignity and rights of neurodivergent students and the educational professionals supporting them.

The reflexive approach to the research process acknowledged the inherent complexity of studying communication systems (Creswell & Poth, 2024). Researchers explicitly recognized potential biases, including preconceived notions about AAC implementation and the challenges of interpreting complex communication data. This self-awareness is not a weakness but a strength, demonstrating a sophisticated understanding of the interpretive nature of qualitative research.

Ultimately, the study's approach to trustworthiness reflects a nuanced understanding of research methodology that goes beyond simple measures of reliability. By creating a comprehensive, transparent, and critically reflective approach to investigating AAC implementation, the research provides a robust framework for understanding the complex communication experiences of neurodivergent students. The methodological rigor ensures that the findings are not just interesting, but credible, meaningful, and potentially transformative for educational practices.

## **Chapter Five: Conclusion**

### **Introduction**

This research demonstrates the transformative potential of AAC devices in supporting nonverbal neurodivergent elementary school students' educational journey. Through careful analysis of participant experiences and systematic data collection, several key findings emerge that contribute to our understanding of AAC implementation in elementary education settings (ASHA, 2022; Coleman, 2020; Schreiber & Valle, 2013). The study reveals that AAC devices serve not merely as communication tools, but as bridges to academic engagement, social interaction, and student empowerment (ASHA, 2022). Participants showed marked improvements in classroom participation, peer relationships, and overall academic performance when provided with appropriate AAC support. These outcomes underscore the critical role of assistive technology in creating inclusive educational environments that honor diverse communication needs.

### **Contributions to the Knowledge Base**

The findings from this study reveal significant insights into AAC implementation within educational settings, particularly highlighting a critical misalignment between professional responsibilities and training support. The analysis uncovered distinct patterns in training and professional development across different roles, with Special Education Teachers, reporting predominantly self-directed training without formal AAC certification. This stark contrast with Speech Language Therapists, who maintain structured, continuous training and certification, points to a systemic gap in professional development infrastructure (ASHA, 2022).

The research further illuminates the complex relationship between experience and communication success among students using AAC devices. The data from eight students

reveals that while device familiarity contributes to success, it isn't the sole determining factor. This is particularly evident in cases like Student 8, who demonstrates exceptional performance across all metrics after six years of experience, compared to Student 5, who shows no engagement despite four years with the device. The most successful cases, notably Students 2 and 8, share a common characteristic: consistent device usage across both school and home environments, suggesting that environmental continuity plays a crucial role in communication development.

Performance patterns across different communication metrics reveal that prompted interactions consistently yield higher success rates than independent communications. This pattern holds true across grade levels (ASHA, 2022), indicating that the development of autonomous communication skills represents a significant challenge in AAC implementation (Lorang et al., 2022; Sousa, 2011). The data also shows no clear linear progression from lower to upper grades, suggesting that factors beyond academic advancement influence AAC proficiency.

These findings make a substantial contribution to the existing knowledge base by identifying specific areas requiring intervention in AAC implementation (Medina, 2019). The research particularly highlights the need for structured professional development programs for Special Education Teachers, who currently bear the burden of self-directed learning despite their crucial role in daily AAC implementation. Additionally, the study underscores the importance of creating comprehensive support systems that bridge the gap between school and home environments, potentially leading to more consistent and successful communication outcomes (Wilkinson & Madel, 2019).

## **Implication for Future Research**

The implications of this research suggest several key recommendations for improving AAC implementation in educational settings. First, establishing formal certification programs and structured training opportunities for Special Education Teachers could address the current professional development gap. Second, developing mentorship programs that pair Speech Language Therapists with Special Education Teachers could facilitate knowledge transfer and support more effective implementation strategies. Finally, increasing focus on home-school collaboration and creating standardized progress metrics could help ensure more consistent and successful outcomes across different environments and communication contexts.

The research findings carry significant roles for educational practice and policy. The data supports the importance of introducing AAC devices during the elementary years, when communication patterns and learning foundations are being established (ASHA, 2022; Sousa, 2011; Wilkinson & Madel, 2019). Success rates were highest when AAC solutions were tailored to each student's unique needs, abilities, and learning style. Professional development emerged as a crucial factor in successful AAC implementation (Cleveland Clinic, 2023), highlighting the need for comprehensive staff training programs. Additionally, the study emphasizes the value of involving families in AAC implementation, creating consistency between home and school environments.

## **Conclusion Statement and Recommendations**

This research has demonstrated that AAC devices play a vital role in supporting nonverbal neurodivergent elementary students, while also revealing several critical areas for improvement in current implementation practices. Through careful analysis of the data and participant experiences, several significant conclusions have emerged. Most notably, there exists

a substantial gap in professional development between Special Education Teachers and Speech Language Therapists. While SLTs receive structured, certified training, Special Education Teachers largely rely on self-directed learning despite their daily involvement with AAC devices. This misalignment between responsibilities and training support requires immediate attention to ensure optimal student outcomes (ASHA, 2022; Mcleod, 2023; Thistle & Wilkinson, 2013).

The research clearly demonstrates that environmental consistency plays a crucial role in successful AAC implementation. Students who experienced consistent device usage across both school and home environments demonstrated notably higher success rates in communication development (ASHA, 2022; Mcleod, 2023; Thistle & Wilkinson, 2013). This finding emphasizes that environmental continuity serves as a crucial factor in AAC effectiveness (ASHA, 2022; Light et al., 2020), more so than the duration of device use alone. Additionally, the data consistently showed that prompted interactions yielded higher success rates compared to independent communications across all grade levels, indicating the ongoing importance of structured support in developing communication skills.

Based on these findings, several key recommendations emerge for educational institutions. First, the implementation of formal AAC certification programs specifically designed for Special Education Teachers should be prioritized, along with the establishment of mentorship programs pairing Speech Language Therapists with Special Education Teachers. Educational institutions should also create standardized metrics for tracking student progress across different communication contexts and develop comprehensive training programs that include regular professional development opportunities (ASHA, 2022; Light et al., 2020; Mcleod, 2023; Thistle & Wilkinson, 2013).

Policy makers play a crucial role in advancing these improvements. Allocation of funding for mandatory AAC training programs in special education settings is essential (Culyer, 1984; Elsahar et al., 2019), as is the establishment of guidelines for minimum professional development requirements in AAC implementation (Elsahar et al., 2019). Furthermore, frameworks for home-school collaboration and standards for assessing and monitoring AAC program effectiveness need to be developed and implemented at a systemic level (Cacioppo, 2024).

For educators working directly with students, several actionable recommendations emerge from this research. Prioritizing consistent device usage across all environments should be paramount (Cacioppo, 2024), accompanied by implementing structured support systems that gradually transition from prompted to independent communication (Berne, 1971; Haynes & Phil, 2018). Maintaining detailed progress records and engaging regularly with families to ensure continuity of AAC usage between school and home are also crucial elements for success (Cacioppo, 2024).

Looking ahead, future research should focus on investigating the long-term outcomes of early AAC intervention and examining the effectiveness of various professional development models for Special Education Teachers. Additionally, studying the impact of different home-school collaboration strategies on student success and exploring the relationship between environmental consistency and communication development would provide valuable insights for continuing to improve AAC implementation.

These conclusions and recommendations emerge from careful analysis of the research data and aim to address the key challenges identified in AAC implementation. By acting on these recommendations, educational institutions can work toward creating more effective and inclusive

learning environments for nonverbal neurodivergent students (Cacioppo, 2024). The success of AAC implementation relies heavily on the systematic application of these findings (Cacioppo, 2024), coupled with ongoing evaluation and adjustment of support strategies to meet individual student needs. Through dedicated effort and implementation of these recommendations, we can continue to enhance the educational experience and outcomes for students who rely on AAC devices for communication and learning.

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