AUGMENTATIVE AND ALTERNATIVE COMMUNICATION SUPPORTS AND SERVICES FOR STUDENTS WITH COMPLEX COMMUNICATION NEEDS: A QUANTITATIVE SURVEY OF SCHOOL ADMINISTRATORS AND SPEECH-LANGUAGE PATHOLOGISTS

A Dissertation By

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Abstract:
Students with disabilities who exhibit severe communication deficits often lack the skills needed to effectively express their wants, needs, and actively participate in meaningful academic and social interactions with those in their environment. The purpose of this study was to understand the organizational factors that affect the provision and implementation of Augmentative and Alternative Communication (AAC) for students with severe communication deficits. Quantitative methodology was used to explore the ideologies of school administrators (n = 67) and speech-language pathologists (SLP) (n = 53) as it relates to the benefits for, and access to, AAC supports and services for students with complex communication needs (CCN). It was found that school administrators and SLPs both agree that students with CCN benefit in the areas of spoken communication, classroom behavior, attention span, motivation, academic skills, interest in classroom activities, and interaction with peers within the school setting as a result of AAC use. School administrators and SLPs also had about the same level of agreement regarding the organizational factors (funding, time, technical assistance, professional development, administrative support and awareness and knowledge) that affect the provision and implementation of AAC for students with CCN. As a result of these findings, implications for educational policy, leadership, practice, and future research are explored. Additionally, recommendations to ensure educational equity for students with CCN include the provision of adequate on-going funding, enhancing stakeholder's knowledge and awareness of AAC, and development and continued support of an assistive technology/AAC team.

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CHAPTER 1

INTRODUCTION

Students with disabilities exhibiting severe communication deficits often lack the skills needed to effectively express their wants, needs, and actively participate in meaningful academic and social interactions with those in their environment. Communication deficits can also affect a child's ability to develop positive peer relationships which in turn may negatively impact their ability to become productive members of society. Children who "do not develop speech and language skills as expected due to motor, language, cognitive, and/or sensory impairments that may result from cerebral palsy, autism, Down syndrome, or other developmental disabilities" (Light & Drager, 2007, p. 204) are among a group categorized as having complex communication needs (CCN). As such, children with CCN that are not presented with opportunities to develop the basic skill of language will be "confronted with very significant challenges to participating in everyday life" (Clarke et al., 2011). Therefore, children with CCN due to developmental or acquired disabilities and who "are unable to meet their communication needs through spoken words" (Therrien & Light, 2016, p 163) may benefit from various modalities of augmentative and alternative communication (AAC). AAC is described as "all forms of communication supplementing verbal speech that are used to express thoughts, needs, wants, and ideas" (Chabon & Cohn, 2011, p. 83). Through the use of AAC, the development of communication skills for these students can have a fundamental impact on their ability to participate in academic settings, develop positive peer/adult relationships, and successfully transition into adulthood.

Background of the Problem

The educational rights of students with disabilities are safeguarded by the Individuals with Disabilities Education Act (IDEA). IDEA entitles students with disabilities to a free and appropriate public education (FAPE) (Zirkel, 2013). As such, students with CCN should be provided with the necessary tools to enhance their ability to communicate with those in their environment. Providing AAC systems and supports for students with severe communication impairments should be made

available to assist them with “one of the most basic elements of human functioning” (Erozkan, 2013, p. 739). Without this basic element of human functioning, students with CCN experience difficulty participating in conversations with peers, family members, and others within their home and school communities. Difficulties with language expression can also lead students with CCN to experience isolation due to their inability to effectively communicate with others (Hodge, 2007).

Students with CCN who have the opportunity to receive AAC interventions at an early age and throughout their educational career will likely develop expressive language skills, thereby promoting the student’s ability to actively participate in their environment (Hodge, 2007). In order to support language development for students who are otherwise “voiceless”, AAC systems and interventions have to “incorporate appropriate vocabulary and the use of modeling strategies and scaffolding to support the labeling of emotions as well as discussion about emotions and appropriate responses to emotions” (Na, Wilkinson, Karny, Blackstone, & Stifter, 2016, p. 450). Within the educational setting, the ability to participate in meaningful exchanges with school staff and peers is a challenge for children with severe communication deficits. Without the use of AAC, students may be unable to answer questions posed by their teachers and peers, participate in classroom dialogue, and initiate conversations (Pufpaff, 2008).

In the book, *Democracy and Education,* Dewey (1916) states, the “ability to share effectively in adult activities thus depends upon a prior training given with this end in view” (p. 8). With this, if students with severe communication needs are provided opportunities to connect with their peers, “it is anticipated that these procedural behaviors, learned by participating in the school milieu, will become habitualized standards of behavior that will transfer to the larger out-of-school society” (Gutek, 2014, p. 245). Non-disabled peers who model appropriate AAC practices with students positively affect language development by providing enhanced social communication opportunities for students with CCN (Barker et al., 2013). Providing students who possess communication deficits with the tools and natural supports needed to participate in meaningful exchanges throughout their school age years will improve their ability to participate in a democratic society as an adult.

Developing communication skills for students with severe communication impairments through the use of AAC will also support a successful transition into adulthood. A successful transition into adulthood requires students with disabilities to be adequately educated and equipped with the emotional competence needed to respond appropriately in social situations. Na et al., (2016) assert, “emotional competence is critical to many functional outcomes, including making and maintaining friends, academic success, and community integration” (p. 441). Communication is a vital skill needed throughout a person’s life, especially for those with CCN, and is essential for expressing oneself fully as a human being and participating actively in society (Hodge, 2007).

Problem Statement

AAC is often not presented as an option for students with severe communication needs and when it is there may be barriers that affect student use and the implementation of the communication system. One barrier is lack of sufficient AAC equipment and services for students with CCN. Another barrier is lack of knowledge from key stakeholders regarding the importance of developing language and communication skills for students with CCN. A final barrier is that stakeholders are unaware of the range of augmentative and alternative communication interventions available to assist students with severe communication needs. Moreover, the researcher proposes that failure to provide and effectively implement AAC systems and supports for students with CCN may be due to specific organizational structures and processes of educational institutions. AAC is likely to have a long-term positive academic and social impact on students with CCN if it is introduced at an early age and is part of a systems of support approach that consider the student’s unique needs (Hodge, 2007).

Purpose Statement

The purpose of this study is to understand the organizational factors that affect the provision and implementation of AAC for students with severe communication deficits. Individualized AAC options should be introduced to students from an early age (Hodge, 2007) as language development is a key factor for individuals to interact with others within their home, school, and in their communities. This study will explore the perceptions of school administrators and speech-language

pathologists (SLP) to determine their knowledge of AAC services and supports and the impact AAC has on students with CCN as it relates to their academics and social integration. Also studied are the perceptions of school administrators and SLPs regarding their beliefs on the provision and implementation of AAC devices and services for students with severe communication needs.

Research Questions

In order to establish how schools currently provide AAC devices for student use and implement AAC service delivery, this study posits and answers the following research questions:

1. What are the attitudes toward the benefits of AAC use for students with severe communication impairments amongst school administrators and speech-language pathologists?
2. What are the factors that school administrators and speech-language pathologists consider important when implementing AAC for students with severe communication impairments?
3. What are the views about access to AAC for students with severe communication impairments amongst school administrators and speech-language pathologists?

Significance of the Study

School districts that receive federal funds are mandated by IDEA to provide FAPE to students with disabilities. As such, the provision of AAC supports and services must be provided to students with CCN. This research will contribute to the field of educational leadership by presenting a comparative analysis of the perceptions of school administrators and SLPs as it relates to the provision of AAC supports and services for students with CCN. The findings may assist school districts with aligning site level and district support structures, such as multi-tiered systems of support (MTSS), to include appropriate services and supports for all children, including those with CCN. This study will benefit a variety of stakeholders including school administrators, teachers, service providers, instructional assistants, and students. Training all stakeholders, including students who do not present with difficulties with communication, about the benefits and proper implementation of AAC for students with CCN will assist with a cultural shift of the educational environment, promoting inclusion and acceptance of those who have to rely on various forms of AAC supports and services to participate in conversations and interact with others in their environment.

Scope of the Study

This study will explore current educational organizational factors surrounding AAC implementation and use for students with CCN. Additionally, this study will investigate perceptions of the benefits of AAC use for students with CCN and its impact through the lens of school administrators and SLPs. Lastly, this study will explore school administrators and SLPs perceptions in regard to student access to AAC equipment, implementation, and services.

Assumptions of the Study

The assumptions of this study are that all participants who complete the survey tool will provide honest answers. Study assumptions also include the fact that SLPs and school administrators will currently work in educational institutions. Furthermore, the researcher assumes that the federal government will continue to mandate that federally funded educational institutions provide FAPE to students with disabilities.

Study Delimitations

For the purpose of this study, the researcher has chosen to seek out school administrators and SLPs who currently work in K-12 schools to complete the survey tool. The researcher will not consider any responses from teachers, support staff, or parents as data for this study. Excluding all groups from the survey with the exception of school administrators and SLPs will allow the researcher to compare the responses of the two groups of stakeholders.

Study Limitations

Limitations of the current study include the sample size, as this study only surveyed school administrators and SLPs from one school district. Additionally, due to the one-year timeline provided for completing this study, the number of responses from school administrators and SLPs may be limited. Lastly, the researcher has chosen a quantitative approach to data collection. This approach does not allow the researcher to ask survey participants clarifying and probing questions regarding their responses.

Definitions of Key Terms

Assistive Technology (AT). IDEA defines AT as "any item, piece of equipment or product system, whether acquired commercially off the shelf, modified or customized, used to increase, maintain, or improve the functional capabilities of a child with a disability." IDEA also recognizes AT as "any service that directly assists a child with a disability in the selection, acquisition or use of an assistive technology device". Examples of AT include: voice recognition programs, adapted pencil grips, adapted keyboards, closed captioning, automatic page turners, and text to speech/speech to text applications.

Augmentative and Alternative Communication (AAC). Children and adults with severe speech or language problems may need to find other ways to communicate. There are two main types of AAC—unaided systems and aided systems. Individuals may use one or both types. Most people who use AAC use a combination of AAC types to communicate. Unaided systems include gestures, body language, facial expressions, and some sign vocabulary. There are two types of aided systems—basic and high-tech. A pen and paper is a basic aided system. Pointing to letters, words, or pictures on a board is a basic aided system. Touching letters or pictures on a computer screen that speaks for you is a high-tech aided system. Some of these speech-generating devices, or SGDs, can speak in different languages (Augmentative and Alternative Communication [AAC], n.d.).

College and Career Readiness (CCR). A general, cross-disciplinary literacy expectation embedded within the Common Core State Standards (CCSS) that must be met for students to be considered prepared for college and workforce training programs after the completion of high school (CA Dept of Education, n.d). In order to facilitate CCR skills for students with CCN, transition goals are required be written within a students Individualized Transition Plan (ITP). Specifically, transition goals are developed in the following areas, post-secondary training or education, employment, and independent living.

Common Core State Standards (CCSS). A policy aimed at ensuring that all students are college and career ready at the conclusion of high school (Dukes & Darling, 2017). Extra attention to

students with special needs should be provided to guarantee they are exposed to the CCSS. This can be achieved by developing academic goals within a student's Individualized Education Plan (IEP) that are aligned to the CCSS. IEP teams should then provide the needed supports and adaptions to make certain that all students have access to the CCSS.

Complex Communication Needs (CCN). Describes individuals unable to "develop speech and language skills as expected due to motor, language, cognitive, and/or sensory impairments that may result from cerebral palsy, autism, Down syndrome, or other developmental disabilities" (Light & Drager, 2007, p. 204).

Free and Appropriate Public Education (FAPE). (Authority: 20 U.S.C. 1401(8)): Special education and related services that- (a) Are provided at public expense, under public supervision and direction, and without charge; (b) Meet the standards of the SEA, including the requirements of this part; (c) Include preschool, elementary school, or secondary school education in the State; and (d) Are provided in conformity with an individualized education program (IEP) that meets the requirements of 20 U.S.C. 1401, 300.340-300.350.

Individuals with Disabilities Education Act (IDEA). P.L. 105-17, formerly called Education of the Handicapped Act, P.L. 91-230 (20 U.S.C., 1400, 300).. According to the U.S. Department of Education, IDEA makes available a free and appropriate public education for students found eligible for special education services. The law ensures the provision of early intervention services (birth through age two, as well as, special education and related services for eligible children ages three through 21. Additionally, the law ensures that the rights of children with disabilities and their parents are protected under this federal law.

Individualized Education Plan (IEP). The IEP is a legal document, for children requiring special education services which is developed to outline a student's learning needs; specify academic and transition goals to address those needs; and list the program, placement, and services that will support the student in attainment of their goals in the least restrictive environment (Klang et al., 2016).

IEP Team. The IEP team must include the following individuals: (i) the parents of a child with a disability; (ii) not less than one regular education teacher of such child (if the child is, or may be, participating in the regular education environment); (iii) not less than one special education teacher, or where appropriate, not less than one special education provider of such child; (iv) a representative of the local educational agency . . . ; (v) an individual who can interpret the instructional implications of evaluation results . . . ; (vi) at the discretion of the parent or the agency, other individuals who have knowledge or special expertise regarding the child, including related services personnel as appropriate; and (vii) whenever appropriate, the child with a disability (Gartin & Murdick, 2005, p. 327; 20 U.S.C. § 614(d)(1)(B))).

Individualized Transition Plan (ITP). Transition planning is to begin "not later than the first IEP to be in effect when the child is 16" (20 U.S.C. § 614(d)(1)(A)(i)(VIII)). Postsecondary goals are to be included in the ITP. These goals must be measurable and based upon age-appropriate transition assessment related to training, education, employment, and, where appropriate, independent skills. (20 U.S.C. § 614(d)(1)(A)(i)(VIII)). Furthermore, the statement of needed transition services must include a description of the courses of study that are anticipated to assist a student with obtaining their postsecondary goals (Gartin & Murdick, 2005, p. 327).

School Administrator. For the purpose of this study, school administrators are defined as school site principals, assistant or vice principals, or any other equivalent title.

Speech-Language Pathologist (SLP). "Speech-language pathologists (SLPs) work to prevent, assess, diagnose, and treat speech, language, social communication, cognitive-communication, and swallowing disorders in children and adults" (Speech-Language Pathologists - Job Description and Career Information, n.d.).

Supplementary aids and services. Aids, services, and other supports that are provided in regular education classes or other education-related settings to enable children with disabilities to be educated with nondisabled children to the maximum extent appropriate in accordance with 20 U.S.C. 1401(29)). Some examples of supplementary aids and services include speech therapy, audiological

and vision services, Educationally Related Mental Health (ERMH) services, adaptive physical education (APE).

Special Factors. Factors that must be considered when developing the child's IEP. Two of the special factors include: (a) the communication needs of a child who is deaf or has a hearing impairment, and (b) the needs of the child for assistive technology devices and services (20 U.S.C. § 614(d)(3)(B)) (Gartin & Murdick, 2005).

Organization of the Dissertation

In Chapter 1, the researcher provided a context regarding students with CCN who need AAC supports and services to assist them with accessing their academic curriculum and peers. These students have educational rights under IDEA; however, due to educational organization factors, these rights may not be actualized. The researcher then defined the problem and purpose of this study. The researcher further discussed the significance and scope of the study and provided definitions for key terms used within the study. Chapter 2 presents a review of the literature exploring the provision and impact of AAC supports and services for students with CCN throughout various stages of their education. Also explored is the impact that educational organizational factors have on students who use or can benefit from using AAC. The critical review of the literature presented relates to the research questions posed for the study. Chapter 3 contains the quantitative survey research design used for the study. It explains the sources of data collection and an analysis of the data collected. Chapter 4 describes the findings of the study and provide responses to each of the research questions. In Chapter 5, the researcher summarizes the significant findings, discusses conclusions, interpretations, and recommendations for policy and practice.

CHAPTER 2

REVIEW OF THE LITERATURE

This literature review explores the provision and impact of AAC devices and services for students with complex communication needs (CCN) throughout various stages of their education. Organizational factors that affect the provision and implementation of AAC for students with students who present with significant communication challenges will also be discussed. At the beginning of this chapter, the researcher will review the theoretical foundation of the study. Next, the researcher will present an examination of the empirical literature surrounding the provision and impact of AAC for students with CCN from childhood throughout high school. The researcher will then explore the impact that educational organizational factors have on students who use or can benefit from using AAC.

Theoretical Foundation – Bronfenbrenner's System of Human Growth

An individual classified with a disability typically has a deficit in one or more areas of functioning that can impact their performance in major life activities. Some of these difficulties include: cognition (thinking), learning academic subjects, focusing and sustaining attention, controlling emotions and/or behavior, communicating with speech and/or language, hearing, seeing, and moving (Kauffman et al., 2018). The severity of these difficulties varies by individual and while some cases are considered mild others are characterized as severe. The terms severe and multiple disabilities are used to describe individuals with extreme disabilities that encompass several difficulties that are experienced in combination (Kauffman et al., 2018). The population of children with extreme disabilities who also exhibit difficulties producing functional speech face significant challenges with participating in everyday life and can benefit from the provision of AAC to develop and enhance their communication skills and promote participation in society (Clarke et al., 2011). In this section, the researcher will discuss Urie Bronfenbrenner's system of human growth as it relates to children with disabilities, particularly those with severe speech impairments who use or can benefit from using AAC.

The needs of children that are born with deficits inhibiting normal language acquisition are best met when the ecological system surrounding the child work together to influence the best possible outcome for the child's ability to communicate with those in their environment. Uri Bronfenbrenner (1975) defined the ecology of human growth as the "interaction between the developing organism and the enduring environments or contexts in which it lives its life" (p. 439). Specifically, the ecological environment in which a person lives is affected by the relationships that are formed "within and between these immediate settings, as well as the larger social contexts, both formal and informal, which the settings are embedded" (Bronfenbrenner, 1977, p. 514). According to Bronfenbrenner (1977), the various settings that comprise and impact an individual's growth are formed in successive levels that are defined as: (1) the microsystem, (2) the mesosystem, (3) the exosystem, and (4) the macrosystem. The last system, the chronosystem, encompasses the aforementioned systems in conjunction with "change or consistency over time" (Bronfenbrenner, 1997, p. 40) to explain an individual's development. The interrelationships of the settings described above allow for the interpretation of systemic patterns that affect individuals developmental outcomes (Godwin & O'Neal, 2015).

The researcher has applied Bronfenbrenner's ecological system of human growth to describe the way children with CCN are impacted by their immediate settings as well as the larger social contexts of which they are a part. This theoretical framework holds that each system is bidirectional and occurs concurrently at every level. For example, "interactions occurring at the outer levels have an impact on the inner structures, just as the changes in the inner structures, while having a greater impact on the individual, still interact with the outer levels (Anderson & Chiasson, 2012, p. 3).

Microsystem

The microsystem is defined as "the complex of relations between the developing person and environment in an immediate setting containing that person (e.g., home, school, workplace, etc.) (Bronfenbrenner, 1977, p. 514). A child born with the inability to effectively express their wants and needs through verbal communication is often at a disadvantage with communicating effectively within

their home and their school environment. Children within this category must rely on the support of individuals in their immediate environment to assist with identifying and meeting their basic needs. As it pertains to Bronfenbrenner's ecological theory of human development, alternative forms of communication must be identified and supplied to children who have deficits with language development to assist with their acquisition of language. In this case, individuals such as caregivers and educators within the child's microsystem must be able to identify the needs of the child and provide the needed tools and structure to ensure the child's ability to be exposed to and have access to alternative modes of communication, thereby assisting them with language development.

Mesosystem

The second interconnected system, the mesosystem, "comprises the linkages and processes taking place between two or more settings containing the developing person" (Bronfenbrenner, 1997, p. 40). Settings can be defined as school, home, workplace, and community. Because the relationships within the child's microsystem such as the home and school setting do not operate independent of one another (Bronfenbrenner, 1986), they can have a marked effect on the communication development of a child with CCN. Efforts put forth by parents to enhance the development of language of their child within the home environment may be fruitless if the child attends a school setting that does not feel the need to ensure the acquisition of language for children with CCN. Conversely, school settings that strive to enhance the development of language for students with communication deficits may be met with family structures that feel that their child is incapable of communicating and, therefore, do not support the efforts of the school. In both instances, the mesosystem of the child is affected by the disconnect between the two microsystems (home and school setting) that are not working in concert to aide in the development of the language skills needed by the child with CCN. Because the mesosystem can be used to explain how events that occur at home can affect the progress the student has at school and vice versa (Bronfenbrenner, 1986), it is most beneficial for a child with communication needs to have the home and school settings communicate and work together to enhance the development of the child. Within the

mesosystem, interactions with parents in the home and personnel in the school setting play a critical role on the language acquisition of students with CCN.

Exosystem

The exosystem encompasses structures such as the neighborhood, the world of work, the media, agencies of the government (local, state, and national), and both formal and informal social networks (Bronfenbrenner, 1977). The socio-economic status of an individual may influence the level of support and services an individual is provided. As such, the exosystem is an extension of the mesosystem and, although it does not include the developing person, the development of the individual is affected by the formal and informal structures operating around them (Bronfenbrenner, 1977; Zhang, 2018). The exosystem of a child with CCN can impact them greatly, either positively or negatively. A child born with the inability to develop language and speech at the rate of their typical peers are at a disadvantage socially and academically while progressing through childhood and as a result may lack the ability to participate to the best of their ability in society.

Macrosystem

The system furthest away from the microsystem, which contains the developing individual, is the macrosystem. The macrosystem differs from the preceding systems in that it “refers not to the specific contexts affecting the life of a particular person but to general prototypes, existing in the culture or subculture, that set the pattern for the structures and activities occurring at the concrete level (Bronfenbrenner, 1977, p. 515). Specifically, “a macrosystem refers to the overarching institutional patterns of the culture or subculture, such as the economic, social, educational, legal, and political systems, of which micro-, meso-, and exo- systems are the concrete manifestations” (Bronfenbrenner, 1977, p. 515). A wide range of structures within the macrosystem can affect the language acquisition and communication development of a child with CCN.

The development of language for a child with CCN can be impacted by various factors at the macrosystem level. Some of these factors may include society’s perception of individuals with disabilities in regard to their academic ability and future roles as productive members of society.

Other factors may consist of failure of the federal government to fully fund special education programming and the extent to which local educational agencies comply with federal and state mandates as it relates to students in special education. Socioeconomic status, legal status, and race are additional factors that can impact a child with CCN at the macrosystem level.

Chronosystem

Lastly, the "chronosystem highlights the impact of time" (Zhang, 2018, p. 5) across all subsystems. Specifically, the chronosystem allows one to consider the development of the individual characteristics of the person in relation to the "environment in which that person lives (e.g., changes over the life course in family structure, socioeconomic status, employment, place of residence, or the degree of hecticness and ability in everyday life) (Gauvain & Cole, 1997, p. 40). The chronosystem can help with grasping the importance of understanding the vast experiences or transitions the individual encounters throughout their development. It is important to know if a child was afforded special education services and supports at a minimal level or if their level of educational support was substantial. For instance, a student with CCN who has been exposed to alternative forms of communication, at an early age, may develop the necessary skills that enable them to express their needs, participate in interchanges with their peers, and interact within a classroom environment. Students with maximum exposure to special education supports and services will be better prepared to participate as adults within society. Consequently, a student who has not been exposed to adequate opportunities to enhance their communication abilities may be ill prepared for their role as an adult in society.

In conclusion, Bronfenbrenner's ecological system of human growth can be used to understand the impact various systems have on the overall development of a child with CCN. This theory can be used to gain and in-depth view into the needed structures and supports an educational environment should be aware of in order to enhance the language development of students with CCN. Some students cannot rely on their own natural devices and are dependent upon the structures

and relationships of their microsystems, mesosystems, exosystems, and macrosystems to achieve a level of communicative independence commensurate with their ability level.

For the purpose of this study, the researcher will focus on students with CCN and the impact the educational system has on their mesosystem. The study will examine both school administrators and speech-language pathologists (SLP) and their perceptions regarding the impact of AAC within the student's mesosystem (school system). The researcher recognizes that members of the child's mesosystem play an important role, in conjunction with the child's microsystem (family environment) to ensure that AAC supports and services are adequately provided and utilized in the school and family environment. The communication and collaboration between the family and school environment are integral for the development of language for students who use or could benefit from using AAC.

Review of the Scholarly Empirical Literature

This section will provide a review of literature addressing the provision and impact of AAC services and supports for students with CCN at various academic stages. Educational organizational factors that affect AAC implementation for students with CCN will also be explored and presented.

AAC Usage for Children in Preschool through Grade 12

Studies have examined the provision and impact of AAC at various stages of a child's life. In this section, the researcher will discuss the impact of AAC implementation during a child's preschool years, elementary school years, and secondary school years of education. Special attention to peer relationships in the context of the academic stages is presented as research has shown that the development of peer relationships has an impact on students who use or could benefit from using AAC.

Preschool Years

The need to identify and address communication challenges in the early stages of a child's development is crucial to evade the ill effects of communication disabilities (Light & Drager, 2002). In fact, children with CCN who are unable to get their communication needs met via AAC until after the

age of four or later are at a disadvantage compared to their typical peers who have already acquired verbal expression and are progressing with their language skills (Zangari, 2019). Early language intervention, through the use of AAC, enhances children's ability to acquire language (Romski & Sevcik, 2005). Language intervention approaches, such as forced stimulation and augmented input, "resulted in generalized and sustained improvement" of expressive vocabulary in toddler age children (Solomon-Rice & Soto, 2014, pg. 211). While it is possible for some children who experience language delays at the toddler stage to eventually learn to utilize language at a suitable level without the use of aides and supports, they still benefit from the introduction of AAC in the early stages of communication and language skills development. The use of AAC at this pivotal time in a child's life will prevent failure in future communication and language development (Romsky & Sevcik, 2005).

AAC intervention in the school setting has had promising results for preschoolers; however, it is important to consider the family environment. Children with language delays often receive less language input from their parents and other individuals in the home environment (Brady et al., 2013). In order for AAC supports and services to be effective, "intervention must extend to the communication partners, to ensure that they have the knowledge and skills required to successfully support the individual who requires AAC" (McNaughton & Light, 2013). Providing parents of AAC users with specific strategies to support language development within the home and community promotes carryover of school-based instruction to home (Brady et al., 2013).

Children who utilize AAC often have difficulties with establishing peer relationships. "Research has shown that simply being in the same physical space does not do enough to promote social interaction between children with disabilities and their peers" (Therrien & Light, 2016, p. 163). Investigators have examined the use of and availability of AAC supports in preschool settings and found a positive correlation between the language outcomes for students with CCN who use AAC with their peers (Barker et al., 2013). The use of stay-play-talk interventions have shown an increase in the amount of time preschool AAC users interact with their typically developing peers (Severini et al., 2018). Peers without disabilities "represent an often-untapped resource for augmented

communication input" (Barker et al., 2013, p. 343); therefore, encouraging the interactions of users and non-users of AAC systems is beneficial to establishing and nurturing peer interactions for the AAC user.

Elementary School Years

Students with severe communication challenges should be provided with opportunities to develop literacy skills at the elementary school level. Literacy provides students with the essential skills needed to become less dependent on others, to make individual choices about learning, and can increase community participation (Copeland & Keefe, 2007). Between grades one and three, students in typical classrooms are exposed to and engage in "extensive and repeated opportunities to build a range of reading skills (e.g., word recognition, decoding, text comprehension, fluency (Sturm et al., 2006, p. 32). During these same grades, students with communication challenges have a difficult time producing language and "often lack sufficient opportunities to be exposed to literacy" (Hetzroni, 2004, p. 1306). It is unfortunate that students who use AAC are often viewed by their teachers as incapable of learning to read and write and are therefore provided with minimal opportunities to learn written language (Light & McNaughton, 1993). "Despite this lack of emphasis on literacy for students with severe disabilities, several researchers such as (Erickson & Koppenhaver, 1995), (Kliewer & Landis, 1999), and (Ryndak et al., 1999) provided early demonstrations that this population could acquire meaningful literacy skills" (Browder et al., 2009, p. 3). The development of literacy skills is important for all children, including those who use or could benefit from using AAC, and enhances their ability to actively participate within their home and school environments.

IDEA mandates that students with disabilities be educated in the same environment, to the maximum extent possible, with their non-disabled peers (Thorius & Maxcy, 2015). With this requirement, all students in grades kindergarten through 12th grade, including those with varying needs, are held to the requirements of the Common Core State Standards (CCSS). CCSS is a policy aimed at ensuring that all students meet specific educational requirements needed to graduate and become college and career ready (CCR) at the conclusion of high school (Dukes & Darling, 2017;

Morningstar et al., 2017). Developing CCR skills for students with CCN can be challenging and complex and students with special needs require extensive supports to assist them in becoming equipped for post-secondary success (Morningstar et al., 2017).

Efforts to ensure the academic success of AAC users or those who could benefit from using AAC at the elementary school level should be a focus of school administrators. As such, students with severe speech deficits who use or could benefit from using AAC are at a disadvantage in the classroom and can benefit from the response to intervention (RTI) approach (Grether & Sickman, 2008). Students with disabilities typically meet the criteria for RTI tier 3 interventions (Thorius & Maxcy, 2015) which provide greater levels of academic and related service support. School administrators must ensure that tier 3 interventions for students with CCN are focused on developing expressive language skills and be aligned to the student's IEP goals (Grether & Sickman, 2008).

In developing IEP goals for a student, IEP teams "must come to a consensus on how they will plan and deliver individualized instruction" (Hartmann, 2016, p. 2). With collaboration, the IEP team, which includes the student's parent(s), can decide on the best approach to effectively implement AAC into the student's educational plan. It is through the IEP team where decisions about the child's academic course of study is devised. All attempts to ensure the future academic and communicative success of children with CCN must be explored and continually reevaluated so that the child is equipped with CCR skills and prepared for life after high school.

Peer interactions at the elementary school level are limited for students with severe disabilities with CCN who use or could benefit from using AAC. Peer relationships can facilitate learning and skill development and create a sense of belonging for all students (Bukowski et al., 2018). Elementary school educators should focus on promoting peer interaction interventions between non-disabled students and those with significant disabilities (Chung & Carter, 2013). The IEP of a student who utilizes AAC should include goals for academic, communication, and social skills; however, many IEP goals typically focus on individual acts of the child learning and communicating, rather than interacting with peers and participating in classroom-related activities (Klang et al., 2016). Non-

disabled peers can support AAC users by being a model or an extension of the classroom teacher and speech therapist by participating in dialogues with the student (Chung & Carter, 2013; Grether & Sickman, 2008), thereby increasing the student's level of peer interaction.

Secondary School Years

Students with CCN should be identified as candidates for AAC supports and services at an early age however some older students remain unidentified. Students who would benefit from or come to utilize AAC supports and services at a later age are victims of neglect (Light & Drager, 2007). Providing effective AAC supports and services to students with CCN at a later stage in their secondary grades of schooling can be particularly challenging. Some of these challenges include slow rates of learning, years of learned passivity, challenging behaviors that stem from the inability to communicate, and difficulty adapting to chronologically age appropriate activities (Light & Drager, 2007). Despite a child's perceived language limitations, best practice recommendations are that all students are viewed as active communicators (Sonnenmeier et al., 2005). Students with severe learning difficulties may grow to lead independent successful vocational lives while others may be dependent on other people for various aspects of their daily functioning (Mittler & Farrell, 1987). The need for students with CCN to be taught and exposed to functional skills, including communication, is not only their right, but is essential to their development in becoming contributing members of society.

The needs of older students who are not receiving AAC supports and services to assist with communication and language development should be addressed through the IEP process. The need for knowledgeable and effective IEP teams is essential for all students who receive special education services, especially those with complex needs. Educators often lack the resources, training, and experience with students with CCN and as such, develop IEP goals that are not specific to the student's unique needs (Rowland et al., 2015). Attempts to assist IEP teams with the development of high quality IEP goals for AAC users is witnessed by the creation of clinical resources, such as the Design to Learn IEP Development Guide (Rowland et al., 2015).

Near the end of a student's secondary years, schools have the critical role of ensuring that students are prepared to transition into life after high school. The needs of students with severe disabilities, including those with CCN, are complex and present with many challenges for stakeholders to overcome to ensure that students are prepared for college and career opportunities after high school. In addition to IEP teams developing high quality goals for students, IDEA requires that transition planning for students with disabilities begin at age 16 (Prince et al., 2013). With this, an individualized transition plan (ITP) must be developed that includes post-secondary goals which include employment and postsecondary education and training, and in some instances must also address independent living (Lombardi et al., 2017). Along these same lines, there is a need to integrate IEP/ITP goal statements that include CCR skills for students to enhance their ability to be equipped with the skills necessary for life after high school (Lombardi et al., 2017).

High school age children with communication challenges often face difficulties developing peer relationships. Additionally, older students with communication deficits tend to have "higher levels of social isolation and educational segregation that may be due to lowered adult outcome expectations" (Morningstar et al., 2017, p. 188). Efforts to prevent and remediate social isolation and educational segregation for students with disabilities has been prioritized by researchers by a need to analyze the CCR framework. Analyzing the CCR framework has allowed researchers to pinpoint the specific characteristics that youth with disabilities need to attain, and to experience, to be greater prepared for life after high school (Morningstar et al., 2017).

Morningstar et al., (2017) proposed a framework that described six academic and nonacademic domains of the CCR framework: (1) academic engagement, (2) academic mind-sets, (3) learning processes, (4) social skills, (5) critical thinking, and (6) transition knowledge. When considering the severe deficits in communication students with CCN have, as well as those who utilize AAC, five of the six domains proposed in the framework included the skill of communication. This corroborates the need for students with CCN to be provided with the knowledge, tools, and support to effectively express themselves through communication. In addition, within the domains of

academic engagement and mindsets, the skills “social interactions for learning” and “social communication”, respectively, were noted (Morningstar et al., 2017). This validates the argument that the development of communication skills for students with CCN are vital to their ability to develop positive peer relationships with others in their school, home, and community environment.

This section presented literature that substantiates the need for students with CCN to be provided AAC to support their language and social development from the toddler stage to the end of high school. AAC enhances communication and peer relationships for students with severe deficits in the area communication. Aligning components of the IEP to focus on the readiness skills needed for life after high school is integral for the developing student and their preparedness for life after high school (Flannery & Hellemn, 2015). The development of communication skills enhances students’ ability to become college and career ready by the conclusion of high school. Next, organizational factors that present as barriers to the provision and implementation of AAC for students with CCN will be addressed.

Organizational Factors That Affect AAC Implementation

There are several educational organizational factors that may adversely impact AAC implementation for students who need or currently have AAC. Some of these factors include awareness and knowledge about AAC, administrative support, funding, and professional development opportunities. This section presents empirical research on organizational factors as they relate to AAC implementation for students with CCN.

Awareness and Knowledge of AAC

Students with CCN receive the most benefit from educators and service providers who have an awareness and knowledge of AAC systems needed to effectively support their unique needs (McNaughton & Light, 2013). Although students should have access to a range of techniques and strategies to enhance their ability to communicate (Williams et al., 2008), some students are being served by individuals who feel they are ill prepared to provide AAC supports and services. SLPs who have participated in training during certification classes and professional development, both inside

and outside of their organization, state that they lack the knowledge, expertise, and comfort level to adequately provide AAC services due to their lack of education and training in AAC (Ratcliff et al., 2008). Similarly, team members who provide supports to AAC users express both reluctance and fear of technology (Soto et al., 2001) which can be a result of lack of knowledge and awareness of AAC systems and supports.

Administrative Support

School administrators are responsible for ensuring that the educational and safety needs of all students, including AAC users, are met. Administrative support may include meeting the needs of all students by developing a comprehensive plan and approach to ensure that the school culture is sensitive to the needs of all students (Schaefer et al., 2018). This approach to school leadership promotes connections for students with CCN to interact fully with their non-disabled peers across multiple settings (Schaefer et al., 2018). School administrators who lack knowledge and awareness of AAC supports and services are unable to advocate for the needs of students who rely on AAC to communicate. Lack of support from administrators, as well as lack of time to collaborate with key school personnel, impact the educational and support services that are provided to AAC users (Pufpaff, 2008; Soto et al., 2001). The school administrator must understand that it takes a significant amount of time for professionals to become proficient with the technical competence needed to support students who use AAC (Light & Drager, 2007). Lack of administrative support and knowledge of the needs of students who use or could benefit from AAC can negatively affect a child's ability to develop communication skills and further hinder their ability to develop into contributing members of society.

Funding

Meeting the unique communication needs of students who use AAC is often difficult due to funding restrictions. Often, AAC devices, especially high-tech devices, are discussed and recommended through the IEP process; however, access to these communication aides are often restricted due to lack of funding and resources (Brophy-Arnott et al., 1992; Soto et al., 2001).

Although students with disabilities are entitled to FAPE, they are often overlooked and denied access to communication devices and services. “Strong evidence exists for the potential of communication aid provision to benefit significantly the lives of people with complex communication needs in a variety of ways” (Clarke et al., 2011, p. 779). In order for this potential to be realized, teachers and service providers need access to quality training to gain the skills and knowledge needed to provide services for students. Unfortunately, provision of high-quality professional development activities has been identified as a major challenge due to the cost (Campbell et al., 2004).

Professional Development Opportunities

Education stakeholders can benefit from professional development (PD) to increase their ability to positively influence a child’s communicative outcomes and lifelong success. PD is described as training for teachers and service providers in a multitude of formats including working with a more experienced practitioner, observing or being observed in the educational environment, coaching, attendance at workshops and conferences and professional discourses (Campbell et al., 2004). Intensive coaching combined with a system of professional development that supports ongoing training of staff who work with students that use AAC results in increased student use of AAC (Chazin et al., 2018). Although SLPs have been certified to provide speech related services, many express a lack of knowledge, expertise, and low comfort level when tasked with supporting AAC users (Ratcliff et al., 2008). SLPs assert that they need additional training in the area of AAC (Ratcliff et al., 2008; Soto et al., 2001) to effectively assist students who use or could benefit from using AAC.

Students with severe speech impairments who use AAC may function adequately and independently if they are provided adequate AAC intervention (Lloyd, 1997). Relatedly, the act of simply providing AAC devices for students with CCN does not mean it will result in effective communication (McNaughton & Light, 2013). Stakeholders must be adequately trained on service provision as well as how to ensure that others in the environment know how to interact with the AAC user. Ongoing professional development will assist stakeholders with implementing AAC best

practices; however, it must also incorporate opportunities to support a school-wide cultural shift for the inclusion of all students (Glover & Law, 1996).

Conceptual Framework

The framework for this study (Figure 1) is derived from the theoretical framework and literature review of empirical studies. Bronfenbrenner's system of human growth describes the impact various environmental factors have on an individual's development. In particular, the mesosystem, as described by Bronfenbrenner (1977), focuses on the linkages and processes taking place in two or more settings, such as the home and school environment. The successful interaction of the two settings, or lack thereof, impacts and can thereby explain the development of a child. Bronfenbrenner's ecological theory of human development has been applied to this study due to the impact the educational environment and family environment can have on a growing child. More specifically, children with severe communication deficits will greatly benefit if the home and school environment communicate and work together to enhance the development of the child (Bronfenbrenner, 1986). The literature review detailed various sources of influence such as the impact AAC has on children throughout various grade stages and educational organizational factors that affect AAC implementation for school-age children. While family support is an important factor impacting the development of language and communication for AAC users, the focus of this research is to explore the educational organizational factors surrounding AAC implementation for students with CCN.

Chapter Summary

The current study will compare the perceptions of school administrators and SLPs as it pertains to their ideologies surrounding the implementation of, and impact of, AAC supports and services for students with significant communication deficits within their current educational organization. It is predicted that although students with disabilities are guaranteed educational provisions through IDEA, some may not be afforded a fair and just education as it relates to providing communication devices and adequate speech and language related services. The literature has shown that educational

organizational barriers exist that limit the ability for students with CCN to develop language and literacy, and in many cases, limit their ability to communicate their most basic needs. In the next chapter, the quantitative survey research design will be detailed which was used to collect data on the perspectives of school administrators and SLPs regarding the benefits of AAC student usage, organizational factors that affect student AAC use, and student access to AAC. Specific data collection procedures and analysis used for the study will also be presented.

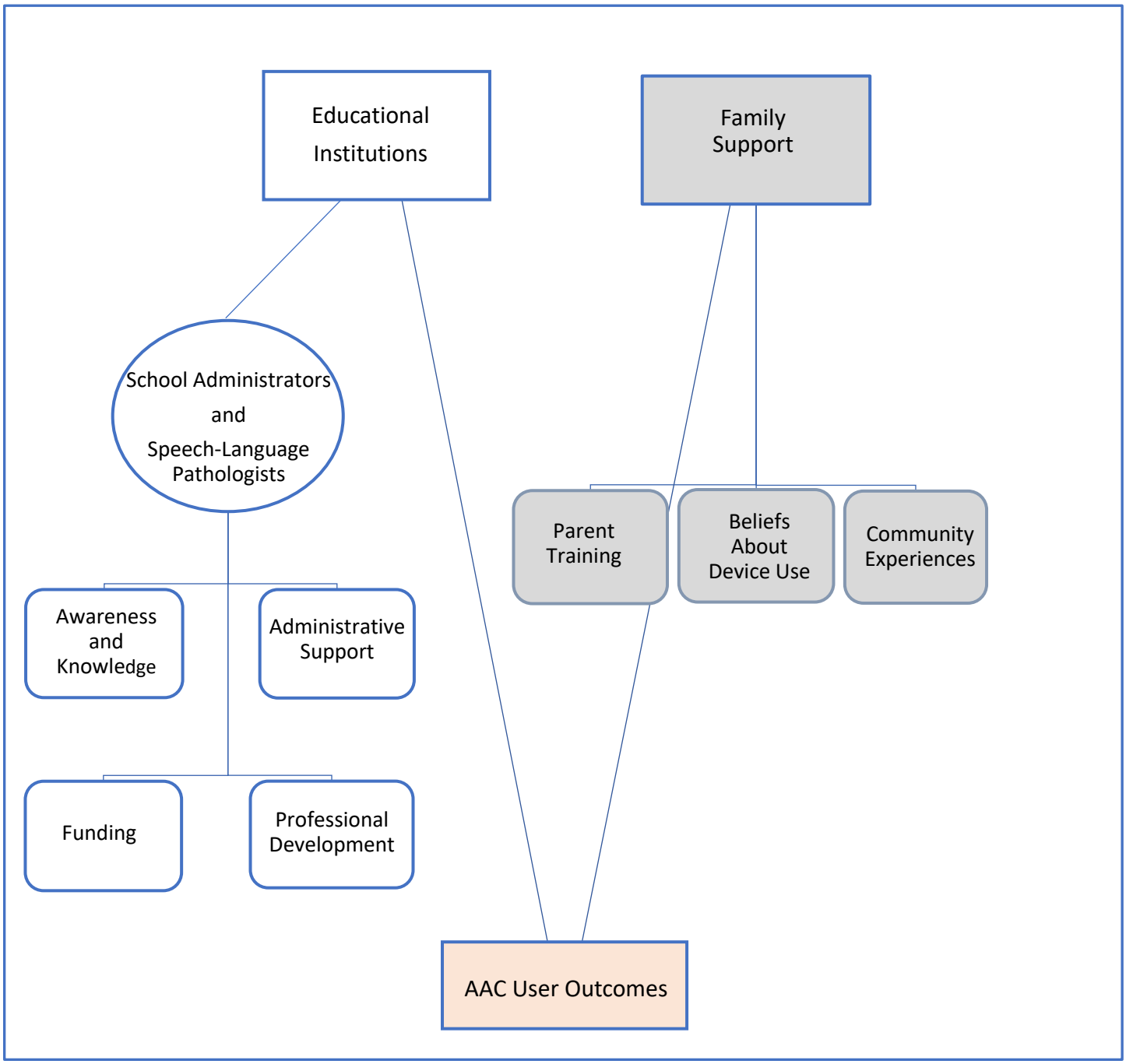

Figure 1. Conceptual Framework.

CHAPTER 3

METHOD OF INQUIRY

Augmentative and Alternative Communication (AAC) supports and services are often not presented as options for students with complex communication needs (CCN). Oftentimes, when it does exist, there may be organizational barriers that affect a student's access to the communication tools. As a result of these barriers, students may be denied the ability to develop fundamental language and social skills which are important for active participation in school and later in society. Among these barriers are a lack of sufficient AAC supports and services for students with severe communication deficits. Another barrier is lack of knowledge from key stakeholders regarding the importance of developing language and communication skills for students with moderate to severe disabilities. A final barrier is that stakeholders are unaware of the range of augmentative and alternative communication interventions available to assist students with communication deficits. Due to these barriers, the researcher proposed that failure to provide and/or effectively implement AAC supports and services for students with CCN may be due to specific organizational structures and processes of educational institutions.

The purpose of this study was to understand the organizational factors that affect the provision and implementation of AAC supports and services for students with CCN. This study explored the perceptions of school administrators and speech-language pathologists (SLP) to determine their attitudes regarding the benefits of AAC student usage. The views of school administrators and SLPs were also studied surrounding their beliefs on access to AAC supports and services for students with CCN. The following research questions helped to guide the development this study:

1. What are the attitudes toward the benefits of AAC use for students with severe communication impairments amongst school administrators and speech-language pathologists?
2. What are the factors that school administrators and speech-language pathologists consider important when implementing AAC for students with severe communication impairments?
3. What are the views about access to AAC for students with severe communication impairments amongst school administrators and speech-language pathologists?

In this chapter, the methodology of the study will be presented including a discussion of its philosophical foundations. Next, a description of the quantitative survey research design used within the study will be shared. Following the survey research design, specific survey methods used in this study will be described. This area of focus includes information about the setting, sample, and data collection, including instrumentation and procedure. Information about the study's data analysis procedures, interpretation, and validity/trustworthiness will also be detailed. Finally, the role of the researcher is examined, followed by a brief chapter summary.

Quantitative Research

Quantitative research methods were used to collect and analyze variables to verify theories, explanations, and provide evidence for claims (Creswell, 2003). Through the use of quantitative research methods, researchers use a deductive form of logic to test theories and hypotheses on the intended topic (Creswell, 1994). Additionally, the use of quantitative methods in research can assist in exploring variables that go beyond overall program impacts (Mclaughlin, 2019). Within this study, quantitative methodology was used to explore the ideologies of school administrators and SLPs relating to the benefits for, and access to, AAC supports and services for students with CCN. Quantitative methodology is based on postpositivist philosophical foundations. "Postpositivism reflects a deterministic philosophy in which causes probably determine effects or outcomes" (Creswell, 2003, p. 7). Within this philosophy, researchers must examine causes that influence outcomes utilizing numeric measures to study the behaviors of individuals (Creswell, 2003). Quantitative methods often utilize formal measures that do not consider a holistic view of an individual's ideology on a specified phenomenon. Although this is true, the researcher in this study determined that the strengths of quantitative research outweigh the limitations.

Research Design

A review of both qualitative and quantitative research designs was considered for preparation of this study. Research designs can be qualitative, quantitative, and in some research designs, a combination of the two (Creswell, 2008). Characteristics of qualitative research designs are generally

exploratory and understanding-oriented, based on participants' experiences, have a small sample size, and although reporting evidence can be flexible, it can be biased (Creswell, 2008). On the other hand, quantitative designs are description-oriented, use measurable observable data, have a larger sample size, is analyzed using statistical procedures, and is often unbiased (Creswell, 2008). A mixed methods research design can be used by researchers who want to utilize components from both qualitative and quantitative approaches. For this study, the researcher chose to construct an online quantitative survey research design to collect data on the perspectives of school administrators and SLPs as it relates to the use and provision of AAC supports and services for students with CCN.

Research Methods

In this section, the quantitative research methodology used to apply online survey research for this study will be explained. Collecting survey responses electronically provides an easy and quick form of data collection (Creswell, 2008). Quantitative survey research design is appropriate for this study because it allowed the researcher to compare the attitudes and viewpoints of two different groups on the benefits of AAC supports and services and access to AAC for students with CCN. Within this section, the setting, sample, data collection, data analysis, and steps taken to ensure the validity of the study will be described.

Setting

This research study surveyed a total of 120 respondents including school administrators (*n* = 67) and SLPs (*n* = 53) in one school district within California. According to the California Department of Education (CDE), there were 6,002,523 students who were enrolled in public schools in school year 20-21 (CA Department of Education, 2021). CDE also reported that in school year 18-19, special education services were provided to 795,047 individuals, ages newborn through twenty-two years of age (CA Department of Education, 2020). The total number of special education students who qualified as having a speech or language impairment was 164,698 in school year 18-19 (CA Department of Education, 2020) which equates to 2.74% of the total population of public school

students. Relatedly, of the 795,047 students who received special education services, 20.7% were classified as having a speech or language impairment.

Sample

The target population for this research was school administrators and SLPs in one single unified school district in California. The researcher used purposive sampling to identify the specific groups for the study. Purposive sampling can be considered a “key informant survey”, which targets participants who are knowledgeable or have a personal stake or understanding of the central phenomenon (Cohen et al., 2017; Creswell, 2008). For the purpose of this study, the researcher studied two groups of professionals: school administrators and SLPs.

School Administrators

For the purpose of this study, school administrators were defined as school site principals, assistant or vice principals, or any other equivalent title. School administrators were recruited from the one participating unified school district in California. The selected unified school district had a total number of 95 school administrators that met the selection criteria to request participation in the survey research. Upon the conclusion of survey distribution and collection, there were a total of 67 school administrators who completed the survey.

Speech-Language Pathologists (SLP)

For the purpose of this study, SLPs were defined as individuals who have gone through specialized training and certification programs to assess, diagnose, and treat speech, language, and social communication for students in schools. SLPs were recruited from the one participating unified school district in California. The selected unified school district had a total number of 68 SLPs to request participation in the survey, of which 53 SLPs completed the survey.

Utilizing these two specific groups of professional roles allowed the researcher to compare their perspectives on various issues regarding AAC use for students who use or could benefit from AAC to communicate. The researcher requested permission from the unified school district to conduct online survey research with school administrators and SLPs employed within the school district.

Because the researcher is employed within the participating school district, access to the email addresses of the targeted groups, school administrators and SLPs, were accessible. The target groups received an email (Appendix A) with a link to the survey that could be accessed from a computer or mobile device at a location of their choice.

To ensure the provision of ethical protection for all survey participants, the researcher followed the established guidelines in alignment with Institutional Review Board (IRB) requirements. Creswell (2003) asserts that informed consent be obtained prior to participants completing research studies. Informed consent includes providing participants information regarding the purpose and procedures of the study, their right to ask questions, and ability to request a copy of the results. Participants were made aware that their privacy would be protected and that involvement in the study was voluntary which allows them the right to withdraw from the study at any time (Creswell, 2003).

Data Collection and Management

Within this section, survey instrumentation, procedures for data collection, and data management strategies that were used to conduct this quantitative research study will be detailed.

Instrumentation

After researching many validated survey instruments focused on technology and AAC, a survey was created based on subscales located from two previously validated surveys. Utilizing full or modified existing instruments represents an easier approach to survey design when compared to designing a new instrument (Creswell, 2008). The first survey that was used was found in a dissertation focused on exploring special educators' perceived skills, knowledge, and professional development needs related to assistive technology (Gustafson, 2006). In this study, a questionnaire was used to identify facilitators that contribute to the successful implementation of assistive technology (AT).

From the questionnaire used by Gustafson (2006), the researcher for this study chose to utilize only one of the subscales. The selected subscale focused on factors important to the implementation of AT. For the purpose of the current study, the researcher used the described subscale and replaced

the term “AT” with “AAC”. Additionally, the original survey question was modified to instead compare the level of agreement between school administrators and SLPs on factors needed for the successful implementation of AAC for students with CCN.

The second validated survey instrument used in the development of this research instrument was retrieved from a doctoral level dissertation that studied the use of AAC systems in schools for children with severe learning difficulties (Kalambouka, 1999). Kalambouka (1999) developed a series of questions to obtain data from participants; however, the researcher was unable to find a survey instrument that had been validated in prior research. Because of this, multiple survey instruments were examined before constructing an instrument to match the scope and population of interest. For the purpose of this current study, the researcher chose to use two validated subscales from Kalambouka’s (1999) original survey instrument. Kalambouka’s (1999) first subscale was designed to survey “respondents’ attitudes towards the benefits to students using AAC” (Kalambouka, 1999). The second subscale measured the “extent to which AAC was used in schools” (Kalambouka, 1999). For the purpose of this current research study, the first identified subscale was used to survey school administrators and SLPs on the benefits they have seen in students as a result of using AAC. The latter subscale was used to determine the views of school administrators and SLPs regarding access to AAC for students with CCN at their current school site/district.

Utilizing the three subscales detailed above, an online survey instrument was designed to determine the differences in ideologies of two professional groups, school administrators and SLPs, and their views regarding student access to, the benefits of AAC for students, and implementation of AAC for students with CCN (Appendix B). The online survey contained a total of 23 questions and was composed of four sections including the following: (1) demographic/background information, (2) benefits of AAC student use, (3) organizational factors that affect AAC implementation, and (4) viewpoints regarding student access to AAC. The first section (SQ1-8) included demographic/background questions and acquired information such as current position, number of years of each participant’s professional capacity as a school administrator or SLP, and level of

education. Additionally, respondents were asked if they have had experience working on a campus with programs for students with moderate/severe disabilities (SQ5), their level of familiarity with AAC (SQ6), and if their school/district has an AT/AAC coordinator (SQ7).

The second section (SQ9-16), surveyed respondents' attitudes surrounding the benefits of AAC use for students with CCN. This section utilized a Likert type scale to rate the perceived benefits of AAC use for students. Likert scales are treated as both interval and ordinal data when conducting educational research (Creswell, 2008). This section used the following scale: 1 = most positive change; 2 = positive change; 3 = no real change; 4 = slight deterioration; 5 = major deterioration; 6 = don't know. Respondents used the scale to rate improvements they have seen in students as a result of using AAC in the following areas: (1) spoken communication, (2) classroom behavior, (3) attention span, (4) motivation, (5) academic skills, (6) interest in classroom activities, and (7) interaction with peers. An open-ended response option (SQ16) was also provided so that respondents could specify any other changes they have witnessed in students as a result of AAC use.

The second section also utilized branch logic within the survey design which is also referred to as skip pattern logic. Branch logic allows survey respondents to skip to a future point in the survey based on how they respond to specific questions (https://www.qualtrics.com/support/edit-survey/survey-flow/branch-logic/). By using this skip pattern logic, some respondents answered less than the total number of questions in the survey. To determine if respondents were able to skip the remaining questions in section two, they were asked the following question (SQ8), "Have you ever interacted or worked with a student who used a low or high-tech form of AAC to communicate?" In an effort to ensure that respondents had sufficient background information, so as not to exclude themselves to the intended line of questioning, they were supplied with examples of low and high-tech AAC forms of communication that are commonly used prior to answering yes or no. Responding yes to the question allowed the respondent to progress through the subsequent line of questions in section two. Conversely, a "no" response resulted in the participant advancing to the third section (SQ17) of the survey.

The third section used a Likert-type scale to determine the importance of organizational factors (SQ17-22) that affect AAC implementation. Findings in this section were compared between two professional groups: school administrators and SLPs. This section used the following scale for participants to identify their positionality: 4 = very important; 3 = somewhat important; 2 = not important, 1 = unsure. Implementation factors that respondents rated included the following: (a) funding, (b) technical assistance and support, (c) administrative support, (d) time, (e) professional development opportunities, and (f) awareness and knowledge about AAC.

The fourth section of the survey posed one question and utilized a multiple-choice option (SQ23) for respondents to express their views regarding AAC student access within their school/district. Responses for this section included the following six options: (1) All children who need AAC have sufficient access to it, (2) Most children who need AAC have sufficient access to it, (3) Some children who need AAC have sufficient access to it, (4) Few children who need AAC have sufficient access to it, (5) Hardly any children who need AAC have sufficient access to it, and (6) No children who need AAC have sufficient access to it.

Procedures

The researcher utilized a sample size calculator embedded in the Qualtrics survey development software to determine the appropriate number of participants needed to complete the survey. It is estimated that from one unified school district there is a total number of 95 school administrators and 68 SLPs available to request participation in the survey. The researcher estimated that an ideal sample size of 77 school administrators and 58 SLPs is sufficient to report findings with a confidence level of 95%. This sample also will also ensure a 5% margin of error.

The researcher sought approval to conduct research from one school district in California. The application to conduct research specifically stated that only school administrators and SLPs were requested to participate in the study. The researcher was able to access school administrator and SLPs contact information due to the fact that the researcher was employed within the participating school district.

The target population received an email from the researcher's school district email account requesting their participation in the survey (Appendix A). Within this email, participants were given a short description of the survey and were informed that they would receive a subsequent email with a link to the survey from the email address at "noreply@qemailserver.com. "The researcher sent the initial email through each participant's school district email server as a means to show targeted participants that the request to participate in the survey was coming from a reliable source.

The survey link was accessible via computer, tablet, or smartphone. Once accessing the link, participants were directed to a statement regarding the survey and participant consent instructions (Appendix C). Participants were informed that for the purpose of this study their identities would remain confidential. All identifying information from participants was removed prior to analyzing.

Data Management

The researcher created and distributed the research study using the Qualtrics website (https://www.qualtrics.com/). All survey data obtained within the Qualtrics website that had been printed by the researcher was stored in a locked file cabinet at the researcher's residence to ensure the confidentiality of all participants and their responses to the survey items.

The researcher used Qualtrics to obtain survey data from the respondents. The researcher reviewed, cleaned the data, and uploaded the cleaned data into the Intellectus software. Intellectus Statistics (2021) is a statistics software package designed to manage, clean, and input data. Intellectus is also capable of running descriptive statistics, *t*-tests, various types of ANOVA's, and regressions (https://www.intellectusstatistics.com/intellectus-features-page/). Once the researcher determined that all inputted data was clean and free of any personal identifying information from the participants, Intellectus was used to analyze the data. The primary focus of this study was to compare the views of school administrators and SLPs on the student benefits of using AAC, organizational factors associated with implementation of AAC, and access to AAC supports and services for students with CCN.

Data Analysis and Interpretation

Quantitative research consists of analyzing data using statistics to answer research questions. Analyzing quantitative data often results in describing trends, comparing groups, and finding relationships between variables (Creswell, 2008). The independent variables (IV) and dependent variables (DV) will be specified for the three research questions within the study.

RQ1

As a means to examine the differences in attitudes towards the benefits of AAC use for students with CCN (DV) between the two professional roles (school administrators and SLPs) (IV) an independent samples *t*-test was conducted. The independent samples *t*-test assessed if differences exist on the student benefits of AAC when compared by professional role (school administrator and SLP). An independent samples *t*-test is the appropriate statistical test when the purpose of research is to assess if differences exist on a continuous (interval/ratio) DV by a dichotomous (2 groups) IV. For the purpose of this research, the AAC student benefit scale was used as the continuous DV, and professional role was the dichotomous IV, with the two groups being school administrators and SLPs. The assumptions of normality and homogeneity of variance were assessed. Normality assumes that the scores are normally distributed (bell-shaped) and were assessed using the one-sample Shapiro-Wilk test (Razali & Wah, 2011). Homogeneity of variance assumes that both groups (school administrators and SLPs) have equal variances and will be assessed using Levene's test for equality of variances (Levene, 1960). If the Levene's test for equal variance indicates that equal variances cannot be assumed ($p < .05$), a Welch's *t*-test will be used instead of the Student's *t*-test, which is more reliable when the two samples have unequal variances (Ruxton, 2006). For the purpose of this study, the *t*-test will be two-tailed with the probability of rejecting the null hypothesis when it is true set at $p < 0.05$. This ensures a 95% certainty that the differences in attitudes, between the two groups, regarding the benefits of AAC use for students with CCN, did not occur by chance.

RQ2

To examine the organizational factors that school administrators and SLPs consider important when implementing AAC for students with severe communication impairments, an independent samples *t*-test was conducted. An independent samples *t*-test is the appropriate statistical test when the purpose of research is to assess if differences exist on a continuous DV by an IV with two groups. For the purpose of this study, the organizational factors scale is the DV and the IV is the professional role (school administrators and SLPs).

The assumptions of normality and homogeneity of variance were assessed. Normality assumes that the scores are normally distributed (bell-shaped) and were assessed using the one-sample Shapiro-Wilk test (Razali & Wah, 2011). Homogeneity of variance assumes that both groups have equal variances and were assessed using Levene's test for equality of variances (Levene, 1960). If the Levene's test for equal variance indicates that equal variances cannot be assumed ($p < .05$), a Welch's *t*-test will be used instead of the Student's *t*-test, which is more reliable when the two samples have unequal variances (Ruxton, 2006). The *t*-test will be two-tailed with the probability of rejecting the null hypothesis when it is true set at $p < 0.05$. This ensures a 95% certainty that the differences in opinions about the organizational factors that are considered important when implementing AAC for students with CCN did not occur by chance.

RQ3

Lastly, to examine the views of student access to AAC amongst school administrators and SLPs, an independent samples *t*-test was conducted. An independent samples *t*-test is the appropriate statistical test when the purpose of research is to assess if differences exist on a continuous DV by an IV with two groups. For the purpose of this statistical test, student access to AAC was used as the DV and the professional role (school administrators and SLPs) was the IV. Normality assumes that the scores are normally distributed (bell-shaped) and will be assessed using the one-sample Shapiro-Wilk test (Razali & Wah, 2011). Homogeneity of variance assumes that both groups (school administrators and SLPs) have equal variances and will be assessed using Levene's

test for equality of variances (Levene, 1960). If the Levene's test for equal variance indicates that equal variances cannot be assumed ($p < .05$), a Welch's *t*-test will be used instead of the Student's *t*-test, which is more reliable when the two samples have unequal variances (Ruxton, 2006). The *t*-test utilized in this study was two-tailed with the probability of rejecting the null hypothesis when it is true set at $p < 0.05$. This ensures a 95% certainty that the differences regarding student access to AAC amongst school administrators and SLPs did not occur by chance.

Additional Statistical Analysis

Data collected and analyzed for research questions one, two, and three, allowed the researcher to consider and run additional analysis relating to the study. A Pearson product-moment *r* correlation was conducted to assess the relationship between AAC student benefit and organizational factors. Pearson *r* correlation is a bivariate measure of association (strength) of the relationship between two variables. Pearson correlation analysis assumes that the variables have a linear relationship with each other (Conover & Iman, 1981). The assumption of linearity will be assessed graphically with a scatterplot. Given that the variables are continuous (interval/ratio data), the assumption of linearity is met. Correlation coefficients, *r*, vary from 0 (no relationship) to 1 (perfect linear relationship) or -1 (perfect negative linear relationship). Positive coefficients indicate a direct relationship, indicating that as one variable increases, the other variable also increases. Negative correlation coefficients indicate an indirect relationship, indicating that as one variable increases, the other variable decreases. Cohen's standard will be used to evaluate the correlation coefficient, where 0.10 to .29 represents a weak association between the two variables, 0.30 to 0.49 represents a moderate association, and 0.50 or larger represents a strong association (Cohen, 1988).

Procedures to Ensure Validity and/or Trustworthiness

The survey tool designed for this research study has been modified from two previously validated survey instruments. Utilizing full or modified existing instruments represents an easier approach to survey design when compared to designing a new instrument (Creswell, 2008). To assess the reliability of this study’s survey tool, the researcher calculated a Cronbach alpha

coefficient for the survey items specific to the student benefits of utilizing AAC. This calculation, which resulted in the development of the AAC student benefit scale, consisted of survey questions relating to spoken communication, classroom behavior, attention span, motivation, academic skills, interest in classroom activities, and interaction with peers. The Cronbach's alpha coefficient was evaluated using the guidelines suggested by George & Mallery (2018) where > .9 excellent, > .8 good, > .7 acceptable, > .6 questionable, > .5 poor, and ≤ .5 unacceptable. As a result, the items for the AAC student benefit scale had a Cronbach's alpha coefficient of 0.86, indicating good reliability. Table 1 presents the results of the reliability analysis for the AAC student benefit scale.

Table 1. Reliability Table for AAC Student Benefit

Construct	No. of Items	α	Lower Bound	Upper Bound
AAC Student Benefit	7	0.86	0.82	0.89

Note. The lower and upper bounds of Cronbach's α were calculated using a 95% confidence interval.

A Cronbach’s Alpha was also calculated to establish the reliability for survey questions surrounding organizational factors. This calculation, which resulted in the development of the organizational factors scale, consisted of funding, technical assistance, administrative support, time, professional development, and awareness and knowledge. The Cronbach's alpha coefficient was evaluated using the guidelines suggested by George & Mallery (2018) where > .9 excellent, > .8 good, > .7 acceptable, > .6 questionable, > .5 poor, and ≤ .5 unacceptable. As a result, the items for the organizational factors scale had a Cronbach's alpha coefficient of 0.83, indicating good reliability. Table 2 presents the results of the reliability analysis for the organizational factors scale.

Table 2. Reliability Table for Organizational Factors

Construct	No. of Items	α	Lower Bound	Upper Bound
Organizational Factors	6	0.83	0.79	0.87

Note. The lower and upper bounds of Cronbach's α were calculated using a 95% confidence interval.

Role of the Researcher

The researcher is a special education administrator and does not hold credentials to practice speech-language pathology. The researcher believes that the development of communication skills for children with moderate to severe disabilities is integral to their success in functioning as adults in society. A postpositivist approach to research considers that when studying the actions and behaviors of individuals, we cannot be certain that the conclusions drawn from the researcher or answers depicted by survey respondents are a reflection of the absolute truth (Creswell, 2003). Individuals' viewpoints on controversial topics may be biased based on their personal feelings and interpretations of society's complex issues.

The researcher is currently employed within the unified school district that participated in this study. The researcher believes that all students with disabilities, including those with CCN, are entitled to the supports and services afforded to them under the provisions of IDEA regardless of the student's true or perceived levels of functioning and barriers. The researcher has been employed in the field of special education as both a teacher and administrator for over twenty years and has witnessed first-hand the lack of AAC supports and services that students with CCN have been provided. Knowing this, the researcher did not let her personal conjectures influence the development of survey items nor the interpretation of results for this study.

Chapter Summary

The problem this study addressed is the need for students with significant disabilities who have challenges with communication to have access to AAC supports and services, which can assist them with communicating. The researcher used statistical analysis to examine school administrators and SLPs ideologies regarding the benefits for, factors influencing implementation of, and perceptions of access to AAC for students with CCN. Within the next chapter, the statistical findings and analysis of this quantitative survey will be presented.

CHAPTER 4

FINDINGS

The purpose of this study was to understand the organizational factors that affect the provision and implementation of Augmentative and Alternative Communication (AAC) for students with severe communication deficits. The perceptions of school administrators and speech-language pathologists (SLPs) surrounding the impact that AAC has on students with complex communication needs (CCN) were also studied. Quantitative methodology was used to explore the ideologies of two professional groups, school administrators and SLPs, as it relates to the benefits for, and access to, AAC supports and services for students with CCN. Independent samples *t*-tests were conducted to determine if there were significant differences within the role of the professional (IV) and both the student benefits of using AAC (DV) and organizational factors involved with AAC student use (DV). Additionally, an independent samples *t*-test was conducted to determine if there was a significant difference in the views of the role of the professional (IV) as it relates to student access to AAC (DV). In this chapter, the descriptive statistics of the study will be presented, including frequencies and percentages of demographic information such as years of experience in current position, level of familiarity with AAC, and experience working on a school campus that had a program for students with moderate/severe disabilities. Each research question of the study will then be restated and the statistical analyses that were performed will be discussed along with the results that will be used to answer the study's three research questions. An additional test was applied to examine the correlations between AAC student benefits, and the specific organizational factors discussed in this study. The chapter concludes with a summary of the findings.

Preliminary Analysis

Email correspondence (Appendix A) requesting participation in the current study was distributed to 167 candidates within two professional groups, school administrators and SLPs. The professional group of school administrators encompassed principals (n = 38) and assistant principals (n = 29). The combined total of school administrators who completed the survey was 67. Conversely,

there were 53 SLPs who completed the survey. These results yielded a 72% response rate. The final sample consisted of 120 total respondents: 67 school administrators and 53 SLPs. Demographic characteristics of the respondents are detailed below.

Years in Current Position

Participants were asked to identify the number of years they have been in their current position. Respondents specified their number of years in their current role in an open-ended response format. The researcher then merged the data submitted by the respondents into five groups. The results of the years in current position groupings and data are displayed in Table 3 below. The majority of the participants in the SLP group reported that they have been in their current role for 6-9 years (28%) and 16+ years (28%). The lowest grouping for years in current position reported by SLPs was 1-2 years (8%). The majority of the participants in the school administrator group responded that they have been in their current role for 6-9 years (28%) and the lowest years in the current position reported by this group was less than 1 year (1%).

Table 3. Frequency of Survey Participants by Years in Current Position by Professional Role

Years in Current Position	Speech-Language Pathologist	School Administrator
1-2 years	4 (8%)	14 (21%)
3-5 years	10 (19%)	11 (16%)
6-9 years	15 (28%)	16 (24%)
10-15 years	9 (17%)	12 (18%)
16+ years	15 (28%)	13 (19%)

Note. Due to rounding errors, column wise percentages may not equal 100%.

Personal Experience with a Person with a Disability

Respondents were asked if they have had a personal experience with a person with a disability and were given the opportunity to select one or more descriptors to answer the question. The descriptors that were provided were as follows: (1) self, (2) immediate family member, (3) extended family member, (4) friend, (5) neighbor, and (6) other (open-ended response). An analysis of the data

revealed that 21% of SLPs and 24% of school administrators have had a personal experience with an individual with a disability. Conversely, 79% of SLPs and 64% of the school administrators surveyed have not had a personal experience with an individual with a disability. These results are displayed in Table 4 below.

Table 4. Frequency of Survey Participants Experience with Individual with a Disability by Professional Role

Experience with Individual with a Disability	Speech-Language Pathologist	School Administrator
Previous experience with a person with a disability	11 (21%)	24 (36%)
No previous experience with a person with a disability	42 (79%)	43 (64%)

Note. Due to rounding errors, column wise percentages may not equal 100%.

Experience on a Campus with Students with Moderate/Severe Disabilities

SLPs and school administrators were asked if they have ever worked on a campus that had special education programs for students with moderate/severe disabilities. As Table 5 references below, 77% of SLPs and 49% of school administrators have worked at a campus with programs for students with moderate/severe disabilities. Conversely, 2% of SLPs and 12% of school administrators reported that they have not worked at a school with programs for students with moderate/severe disabilities. The analysis also reflected that a total number of 37 respondents did not provide an answer to this survey question.

Table 5. Frequency of Survey Participants by Experience on Campus by Professional Role

Experience on a campus with students with moderate/Severe Disabilities	Speech-Language Pathologist	School Administrator
Has worked on a campus with students with moderate/severe disabilities	41 (77%)	33 (49%)
Has not worked on a campus with students with moderate/severe disabilities	1 (2%)	8 (12%)
No response	11 (21%)	26 (39%)

Note. Due to rounding errors, column wise percentages may not equal 100%.

Interaction with Students who use AAC

Survey respondents were asked if they have ever interacted or worked with a student who used a low or high-tech form of AAC to communicate. Prior to reading the survey question, participants were given a brief description of what AAC entails. Specifically, respondents were able to read the following statement prior to answering: “AAC may vary from low-tech to high-tech methods. Low-tech forms of AAC may include pointing to picture symbols, letters, and/or words in a communication book or board. High-tech forms of AAC may include touching picture symbols, letters, words, and/or phrases on an electronic device that produce voice output.” Frequencies and percentages regarding SLPs and school administrators’ interactions with students who use AAC are displayed below in Table 6. The majority of SLPs (98%) and school administrators (73%) responded that they have interacted with students who use AAC, while the percentage of those who have not interacted with students who use AAC were 1% and 4%, respectively. In addition, there were a total number four school administrators who did not respond to this survey question.

Table 6. Frequency of Survey Participants Interaction with Students who use AAC by Professional Role

Interaction with students who use AAC	Speech-Language Pathologist	School Administrator
Have interacted with AAC student users	52 (98%)	49 (73%)
Have not interacted with AAC student users	1 (2%)	14 (21%)
Missing	0 (0%)	4 (6%)

Note. Due to rounding errors, column wise percentages may not equal 100%.

Level of Familiarity with AAC

Participants were asked to rate their level of familiarity with AAC. Prior to being asked this question, participants were provided with the following information: “Augmentative and Alternative Communication, or AAC, can assist children and adults with speech and/or language deficits by facilitating communication and providing access to engage with others in their environment.” As Table 7 indicates below, the most frequently observed category of level of familiarity with AAC for SLPs was

moderately familiar (*n* = 21) followed by the extremely familiar category (*n* = 13). For school administrators, the most frequently observed category in level of familiarity with AAC was not at all familiar (*n* = 23), followed by slightly familiar (*n* = 17).

Table 7. Frequency Table for Level of Familiarity with AAC by Professional Role

Level of Familiarity with AAC	Speech-Language Pathologist	School Administrator
Extremely familiar	13 (25%)	2 (3%)
Moderately familiar	21 (40%)	6 (9%)
Somewhat familiar	10 (19%)	16 (24%)
Slightly familiar	9 (17%)	17 (25%)
Not at all familiar	0 (0%)	23 (34%)
Missing	0 (0%)	3 (4%)

Note. Due to rounding errors, column wise percentages may not equal 100%.

School or District Has an AAC or Assistive Technology (AT) Coordinator

Survey participants were asked if their school/district has an AAC or AT team or coordinator. All participants in the SLP group responded that their school/district does have an AAC or AT coordinator. Conversely, 46% of school administrators responded yes and 6% responded no. Additionally, 43% of school administrators stated they were unsure if their school/district had an AAC or AT coordinator. Table 8 details the frequency of the school/district's opportunity of having an AAC or AT Coordinator.

Table 8. Frequency Table School/District Has an AAC or AT Coordinator by Professional Role

School/District Has an AAC or AT Coordinator	Speech-Language Pathologist	School Administrator
Yes	53 (100%)	31 (46%)
Unsure	0 (0%)	29 (43%)
No	0 (0%)	4 (6%)
Missing	0 (0%)	3 (4%)

Note. Due to rounding errors, column wise percentages may not equal 100%.

First Research Question

The researcher conducted a two-tailed independent samples *t*-test to examine whether the mean of AAC student benefit was significantly different between the SLP and school administrator categories of professional role.

Research Question 1 and Hypothesis

What are the attitudes toward the benefits of AAC use for students with severe communication impairments amongst school administrators SLPs?

H_o: There is not a statistically significant difference amongst professional role (school administrator vs. SLP) as it relates to their attitudes regarding the student benefit of using AAC.

H_a: There is a statistically significant difference amongst professional role (school administrator vs. SLP) as it relates to their attitude regarding the student benefit of using AAC.

Assumptions of RQ1

Normality. Shapiro-Wilk tests were conducted to determine whether AAC student benefit could have been produced by a normal distribution for each category of professional role (Razali & Wah, 2011). The result of the Shapiro-Wilk test for AAC student benefit in the SLP category was significant based on an alpha value of 0.05, $W = 0.87$, $p < .001$. This result suggests that AAC student benefit in the SLP category is unlikely to have been produced by a normal distribution. The result of the Shapiro-Wilk test for AAC student benefit in the school administrator category was significant based on an alpha value of 0.05, $W = 0.75$, $p < .001$. This result suggests that AAC student benefit in the school administrator category is unlikely to have been produced by a normal distribution. The Shapiro-Wilk test was significant for both the SLP and school administrator categories of professional role, indicating the normality assumption is violated.

Homogeneity of Variance. Levene's test was conducted to assess whether the variance of AAC student benefit was equal between the categories of professional role. The result of Levene's test for AAC student benefit was not significant based on an alpha value of 0.05, $F(1, 94) = 0.06$, $p = .814$. This result suggests it is possible that the variance of AAC student benefit is equal for each category of professional role, indicating the assumption of homogeneity of variance was met.

Results of RQ1

Welch's *t*-test was used instead of Student's *t*-test, which is more reliable when the two samples have unequal variances and unequal sample sizes (Ruxton, 2006). The result of the two-tailed independent samples *t*-test was not significant based on an alpha value of 0.05, $t(89.63) = 0.58$, $p = .566$, indicating the null hypothesis cannot be rejected. This finding suggests that the mean of AAC student benefit was not significantly different between the SLP and school administrator categories of professional role. The results are presented in Table 9. A bar plot of the means is presented in Figure 2.

Table 9. Two-Tailed Independent Samples *t*-Test for AAC Student Benefit by Professional Role

	Speech-Language Pathologist		School Administrator				
Professional Role	*M*	*SD*	*M*	*SD*	*t*	*p*	*D*
AAC Student Benefit	4.70	0.89	4.58	1.07	0.58	.566	0.12

Note. $N = 96$. Degrees of Freedom for the *t*-statistic = 89.63. *d* represents Cohen's *d.*

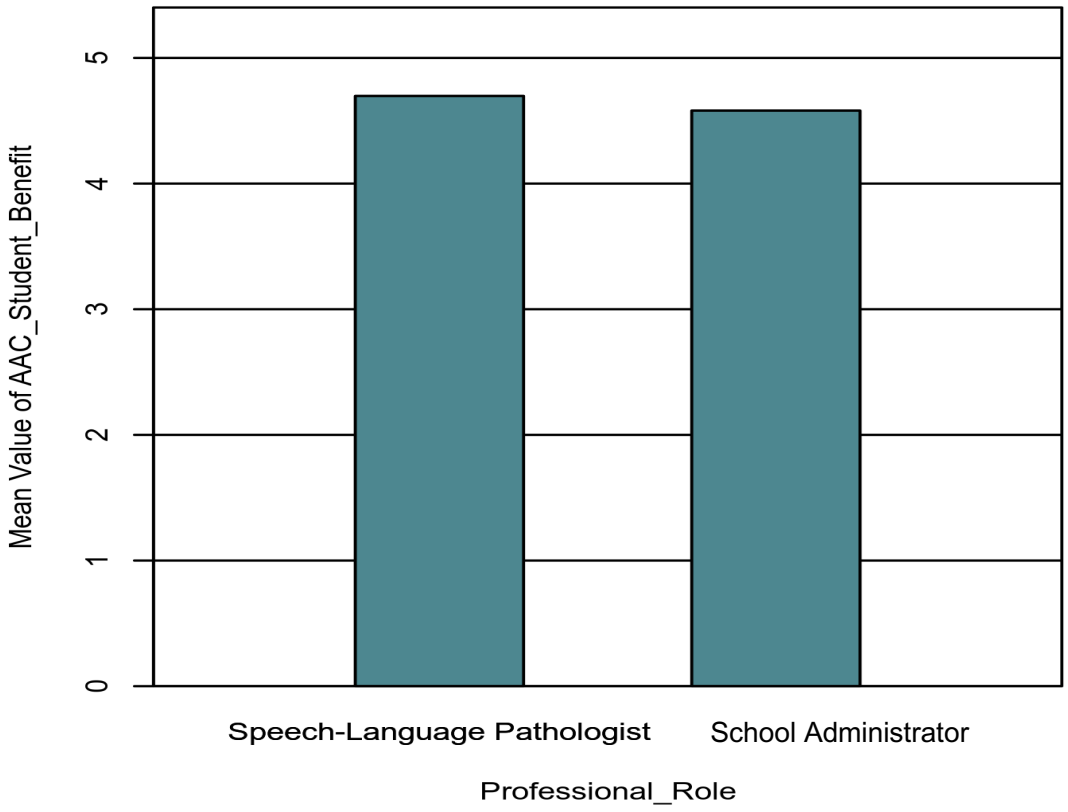

Figure 2. Mean of AAC student benefit by levels of professional role.

To further examine if a significant difference exists between AAC student benefit and levels of professional role, a two-tailed Mann-Whitney *U* two-sample rank-sum test was conducted. The two-tailed Mann-Whitney *U* two-sample rank-sum test is an alternative to the independent samples *t*-test but does not share the same assumptions (Conover & Iman, 1981). There were 49 observations in the SLP group and 47 observations in the school administrator group.

The result of the two-tailed Mann-Whitney *U* test was not significant based on an alpha value of 0.05, $U = 1110.5$, $z = -0.30$, $p = .762$. The mean rank for the SLP group was 47.66 and the mean rank for the school administrator group was 49.37. This suggests that the distribution of AAC student benefit for the SLP group (*Mdn* = 4.86) was not significantly different from the distribution of AAC student benefit for the School Administrator (*Mdn* = 5.00) category. Table 10 presents the result of the two-tailed Mann-Whitney *U* test. Figure 3 presents a boxplot of the ranks of AAC student benefit by professional role.

Table 10. Two-Tailed Mann-Whitney *U* Test for AAC Student Benefit by Professional Role

	Mean Rank				
Variable	Speech-Language Pathologist	School Administrator	*U*	*z*	*p*
AAC Student Benefit	47.66	49.37	1110.50	-0.30	.762

Second Research Question

The researcher utilized an independent samples *t*-test to determine the administrative factors that are considered important for implementing AAC for students with severe communication impairments as reported by two professional groups, school administrators and SLPs.

Research Question 2 and Hypothesis

What are the factors that school administrators and speech-language pathologists consider important when implementing AAC for students with severe communication impairments?

H_o: There is not a statistically significant difference on the importance of administrative factors when implementing AAC by professional role (school administrators vs. speech-language pathologists).

H_a: There is a statistically significant difference on the importance of administrative factors when implementing AAC by professional role (school administrators vs. speech-language pathologists).

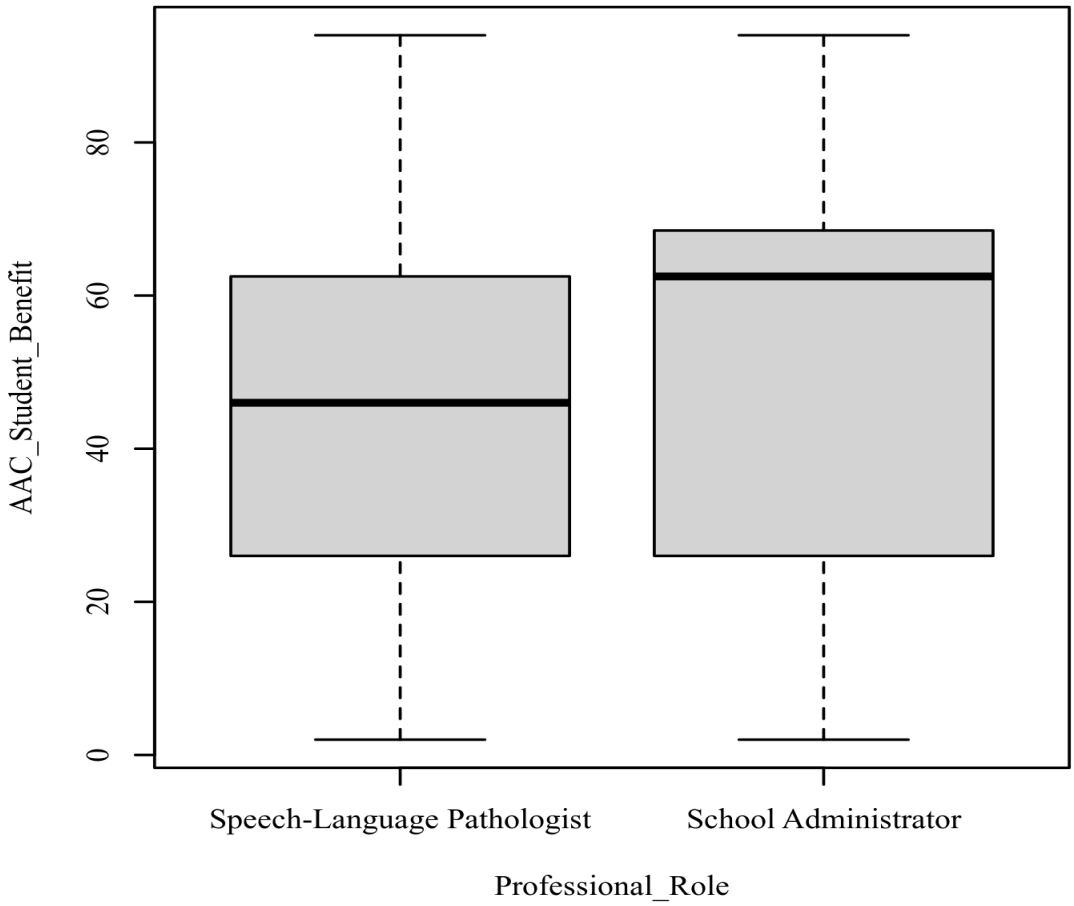

Figure 3. Ranks of AAC student benefit by professional role.

Assumptions of RQ2

Normality. Shapiro-Wilk tests were conducted to determine whether organizational factors could have been produced by a normal distribution for each category of professional role (Razali & Wah, 2011). The result of the Shapiro-Wilk test for organizational factors in the SLP category was significant based on an alpha value of 0.05, $W = 0.87$, $p < .001$. This result suggests that organizational factors in the SLP category is unlikely to have been produced by a normal distribution. The result of the Shapiro-Wilk test for organizational factors in the school administrator category was significant based on an alpha value of 0.05, $W = 0.75$, $p < .001$. This result suggests that organizational factors in the school administrator category is unlikely to have been produced by a

normal distribution. The Shapiro-Wilk test was significant for both the SLP and school administrator categories of professional role which indicated that the normality assumption is violated.

Homogeneity of Variance. Levene's test was conducted to assess whether the variance of organizational factors was equal between the categories of professional role. The result of Levene's test for organizational factors was not significant based on an alpha value of 0.05, $F(1, 94) = 0.06$, $p = .814$. This result suggests it is possible that the variance of organizational factors is equal for each category of professional role indicating the assumption of homogeneity of variance was met.

Results of RQ2

Welch's *t*-test was used instead of Student's *t*-test, which is more reliable when the two samples have unequal variances and unequal sample sizes (Ruxton, 2006). The result of the two-tailed independent samples *t*-test was not significant based on an alpha value of 0.05, $t(89.63) = 0.58$, $p = .566$ indicating the null hypothesis cannot be rejected. This finding suggests the mean of organizational factors was not significantly different between the SLP and school administrator categories of professional role. The results are presented in Table 11. A bar plot of the means is presented in Figure 4.

Table 11. Two-Tailed Independent Samples *t*-Test for Organizational Factors by Professional Role

	Speech-Language Pathologist		School Administrator				
Variable	*M*	*SD*	*M*	*SD*	*t*	*p*	*d*
Organizational Factors	4.70	0.89	4.58	1.07	0.58	.566	0.12

Note. $N = 96$. Degrees of Freedom for the *t*-statistic = 89.63. *d* represents Cohen's *d.*

To further examine if a significant difference exists between organizational factors and levels of professional role, a two-tailed Mann-Whitney *U* two-sample rank-sum test was conducted. The two-tailed Mann-Whitney *U* two-sample rank-sum test is an alternative to the independent samples *t*-test, but does not share the same assumptions (Conover & Iman, 1981). There were 49 observations in the SLP group and 47 observations in the school administrator group.

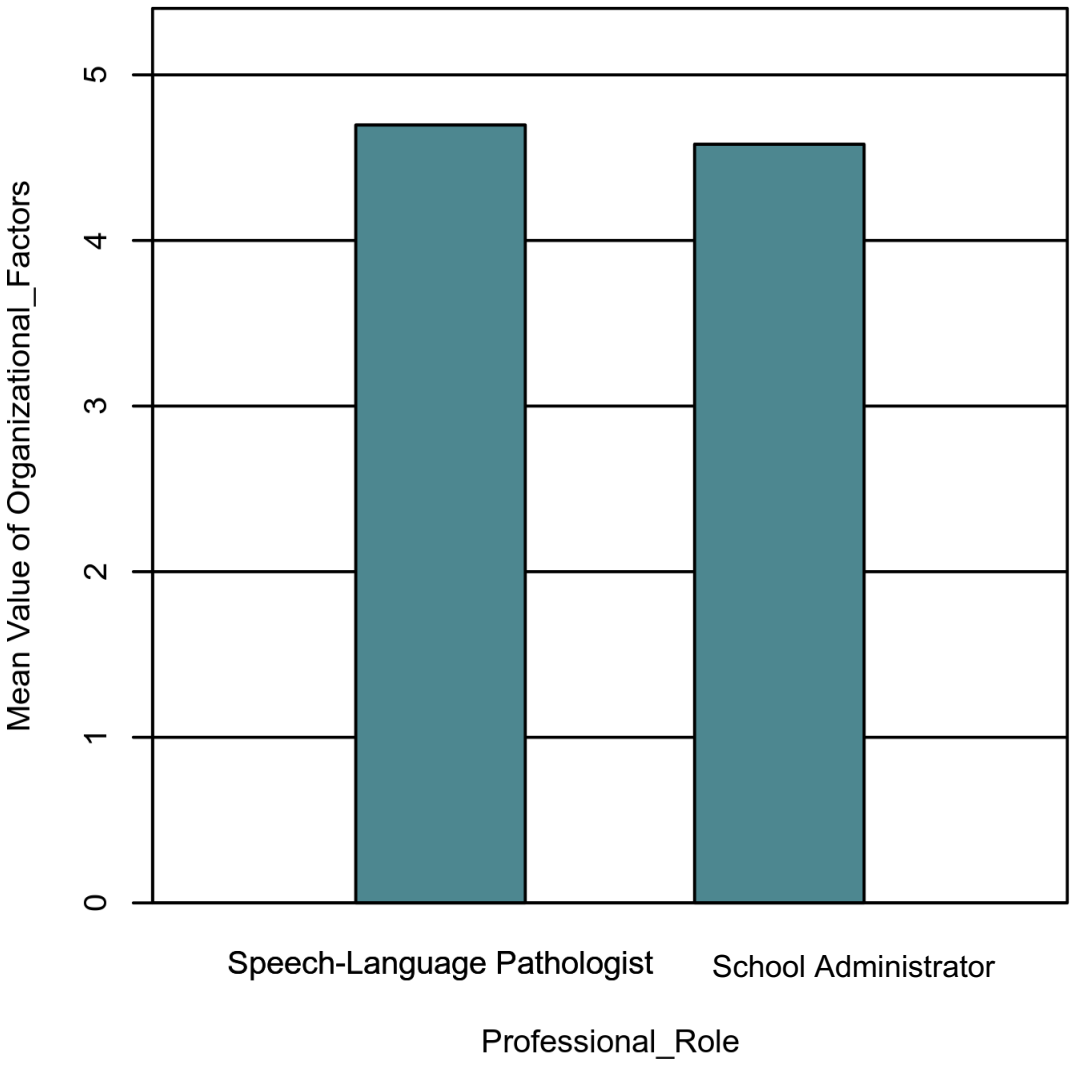

Figure 4. Mean of organizational factors by levels of professional role.

The result of the two-tailed Mann-Whitney *U* test was not significant based on an alpha value of 0.05, $U = 1110.5$, $z = -0.30$, $p = .762$. The mean rank for the SLP group was 47.66 and the mean rank for the school administrator group was 49.37. This suggests that the distribution of organizational factors for the SLP group (*Mdn* = 4.86) was not significantly different from the distribution of organizational factors for the school administrator (*Mdn* = 5.00) category. Table 12 presents the result of the two-tailed Mann-Whitney *U* test. Figure 5 presents a boxplot of the ranks of organizational factors by professional role.

Table 12. Two-Tailed Mann-Whitney *U* Test for Organizational Factors by Professional Role

	Mean Rank				
Variable	Speech-Language Pathologist	School Administrator	*U*	*z*	*p*
Organizational Factors	47.66	49.37	1110.50	-0.30	.762

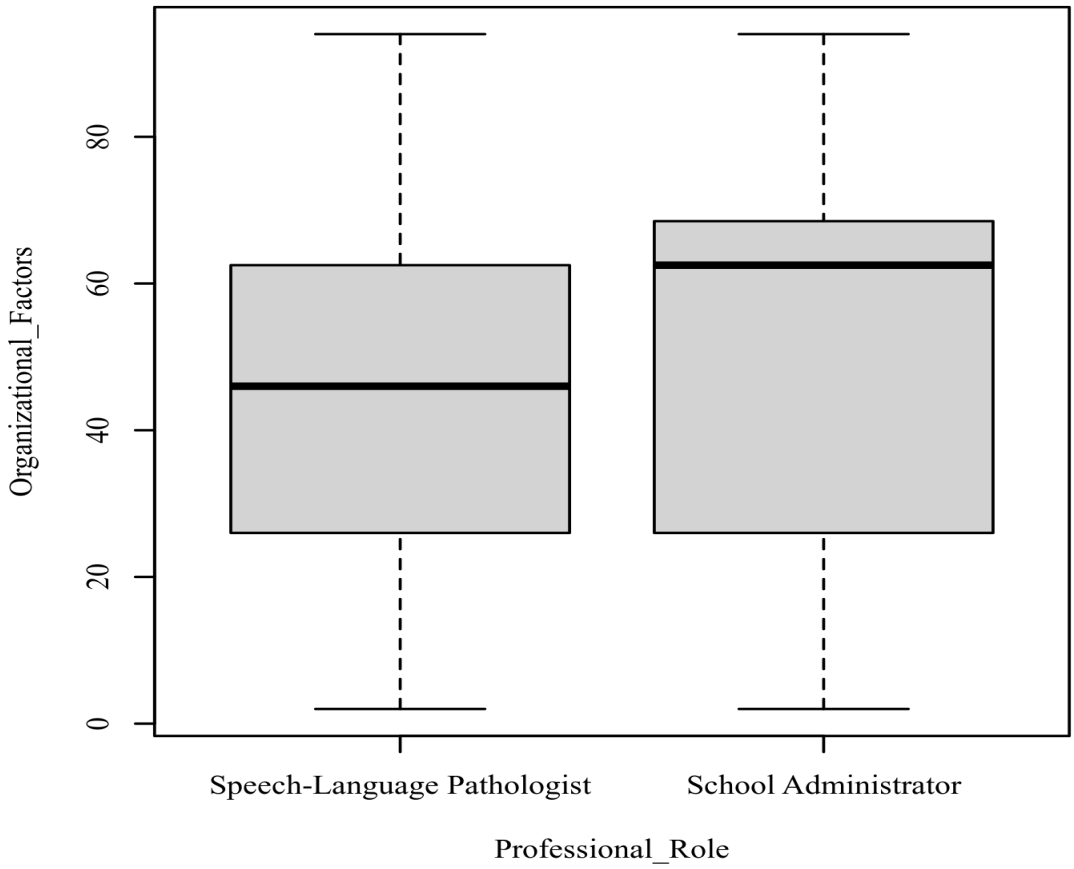

Figure 5. Ranks of organizational factors by professional role.

Third Research Question

The researcher utilized an independent samples *t*-test to determine the views on AAC student access for students with severe communication impairments amongst two professional groups, school administrators and SLPs.

Research Question 3 and Hypothesis

What are the views about access to AAC for students with severe communication impairments amongst school administrators and speech-language pathologists?

H_o: There is not a statistically significant difference on student access to AAC by professional role (school administrators vs. speech-language pathologists).

Ha: There is a statistically significant difference on student access to AAC by professional role (school administrators vs. speech-language pathologists).

Assumptions of RQ3

Normality. Shapiro-Wilk tests were conducted to determine whether student access to AAC could have been produced by a normal distribution for each category of professional role (Razali & Wah, 2011). The result of the Shapiro-Wilk test for student access to AAC in the SLP category was significant based on an alpha value of 0.05, $W = 0.87$, $p < .001$. This result suggests that student access to AAC in the SLP category is unlikely to have been produced by a normal distribution. The result of the Shapiro-Wilk test for student access to AAC in the school administrator category was significant based on an alpha value of 0.05, $W = 0.85$, $p < .001$. This result suggests that student access to AAC in the school administrator category is unlikely to have been produced by a normal distribution. The Shapiro-Wilk test was significant for both the SLP and school administrator categories of professional role, indicating the normality assumption is violated.

Homogeneity of Variance. Levene's test was conducted to assess whether the variance of student access to AAC was equal between the categories of professional role. The result of Levene's test for student access to AAC was not significant based on an alpha value of 0.05, $F(1, 101) = 1.95$, $p = .166$. This result suggests it is possible that the variance of student access to AAC is equal for each category of professional role which indicates that the assumption of homogeneity of variance was met.

Results of RQ3

Welch's *t*-test was used instead of Student's *t*-test, which is more reliable when the two samples have unequal variances and unequal sample sizes (Ruxton, 2006). The result of the two-tailed independent samples *t*-test was significant based on an alpha value of 0.05, $t(99.57) = -2.72$, $p = .008$ indicating the null hypothesis can be rejected. This finding suggests the mean of student access to AAC was significantly different between the SLP and school administrator categories of professional role. The results are presented in Table 13. A bar plot of the means is presented in Figure 6.

Table 13. Two-Tailed Independent Samples *t*-Test for Student Access to AAC by Professional Role

	Speech-Language Pathologist		School Administrator				
Variable	*M*	*SD*	*M*	*SD*	*t*	*p*	*d*
Student Access To AAC	4.35	0.82	4.83	0.94	-2.72	.008	0.54

Note. N = 103. Degrees of Freedom for the *t*-statistic = 99.57. *d* represents Cohen's *d.*

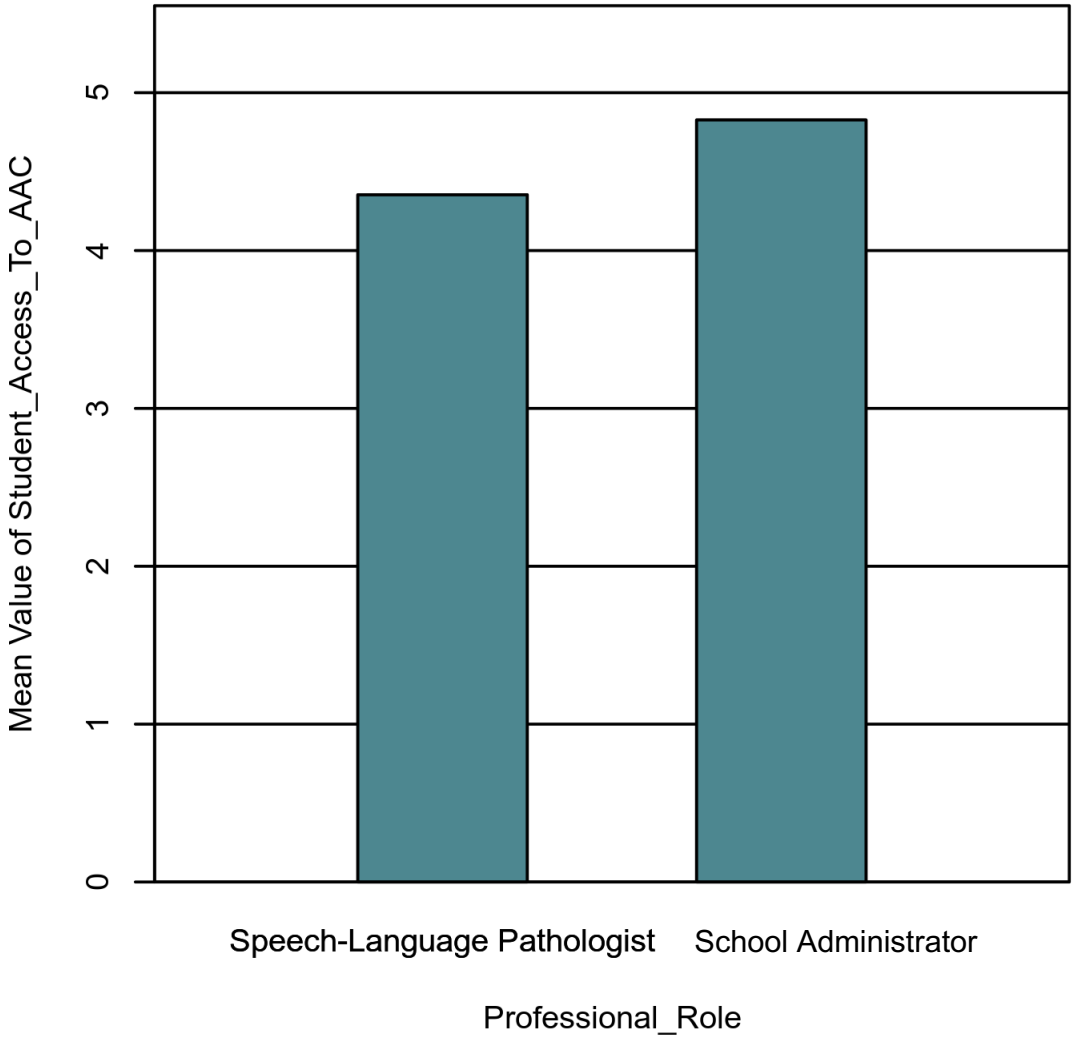

Figure 6. Mean of student access to AAC by levels of professional role.

A two-tailed Mann-Whitney *U* two-sample rank-sum test was conducted to further examine whether there were significant differences in student access to AAC between the levels of professional role. The two-tailed Mann-Whitney *U* two-sample rank-sum test is an alternative to the

independent samples *t*-test, but does not share the same assumptions (Conover & Iman, 1981). There were 51 observations in the SLP group and 52 observations in school administrator group.

The result of the two-tailed Mann-Whitney *U* test was significant based on an alpha value of 0.05, $U = 967$, $z = -2.50$, $p = .012$. The mean rank for the SLP group was 44.96 and the mean rank for the school administrator group was 58.90. This suggests that the distribution of student access to AAC for the SLP group was significantly different from the distribution of student access to AAC for the school administrator category. The median for the SLP category (*Mdn* = 4.00) was significantly lower than the median for school administrator category (*Mdn* = 5.00). Table 14 presents the result of the two-tailed Mann-Whitney *U* test. Figure 7 presents a boxplot of the ranks of student access to AAC by professional role.

Table 14. Two-Tailed Mann-Whitney *U* Test for Student Access to AAC by Professional Role

	Mean Rank				
Variable	Speech-Language Pathologist	School Administrator	*U*	*z*	*p*
Student Access to AAC	44.96	58.90	967.00	-2.50	.012

Additional Analysis

Data collected and analyzed for the three research questions in this study produced results that allowed the researcher to run additional analysis relating to the premise of the study. A Pearson correlation was conducted which was used to analyze the correlation of specific organizational factors that all survey respondents (school administrators and SLPs) felt affected the benefits of AAC supports and services for students who use or could benefit from using AAC. The specific organizational factors that were analyzed were as follows: (1) funding, (2) time, (3) technical assistance, (4) professional development, (5) administrative support, and (6) awareness and knowledge.

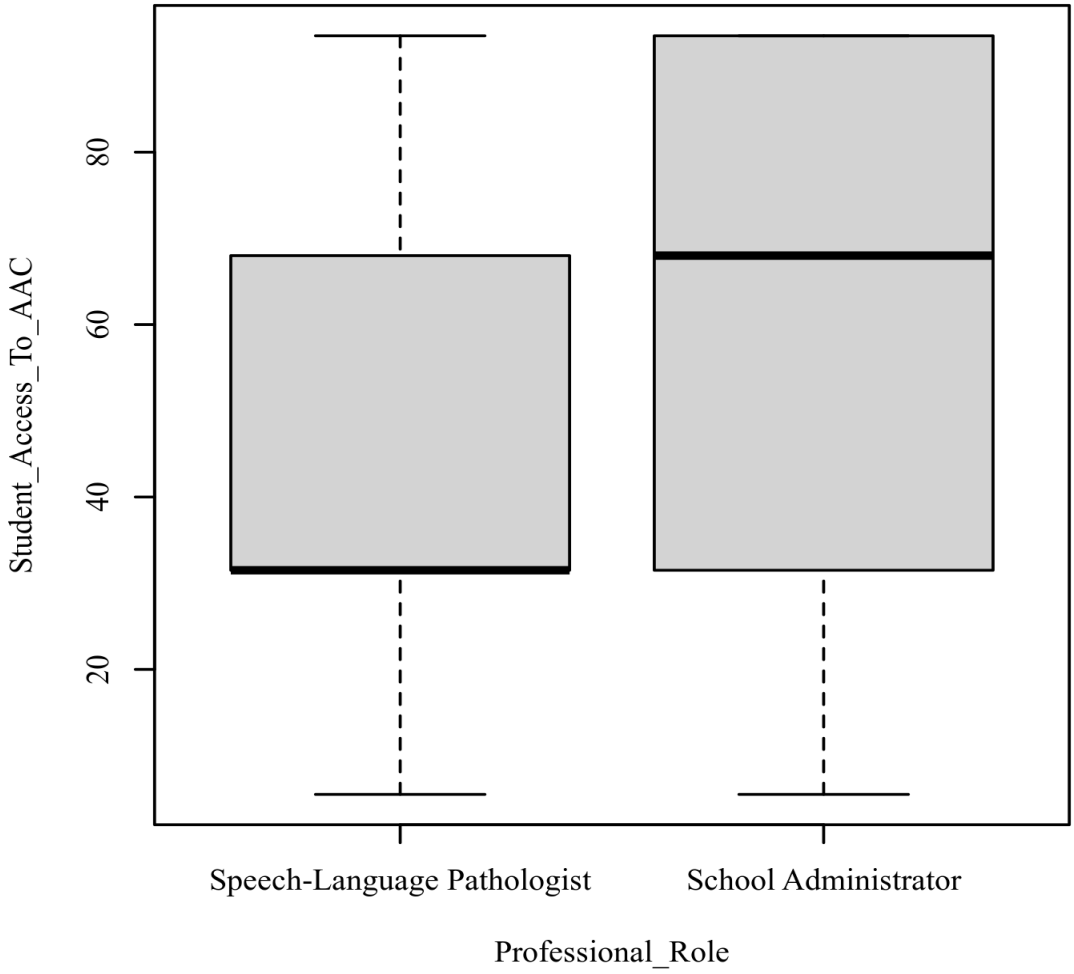

Figure 7. Ranks of student access to AAC by professional role.

Assumptions of Linearity

A Pearson correlation requires that the relationship between each pair of variables is linear (Conover & Iman, 1981). This assumption is violated if there is curvature among the points on the scatterplot between any pair of variables. Figure 8 - Figure 14 presents the scatterplots of the correlations. A regression line has been added to assist the interpretation.

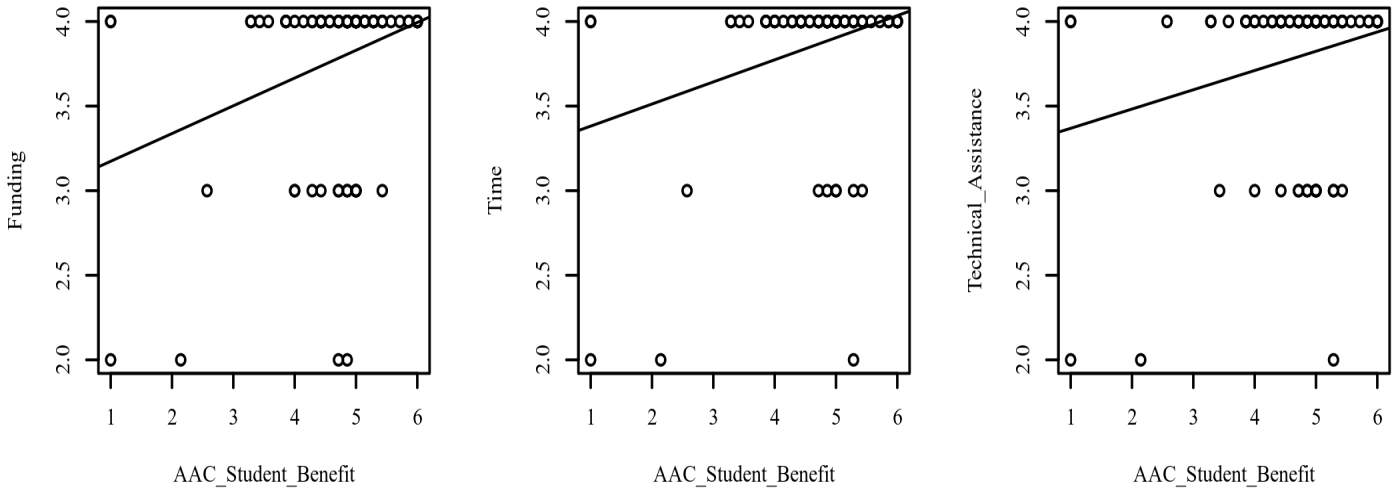

Figure 8. Scatterplots between each variable with regression line.

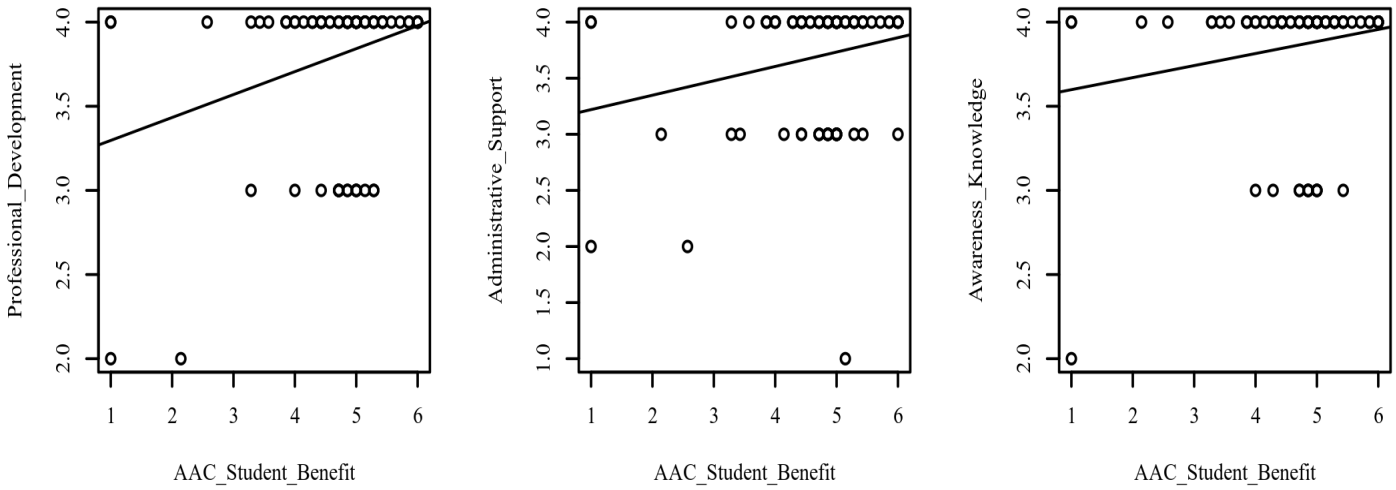

Figure 9. Scatterplots between each variable with regression line.

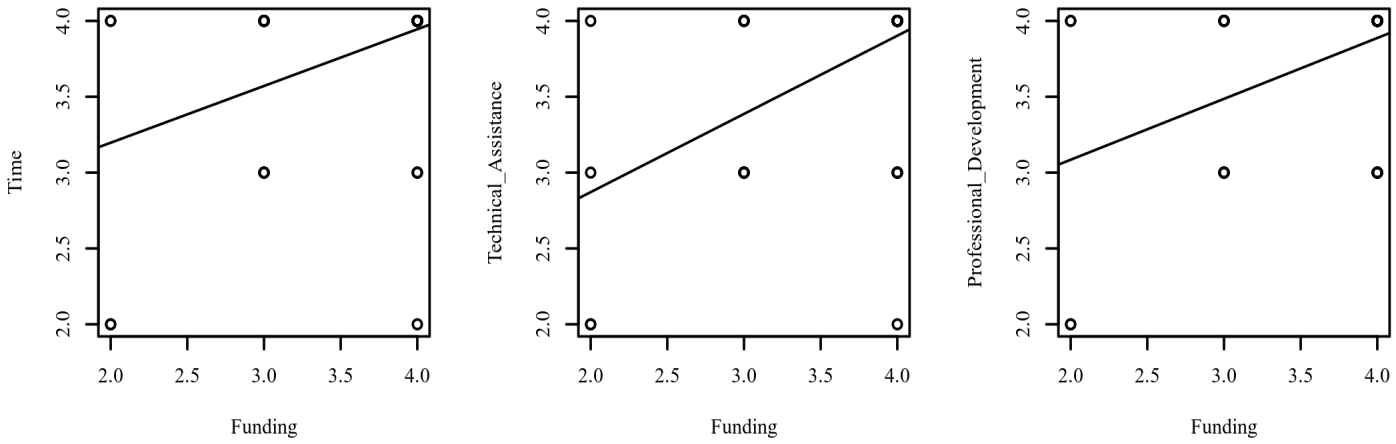

Figure 10. Scatterplots between each variable with regression line.

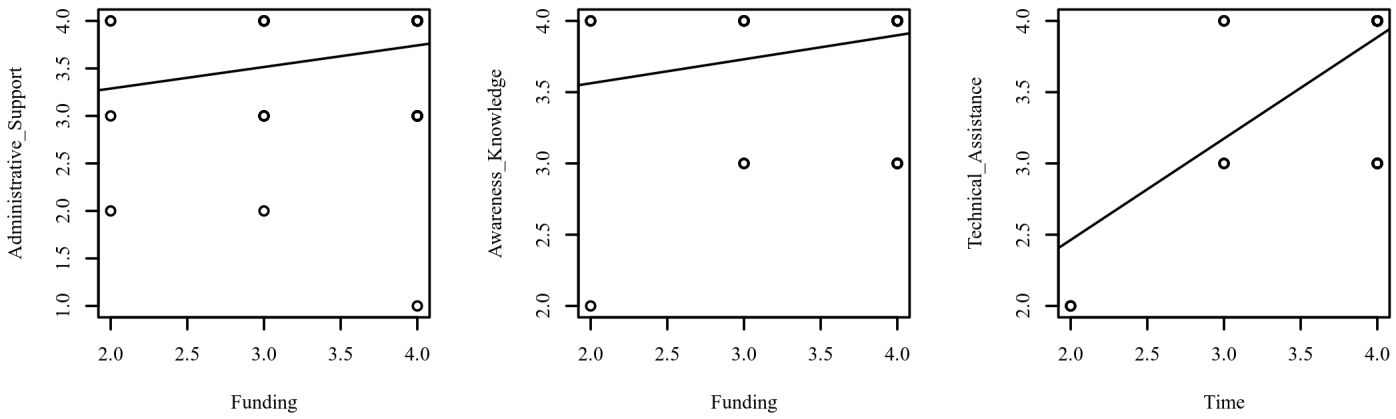

Figure 11. Scatterplots between each variable with regression line.

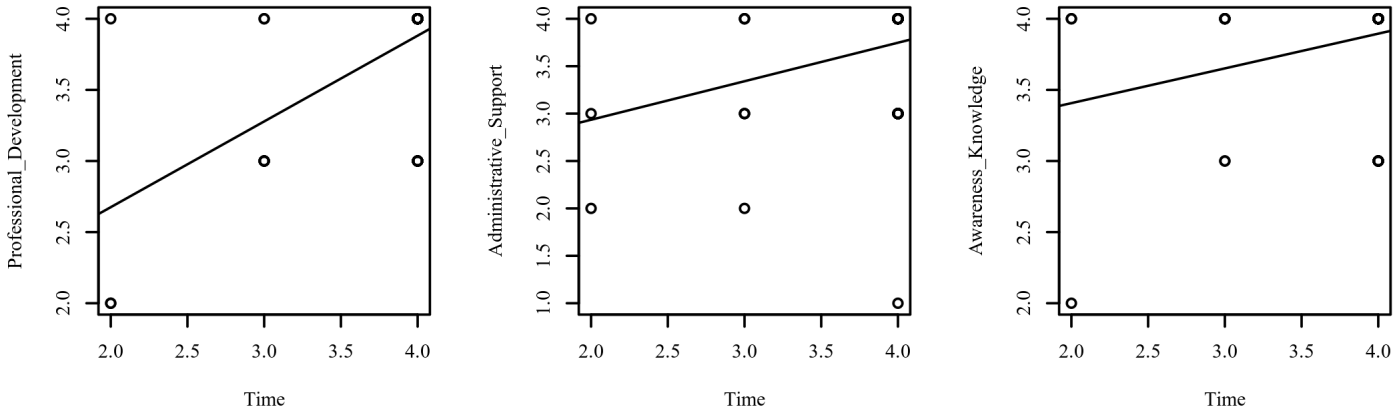

Figure 12. Scatterplots between each variable with regression line.

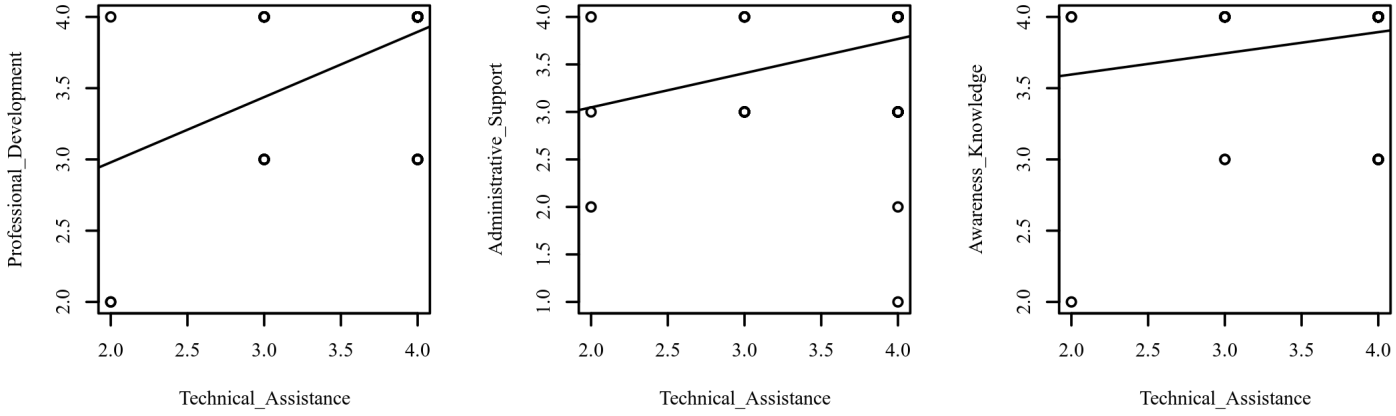

Figure 13. Scatterplots between each variable with regression line.

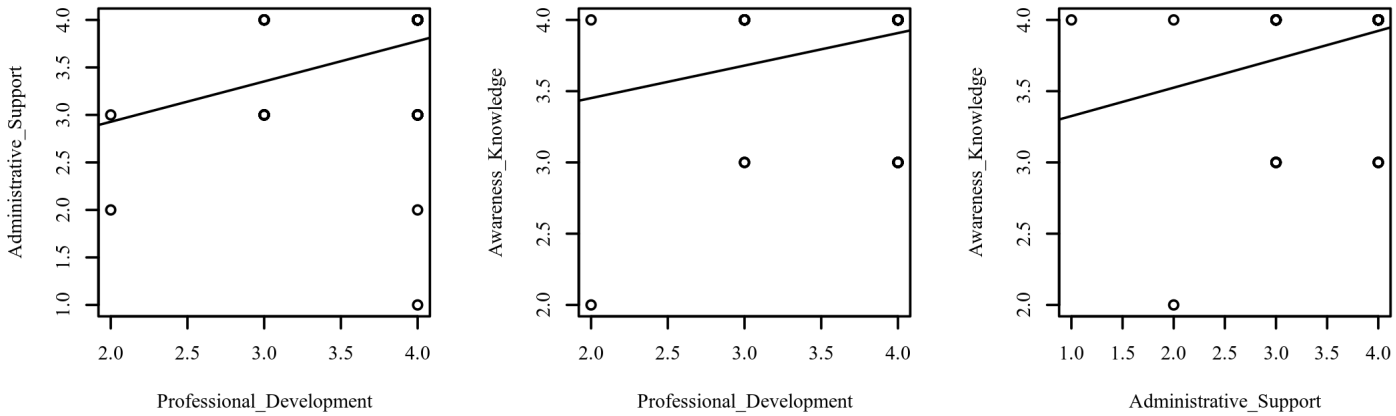

Figure 14. Scatterplots between each variable with regression line.

Results of Additional Analysis

The result of the correlations were examined using Holm corrections to adjust for multiple comparisons based on an alpha value of 0.05. There were several large and moderate effects between the variables that resulted from the analysis.

Large Effect Size

A significant positive correlation was observed between funding and technical assistance (r_p = 0.55, p < .001, 95% CI [0.38, 0.67]). The correlation coefficient between funding and technical assistance was 0.55, indicating a large effect size. This correlation indicates that as funding increases, technical assistance tends to increase. A significant positive correlation was observed between time and technical assistance (r_p = 0.63, p < .001, 95% CI [0.49, 0.74]). The correlation coefficient between time and technical assistance was 0.63, indicating a large effect size. This correlation indicates that as time increases, technical assistance tends to increase. A significant positive correlation was observed between time and professional development (r_p = 0.57, p < .001, 95% CI [0.42, 0.69]). The correlation coefficient between time and professional development was 0.57, indicating a large effect size. This correlation indicates that as time increases, professional development tends to increase.

Moderate Effect Size

A significant positive correlation was observed between AAC student benefit and funding (r_p = 0.31, p = .003, 95% CI [0.11, 0.48]). The correlation coefficient between AAC student benefit and

funding was 0.31 which indicates a moderate effect size. This correlation means that as AAC student benefit increases, funding tends to increase. The correlation coefficient between funding and time was 0.44, indicating a moderate effect size. This correlation indicates that as funding increases, time tends to increase. A significant positive correlation was observed between funding and professional development (r_p = 0.45, p < .001, 95% CI [0.27, 0.60]). The correlation coefficient between funding and professional development was 0.45, indicating a moderate effect size. This correlation indicates that as funding increases, professional development tends to increase. A significant positive correlation was observed between time and administrative support (r_p = 0.31, p = .003, 95% CI [0.11, 0.48]). The correlation coefficient between time and administrative support was 0.31, indicating a moderate effect size. This correlation indicates that as time increases, administrative support tends to increase. A significant positive correlation was observed between technical assistance and professional development (r_p = 0.49, p < .001, 95% CI [0.32, 0.63]). The correlation coefficient between technical assistance and professional development was 0.49, indicating a moderate effect size. This correlation indicates that as technical assistance increases, professional development tends to increase. A significant positive correlation was observed between technical assistance and administrative support (r_p = 0.31, p = .003, 95% CI [0.11, 0.48]). The correlation coefficient between technical assistance and administrative support was 0.31, indicating a moderate effect size. This correlation indicates that as technical assistance increases, administrative support tends to increase. A significant positive correlation was observed between professional development and administrative support (r_p = 0.34, p < .001, 95% CI [0.15, 0.51]). The correlation coefficient between professional development and administrative support was 0.34, indicating a moderate effect size. This correlation indicates that as professional development increases, administrative support tends to increase. A significant positive correlation was observed between administrative support and awareness and knowledge (r_p = 0.30, p = .003, 95% CI [0.10, 0.47]). The correlation coefficient between administrative support and awareness and knowledge was 0.30, indicating a moderate effect size. This correlation indicates that as administrative support increases, awareness and knowledge tends

to increase. No other significant correlations were found. Table 15 presents the results of all the correlations, including those with small effect sizes.

Table 15. Pearson Correlation Results Among AAC Student Benefit and Organizational Factors (Funding, Time, Technical Assistance, Professional Development, Administrative Support, and Awareness and Knowledge)

Combination	r_p	95% CI	*p*
AAC Student Benefit - Funding	0.31	[0.11, 0.48]	.003
AAC Student Benefit - Time	0.29	[0.09, 0.47]	.005
AAC Student Benefit - Technical Assistance	0.22	[0.02, 0.41]	.029
AAC Student Benefit - Professional Development	0.29	[0.09, 0.46]	.005
AAC Student Benefit -Administrative Support	0.22	[0.01, 0.40]	.037
AAC Student Benefit - Awareness and Knowledge	0.18	[-0.02, 0.37]	.080
Funding – Time	0.44	[0.27, 0.59]	< .001
Funding – Technical Assistance	0.55	[0.38, 0.67]	< .001
Funding – Professional Development	0.45	[0.27, 0.60]	< .001
Funding – Administrative Support	0.20	[0.00, 0.39]	.048
Funding – Awareness and Knowledge	0.23	[0.03, 0.41]	.027
Time – Technical Assistance	0.63	[0.49, 0.74]	< .001
Time – Professional Development	0.57	[0.42, 0.69]	< .001
Time – Administrative Support	0.31	[0.11, 0.48]	.003
Time – Awareness and Knowledge	0.28	[0.08, 0.46]	.006
Technical Assistance – Professional Development	0.49	[0.32, 0.63]	< .001
Technical Assistance -Administrative Support	0.31	[0.11, 0.48]	.003
Technical Assistance – Awareness and Knowledge	0.19	[-0.01, 0.38]	.065
Professional Development – Administrative Support	0.34	[0.15, 0.51]	< .001
Professional Development – Awareness and Knowledge	0.27	[0.08, 0.45]	.007
Administrative Support - Awareness and Knowledge	0.30	[0.10, 0.47]	.003

Note. n = 94. Holm corrections used to adjust *p*-values.

Chapter Summary

This chapter presented a preliminary analysis of the findings including demographic characteristics of the survey respondents. The researcher focused on each of the three research questions designed for this study, specifically the research question and hypothesis, assumptions, and results. It was determined that there were no significant differences between the role of the professional and both AAC student benefit and organizational factors. However, there was a significant difference between the two professional roles and their views regarding student access to AAC.

Additional analyses were conducted to determine if correlations existed between AAC student benefit and each of the specific organizational factors of the current study. Findings of this analysis indicate that there are several significant positive correlations within various areas. Specifically, there was a moderate association between the benefits of AAC student use and funding. Additionally, there were strong associations between the following variables: (1) funding and technical assistance, (2) time and technical assistance, and (3) time and professional development. The following chapter will provide a discussion of the results of the three research questions, including interpretations and conclusions, as well as a discussion of the correlation analysis performed. Lastly, the researcher will share implications and recommendations for future study.

CHAPTER 5

DISCUSSION

Children with severe communication impairments who “are unable to meet their communication needs through spoken words” (Therrien & Light, 2016, p 163) may benefit from various forms of Augmentative and Alternative Communication (AAC). Providing AAC systems and supports for students with complex communication needs (CCN) can assist them with communication which is “one of the most basic elements of human functioning,” (Erozkan, 2013, p. 739). The problem this study addresses is that AAC is often not presented as an option for students with severe communication needs and when it is presented, there may be organizational barriers that affect student use as well as the implementation of the communication system. The purpose of this research was to understand the organizational factors that affect the provision and implementation of AAC for students with CCN.

Quantitative methodology was used to explore the ideologies of school administrators and speech-language pathologists (SLP) as it relates to the benefits of, and access to, AAC supports and services for students with CCN. The organizational factors that affect the provision of AAC supports and services for students with CCN were also explored. The following three research questions guided the current study:

1. What are the attitudes toward the benefits of AAC use for students with severe communication impairments amongst school administrators and speech-language pathologists?
2. What are the factors that school administrators and speech-language pathologists consider important when implementing AAC for students with severe communication impairments?
3. What are the views about access to AAC for students with severe communication impairments amongst school administrators and speech-language pathologists?

This chapter provides a summary of findings and discussion of the results of the three guiding research questions, including interpretations and conclusions. Lastly, implications and recommendations for future study are discussed. The chapter concludes with a summary of the study.

Summary of Findings and Discussion of Research Questions

Statistical analysis was used to answer the study's three research questions. In short, it was determined that there were no significant differences in the perspectives of the role of the professional (school administrators and SLPs) as it relates to both AAC student benefit and organizational factors. However, there was a significant difference between the two professional roles and student access to AAC. Additional analysis revealed that there were several strong, moderate, and small correlations within the areas of AAC student benefit and the specific organizational factors explored in this study.

Research Question 1

This research question measured the attitudes of school administrators and SLPs regarding the benefits of AAC use for students with severe communication impairments. The result of the two-tailed independent samples *t*-test was not significant, suggesting that the mean of AAC benefit was not significantly different between the categories of school administrators and SLPs. The findings of this survey suggested that all respondents agreed that students with CCN benefit from AAC use in several areas, including spoken communication, classroom behavior, attention span, motivation, academic skills, interest in classroom activities, and interaction with peers.

Research Question 2

This research question determined the administrative factors that school administrators and SLPs consider important for implementing AAC for students with severe communication impairments. The result of the two-tailed independent samples *t*-test was not significant which suggests that the mean of organizational factors was not significantly different between school administrators and SLPs. The findings of this study as it relates to research question 2 suggest that all respondents had about the same level of agreement regarding the organizational factors that affect students who use or could benefit from AAC supports and services.

The specific organizational factors targeted within this survey were awareness and knowledge about AAC, administrative support, funding, time, and professional development opportunities. While

there were no significant findings between the two groups (school administrators and SLPs) as it relates to organizational factors, a correlation analysis was run to determine the specific organizational factors that both school administrators and SLPs felt contributed to the benefits students with CCN receive as a result of AAC use. Of the six organizational factors detailed in this research (funding, time, technical assistance, professional development, administrative support, and awareness and knowledge), there was a moderate relationship between the benefits of AAC student use and funding. This correlation indicates that as AAC student benefit increases, funding tends to increase. Additionally, there were strong associations between the following variables: (1) funding and technical assistance, (2) time and technical assistance, and (3) time and professional development.

Research Question 3

This research question determined the views pertaining to AAC student access for students with severe communication impairments amongst the two groups, school administrators and SLPs. The result of the Welch's two-tailed independent samples *t*-test was significant, suggesting that the mean of student access to AAC was significantly different between the school administrator (m = 4.83) and SLP (m = 4.35) groups (Table 13). Further analysis for this question occurred by conducting a two-tailed Mann-Whitney U test. Again, the result of this test was significant (Table 14). The mean rank for the SLP group was 44.96 and the mean rank for the school administrator group was 58.90. The median for SLPs (*Mdn* = 4.00) was significantly lower than the median for school administrators (*Mdn* = 5.00). These results suggest that the school administrator group believed that students who use or could benefit from AAC had greater access to it when compared to the SLP group. While it is noteworthy that school administrators responded that AAC student users were receiving the supports and services that they need and are afforded due to IDEA, the SLP group did not share the same position. Demographic information collected regarding the school administrator and SLP groups level of familiarity with AAC (SQ6) and response to the question regarding if their

school/district has access to an AT/AAC coordinator (SQ7) shed light on if school administrators are truly aware of the needs of students who use or could benefit from using AAC.

Implications

The premise of this study was to determine the attitudes towards the benefits of AAC student use amongst school administrators and SLPs. Also explored were organizational factors that school administrators and SLPs consider important when implementing AAC supports and services for students with severe communication impairments. Lasty, the current study aimed to determine the views about access to AAC supports and services as compared by professional role, school administrators and SLPs. The results of this quantitative study indicate that both school administrators and SLPs agree that students with CCN can benefit from AAC supports and services within the school setting. Additionally, all respondents had about the same level of agreement regarding the organizational factors that affect AAC student benefit for those with CCN. Furthermore, survey analysis revealed that as AAC student benefit increases, the need for funding tends to increase.

Implications for Policy

There is strong evidence surrounding the provision of communication aids and the subsequent benefits on the lives of people with CCN (Clarke et al., 2011). The current research suggests that to support educational policy and proper implementation of AAC supports and services for students with CCN, school districts must abide by the federal guidelines established by the Individuals with Disabilities Education Act (IDEA) and provide adequate supports and services for students with severe deficits in the area of communication. This specifically includes the allocation of funds to support the provision of AAC supports and services for students with disabilities. As previously stated, services for students with disabilities are mandated by federal law; however, students in need of specialized communication systems and services are often overlooked due to funding and resources (Brophy-Arnott et., 1992; Soto et al., 2001). Although it is true that educational institutions across the nation have been historically unjustly underfunded, it is important for them to strategically align their

state and federal allocations while employing creative ways to repurpose their current educational resources while also considering their strategic plan for student success. This can be accomplished by reallocating resources to optimize student learning and providing instructional coaches and trainers who are trained and qualified to work with children with varying needs.

Implications for Leadership

This study has drawn attention to the role of the school administrator within the educational setting. Findings indicate that both professional groups, school administrators and SLPs, agree that increased funding and time towards student AAC efforts are essential for students to benefit from AAC supports and services. Additionally, funding towards AAC efforts and time are needed to ensure that adequate technical assistance and professional development are provided to all stakeholders. Overall, funding is a major variable that impacts the benefits of AAC student use.

While school administrators are responsible for a plethora of job responsibilities, one specific responsibility is to ensure that the needs of all students are met ethically, morally, and in accordance with federal and state guidelines. This would include devoting the time to ensure that students with significant speech deficits who use or could benefit from using AAC are included within the Response to Intervention (RTI) approach (Grether & Sickman, 2008). Students with disabilities typically meet the eligibility criteria for RTI tier 3 interventions (Thorius & Maxcy, 2015) which provide greater levels of academic and related service support. School administrators must ensure that tier 3 interventions for students with CCN are focused on developing expressive language skills and be aligned to the student's IEP goals (Grether & Sickman, 2008).

In addition, school administrators should actively participate in on-going training on all aspects of special education, including understanding and meeting the needs of students with significant disabilities. Conversely, administrators must ensure that both general and special education teachers at their school sites are trained appropriately to meet the unique needs of students with disabilities. Providing quality on-going professional development for all teachers is paramount to ensuring educational equity and inclusion for students who receive special education services; however, the

provision of high-quality professional development activities have been identified as a major challenge due to cost (Campbell et al., 2004).

Lastly, school administrators can cultivate educational environments that are inclusive and promote peer interaction interventions between non-disabled students and those with disabilities (Chung & Carter, 2013). School administrators must be willing to provide administrative support to meet the needs of all students by developing a comprehensive plan and approach to ensure that the school culture is sensitive to the needs of all students (Schaefer et al., 2018). On-going professional development will aid all stakeholders with implementing AAC best practices however it must also incorporate opportunities to support a school-wide cultural shift for the inclusion of all students (Glover & Law, 1996).

Implications for Practice

As indicated above, school administrators and SLPs agree that funding is imperative to promote positive student outcomes of student AAC use. While lending specificity to the role of the SLP, funding for specialized training opportunities is crucial to their development as professionals. SLPs who have participated in training during certification classes and professional development, both inside and outside of their organizations, state that they lack the knowledge, expertise, and comfort level to adequately provide AAC services to students with CCN due to their lack of education and training (Ratcliff et al., 2008). Similarly, IEP team members, including SLPs, express both reluctance and fear of technology (Soto et al., 2001) which may be a result of lack of knowledge, adequate training, and awareness of AAC systems and supports. Intensive coaching combined with a system of professional development that supports ongoing training of staff who work with students that use AAC results in increased student use of AAC (Chazin et al., 2018). The need for the appropriation of funds to allow for continued specialized training for SLPs in school districts who assess, treat, and communicate with students who use or could benefit from using AAC is imperative to ensure successful AAC student outcomes.

Implications for Theory and Future Research

The theoretical framework that guided this study was based on Urie Bronfenbrenner's ecological system of human growth. The researcher utilized this system to understand the impact various systems have on the development of a child who uses or could benefit from using AAC. While a child's microsystem encompasses interactions within the family structure, a child's mesosystem involves interaction between the child's family structure and their educational environment. For the purpose of this study, the researcher examined both school administrators and SLPs (educational environment) and their perceptions regarding the impact that the educational system has on an AAC student user's mesosystem. Future research could explore the perceptions of the AAC student user's family and school personnel to determine the level of interaction and intersection between the home and school environment.

As a result of this study implications for further research surrounding AAC supports and services for students with CCN arose. The current study utilized quantitative methodologies; however, a qualitative approach to this study would lend specificity to perceived barriers that administrators and SLPs believe affect the use of AAC supports and services for students who could benefit from or currently use AAC to communicate. This approach would also allow respondents the ability to expound upon their responses and, at the same time, the researcher would be able to ask additional clarifying or follow-up questions.

The researcher further posits that future research surrounding student access to AAC supports and services for students with CCN should be explored within school districts within varying socio-economic communities. Unfortunately, the needs of students with disabilities are often met at a low level in many school districts. Within these districts, school administrators may feel they are not able to adequately allocate fiscal resources to fund the additional supports and services needed by students with significant needs. Of particular interest would be to determine if school districts operating in lower, middle, and higher socio-economic areas have the same perceptions regarding

student access to AAC supports and services. A study such as this may shed light on inequitable practices employed by school districts.

Recommendations

Provision of Adequate On-going Funding

In order to provide the needed supports and services for all students, including those with CCN, educational institutions must ensure that funds are allocated and utilized appropriately to ensure that the specific needs of all students who would benefit from either low- or high-tech forms of communication supports and services is met. The current study presents a bird's eye view on the need for school-based technological advances to optimize student learning. During this time of COVID-19 school closures and reopening's, it is evident that the need for all students to become technologically literate is great. When the needs of the greater population of students to become more technologically savvy is coupled with the small percentage of students who could benefit from various forms of technology to communicate, it comes to be that all children can reap the benefits from increased training and access to technology to optimize their learning. It is the recommendation that school districts revisit their strategic plans and Multi-Tiered System of Support (MTSS) structures to determine an appropriate allocation of funds towards technology access and training for all students, and if needed, reallocate funds for this purpose. In addition, while providing funds in the area of technology for student use and optimization of learning, it is important to focus on the training that both students and staff may need in this area. The provision of technology coaches and trainers will assist with the education of both students and teachers in this area; however, consistent monitoring of the coaches, trainers, students, and staff will also assist in ensuring that high quality teaching and learning is occurring. Again, additional staff, training, and equipment must be adequately budgeted for and continuously monitored for effectiveness. School administrators and school districts must understand, support, and advocate for the technological needs of students with severe communication deficits and ensure that efforts for funding in this complex area are sustainable.

Enhancing Knowledge and Awareness

AAC supports and services allow the voiceless to be provided with the opportunity to communicate their most basic wants, needs, and participate in their educational environment. However, it is unfortunate that AAC student users are often viewed by their teachers as incapable of learning to read and write and therefore provided with minimal opportunities to learn written language (Light & McNaughton, 1993). Despite a child's perceived language limitations, best practice recommendations are that all students are viewed as active communicators (Sonnenmeier et al,. 2005). While some students with severe learning difficulties may grow to lead independent successful vocational lives, others may be dependent on other people for various aspects of their daily functioning (Mittler & Farrell, 1987). Students with CCN receive the most benefit from educators and service providers who have an awareness and knowledge of AAC systems needed to effectively support their unique needs (McNaughton & Light, 2013). Therefore, on-going professional development activities should be mandatory to enhance all stakeholder's knowledge and awareness of students who receive special education services. Stakeholders must be sufficiently trained on service provision as well as how to ensure that others in the educational environment know how to interact with the AAC user. Again, it is important to note that the time needed for effective professional development trainings to promote awareness and knowledge of AAC supports and services for students with CCN may require the use of funding and should be planned for accordingly.

Development and Continued Support of Assistive Technology/AAC Team

In an effort to ensure the continued provision of AAC supports and services for students who use or could benefit from using communication aids, the researcher recommends that school districts develop and continually support the efforts of an assistive technology (AT)/AAC team. Specific consideration as to the members of team should be intentional and may include a school district level administrator, school psychologist, occupational and physical therapist, special education teacher, and depending on the size of the district and needs of students, multiple speech-language pathologists. SLPs on the team should receive on-going specialized training and can assist with

determining appropriate referrals for assessment, participate in IEP meetings as the assistive technology specialist, recommend low- and high-tech options of communication aides, provide technical assistance, and training. Of extreme importance is the ability for the school district to financially sustain this team and their efforts to enhance the communication skills of students. Lack of support from administrators, as well as lack of time to collaborate with key school personnel, impact the educational and support services that are provided to AAC users (Pufpaff, 2008; Soto et al., 2001). Furthermore, continued support of an AT/AAC team can positively affect a child's ability to develop communication skills, promoting their ability to develop into contributing members of society.

Summary of the Dissertation

The purpose of this research study was to understand the organizational factors that affect the provision and implementation of AAC for students with severe communication deficits. The perceptions of school administrators and SLPs were examined to determine their knowledge of AAC services and supports and the impact AAC has on students with CCN as it relates to their academics and social integration. Quantitative methodology was used to determine the ideologies of school administrators and SLPs as it relates to the benefits of, and access to, AAC supports and services for students with CCN. Organizational factors that affect the provision of AAC supports and services for students with CCN were also explored. Results of the analysis suggested that all respondents agreed that students with CCN benefit from AAC use in several areas including spoken communication, classroom behaviors, attention span, motivation, academic skills interest in classroom activities, and interactions with peers. Additional analysis revealed that there was a moderate relationship between the benefits of AAC student use and funding. The last major finding indicated that school administrators reported that students who use or could benefit from AAC had greater access to it when compared to the SLP group. There was an overarching theme of the need for funding for adequate provision and implementation of AAC supports and services. In order for a just and fair education for all students to occur, schools and districts must be willing to ensure that all students are provided with the supports and services needed for them to experience high quality teaching and

learning. Educational institutions must be willing to understand that the educational needs of students with disabilities, including those who require AAC supports and services to communicate, are a priority. These institutions must guarantee that adequate funding is allocated, spent, and monitored appropriately for this unique group of students.

APPENDIX A

PARTICIPATION REQUEST EMAIL

Hello Administrators and Speech Language Pathologists!

My name is [redacted] and I am Program Supervisor with the Office of Special Education, here at [redacted]. I am currently completing my doctoral degree in Educational Leadership and I need your assistance with completing a quick survey for my dissertation research.

The survey will take about 10 minutes or less to complete. You will shortly receive an email from "noreply@qemailserver.com" that contains a link to take the survey After clicking the link, you will be directed to an electronic consent form. Once indicating your consent, the survey will begin. Again, it will take about 10 minutes or less to complete and I am aiming for 100% participation.

Please let me know if you have any questions or concerns. Thank you in advance and have a great Winter Recess!

[redacted]

Program Supervisor - Special Education
[redacted] **Unified School District**
[redacted] Avenue
[redacted], California [redacted]
[redacted] Phone
[redacted] Fax

APPENDIX B

SURVEY TOOL

	Section 1
Q1	What is your current position? Principal Assistant Principal Speech-Language Pathologist Other (Please specify)
Q2	How many years have you been in your current position? _____ (Insert #)
Q3	What is your highest level of education? Bachelor's Degree Master's Degree Valid Credential Speech-Language Pathology State License Certificate of Clinical Competence (CCC) Doctorate Other (Please specify)
Q4	Do you have personal experience with an individual with a disability? Yes No If No, skip to Q5
Q4.5	Self Immediate family member Extended family member Friend Neighbor Other (Please specify)
Q5	Do you currently work, or have previously worked, at a campus that has a program for students with moderate/severe disabilities? Yes No
Q6	Augmentative and Alternative Communication, or AAC, can assist children and adults with speech and/or language deficits by facilitating communication and providing access to engage with others in their environment. Question: How would you rate your level of familiarity with AAC? Not at all familiar Slightly familiar Somewhat familiar Moderately familiar Extremely familiar

Q7	Does your school/district have an Augmentative and Alternative Communication (AAC) or Assistive Technology (AT) team or coordinator? Yes No Unsure
Q8	AAC may vary from low-tech to high-tech methods. --Low-tech forms of AAC may include pointing to picture symbols, letters, and /or words in a communication book or board. --High-tech forms of AAC may include touching picture symbols, letters, words, and/or phrases on an electronic device that produce voice output. Question: Have you ever interacted or worked with a student who used a low or high-tech form of AAC to communicate? Yes No If No skip to Q17
	Section 2
Q9	In your opinion, what are the changes you have seen in students as a result of using AAC in regard to their improved spoken communication? 1 – Most positive change 2 – Positive change 3 – No real change 4 – Slight deterioration 5 – Major deterioration 6 – Don't know
Q10	In your opinion, what are the changes you have seen in students as a result of using AAC in regard to their improved classroom behavior? 1 – Most positive change 2 – Positive change 3 – No real change 4 – Slight deterioration 5 – Major deterioration 6 – Don't know
Q11	In your opinion, what are the changes you have seen in students as a result of using AAC in regard to their 1 – Most positive change 2 – Positive change 3 – No real change 4 – Slight deterioration

	5 – Major deterioration 6 – Don't know
Q12	In your opinion, what are the changes you have seen in students as a result of using AAC in regard to their improved motivation? 1 – Most positive change 2 – Positive change 3 – No real change 4 – Slight deterioration 5 – Major deterioration 6 – Don't know
Q13	In your opinion, what are the changes you have seen in students as a result of using AAC in regard to their improved academic skills? 1 – Most positive change 2 – Positive change 3 – No real change 4 – Slight deterioration 5 – Major deterioration 6 – Don't know
Q14	In your opinion, what are the changes you have seen in students as a result of using AAC in regard to their interest in classroom activities? 1 – Most positive change 2 – Positive change 3 – No real change 4 – Slight deterioration 5 – Major deterioration 6 – Don't know
Q15	In your opinion, what are the changes you have seen in students as a result of using AAC in regard to their increased interaction with peers? 1 – Most positive change 2 – Positive change 3 – No real change 4 – Slight deterioration 5 – Major deterioration 6 – Don't know
Q16	Are there any other changes you have seen in students as a result of AAC use? If so, please specify. (Open-ended response)
	Section 3
Q17	In your opinion, how important is funding to successfully implement Augmentative and Alternative Communication (AAC)? 4 – Very important 3 – Somewhat important 2 – Not important 1 – Unsure

Q18	In your opinion, how important is technical assistance and support to successfully implement Augmentative and Alternative Communication (AAC)? 4 – Very important 3 – Somewhat important 2 – Not important 1 – Unsure
Q19	In your opinion, how important is administrative support to successfully implement Augmentative and Alternative Communication (AAC)? 4 – Very important 3 – Somewhat important 2 – Not important 1 – Unsure
Q20	In your opinion, how important is time to successfully implement Augmentative and Alternative Communication (AAC)? 4 – Very important 3 – Somewhat important 2 – Not important 1 – Unsure
Q21	In your opinion, how important is professional development opportunities to successfully implement Augmentative and Alternative Communication (AAC)? 4 – Very important 3 – Somewhat important 2 – Not important 1 – Unsure
Q22	In your opinion, how important is awareness and knowledge about Augmentative and Alternative Communication (AAC) to successfully implement AAC? 4 – Very important 3 – Somewhat important 2 – Not important 1 – Unsure
	Section 4
Q23	What is your view about the extent to which Augmentative and Alternative Communication (AAC) is used at your school/district? 1 – All children who need AAC have sufficient access to it 2 – Most children who need AAC have sufficient access to it 3 – Some children who need AAC have sufficient access to it 4 – Few children who need AAC have sufficient access to it 5 – Hardly any children who need AAC have sufficient access to it 6 – No children who need AAC have sufficient access to it

APPENDIX C

INFORMED CONSENT

You are invited to participate in a study (AAC Supports and Services for Students with CCN; HSR-19-20-1) being conducted by Tyree Curry, a CSU Fullerton doctoral student under the advisement of Dr. Melinda Pierson. The purpose of the study is to gain the perspectives of school administrators and speech-language pathologists as it relates to supports and services for students with disabilities.

PARTICIPATION
Taking part in the study will take about 10 minutes or less and can be completed on your computer, tablet, or smart device in a location of your choice. The survey will begin with demographic background questions (current position, level of education, etc.). Next you will answer questions regarding your familiarity with, and perceptions of, supports and services for students with disabilities. You may choose not to answer any question that makes you feel uncomfortable.

BENEFITS/RISKS
This study will benefit a variety of stakeholders including school administrators, teachers, service providers, instructional assistants, and students. Training all stakeholders, including students who do not present with difficulties with communication, about the benefits and proper implementation of AAC for students with complex communication needs will assist with a cultural shift of the educational environment, promoting inclusion and acceptance of those who have to rely on various forms of AAC supports and services to participate in conversations and interact with others in their environment.

CONFIDENTIALITY
The data for this study will be kept anonymous to the extent allowed by law. The researcher will keep all electronic files in a password protected computer via cloud storage that only the researcher can access. Survey data that is printed will be kept in a locked file cabinet at the researcher's residence. No published results will identify you, and your name will not be associated with the findings. In accordance with Federal guidelines, all data collected for this study will be kept for three years after the completion of the study.

CONTACT
If you have questions about this study or the information in this form, please contact Tyree Curry at tycurry@csu.fullerton.edu or 562-366-6780. If you have questions about your rights as a research participant or would like to report a concern or complaint about this study, please contact the Institutional Review Board at (657) 278-7719, or e-mail irb@fullerton.edu.

ELECTRONIC CONSENT
By completing the attached survey, you are agreeing to participate in this research study.

∆ Agree

∆ Disagree

REFERENCES

American Speech-Language-Hearing Association*. Augmentative and alternative communication (AAC)*. (n.d.). Retrieved July 22, 2020, from https://www.asha.org/public/speech/disorders/aac/

American Speech-Language-Hearing Association. *Speech-language pathologists: Job description and career Information*. (n.d.). Retrieved July 22, 2020, from https://www.asha.org/Students/Speech-Language-Pathologists/

Anderson, S. K., & Chiasson, K. (2012). Ecological factors in social skill acquisition: High school students with emotional and/or behavioral disorders. *The Journal of Special Education Apprenticeship*, *1*(1), 1–24.

Barker, R. M., Akaba, S., Brady, N. C., & Thiemann-Bourque, K. (2013). Support for AAC use in preschool, and growth in language skills, for young children with developmental disabilities. *AAC: Augmentative and Alternative Communication*, *29*(4), 334–346. https://doi.org/10.3109/07434618.2013.848933

Brady, N. C., Thiemann-Bourque, K., Fleming, K., & Matthews, K. (2013). Predicting language outcomes for children learning augmentative and alternative communication: Child and environmental factors. *Journal of Speech, Language, and Hearing Research*, *56*(5), 1595–1612. https://doi.org/10.1044/1092-4388(2013/12-0102)

Bronfenbrenner, U. (1975). Reality and research in the ecology of human development. *Proceedings of the American Philosphical Society*, *119*(6), 439–469.

Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychology*, 513–531.

Bronfenbrenner, U. (1986). Ecology of the family as a context for human development: Research perspectives. *Developmental Psychology*, *22*(6), 723–742.

Brophy-Arnott, M. B., Newell, A. F., Arnott, J. L., & Condie, D. (1992). A survey of the communication-impaired population in Tayside. *European Journal of Disorders of Communication*, *27*, 159–173.

Browder, D. M., Mims, P. J., Spooner, F., Ahlgrim-Delzell, L., & Lee, A. (2008). Teaching elementary students with multiple disabilities to participate in shared stories. *Research and Practice for Persons with Severe Disabilities*, *33*(1–2), 3–12. https://doi.org/10.2511/rpsd.33.1-2.3.

Bukowski, W. M., Laursen, B., & Rubin, K. H. (2018). *Handbook of peer interactions, relationships, and groups, Second Edition*. Guilford Publications. http://ebookcentral.proquest.com/lib/fullerton/detail.action?docID=5314668

CA Department of Education (n.d.). *College and career readiness anchor standards - Content standards*. Retrieved July 14, 2020, from https://www.cde.ca.gov/be/st/ss/elaanchorstandards.asp

CA Department of Education. (2020). *Special Education - CalEdFacts*. https://www.cde.ca.gov/sp/se/sr/cefspeced.asp

CA Department of Education. (2021). *California Department of Education Releases 2020–21 Statewide School Enrollment Data*. https://www.cde.ca.gov/nr/ne/yr21/yr21rel32.asp

Campbell, A., McNamara, O., & Gilroy, P. (2004). *Practitioner research and professional development in education*. SAGE Publications. http://ebookcentral.proquest.com/lib/fullerton/detail.action?docID=254812

Chabon, S. S., & Cohn, E. R. (2011). *The communication disorders casebook: Learning by example*. Pearson Education Inc.

Chazin, K. T., Barton, E. E., Ledford, J. R., & Pokorski, E. A. (2018). Implementation and intervention practices to facilitate communication skills for a child with complex communication needs. *Journal of Early Intervention*, *40*(2), 138–157. https://doi.org/10.1177/1053815118771397

Chung, Y. C., & Carter, E. W. (2013). Promoting peer interactions in inclusive classrooms for students who use speech-generating devices. *Research and Practice for Persons with Severe Disabilities*, *38*(2), 94–109. https://doi.org/10.2511/027494813807714492

Clarke, M. T., Newton, C., Griffiths, T., Price, K., Lysley, A., & Petrides, K. V. (2011). Factors associated with the participation of children with complex communication needs. *Research in Developmental Disabilities*, *32*, 774–780. https://doi.org/10.1016/j.ridd.2010.11.002

Cohen, J. (1988). *Statistical power analysis for the behavior sciences.* (2nd ed.). West Publishing Company.

Cohen, L., Manion, L., & Morrison, K. (2017). Research methods in education. In *Research Methods in Education*. https://doi.org/10.4324/9781315456539

Copeland, S. R., & Keefe, E. B. (2007). *Effective literacy instruction for students with moderate or severe disabilities.* P.H. Brookes Pub.

Creswell, J. W. (1994). *Research design: Qualitative & quantitative approaches.* SAGE Publications Inc.

Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches* (2nd ed.). SAGE Publications Inc.

Creswell, J. W. (2008). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research.* (3rd ed.). Pearson Education Inc.

Dewey, J. (1916). *Democracy and education.* Champaign, Ill.: Project Gutenberg.

Dukes, C., & Darling, S. M. (2017). Common core state standards and students with severe disabilities: An introduction to the special issue. *Research and Practice for Persons with Severe Disabilities*, *42*(3), 139–142.

Erickson, K. A., & Koppenhaver, D. A. (1995). Developing a literacy program for children with severe disabilities. *The Reading Teacher*, *48*(8), 677–684.

Erozkan, A. (2013). The effect of communication skills and interpersonal problem solving skills on social self-efficacy. *Educational Sciences: Theory & Practice*, *13*(2), 739–745. www.edam.com.tr/estp

Flannery, K. B., & Hellemn, L. A. (2015). Building strategically aligned individualized education programs for transition. *Journal of Special Education*, *49*(2), 67–76. https://doi.org/10.1177/0022466914521771

Gartin, B. C., & Murdick, N. L. (2005). IDEA 2004: The IEP. *Remedial and Special Education*, *26*(6), 327–331.

Gauvain, M., & Cole, M. (1997). Ecological models of human development. In M. Gauvain & M. Cole (Eds.), *Readings on the development of children.* (2nd ed., pp. 37–41). W. H. Freeman and Company.

George, D., & Mallery, P. (2018). *IBM SPSS statistics 25 step by step.* https://doi.org/10.4324/9781351033909

Glover, D., & Law, S. (1996). *Managing professional development in education.* (2nd ed.). Taylor & Francis Group. http://ebookcentral.proquest.com/lib/fullerton/detail.action?docID=241973

Godwin, A. S., & O'Neal, K. K. (2015). Child social development in context: An examination of some propositions in Bronfenbrenner's bioecological theory. *SAGE Open*, *5*(2), 1–14. https://doi.org/10.1177/2158244015590840

Grether, S. M., & Sickman, L. S. (2008). AAC and RTI: Building classroom-based strategies for every child in the classroom. *Seminars in Speech and Language*, *29*(2), 155–163. https://doi.org/10.1055/s-2008-1079129

Gustafson, G. S. (2006). *The assistive technology skills, knowledge, and professional development needs of special educators in southwestern Virginia*.

Gutek, G. L. (2014). *Philosopical, ideological, and theoretical perspectives on education* (2nd ed.). Pearson.

Hartmann, E. S. (2016). Understanding the everyday practice of individualized education program team members. *Journal of Educational and Psychological Consultation*, *26*(1), 1–24. https://doi.org/10.1080/10474412.2015.1042975

Hetzroni, O. E. (2004). AAC and literacy. In *Disability and Rehabilitation* (Vol. 26, Issues 21–22, pp. 1305–1312). https://doi.org/10.1080/09638280412331280334

Hodge, S. (2007). Why is the potential of augmentative and alternative communication not being realized? Exploring the experiences of people who use communication aids. *Disability and Society*, *22*(5), 457–471. https://doi.org/10.1080/09687590701427552

Intellectus statistics. (2021). *Intellectus Statistics*. https://analyze.intellectusstatistics.com/

Kalambouka, A. (1999). *The use of augmentative and alternative communication systems in schools for children with severe learning difficulties*.

Kauffman, J. M., Hallahan, D. P., Pullen, P. C., & Badar, J. (2018). *Special education : What it is and why we need it*. Taylor & Francis Group. http://ebookcentral.proquest.com/lib/fullerton/detail.action?docID=5405473

Klang, N., Rowland, C., Fried-Oken, M., Steiner, S., & Adolfsson, M. (2016). The content of goals in individual educational programs for students with complex communication needs. *Augmentative and Alternative Communication*, *32*(1), 41–48. https://doi.org/10.3109/07434618.2015.1134654

Kliewer, C., & Landis, D. (n.d.). Individualizing literacy instruction for young children with moderate to severe disabilities. In *Exceptional Children* (Vol. 66, Issue 1).

Levene, H. (1960). *Robust tests for equality of variances*. Stanford University Press.

Light, J. C., & McNaughton, D. (1993). Literacy and augmentative and alternative communication: The expectations and priorities of parents and teachers. *Topics in Language Disorders*, *13*(2), 33–46.

Light, J., & Drager, K. (2002). Improving the design of augmentative and alternative communication technologies for young children. *Assistive Technology*, *14*, 17–32.

Light, J., & Drager, K. (2007). AAC technologies for young children with complex communication needs: State of the science and future research directions. *AAC: Augmentative and Alternative Communication*, *23*(3), 204–216. https://doi.org/10.1080/07434610701553635

Lloyd, Lyle L., Fuller, Donald R., Arvidson, H. H. (1997). *Augmentative and alternative communication: A handbook of principles and practices.* Allyn and Bacon.

Lombardi, A. R., Kern, L., Flannery, K. B., & Doren, B. (2017). Is college and career readiness adequately addressed in annual and postsecondary goals? *Journal of Disability Policy Studies*, *28*(3), 150–161. https://doi.org/10.1177/1044207317716147

Mclaughlin, J. A. (2019). *Other quantitative approaches: Causal and survey research.* In, Research and evaluation methods in special education. 69–93.

McNaughton, D., & Light, J. (2013). The iPad and mobile technology revolution: benefits and challenges for individuals who require augmentative and alternative communication. *Augmentative and Alternative Communication*, 29(2), 107–116. https://doi.org/10.3109/07434618.2013.784930

Mittler, P., & Farrell, P. (1987). Can children with severe learning difficulties be educated in ordinary schools? *European Journal of Special Needs Education*, *2*(4), 221–236.

Morningstar, M. E., Lombardi, A., Fowler, C. H., & Test, D. W. (2017). A college and career readiness framework for secondary students with disabilities. *Career Development and Transition for Exceptional Individuals*, *40*(2), 79–91. https://doi.org/10.1177/2165143415589926

Morningstar, M. E., Zagona, A. L., Uyanik, H., Xie, J., & Mahal, S. (2017). Implementing college and career readiness: Critical dimensions for youth with severe disabilities. *Research and Practice for Persons with Severe Disabilities*, *42*(3), 187–204.

Na, J. Y., Wilkinson, K., Karny, M., Blackstone, S., & Stifter, C. (2016). A synthesis of relevant literature on the development of emotional competence: Implications for design of augmentative and alternative communication systems. *American Journal of Speech-Language Pathology*, *25*(3), 441–452. https://doi.org/10.1044/2016_AJSLP-14-0124

Prince, A. M. T., Katsiyannis, A., & Farmer, J. (2013). Postsecondary transition under IDEA 2004: A legal update. *Intervention in School and Clinic*, *48*(5), 286–293. https://doi.org/10.1177/1053451212472233

Pufpaff, L. A. (2008). Barriors to participation in kindergarten literacy instruction for a student with augmentative and alternative communication needs. *Psychology in the Schools*, *45*(7). https://doi.org/10.1002/pits.20311

Ratcliff, A., Koul, R., & Lloyd, L. L. (2008). Preparation in augmentative and alternative communication: An update for speech-language pathology training. *American Journal of Speech-Language Pathology*, *17*(1), 48–59. www.asha.org/gradguide

Romski, M. A., & Sevcik, R. A. (2005). Augmentative communication and early intervention myths and realities. In *Infants and Young Children*. https://doi.org/10.1097/00001163-200507000-00002

Rowland, C. M., Quinn, E. D., & Steiner, S. A. M. (2015). Beyond legal. *Communication Disorders Quarterly*, *37*(1), 53–62. https://doi.org/10.1177/1525740114551632

Ryndak, D. L., Morrison, A. P., & Sommerstein, L. (1999). Literacy before and after inclusion in general education settings: A case study. *The Association for Persons with Severe Handicaps*, *24*(1), 5–22.

Schaefer, J. M., Cannella-Malone, H., & Brock, M. E. (2018). Promoting social connections across environments for students with severe disabilities. *Career Development and Transition for Exceptional Individuals*, *41*(3), 190–195. https://doi.org/10.1177/2165143417737073

Severini, K., Ledford, J., Barton, E., & Osborne, K. (2018). Implementing stay-play-talk with children who use AAC. *Topics in Early Childhood Special Education*, *38*(4), 220–233. https://doi.org/10.1177/0271121418776091

Solomon-Rice, P. L., & Soto, G. (2014). Facilitating vocabulary in toddlers using AAC: A preliminary study comparing focused stimulation and augmented input. *Communication Disorders Quarterly*, *35*(4), 204–215. https://doi.org/10.1177/1525740114522856

Sonnenmeier, R. M., Mcsheehan, M., & Jorgensen, C. M. (2005). A case study of team supports for a student with autism's communication and engagement within the general education curriculum: Preliminary report of the beyond access model. *Augmentative and Alternative Communication*, *21*(2), 101–115. https://doi.org/10.1080/07434610500103608

Soto, G., Müller, E., Hunt, P., & Goetz, L. (2001). Critical issues in the inclusion of students who use augmentative and alternative communication: An educational team perspective. *Augmentative and Alternative Communication*, *17*(2), 62–72. https://doi.org/10.1080/aac.17.2.62.72

Sturm, J. M., Spadorcia, S. A., Cunningham, J. W., Cali, K. S., Staples, A., Erickson, K., Yoder, D. E., & Koppenhaver, D. A. (2006). What happens to reading between first and third grade? Implications for students who use AAC. *Augmentative and Alternative Communication*, *22*(1), 21–36. https://doi.org/10.1080/07434610500243826

Therrien, M. C. S., & Light, J. (2016). Using the iPad to facilitate interaction between preschool children who use AAC and their peers. *Augmentative and Alternative Communication*, *32*(3), 163–174. https://doi.org/10.1080/07434618.2016.1205133

Thorius, K. A. K., & Maxcy, B. D. (2015). Critical practice analysis of special education policy: An RTI example. *Remedial and Special Education*, *36*(2), 116–124. https://doi.org/10.1177/0741932514550812

Williams, M. B., Krezman, C., & McNaughton, D. (2008). "Reach for the stars": Five principles for the next 25 years of AAC. *Augmentative and Alternative Communication*, *24*(3), 194–206. https://doi.org/10.1080/08990220802387851

Zangari, B. C. (2019). *PrAACtical questions : Can students take their AAC devices home ?* 1–2. https://praacticalaac.org/praactical/praactical-questions-can-students-take-their-aac-devices-home/

Zhang, Y. L. (2018). Using Bronfenbrenner's ecological approach to understand academic advising with international community college students. *Journal of International Students*, *8*(4), 1764–1782. https://doi.org/10.5281/zenodo.1468084

Zirkel, P. A. (2013). Is it time for elevating the standard for FAPE under IDEA? *Exceptional Children*, *79*(4), 497–508. https://doi.org/10.1177/001440291307900407