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# AAC Device Use in School-Aged Special Education Students

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AAC DEVICE USE IN SCHOOL-AGED SPECIAL EDUCATION STUDENTS

IN PUBLIC SCHOOLS

A Thesis

by

VANESSA MEDINA

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The University of Texas Rio Grande Valley
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AAC DEVICE USE IN SCHOOL-AGED SPECIAL EDUCATION STUDENTS

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May 2019

# ABSTRACT

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This investigation analyzes how often AAC users typically utilize their devices throughout their day in their school setting. A survey method was implemented where elementary school educators were asked to report on their special education student's use of their device during their day. To identify special education educators' perceptions regarding the use of AAC devices in the public-school system, special education educators in the public-school system were contacted via email to conduct a survey in regard to current practice in their school setting regarding AAC.

A letter of consent was obtained from the University of Texas Rio Grande Valley (UTRGV) Communication and Sciences Disorders program to access email from special education educators. A majority of participants indicated that they felt moderately competent in supporting learners who use communication devices (47.83% n=11), followed by 26.09% (n=6) of participants who said they feel slightly competent in supporting learners who use communication devices.

DEDICATION

First and foremost, I would like to thank my savior and Lord Jesus Christ for His grace and help on this journey. The completion of my master studies would not have been possible without the love, motivation, and support from my beautiful family. My husband, Alonzo Medina, my mother, Janie Molina, my father, Juan Molina, and my lovely children, Emma, Noah, and Nathan who encouraged and cheered me on every step of the way. This would not be possible without you!

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I would also like to thank my colleagues who helped me formulate my research. I would also like to acknowledge the participants who took part in this research.

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CHAPTER I

INTRODUCTION

What makes us human? The answer to this question is far more complicated than we can imagine. Some scholars believe that it is the inner soul of mankind that makes us human, while others believe it is our ability to love and show expression. One thing we know for certain is that mankind has developed an inherent system of language and speech that makes us superior to any other species. Animals such as monkeys, whales, and apes communicate with each other, but they do it as a primitive response. Communication in its own right is what separates the human species from animals. Humans have developed a language far more sophisticated than any animal could possible produce because it comes from a cortical speech center that does not respond instinctively but organizes sound and meaning on a rational basis. At the center of this communication spectrum is language.  It is the ability to speak and communicate that enables the human species to interact with people and the environment on a complex level.  However, what happens when the instinctive ability to communicate is deficient or absent? Currently, there are many individuals who depend on augmentative and alternative communication (AAC) systems to restore the reduced or lost ability to communicate.

AAC systems have enabled individuals to increase in functional communication skills for over 40 years and have improved the lives of people with severe speech and/or language problems who are faced with many communication challenges. According to the American Speech-Language-Hearing Association website (ASHA.org), AAC devices help supplement existing speech or replace speech that is not functional. Also, ASHA states that special augmentative aids such as picture and symbol communication boards and electronic devices are available to help people express themselves.

## Definition of AAC

Augmentative communication refers to modes of communication that are an augment (supplement) to an individual's limited speech skills. On the other hand, alternative communication refers to modes of communication that are a replacement for the absence of speech skills. Augmentative and alternative communication (AAC) is a discipline in which systems of communication are designed to either augment or replace natural speech. AAC may be unaided (e.g., manual sign language and gestures) or aided. Aided AAC includes devices and external equipment such as communication boards with drawings, symbols, cards with picture or words that are exchanged, and computerized devices with or without verbal output (Light & McNaughton 1998). Aided AAC devices include low-tech and high-tech devices.

Examples of low-tech include single pictures or icons on cards or printed arrays of drawings, whereas high-tech includes devices with one or more cells to select pictures and generate speech, computerized devices dedicated for communication purposes, and tablet, and smart phone communication applications (apps).

Candidates for AAC include individuals with sensory impairments, motor impairments, acquired disabilities, progressive neurological disorders, and temporary conditions. Sensory impairments include severe/profound hearing impairment and dual sensory impairment (i.e. deaf/blind). Motor impairments include cerebral palsy, developmental apraxia, and aphasia. Acquired disabilities include closed head injury, cerebrovascular accident (CVA or stroke), spinal cord injury, laryngectomy, and asphyxia. Progressive neurological disorders include amyotrophic lateral sclerosis, multiple sclerosis, muscular dystrophy, Parkinson's disease, Huntington's chorea. Temporary conditions include shock, trauma, surgery, Guillain-Barre syndrome, and Reyes syndrome.

There are different types of AAC systems which include unaided and aided components. Unaided communication systems rely on the individual's gestures, body language and/or sign language to deliver messages. Aided communication systems require the use of tools or special equipment as well as the individual's body. Examples of aided communication range from paper and pencil to communication boards to devices that produce voice and written output. Some devices can be programmed to produce different spoken languages (Ganz, 2015).

Mode of communication, also known as communication mode or modality, is the avenue by which communication takes place and includes oral, manual, visual, and tactile. The oral mode includes speech and other vocalizations, the manual mode consists of motor movement (e.g., gestures), the visual mode requires vision (e.g., graphic symbols), and the tactile mode requires touching and feeling. With regard to the types of symbols used in aided AAC, AAC displays must take into account the age, functioning, preferences, communication needs, and their communicative partners. Unlike traditional static displays, computerized apps and programs allow users to re-organize and add vocabulary.

Icons can be displayed in static grid arrays in a form called visual scene displays (VSDs). Unlike grid-style AAC displays, VSDs contain language concepts imbedded within photos or drawings. VSDs are programmed to say words or make sounds when tapped or selected. For example, if a child is presented with a picture of a car and clicks on the car, the sound of a revving engine will sound when the image is selected.

**History of AAC**

AAC emerged in the 1950s and 1960s as an avenue of communication for individuals who had not developed the more traditional communication skill of speech. For many years, the focus of speech therapy was on articulation and language to the exclusion of other clinical areas.

Although the profession of speech-language pathology has been around for about 100 years, there were myths surrounding the use of AAC. One myth was that the use of signs would be a detriment to the development of speech and language. Many professionals believed that individuals who relied on external modes of communication would be further delayed in their language progression (Lloyd, Fuller, & Arvidson, 1997).

The emergence of AAC lacked momentum at first; however, the passage of the Education for All Handicapped Children Act (P.L. 94-142) in 1975 was a huge milestone in the provision of special education services to all school-aged students with disabilities. It required that schools provide free appropriated public education in the least restrictive environment. Although this law did not specifically address AAC, legislation facilitated the provision of AAC services. From 1981-1990, there was a greater awareness of the power of assistive technology which included augmentative communication technology.  The Education of the Handicapped Act Amendments of 1986 (P.L. 99-457) provided technological services for school-aged children with disabilities. More specifically, Part G of this legislation required public school districts to promote the use of technology with students who had disabilities. Consequently, the Technology-Related Assistance for Individuals with Disabilities Act (P.L.100-407), passed in 1989, required states to make every reasonable attempt to provide assistive technology to citizens with disabilities regardless of age, disability, or location of residence.  These important pieces of legislation expanded access to assistive technologies including AAC.

Moreover, in the speech-language pathology profession, it is important for proper research to be conducted in order to provide for the best quality of care for the individual. As stated by Iacono (2009), speech-language pathologists working in early childhood intervention are expected to have knowledge and skills across an array of areas. In order to deliver quality therapy to individuals who need AAC services, SLPs should explore all possible concepts of best practice and professional expectations. Consequently, it is important to note that with all the current technological advancement in the realm of communication technology, the terminology of low-tech and high-tech is about to be replaced with a new way of classifying communication technology (Fuller, Pampoulou, & Lloyd, est.2020). A new taxonomy for classifying communication is included at the end of this study (Fuller, et al., est.2020).

## Procedures

The purpose of this research project was to document special education educators' perceptions regarding the use of AAC devices in the public-school system. A survey method was implemented where special education educators in public-schools were asked to report on their students' use of their device during their school day. The researcher analyzed surveys from anonymous participants. The research questions that were utilized in the analysis of these findings were, "Which portion of the class is the AAC user utilizing their AAC the most? Are special education educators aware of the operation of their student's AAC device? What impact did the usage or lack of usage of their AAC device have on the student?" The researchers recruited the participation of pubic-school educators from the Rio Grande Valley, Texas and New Mexico. Findings were analyzed via measures of central tendency including but not limited to mean, median, mode, and standard deviations.

## Hypothesis

It is hypothesized that public-school educators will have limited knowledge of the operation of their student's AAC device and therefore, students equipped with an AAC device will not carryover their device throughout their school day due to a lack of competency and support.

## Methodology

To identify special educators' perceptions regarding the use of AAC devices in public schools, special education teachers were contacted via email to participate in a survey in regard to current practices in their school setting regarding AAC use. Upon approval, participants were recruited via email invitation utilizing an email recruitment script. Inclusion for participation required that the participant be a special education educator in public schools.

A total of 441 electronic surveys were distributed to special educators from across the Rio Grande Valley of Texas, Houston, and New Mexico. There were 28 surveys returned for a return rate of 6.35%, however only 23 were completed by the participants resulting in a response rate of 5.22% Participants included male and female adult special education teachers.

## Development of Survey

The survey was created through review of research articles. One specific article included a survey that resembled what the researcher wanted to include in the survey.

In an article by Hetzroni, (2002), the author chose to describe the current status of augmentative and alternative communication in Israel who are current or potential users of AAC devices. The author sent a survey to families and included the survey in the appendix. Survey components were drawn from this source to form a balanced survey tool regarding the use of AAC devices in a school setting.  Additionally, questions specific to the investigation's research questions were added.

The survey's focus was perception-based and asked the participants questions regarding their current use of AAC within their caseload.  Prior to the start of the survey, each participant was provided with a consent form indicating their willingness to complete the survey.  If the participant agreed to participate, they proceeded to the survey questions. If the participant declined to participate in the survey, the survey was ended.

The survey consisted of 34 questions categorized into the following sections: general identifying information; participant's knowledge/awareness/implementation of the AAC system, and user competency. Questions pertaining to general identifying information include the child's age; child's gender; child's grade level;  type of classroom; child's diagnosis; child's race; child's ethnicity; participant's age; participant's gender; state participant is employed in; number of years participant has been teaching learners with special education needs; type of class;

number of students in the class; number of learners in the class with little or no functional speech; number of learners who have access to or use an AAC device; participant's highest formal qualifications; and name of communication device learner has access to. In addition, participants were asked to rate how useful the devices were in the class, and rate the extent individuals (speech therapist, occupational therapist, teaching assistant, parent and other) supported the implementation of communication devices. Participants were also asked whether the student:

- takes their communication system home

- the number of children using an i-Pad

- the number of children using a laptop

- what they perceived to be part of their role in supporting learners using communication devices

- how competent they felt in supporting learners with communication devices

- the challenges in supporting learners who use communication devices

- what informal or formal training regarding communication devices they had received

- what areas they felt required further training

- the types of communication task(s) the learner is using their device for

The final portion of the survey consisted of an optional comment section regarding the survey and a reminder that all comments would be kept confidential.  Participants answered a variety of survey questions using multiple choice and open-ended responses. The data obtained were analyzed via quantitative analysis via Qualtrics and Microsoft Excel. Data were reported anonymously via descriptive statistics. The frequency of the participant's responses and measures of central tendencies were analyzed.

CHAPTER II

LITERATURE REVIEW

Throughout the extensive literature search, there were several themes commonly identified in various research articles and those were communication needs, generalization of skills, interagency support, AAC intervention, and limitations and directions for future research. For the purpose of this review, attention will be focused around these common themes to provide the reader with an overview of what current literature and research says concerning topics in user competency, educator awareness, and history of AAC. Similarly, the reader will be provided with a new perspective pertaining to what the current literature has held thus far concerning children who use/need AAC systems.

**Communication Needs**

AAC users are individuals with different levels of communication needs. One population with complex communication needs are individuals with autism. It is estimated that about 1 in 68 children have an autism spectrum disorder (ASD). According to Lund and Light (2006), "the purpose of AAC is to improve the communicative competence of people who have complex communication needs.", (p.7). Socially, AAC is considered an acceptable avenue for individuals with ASD who have complex communication needs because it enhances communication and interaction, thus lessening challenging behaviors.

Additionally, children with ASD are characterized as having marked difficulty with abstract thinking which means these individuals operate using a concrete level of cognition.

With regards to AAC, aided devices (high or low tech) provide visually based concrete representations of abstract concepts. Low-tech aided devices have been widely used with individuals with communication needs for many years. With low-tech aided devices, the person with complex communication needs points to pictures, letters, words, or exchanges icons, or picture cards with someone to request or convey information. A major advantage of low-tech aided systems are their portability, ease of creation of new materials, low expense, low probability of loss or damage, and a ease of interpretation by the majority of the public. A widely used low-tech system is the Picture Exchange Communication System (PECS). PECS was developed for individuals with autism spectrum disorder and has been used with people of different developmental disabilities. This single system carries a distinct method for operation and use. The individual hands a picture or pictures to a communication partner to make a request, comment, answer a question or engage in conversation.

In addition to low-tech aided devices, high-tech aided devices are becoming more portable and less expensive. Also, these types of devices are becoming more commonly used via tablet and smartphone apps as speech-generating devices (SGD). SGDs have been utilized for several decades. This type of output provides a means of gaining the attention of the listener because the user is more easily understood. With the advent of digital technology increasing and becoming more powerful and smaller in size, users benefit from better and more efficient communication.

In a study by Oommen (2015), children with childhood apraxia of speech were yet another population with communication needs that benefited from an AAC device. According to

the authors, "understanding the different levels of the complex system in which a child is situated is an important consideration in achieving successful interventions with individuals with children with complex communication needs", (p.12). Although children with childhood apraxia of speech differ widely in their severity level of communication, it is the clinician's role to choose the best combination of strategies for their clients. The choice of strategy will largely depend on the communication needs of their client.

In a separate study by Waddington, van der Meer, Carnett, & Sigafoos (2017), the authors conducted a study to determine whether an 8-year-old boy with ASD could learn to approach communication partners to request items using an iPad-based with an SGD app. Results indicated that the participant learned to use the iPad to request in all communicative settings. This information suggests that although individuals with ASD commonly display difficulty generalizing newly acquired skills, children with ASD can be systematically taught to use an SGD across different settings and communication partners. Consequently, in order for carryover to truly be successful, SGD intervention should maximize the user's daily communication needs.  Properly teaching SGD use to communication partners with whom the child interacts is just as equally important as teaching the child with ASD. According to Iacono, & Cameron (2009) AAC that best meets the needs and preferences of individuals with communication needs depends heavily on ready access, a range of options during an assessment process, and skilled AAC support.

There is evidence to support the fact that both low and high tech AAC serve to meet different types of communication requirements, thus allowing the user to choose AAC according to both needs and preferences, Iacono (2009). Iacono concluded that within the AAC field, a multimodal communication service delivery is paramount in meeting the needs of people with

complex communication needs. Considerable variations in communication needs exist within different types of disorders. Levels of severity differ between these groups and it is the patient's right to receive the best treatment to get that individual back to being functional. It is the SLP's role to examine and investigate the best treatment to provide the patient with specialized therapy to target their communication needs because no two patients are alike.

## Generalization of Skills

Generalization of skills is perhaps the most fundamental factor in determining whether a patient has grasped the necessary components taught in therapy. The speech-language pathologist wants to ensure that the skills taught in therapy have generalized outside of the structured therapy room and over to naturalistic contexts such as school and home.  Not only is generalization important across settings, but it is also important with various communication partners. Consequently, researchers examine whether generalization takes place after treatment. In a study by Binger, Walsh-Kent, King, & Mansfield (2017) the authors investigated the early rule-based sentence productions of 3 to 4-year old children with severe speech disorders.  Video probes of the target structures using novel vocabulary were completed in the generalization phase.

One set of generalization probes was completed for each child and targeted toward the end of the baseline phase, and one set was completed following mastery of each target. In a study by Oommen and McCarthy (2015), the authors included the different strategies for generalization used in their study. Those strategies included providing homework to share with the school team, maintaining a smart chart and notebook with current vocabulary and developing a card ring. These strategies were useful in helping the patient maintain the skills they learned in

therapy and carryover those skills across communicative settings. Waddington, et al. (2016) discussed generalization in teaching a child with ASD to approach communication partners across different settings. In the study by Waddington, et al. (2016), the authors mentioned that "when an individual is taught a behavior across more than one setting and communication partner, the likelihood of generalization to new settings and communication partners increases" (p.237).This observation is quite significant given the fact that much of the literature on AAC includes generalization in their study. When should generalization be targeted in order for it to be effective and beneficial to the client? According to Ganz (2014), generalization of skills across settings is targeted early in the process rather than by providing intensive instruction in unnatural circumstances. The sooner skills can be generalized the better the prognosis of that patient to demonstrate functional and natural communication.

How can clinicians ensure that generalization occurs? Simply put, Ganz (2016) mentioned that instruction should be planned for in all possible settings while targeting multiple social contexts for intervention.This means that communicative partners deliberately plan for and set up communication opportunities that involve routines and materials the individual engages in day to day functions without prompting. Generalization, as mentioned in this study, is defined as the learning of new skills in one context performed in other contexts and settings. When working with special populations such as individuals with ASD, generalization may be difficult to ascertain because they focus on single or few aspects of stimuli. Individuals with ASD may not understand that they can perform the same skills with other people in different settings. In a case study by Dyches, Davis, Lucido, & Young (2002), the authors focused on skill generalization following instruction of an adolescent girl with multiple disabilities using two AAC systems: a

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simple pictographic display and a SGD. Results indicated that the participant was able to use both AAC systems in the community independently.

   Remarkably, the authors of this study measured the percentage of communication member responses to the participant's requests. The study concluded that most, 75% of community members responded to the participant's requests in a timely manner. Additionally, 63% of requests were understood after one attempt and the remaining attempts were understood after a single repetition.  Consequently, in the same study, the authors mentioned that individuals with multiple disabilities still find it difficult for their voices to be heard. Because of the severity of their disabilities, their limitations to AAC systems are remarkable.

   Moreover, one goal of AAC is successful use of communication systems in the community as well as in the classroom. According to Dyches et al. (2002), in order for AAC instruction to be truly effective skills must generalize from instructional, recreational, home and other natural environments.

### Interagency Support

   As proposed by Thistle and Wilkinson (2015), the goal of AAC intervention for a child is to provide support for participation and language development across all environments, facilitating early communication, advancing linguistic growth and functional communication, and providing early literacy experiences.  Within Australia, early intervention services are available to infants and young children with developmental delays.  According to Iacono and Cameron (2009), one aspect of clinical skill is the extent to which professional practices are based on research evidence.

Moreover, the ability to implement such practices is, in turn, dependent on both the quality of service and the clinician's familiarity with the underlying evidence base. Furthermore, according to the ASHA website, specialist knowledge and skills are required and include understanding of developmental disabilities, family-centered approaches, different service delivery models and teams, augmentative and alternative communication, evidence-based interventions and the ability to conduct evidence-based reviews.

As stated by Calculator and Black (2009), even though the responsibility for implementing an AAC program is shared by many, the coordination often resides with the SLP. Additionally, SLPs are encouraged to operate in consultative and collaborative models of service delivery and to provide services that are family-centered, culturally appropriate, and comprehensive. They are also encouraged to be, compassionate and to produce meaningful life outcomes through their services (Calculator & Black, 2009). It is also important for the SLP to educate teachers and provide them with the support they need for using AAC devices. By sharing strategies, teachers can address specific communication objectives in their classrooms. Ganz (2015) writes on the topic of AAC interventions for individuals with autism spectrum disorders and cites that in the U.S. approximately 1 in 68 children has a diagnosis of autism spectrum disorder.  People with autism have difficulty using and comprehending nonverbal communication and therefore require intensive services and supports throughout their life especially if communication is not addressed prior to school completion.

Those with autism have complex communication needs and therefore benefit greatly from using AAC systems and it is imperative that this population amongst others receives a great amount of support. Alant, Champion, & Peabody (2012) explored interagency collaboration in AAC intervention. According to the authors, the amount and type of support for implementation are the key to successful AAC intervention. Waddington et al. (2004) described interagency collaboration as more than one agency working together in a planned and formal way. These collaborations are vital in developing forms of support over extended periods.

Likewise, collaborations across a range of disciplines is key to successful implementation of AAC especially since there are varied levels of expertise across disciplines. For example, SLPs have reported that they have little knowledge or skills to provide writing and reading instruction to individuals who utilize AAC. This is why it is so important for educators and SLPs to work together to address these issues. Yet, the problem is overlooked and the need to consider collaboration between educators, service providers, professionals, and family members is great. A team approach is the most effective avenue to meet the needs of individuals with ASD who use AAC. Collaboration involves successfully working in teams, attending professional development, and engaging in self-teaching activities. Additionally, collaboration involves effective communication among the team and working toward common goals for the individual while respecting input and determining roles and responsibilities from those on the interdisciplinary team.

These tasks are key to successful interdisciplinary teamwork. With that said, each team member should also have knowledge or resources, training in how to promote participation, and knowledge to support these students to maximize their participation. However, generalization to community settings such as shopping malls, department stores, and restaurants is limited. For the purpose of the study conducted by Dyches et al. (2002) the participant visited 14 specialty stores and two fast-food restaurants during a 3-week period.

## AAC Intervention

The role of the family in childhood intervention is vital to the child's rehabilitation and habilitation.  Though the term family-centered practice is not widely used, Iacono and Cameron (2009) mentioned in their study one participant noted her employer actively promote family-centered practice.  One of the participants stated that family-centered practice is looking at what the family needs and that parents are the key targets of intervention so that they can teach or support their children within daily activities.  Starble, Hutchins, Farvo and Prelock (2005) described a family-centered and collaborative intervention approach to developing and implementing AAC device training. As noted by Starble et al. (2005) relatively few studies have examined family-centered intervention and children who use AAC systems.  However, according to their research, the theoretical background and practical applications of family-centered services can improve global family satisfaction and relationships with professionals.

In order for this to happen, the SLP must shift from client-centered to family-centered intervention, from professional to family-driven decision making and from focusing on problems to developing client and family strengths. More importantly, Starble et al. mentions that applying a family-centered practice is helpful in addressing the limited transfer of skills from therapy to daily life.

Family-centered practice provides parents with the opportunity to be involved in all planning related to communication goals for their child and treatment should be aimed to fit within the family's daily routine. Through key concepts that include respect, support, choice, flexibility, collaboration, information, and identification of family strengths, a continuum of parental involvement allows parents to be an agent of change by taking responsibility for designing intervention strategies and techniques.

In addition, Calculator and Black (2009) stated that effective AAC programs acknowledge the importance of family involvement in all aspects of decision making, including discussions about how AAC skills targeted at school may be generalized to daily activities at home, when it is appropriate.  It is important to note that this includes providing direct coaching to parents and siblings because families should have many opportunities to provide input regarding their children's greatest communication needs as well as their own highest priorities. With regard to AAC devices, parents' voices should be heard when selecting AAC methods, goals and objectives that are sensitive to family values and beliefs.

According to Thistle and Wilkinson (2015), practicing a family-centered approach may reduce device abandonment through the provision of supports that result in a good fit between the AAC device and family members. Effective intervention maximizes expressive language potential as in the study by Binger et.al. (2017). When children are provided with viable communication modes, individuals who require AAC readily can be taught with minimal instruction.

## Limitations and Directions for Future Research

As with all types of technological modalities, there are always varying limitations within their performance abilities and use. As technology improves, older models of AAC technology become obsolete and the need to expand the system's potential becomes a driving force in advancement and production. Additionally, flaws in a study's design can also contribute to limitations within the construct of the study that give rise to the need for additional research and support. Binger et al. (2017) conducted a study that investigated the early rule-based sentence productions of 3 to 4-year-old children with severe speech disorders who used single meaning graphic symbols to communicate. Two 3-year-olds and eight 4-year-olds were included in this single-case experimental design. Results of this study indicated that in preschoolers who presented with intact receptive language, children were able to easily learn a range of rule-based sentences using graphic symbols. However, a significant limitation of this study was that experimental control was not maintained.

The authors stated that additional work was required to "further refine which children are ready to produce chosen targets" (2017, p.13). Furthermore, systematic investigation of children of different profiles are needed as well as a greater number of participants that have cognitive and linguistic deficits. Consequently, considering limitations there is more research that needs to be conducted in order to reach a wide variety of the population of AAC users. Oommen and McCarthy (2015) identified clinical decision-making strategies adopted by speech language pathologists during intervention.

For the purpose of this study, the authors chose to investigate children with childhood apraxia of speech (CAS) with different levels of speech intelligibility. It is not uncommon for children with CAS to adopt augmentative and alternative communication strategies because they are quite beneficial and commonly used with this population. As in the previous case, there were limitations in this study that the authors mentioned.

Given the fact that the study utilized an online focus group methodology, limitations occurred in the fact that the frequency of follow-up posts among participants was quite limited. Consequently, another limitation from this study is the fact that it did not include ample information relating to the children's diagnose. Additionally, the study also failed to include information on where participants learned about dual paradigm strategies.

The question raised is, where do we go from here? How can researchers in the field of AAC continue to provide research without design limitations? Oommen and McCarthy (2015) mentioned that adopting an online focus group methodology that focuses on the dual paradigm

approach in children with different communication disorders would provide a wealth of information and would function as an effective platform for experienced clinicians to exchange ideas, which would serve as an important resource for new clinicians. In yet a separate study by Waddington et al. (2016) the authors used a multiple baseline across settings design to determine whether an 8-year-old boy with autism spectrum disorder could request items using an iPad - based-speech generating device.

Since this study involved only one child, the results have restricted generalizability to other individuals with ASD. Also, because the study was so structured, this may have limited the ability of parents to promote naturalistic learning opportunities throughout the participant's day. As mentioned in the article, there were also methodological limitations found in this study. For example, the distance to the iPad was not probed during baseline which could have resulted in the participant being unable to retrieve the iPad without initial teaching. Another limitation found in this study was that there was no follow-up which indicates whether or not the patient's learning was maintained across settings. Amidst the limitations found in this study, the authors identified factors/recommendations that could improve the effectiveness of their research.  One such recommendation was that future research "could examine whether social interaction increases across environments when an individual is taught these skills" (2015, p.240). Moreover, it is the authors' recommendation that research focuses on teaching other types of communication skills (e.g., conversation and social communication skills) and not only the communication skill of requesting.

Consequently, research should also investigate generalization of skills taught in a new environment and with new and unfamiliar communication partners rather than reduplicating the same environment that is not naturalistic. Ganz (2014) discussed conclusions and future research directions concerning aided AAC and its history of effective implementation with people with ASD. As a result, there remain various questions regarding with whom AAC is most effective.

Similarly, research has largely involved a limited range of participant characteristics with authors noting that the majority of research on AAC has involved children. Therefore, it is vital that research be more inclusive of other age populations such as young adults and adults. On the other hand, if we consider the future direction of AAC technology, research shows that the variety and availability of modes of AAC are expanding to include cost effective applications for mobile technology. As mobile apps become more and more accessible, the need for further inclusion into current literature is warranted. Therefore, we must acknowledge the importance of incorporating these types of devices in research in order to provide a thorough investigation that is most current.

Furthermore, future research is needed to expand in investigating various treatment techniques as well as demonstration of skills across natural contexts. For example, much of the literature is limited to primary communication outcomes and highly structured settings Ganz, (2014). However, it is best that research involve investigating treatment outcomes across various contexts in order to identify whether generalization has occurred. The area of future research was discussed throughout each of the articles gathered for this review.

Iacono (2009) stated, further in-depth qualitative research through interviews or focus groups may provide richer data that will contribute to further understanding of issues associated with providing AAC to young children as experienced by clinicians with varied experience in the area. According to Soto, Hartmann and Wilkins (2006), little is known about the early narrative experiences of children with complex communication needs and how these experiences may be supported through the use of AAC.  Also noted in this study was that much works remains to be done on the use of specific intervention strategies to support the development of narrative skills in children who use AAC. This case study suggests that parents, clinicians and educators who serve children with AAC needs should create opportunities for the children to engage in authentic conversations about non-present, fantasy, past and future events.  Soto et al. (2006) also writes that experience in a broad range of communicative exchanges may be crucial for later autonomous narrative production.

In the study of the development and utilization of a scale to measure adolescents' attitudes toward peers who use augmentative and alternative communication systems by Beck, Kosuwan and Prochnow (2010), it was noted that future research should investigate how factors such as the amount of available vocabulary, the communication competence of the AAC user and the use of more widely differing AAC techniques influence adolescents' attitudes.

Furthermore, Thistle and Wilkinson's (2015) study of building evidence-based practice in AAC display design for young children, discusses the results of their study which highlighted the results that a great deal remains unknown about how to support SLPs in contributing to the development of effective AAC displays.  Thistles' et al. (2015) findings suggested the following areas for future research: best practices; education tools and training experiences that support best practices; experience; and caseload influencing decision making. Furthermore, as stated by Ganz (2015), although great progress has been made in the quantity and quality of research on the implementation of AAC with people with autism spectrum disorder over the last several decades, critical work remains to maximize outcomes. Also, Ganz (2015) mentioned that research is required to evaluate the use of newly developed mobile AAC technologies and effective means of generalizing AAC skills across outcomes and contexts. In another study, Starble et al. (2005) mentions that future large-scale, controlled, and randomized studies are needed to address issues of causality and the magnitude of effects.

CHAPTER III

RESULTS

A total of 23 participants consented to participate in the current study.  In total, 28 participants viewed the survey, however, 2 participants did not provide consent, and 3 participants turned in blank surveys. Blank surveys indicated the participant's option to not participate in the survey. All participants of this survey were current special education educators in the public-school setting. Table 1 displays the questions that were provided on the survey. Figure 1 displays the participant's responses to the number of years taught in any school. Most of the participants have taught in a school setting for 4-6 years (n =6, 26%), followed by15 years (n=3, 13%) , 20 years (n = 2, 8%), 1 year (n = 1, .04%), 10 years (n =1, .04%), 13 years (n=1, .04%), 14 years (n=1, .04%), 18 years (n=1, .04%), 21 years (n=1, .04%), 22 years (n=1, .04%), 23 years (n=1, .04%), 24 years (n=1, .04%), and 27 years (n=1, .04%).

Figure 2 displays the varied types of classes taught by the participants. Self-contained classrooms (n=5,22%) were the type of class taught by the majority of the participants followed by special education (n=3,13%) which included the following types of classrooms: life skills, resource, pull-out, PPCD, speech, and general education. In figure 3, participants indicated their highest formal qualifications. Fifty percent of participants (n=11) reported having a bachelor's degree, 45.45% reported having a master's degree as their highest formal qualifications, and 4.5% of participants reported having a Ph.D. degree as their highest formal qualification. With regards to

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the type of communication device the learner has access to, the following was reported: 36.6% (n=8) said that the learner has access to an iPad, followed by 27.27% (n=6) who said the learner has access to a communication board. 22.73% (n=5) of participants said that the learner has access to a laptop, and 13.64% (n=3) of participants reported other. In figure 4, many of the participants (n = 16, 72.73%) indicated that the learner does not take the communication device home. The remaining participants (n = 4, 18.8%) indicated that the learner sometimes takes the device home, and (n=2, 9.09%) answered yes in response to the question of whether the learner takes the device home.

In order to further assess types of communication devices other than an iPad or laptop used, Figure 5 was formed to display the participant's responses to the current devices used in their school setting. Overall the responses were very insightful and varied with the participants indicating the following: a speaking device, Go Talk 3, AAC, and communication boards. In response to this question, participants were asked to rate the device to fulfill the functions of: supporting learning, communicating in class, and socializing with peers. To support learning, 34.78% (n=8) of participants indicated moderately useful, 13.04% (n=3) indicated slightly useful, and 4.35% indicated not at all useful. To communicate in class, 39.13% (n=9) of participants indicated moderately useful, 13.04% (n=3) indicated slightly useful, and 8.70% (n=2) indicated not at all useful. To socialize with peers, 17.39% (n=4) of participants indicated moderately useful, 21.74% (n=5) indicated slightly useful, and 21.74% (n=5) indicated not at all useful.

Collaboration among all disciplines (speech therapist, occupational therapist, teaching assistant, parent, and other) with special education populations was analyzed. Additionally, figure 6 depicts how the participants rated the extent (i.e.very much, somewhat, not much, and

not at all) each of the members above support the implementation of communication devices in the class. With regard to speech therapist, 68.18% of participants (n=15) indicated very much, 13.64% (n=3) indicated somewhat, 9.09% (n=2) indicated not much and 9.09% (n=2) indicated not at all. With regard to occupational therapist, 22.73% of participants (n=5) indicated very much, 54.55% (n=12) indicated somewhat, 18.18% (n=4) indicated not much, and 4.55% (n=1) indicated not at all. 54.55% (n=12) of participants indicated teaching assistants very much supported implementation of communication devices in the class, followed by 31.82% (n=7) who indicated somewhat, 4.55% (n=1) indicated not much, and 9.09% (n=2) indicated not at all. With regard to parents, 17.39% of participants indicated very much, 47.83% (n=11) indicated somewhat, 10.00% (n=1) indicated not much, and 10.00% (n=1) indicated not at all.

Participants were also asked what they perceived to be part of their role in supporting the learners using communication devices. Selections included: making sure the learner has access to the device in class, making sure the device is in proper working condition (e.g. not damaged, checking batteries), reporting malfunctioning equipment, choosing appropriate vocabulary for the device to enable the learner to participate in lessons, telling another team member what vocabulary needs to be added to the device so that the team member can add it, adding new vocabulary items to a communication book, board or overlay (e.g. drawing, printing or cutting out symbols and adding them to a book/board), programming new vocabulary items into electronic devices, teaching in such a way that the learner can participate using his/her device during lessons, teaching a learner how to use his/her device, facilitating the learner's social interaction with peers using the device, and teaching others to communicate with the learners using the device.

Figure 7 indicates that number of responses for each selection. The majority of participants, 12.07% (n=21), said they perceived their role to assure the learner has access to the device in class, followed by: 10.34% (n=18) who chose teaching in a way that the learner can participate using his/her device, 9.77% (n=17) who said their role was to make sure the device is in proper working condition (e.g. not damaged, checking batteries), tied with teaching a leaner how to use his/her device. Equally, 9.20% (n=16) participants selected facilitating the learner's social interaction, adding new vocabulary items to a communication book, board or overlay, and teaching other to communicate with learners using the device. The three least selected choices were: reporting malfunctioning equipment (8.05% n=14), choosing appropriate vocabulary for the device (7.47% n=13) and programming new vocabulary items into electronic aids (6.9% n=12).

Competency is a vital key in providing effective service delivery. Figure 8 looks at the participant's overall competency in supporting learners who use communication devices. A majority of participants indicated that they felt moderately competent in supporting learners who use communication devices (47.83% n=11), followed by 26.09% (n=6) of participants who said they feel slightly competent in supporting learners who use communication devices. None of the participants felt extremely incompetent, nor neither competent nor incompetent. 4.35% (n=1) felt either slightly incompetent or moderately incompetent.  Figure 9 spotlights the participant's experience of challenges faced in supporting learners who use communication devices. Selections included: I am unsure as to how the device(s) work, I am unsure as to how to create opportunities for the learner(s) to participate in class using the device(s), the vocabulary on the devices is too limited, the vocabulary on the device is not appropriate, the speech output on the device(s) is not in the language used in class, other adult communication partners (e.g. teachers,

therapists, assistants or parents do not encourage the use of the device(s), the learner(s) struggles to use the device(s), the learner(s) is/ are not motivated to the use the device(s), the device(s) are not practical to use in various classroom situations (e.g. due to safety), the devices(s) break/malfunction easily, the device(s) tend to get lost, I do not always have the time to facilitate the implementation of the device(s) during class, peers struggle to understand the learner(s) when he/she/they are using the device(s).

The most significant challenge found in this study was; other adult communication partners (18.18% n=4) followed by the vocabulary on the device is too limited (17.39% n=4), and the learner(s) is/are not motivated to use the device. The selection chosen by most participants as not a challenge was: the device(s) tend to get lost with 56.52% (n=13) of participants selecting this option. Figure 9 allowed the participant the opportunity to offer suggestions as to what could help overcome the challenges from the previous question. Participants disclosed the following information. One participant mentioned that it would be beneficial to make " the devices easier to use" and to "make finding vocabulary for conversation easier to use as well". Another participant mentioned that the solution to the challenges would be "more funds to provide either more or more current resources for when we have a malfunction". A majority of the participants indicated a need for more collaboration with other team members and more training and exposure in this area. One participant wrote, "if my student had practice with an iPad or more effective assistive device, maybe she could learn to communicate better with the use of this device, not only for social aspects but to express emotions, wants, or needs. Thus, I could better assist and aid in her progress as a student/young child." Figure 10 provides a pictorial illustration of the need for further training in communication devices utilized by learners with limited speech. Simply put, 86.96% (n=20) said Yes, they would like further

training. What would that further training consist of? 38.10% of participants (n=8) said they

wanted further

training in how to create opportunities in class for children to use their communication aids,

followed by how a specific electronic device works (23.81% n=5).

Participants were asked what communication task(s) the learner used their device for.  A

majority of participants stated initiating as their top choice (14.46% n=12) followed by

continuing and exchanging information. (12.05% n=10). Repairing was the least selected choice

with only 2.41% of participants (n=2).  Figure 11 demonstrates further comments made by

participants in regard to helping others understand experiences and perceptions regarding the use

of communication devices by learners in the class.

CHAPTER IV

SUMMARY

The purpose of this study was to determine whether special education educators possess awareness of the operation of their student's AAC device in the public-school setting. This research was conducted in order to provide the reader with significant research data on whether there is sufficient knowledge and training in place for public-school educators specifically working with special education populations. Therefore, subjects of this study included special education educators in public-school settings.

**Discussion**

The research questions that were utilized in the analysis were: "Which portion of the class is the AAC user utilizing their AAC most? Are special education educators aware of the operation of their student's AAC device? What impact did the usage or lack of usage of their AAC device have on the student?"

In reference to which portion of the class the AAC user is utilizing their device, a majority of participants reported the device was being used during structured learning time, with communicating in class and socializing with peers also noted. This information indicates that AAC is effective in the classroom to promote communication and socializing with peers, Oommen and McCarthy (2015). Participants of this study reported the number of learners in their class who have little or no functional speech; children whose speech is too limited or

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unintelligible to express everything they want to say.  However, how many participants from this study were actually educated/trained to identify children with little or no functional speech?

Another research question this study sought to answer was, "Are special education educators aware of the operation of their student's AAC device? Results of this study indicated that a majority of participants felt moderately competent in supporting learners who use communication systems. Many special educators lack resources or are in classrooms with too many students and not enough assistance. Consequently, special education educators might overlook those students who truly have a communication need. Ideally, identification of students with communication needs begins in the early years of school. Ultimately, there needs to be more done to increase the competency levels of educators. Researchers agree that early intervention is best and there should be no exception when it comes to communication (Ganz, 2015, & Thistle et al.2015). Therefore, the sooner a child with communication needs is identified, AAC intervention should be consulted. But, for this to happen, it will take a team approach to ensure that children with communication deficits get screened in their early years.

The most effective method for AAC intervention and assessment utilizes a team approach. A preferred team is a transdisciplinary team which includes:

- special education teacher and assistant/s

- SLP

- OT

- PT

- Physician

- vision specialist

- dietitian

- orientation and mobility specialist

- psychologist

- vocational rehabilitation counselor

- rehabilitation engineer

- technical specialist

- manufacturer's representative

- residential manager

- educational administrator

- parents or caregivers (Lloyd et al. 1997, Ganz, 2014, Creer, Enderby, Judge, & John, 2015).

In a transdisciplinary team, members make a commitment to teach, learn, and work together. Within this team, a screener completed by the special education teacher or SLP identifies characteristics of students with communication needs. If a child is identified with communication needs, (a child who cannot express wants and needs, etc.), then, assessment for AAC should begin. Many special education educators and SLPs mention that the process of AAC assessment and intervention is difficult. This is unlikely to happen with a transdisciplinary team approach because members plan and conduct a comprehensive assessment plan together based on educational concerns, family concerns, priorities and resources. This is the most effective team approach because there is an on-going transfer of information, knowledge, and skills shared among members (Granlund,2008). Vanderbilt University developed an AAC: Assessment Checklist that would be a great resource for schools to utilize as a simple and resourceful screener (Chazin, Quinn, & Ledford,2016). At the end of the assessment, the examiner should have gained a better understanding as to whether the student will benefit from

an AAC device. Additionally, the examiner will learn if the student is a good candidate for a device and if so, which device is best for that student. For the purpose of this thesis, the checklist has been attached as a resource for future reference.

Lastly, this study chose to answer the following research question, "What impact did the usage or lack of usage of their AAC device have on the student?" In a single-case, multiple-probe, across-targets experimental design, Binger et.al 2017, investigated the early rule-based sentence productions of 10 3-and 4-year old children who required the use of augmentative and alternative communication.  The authors concluded that preschoolers requiring AAC can readily learn to construct a range of rule-based sentences. Waddington et al.2017 conducted a study utilizing a multiple baseline across setting to evaluate whether the participant with ASD could approach communication partners across settings. Results of the study suggested that the intervention procedures were effective in teaching the participant to request items using his iPad. Similarly, results of this current study indicated the positive impact of using a communication device to promote the child's communication to initiate; continue, comment, repair and request. The lack of usage impedes communication as is noted when a child does not carryover the skills they have acquired (, Waddington et al., 2017).

Moreover, there are many myths that surround the utilization of AAC which further impedes the implementation of AAC intervention. Many special education educators have "tried" AAC but don't follow through with it because there's a lack of education/training and a lack of support from administration, teachers, and parents. This study rated the usefulness of AAC devices to support learning, communicate in class, and socialize with peers.  A high percentage of participants (39.13%) indicated that the device was very useful in allowing the

student to socialize with peers. This is important to note because there has been a stigma attached to the use of an AAC device. Parents of children who have communication needs indicate that they feel an AAC device will isolate their child because it is not socially accepted. Yet, results indicate that special education educators recognize the help it holds.

In addition, early AAC intervention is key in ensuring that each student has been given a means of communicating that is specific to meet their communication, physical, and cognitive needs and limitations. For that reason, competency is vital in supporting learners who use communication devices because challenges are likely to occur.

Challenges supporting learners who utilize communication devices can create obstacles that discourage special education educators from pursuing an AAC device (Ganz, 2015). Special education educators face challenges on a daily basis and many cannot bear additional challenges to their work load. It is evident that these educators need the support and resources to follow through with maximizing their student's needs. For many students, the teacher serves as their only advocate. It is a sad reality but holds true for so many children with disabilities. Another challenge from the study was the lack of funding which leads to a limited supply of devices. This then creates a problem for the student because it effects generalization in everyday communicative settings. The need for more funding is a massive obstacle especially in low poverty areas. In this situation, it is paramount that the SLP educate the team on the importance of advocating for the learner. Education can take place in the form of workshops and seminars which are useful in reaching a wide audience at once.

Providing resources and testimonials can be powerful tools in educating others on the importance of AAC assessment and intervention. If opportunities of communication are not

investigated solely because of inconvenience or difficulty, an injustice is created. Learners with communication needs deserve to have the ability to communicate because it is fundamental to all human life. It starts with being a voice for the voiceless and SLPs have the knowledge, skill, and training to be a great help for students who have communication needs. The SLPs role in AAC assessment is to assess receptive and expressive communication; assess oral motor skills; assess present and future communication abilities, needs, opportunities and barriers; implement communication intervention; and evaluate and treat dysphagia. For this reason, the SLP is a great asset to the AAC assessment team because they have the knowledge to help support the special education educator and student in this process.  After a student has been evaluated for an AAC assessment, the student can be deemed suitable or not suitable for a specific device. Areas of assessment include: seating and positioning; motor skills (fine and gross motor skills); cognitive skills (cognition, conceptual skills, and symbols and access); sensory abilities (auditory, visual, and tactile skills); communication (speech, receptive and expressive language); education needs (typical areas of academics, special education); social/behavioral needs (social awareness, problem behavior); and environmental needs (speech and/or visual output needs, computer compatibility, portability, and funding issues) (Lloyd et al., 1997).

The assessment process is as follows: receive assessment referral, review all available background information, determine appropriate team members, determine appropriate assessment tools, determine appropriate assessment time(s), determine appropriate assessment site(s), determine appropriate assessment partners, determine appropriate AAC devices to use during assessment, arrange details of the assessment, conduct the assessment using all appropriate methodologies and instruments, conduct staffing to determine present and future

needs to complete feature matching, write the assessment report and follow the AAC user continuously to integrate assessment with intervention (Lloyd et al., 1997). If the AAC team is educated on the process of assessment, there would be less fear in implementing AAC and more consistency to follow through with intervention.

## Recommendations

This study found that there are various needs for competency, training and education for special educators in the public school-setting.  Participants report the importance of team collaboration in order for there to be support and unification in the AAC approach. Several methods exist that can aid special educators in formulating assessment, intervention, and implementation of AAC use. Children who require the use of a communication device have a variety of options available to meet their communication need, but it is of no use if the professionals are not advocating for the children.  It is a disservice to think that someone is skilled in providing services without proper education and knowledge in that area.

## Limitations

There were a few limitations in this study related to the composition of the sample of participants and increased time frame waiting for approval for this study from the Institutional Review Board (IRB).

First, participants were limited to electronic surveys issued out through email. A larger number of survey responses would have been possible if a greater access to participants would have been utilized. For example, currently in society, social media is utilized by a vast amount of individual. Social media is easily accessible through phone, laptop, and most smart watches

making the possibility of completing surveys. By expanding the accessibility to be more inclusive of other forms of distribution, a more representative sample of awareness would have been obtained. Future research would focus on widening the distribution of the survey in addition to other disciplines and groups without the restriction of limitation in the possibility to reach more individuals through social media.

Secondly, there was an issue with sending out emails through Qualtrics because many of the school emails were not formatted for the software. Many of the emails gathered were "bounced" back because there was an issue when transferring those emails from Excel to CSV format. Another limitation was difficulty in sending reminder emails to participants who had not completed the survey. Difficulty navigating the Qualtrics software made it challenging to send reminder emails which impeded the possibility of gathering more participants to complete started surveys.

Concerning the findings of this study, AAC research is plentiful but there were issues with research finding. For example, when researching current literature, there were limited search findings for surveys done pertaining to school settings. Similarly, there were limited literature findings of surveys done in the United States. This information reveals that there is a need for more survey questionnaires to be accomplished in the US which indicates a lack of AAC school surveys.

**Future Studies**

In addition to suggestions brought up by the participants, research should be conducted to expand on findings from this study. First, researchers should expand the sample size of special education educators who work with children with communication needs. The inclusion of other

disciplines (e.g. occupational therapists) in the survey process would also be beneficial to establish a more effective plan of action.

Additionally, an effective team approach established with the patient and family/caregiver may provide effective results in a timely transition. Secondly, with an expansion of the sample size and an addition of survey questions to evaluate the current practice in public-school settings, there is a better chance to gain an understanding of the awareness and operation of students who use an AAC device. Finally, experimental research should be conducted to test assessment protocols that are quick screeners to identify children who would benefit from an AAC device or who do not meet the criteria for utilizing one.

Although many forms of assessment checklists exist on-line, schools nationwide would benefit from adopting one into their school protocol to use with children with communication needs. With this proposed experiment for a future study, expanding the survey to other disciplines would be beneficial in incorporating other discipline's roles in the survey. Based on survey findings, a transdisciplinary team would be established to hypothesize the effectiveness of utilizing assessment protocols to identify child early. Early intervention is necessary in establishing a solid foundation for future benefit.

Moreover, competency is a huge factor in effective service delivery. Participants of this study reported that much of their informal training regarding communication devices came from workshop/seminar but none of the participants reported receiving training from the parent of the learner. This suggests that there is a need to educate parents of the learners as well.  A child equipped with an AAC device require that the parents or caregivers become knowledgeable in addition to professionals because much of the carryover of skills is exhibited at home and other communicative settings other than school.  Therefore, for future studies, this research indicates a

need for inquiring about what the parent's role is. Many parents believe that if their child receives an AAC device, the team will be responsible for teaching the learner of the device. However, it is equally important that the AAC team educate the parents whether that be through presentations, pamphlets, or seminars.

## Conclusion

Communication is a fundamental component for all of mankind; and the need to communicate is what sets us apart from other species. This study provided evidence that there is a lack of awareness amongst special educators who work with special education students with communication needs in public-school settings and a lack of implementation of AAC device use in the public schools. A collaborative transdisciplinary team, early intervention to screen for AAC compatibility, and increased funding for more and better devices are just some of the methods identified in this study. These avenues will aid in raising awareness for special education educators.

In doing so, educators will have the support and momentum to meet the needs of their students with communication needs. Everyone deserves to be heard and to feel part of society, therefore, it is our responsibility to educate ourselves and advocate for those who cannot.

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APPENDIX A

# APPENDIX A

## APPENDIX B
## COMMUNICATION AID QUESTIONNAIRE

Thank you for taking the time to complete this questionnaire. Your responses will remain confidential. Please see the last two pages for an explanation of terms. Please feel free to ask for further clarification.

1.  Please indicate your date of birth: _____

| For official use |
| --- |
| V1:_____ |
| V2:_____ |
| V3:_____ |

2.  Please indicate your gender.

| Male | | | Female | |
| --- | --- | --- | --- | --- |

3.  How many years (in total) have you been teaching (at any school)?

4.  How many years have you been teaching learners with special educational needs?

5.  Which is your register class? (e.g. junior special, preschool, ....- any description used at your school)

    _____

6.  How many learners are there in your register class?

7.  How many learners in your register class have little or no functional speech (LNFS)? (i.e. their speech is too limited or unintelligible for them to express everything they want to say)

8.  How many learners with little or no functional speech have access to or use a communication aid to help them express themselves in class?

9.  Please indicate your highest formal qualification. Please tick the appropriate block.

| Matric | Tertiary diploma | Tertiary degree |
| --- | --- | --- |
| | | |

Other (please indicate)

_____

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10a. This question deals with **communication aids that are used for expression** by specific learners with LNFS and are not shared between learners. An example may be a communication board or device used by one specific learner. Please provide details of such communication aids which learners in your class have access to in the table below. If children are using a laptop or an iPad/iPod [1TM], please indicate which programme or App the child uses for communication.

| Learner | Name of communication aid(s) which the learner has access to | Communication aid owned by school/ learner? (please circle appropriate) | | Does the learner take the communication aid home? (please circle appropriate) | |
|---|---|---|---|---|---|
| A | | School | learner | Yes | No |
| | | School | learner | Yes | No |
| B | | School | learner | Yes | No |
| | | School | learner | Yes | No |
| C | | School | learner | Yes | No |
| | | School | learner | Yes | No |
| D | | School | learner | Yes | No |
| | | School | learner | Yes | No |
| E | | School | learner | Yes | No |
| | | School | learner | Yes | No |
| F | | School | learner | Yes | No |
| | | School | learner | Yes | No |
| G | | School | learner | Yes | No |
| | | School | learner | Yes | No |

10b. This questions deals with **communication aids used for expression** that are owned by the school and that are used for expression by different learners. An example may be a BIGmack[2] ™ used by various learners during song time. Please provide details of such communication aids which learners in your class are collectively using in the table below.

| Name of communication aid | No. of children using this aid |
|---|---|
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

11. Please rate how useful you find these aids overall for the children in your class to fulfill the following functions (0 = not at all useful; 4 = very useful):

|  | Not at all useful |  |  |  | Very useful |
|---|---|---|---|---|---|
| To support learning | 0 | 1 | 2 | 3 | 4 |
| To communicate in class | 0 | 1 | 2 | 3 | 4 |
| To socialize with peers | 0 | 1 | 2 | 3 | 4 |

Comments:
_____

_____

12. The implementation of AAC aids is typically a team effort. Please rate to what extent each of the people in the table support the implementation of communication aids for the leaners in your class (0=not at all; 4 = very much).

|  | Not at all |  |  |  | Very much | Not applicable: Not employed at school |
|---|---|---|---|---|---|---|
| Speech therapist | 0 | 1 | 2 | 3 | 4 |  |
| Occupational therapist | 0 | 1 | 2 | 3 | 4 |  |
| Teaching assistant | 0 | 1 | 2 | 3 | 4 |  |
| Parent | 0 | 1 | 2 | 3 | 4 |  |
| Other (specify) | 0 | 1 | 2 | 3 | 4 |  |

13. Which of the following do you perceive to be part of your role in supporting the learners using communication aids? Please tick all that apply.

| | |
|---|---|
| | Making sure the learner has access to the aid in class |
| | Making sure the aid is in proper working condition (e.g. not damaged, checking batteries) |
| | Reporting malfunctioning equipment |
| | Choosing appropriate vocabulary for the aid to enable the learner to participate in lessons |
| | Telling another team member what vocabulary needs to be added to the aid so that the team member can add it |
| | Adding new vocabulary items to a communication book, board or overlay (e.g. drawing, printing or cutting out symbols and adding them to a book/board) |
| | Programming new vocabulary items into electronic aids |
| | Teaching in such a way that the learner can participate using his/her aid during lessons |
| | Teaching a learner how to use his/her aid |
| | Facilitating the learner's social interaction with peers using the aid |
| | Teaching others to communicate with the learners using the aid |
| | Other (please specify): _____ _____ _____ |

14. Overall, how competent do you feel in supporting learners who use communication aids?

| Not at all competent | | | | Completely competent |
|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 |

Comments:
_____
_____

15. Please indicate to what extent you experience any of the following challenges in supporting learners who use communication aids (0 = not a challenge; 4 = significant challenge).

| | Not a challenge | | | | significant challenge | Not applicable /comment |
|---|---|---|---|---|---|---|
| I am unsure as to how (some of) the aid(s) work(s). | 0 | 1 | 2 | 3 | 4 | |
| I am unsure as to how to create opportunities for the learner(s) to participate in class using the aid(s). | 0 | 1 | 2 | 3 | 4 | |
| The vocabulary on the aid(s) is too limited. | 0 | 1 | 2 | 3 | 4 | |
| The vocabulary on the aid(s) is not appropriate. | 0 | 1 | 2 | 3 | 4 | |
| The speech output on the aid(s) is not in the language used in class. | 0 | 1 | 2 | 3 | 4 | |
| Other adult communication partners (e.g., teachers, therapists, assistants or parents) do not encourage the use of the aid(s). | 0 | 1 | 2 | 3 | 4 | |
| The learner(s) struggle(s) to use the aid(s). | 0 | 1 | 2 | 3 | 4 | |
| The learner(s) is/are not motivated to use the aid(s). | 0 | 1 | 2 | 3 | 4 | |
| The aid(s) are not practical to use in various classroom situations (e.g. due to safety). | 0 | 1 | 2 | 3 | 4 | |
| The aid(s) break/malfunction easily. | 0 | 1 | 2 | 3 | 4 | |
| The aid(s) tend to get lost. | 0 | 1 | 2 | 3 | 4 | |
| I do not always have the time to facilitate the implementation of the aid(s) during class. | 0 | 1 | 2 | 3 | 4 | |
| Peers struggle to understand the learner(s) when he/she/they are using the aid(s). | 0 | 1 | 2 | 3 | 4 | |
| Other (please specify): _____ | 0 | 1 | 2 | 3 | 4 | |
| _____ | 0 | 1 | 2 | 3 | 4 | |
| _____ | 0 | 1 | 2 | 3 | 4 | |

If you identified any challenges, please answer Question 16. If not, please move on to Question 17.

16. Do you have any suggestions as to what could help you overcome the challenges you identified?

_____

_____

_____

_____

_____

# AAC:

## Assessment Checklist

Student Name: _____    Date:

_____

School: _____    Teacher:

_____

Location: _____    Observer:

_____

Time: _____

1. Who understands the student's communication attempts (check best descriptor):

| | *Most of the time* | *Part of the time* | *Rarely* | *N/A* |
|---|---|---|---|---|
| *Parent/Guardian* | ☐ | ☐ | ☐ | ☐ |
| *Siblings* | ☐ | ☐ | ☐ | ☐ |
| *Peers* | ☐ | ☐ | ☐ | ☐ |
| *Therapists* | ☐ | ☐ | ☐ | ☐ |
| *Teachers* | ☐ | ☐ | ☐ | ☐ |
| *Strangers* | ☐ | ☐ | ☐ | ☐ |

2. Present means of communication (check all that are used, and the ones that are primary means of communication—used at least 60% of the time):

*Verbal*

*Primary   Uses*

☐        ☐  Vocalizations (list examples):

_____

☐        ☐  Vowels, vowel combinations (list examples):

_____

☐        ☐  Single words (list examples and approx.

#):_____

☐        ☐  Reliable "yes"

☐        ☐  Reliable "no"

☐        ☐  2-word utterances  (list examples):

_____

☐        ☐  3-word utterances  (list examples):

_____

☐        ☐  Semi-intelligible speech (estimated % intelligible):

_____

☐        ☐  Intelligible speech (list examples):

_____

*Non-verbal*

*Primary   Uses*

☐        ☐  Changes in breathing

☐        ☐  Eye-gaze/eye movement

☐        ☐  Pointing

☐        ☐  Gestures (list examples):

_____

☐        ☐  Facial expressions (list examples):

_____

☐        ☐  Body position changes (list examples):

_____

☐      ☐ Sign language approximations (list examples):

_____

☐      ☐ Sign language (#signs/#combinations/#sings in a combination):

_____

☐      ☐ Writing (list examples):

_____

*Devices*

*Primary  Uses*

☐      ☐ Voice output AC device (name of device):

_____

☐      ☐ Communication board (check which ones are used):

             ☐  objects       ☐ words       ☐ drawings
             ☐ pictures       ☐ TOBIs       ☐ tangibles
             ☐ graphic symbols   ☐ picture and word combination

☐      ☐

Other:_____

_____

3. Current level of receptive language:

    If formal texting was used, name and scores:

    _____

    _____

    _____

    If informal testing was used, please give a developmental level of functioning.  Explain rational for
    this estimate:

    _____

    _____

_____

_____

_____

_____

Provide examples of commands/requests responded:

_____

_____

_____

_____

_____


*Check all that are used to respond or demonstrate message was understood:*

☐ Objects          ☐ Graphic Symbols          ☐ TOBIs          ☐ Proximity
☐ Photographs       ☐ Tangibles               ☐ Crying         ☐ Pointing
☐ Drawings     ☐ Changes in body tone    ☐ Sign language


4. Current level of expressive language:

If formal texting was used, name and scores:

_____

_____

_____


If informal testing was used, please give developmental level of functioning.  Explain rational for this estimate:_____

_____

_____

_____

_____

_____

Provide examples of expressive language
used:_____

_____

_____

_____

_____

*Check all that are used to respond or demonstrate message was understood:*

☐ Objects        ☐ Graphic Symbols        ☐ TOBIs        ☐ Proximity
☐ Photographs        ☐ Tangibles        ☐ Crying        ☐ Pointing
☐ Drawings        ☐ Changes in body tone        ☐ Sign language

5. Communication interaction skills:

Desires to communicate:      Yes ☐     No ☐
To indicate "yes" and "no," the student (check all that apply):
    ☐ Shakes head        ☐ Vocalizes        ☐ Gestures
    ☐ Points to board/graphic symbols        ☐ Word approximation        ☐ Eye Gazes
    ☐ Other: _____

Can an unfamiliar communication partner understand the response?　　Yes ☐　　No ☐

If no, why? _____

*Communication Interactions*

Does the student…

|  | *Always* | *Frequently* | *Occasionally* | *Seldom* | *Never* |
|---|---|---|---|---|---|
| *Turn attention towards speaker* | ☐ | ☐ | ☐ | ☐ | ☐ |
| *Interact with peers* | ☐ | ☐ | ☐ | ☐ | ☐ |
| *Aware of listener's Attention* | ☐ | ☐ | ☐ | ☐ | ☐ |
| *Initiate interaction* | ☐ | ☐ | ☐ | ☐ | ☐ |
| *Ask questions* | ☐ | ☐ | ☐ | ☐ | ☐ |
| *Respond to communication interaction* | ☐ | ☐ | ☐ | ☐ | ☐ |
| *Repair communication breakdown* | ☐ | ☐ | ☐ | ☐ | ☐ |
| *Require/wait for frequent prompts* | ☐ | ☐ | ☐ | ☐ | ☐ |
| *Require/wait for physical prompts* | ☐ | ☐ | ☐ | ☐ | ☐ |
| *Require/wais for visual prompts* | ☐ | ☐ | ☐ | ☐ | ☐ |

Describe techniques student uses for repair of communication breakdown (e.g. keeps trying, repeats, changes
message):_____
_____

_____

_____

_____

_____

6. Communication opportunities (complete and attach API form)

7. Gross motor ability related to communication device systems (check all that apply):
   ☐ Student walks                                    ☐ Uses wheelchair
   ☐ Student drops or throws things frequently        ☐ Can carry device under 2 lbs
   ☐ Device can be mounted to wheelchair              ☐ Can carry device under 5lbs
   ☐

   Other:_____

   _____

8. Visual abilities related to communication (check all that apply):
   ☐ Can maintain fixation on stationary objects      ☐ Visually recognizes people
   ☐ Visually recognizes common objects               ☐ Visually recognizes photographs
   ☐ Visually recognizes line drawings              ☐ Can visually shift vertically
   ☐ Can look to right & left without moving head     ☐ Can visually shift horizontally
   ☐ Can scan line of symbols left to right           ☐ Can scan matrix of symbols in grid
   ☐ Needs additional space around symbol

9. Does the student use any unaided communication systems?

Yes ☐    No ☐
Types used or tried (e.g., manual signs):

_____

_____

_____

Date used: _____
For how long?:_____


10. Does the student use any aided communication systems?

Yes ☐    No ☐
Types used or tried (e.g., photographs, line drawings):

_____

_____

_____

Date used: _____
For how long?:_____


11. Is figure ground discrimination a factor for symbols?

Yes ☐    No ☐
Explain:

_____

_____

_____

_____

_____

_____

_____

_____

12. Reinforcer: (In addition, complete and attach reinforcer evaluation form)
    Positive:

_____

_____

_____

_____

    Negative:_____

_____

_____

_____

13. Pre-reading and reading skills related to communication (if applicable):

| | *Yes* | *No* |
|---|---|---|
| Object recognition | ☐ | ☐ |
| Photograph recognition | ☐ | ☐ |
| Line drawing recognition | ☐ | ☐ |
| Graphic symbol recognition (tactile, Mayer-Johnson, Rebus, etc.) | ☐ | ☐ |
| Auditory discrimination of sounds | ☐ | ☐ |
| Auditory discrimination of words, phrases | ☐ | ☐ |

Selects initial letter of word ☐ ☐
Follows simple directions ☐ ☐
Sight word recognition ☐ ☐
Can put two symbols or words together to express an idea ☐ ☐

APPENDIX-FORMS

Table 1: Survey Questions

| 1 | Child's Current Age |
|---|---|
| 2 | Child's Gender |
| 3 | Child's Grade Level |
| 4 | Type of Classroom |
| 5 | Child's Diagnosis |
| 6 | Child's Race |
| 7 | Participant's Age |
| 8 | Participant's Gender |
| 9 | What State are you employed in? |
| 10 | How many years (in total) have you been teaching (at any school)? |
| 11 | How many years have you been teaching learners with special education needs? |
| 12 | What type of class do you teach? |
| 13 | How many students are there in your class? |
| 14 | How many learners in your class have little or no functional speech (LNFS)? ( i.e. their speech is too limited or unintelligible for them to express everything they want to say) |
| 15 | How many learners with little or no functional speech have access to or use an AAC device to help them express themselves in class? |
| 16 | Please indicate your highest formal qualifications. |
| 17 | Name of communication device(s) which the learner has access to. |
| 18 | Do the learners take the communication device home? |
| 19 | Number of children using an I-Pad. |
| 20 | Number of children using a laptop. |
| 21 | Number of children using a communication device other than an I-Pad or laptop. Please indicate the communication device used. |
| 22 | Please rate how useful you find these devices overall for the children in your class to fulfill the following functions (0=not at all useful;4=very useful) |
| 23 | The implementation of AAC devices is typically a team effort. Please rate to what extent each of the people in the table support the implementation of communication devices for the learners in your class. |
| 24 | Which of the following do you perceive to be part of your role in supporting the learners using communication devices? Please check all that apply. |
| 25 | Overall, how competent do you feel in supporting learners who use communication devices? |
| 26 | Please indicate to what extent you experience any of the following challenges in supporting learners who use communication devices. |
| 27 | If you identified any challenges, please answer Question 17. If not, please move on to question 18. Do you have any suggestions as to what could help you overcome the challenges you identified? |

| 28 | Have you received formal or informal training regarding any aspect of communication device and/or their use by learners in the classroom? |
|----|-----|
| 29 | Would you like further training in communication devices utilized by learners with limited speech? |
| 30 | If you answered "yes", please continue with question 20. If you answered "no", please move to question 21. Please indicate which area(s) you would like further training on. Check all that apply |
| 31 | What communication task(s) is the learner using their device for. Please check all that apply. |
| 32 | Are there any further comments you would like to make that may help me to understand your experiences and perceptions regarding the use of communication devices by learners in your class? |

Number of years taught in any school. Figure 1

Figure 2



How many years have you been teaching learners with special education needs?
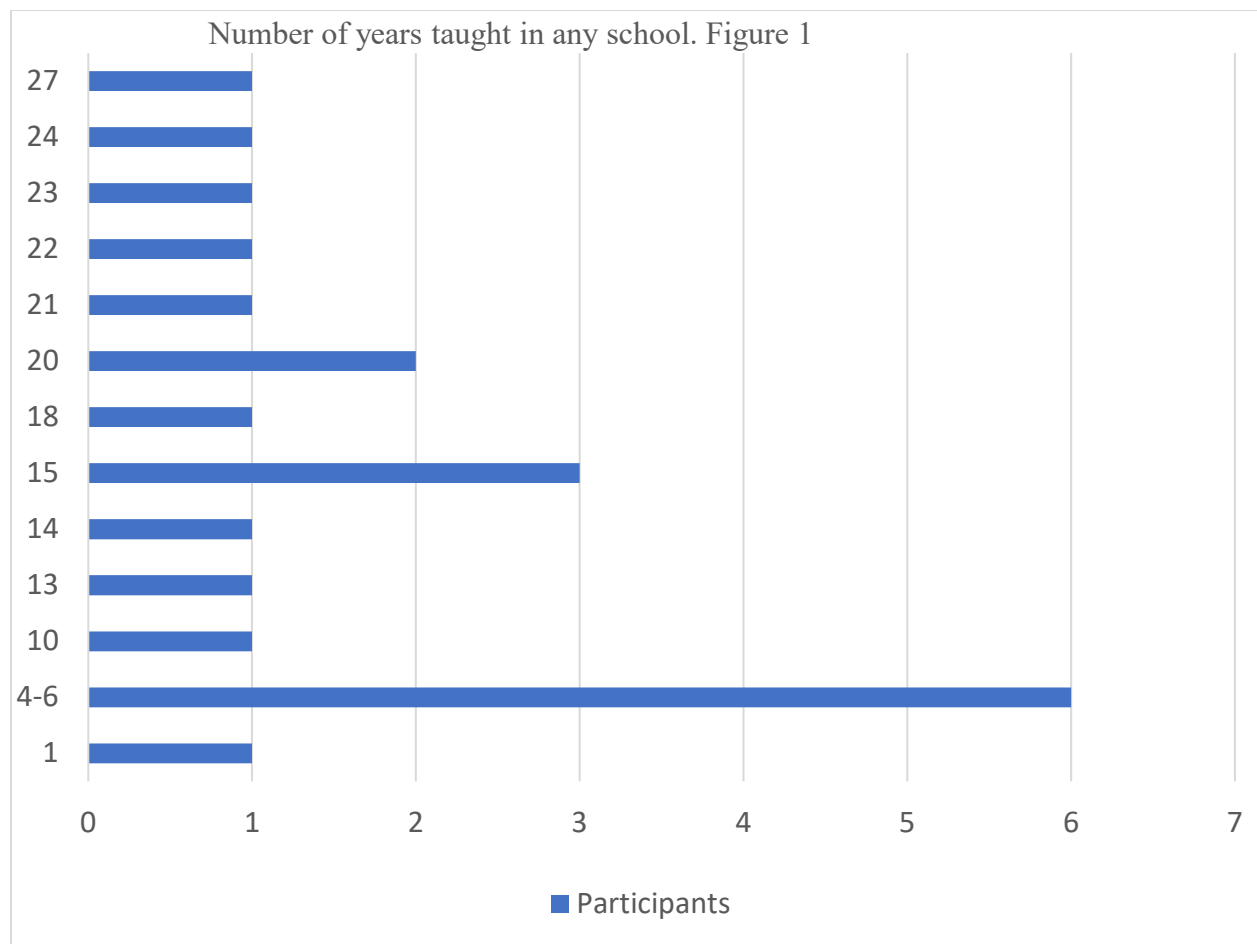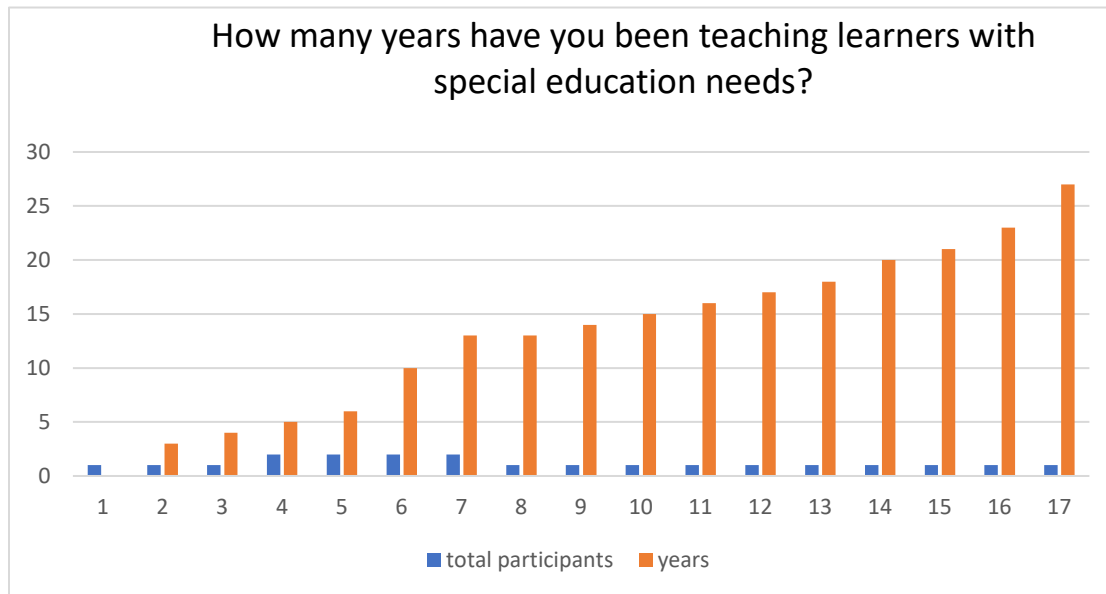
Figure 3

## Q18 - Please indicate your highest formal qualifications.
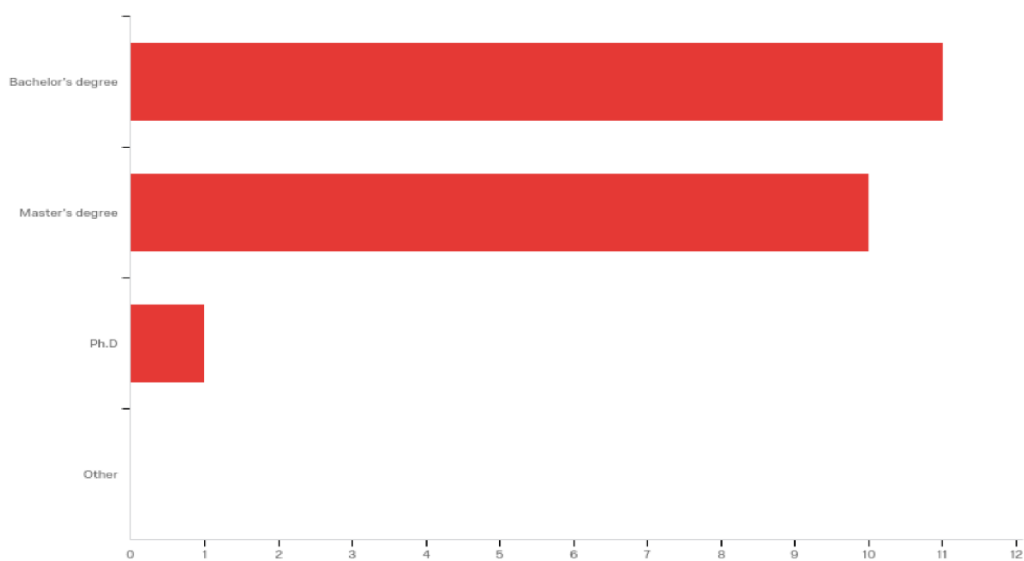
Figure 4

## Q20 - Do the learners take the communication device home?
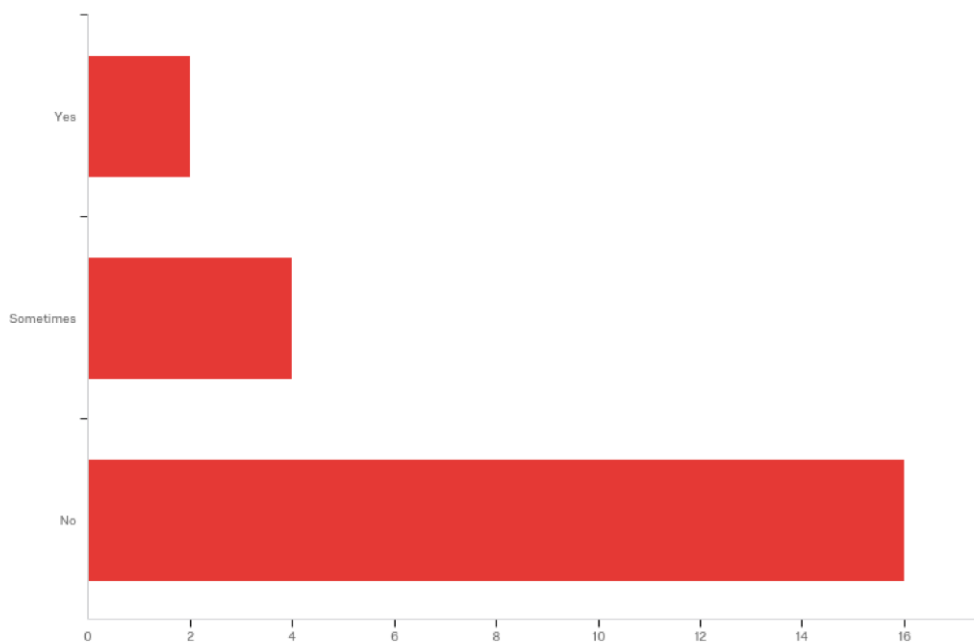


Figure 5          Q21 - Number of children using an I-Pad.

| Number of children using an I-Pad. |
| --- |
| 0 |
| two |
| 0 |
| 3 |
| 10 |
| 10 |
| 7 |
| Zero |
| 1 |
| 5 |
| 22 |

Figure 5

Q21 - Number of children using an I-Pad.

| Number of children using an I-Pad. |
| --- |
| 1 |
| 4 |
| 0 |
| 2 |
| 21 |
| 4 |
| 15 |
| 7 |
| 6 |
| 0 |
| 2 |

Figure 5

Q21 - Number of children using an I-Pad.

| Number of children using an I-Pad. |
| --- |
| 0 |

Figure 5

Q22 - Number of children using a laptop.

| Number of children using a laptop. |
|---|
| 28 |
| 1 |
| 0 |
| 3 |
| 0 |
| 2 |
| 0 |
| Zero |
| 0 |
| 1 |
| 0 |

Figure 5

Q22 - Number of children using a laptop.

| Number of children using a laptop. |
|---|
| 7 |
| 0 |
| 0 |
| 0 |
| 0 |
| 0 |
| 0 |
| 0 |
| 6 |
| 25 |

Figure 6

The implementation of AAC devices is typically a team effort. Please rate to what extent each of the people in the table support the implementation of communication devices for the learners in your class.
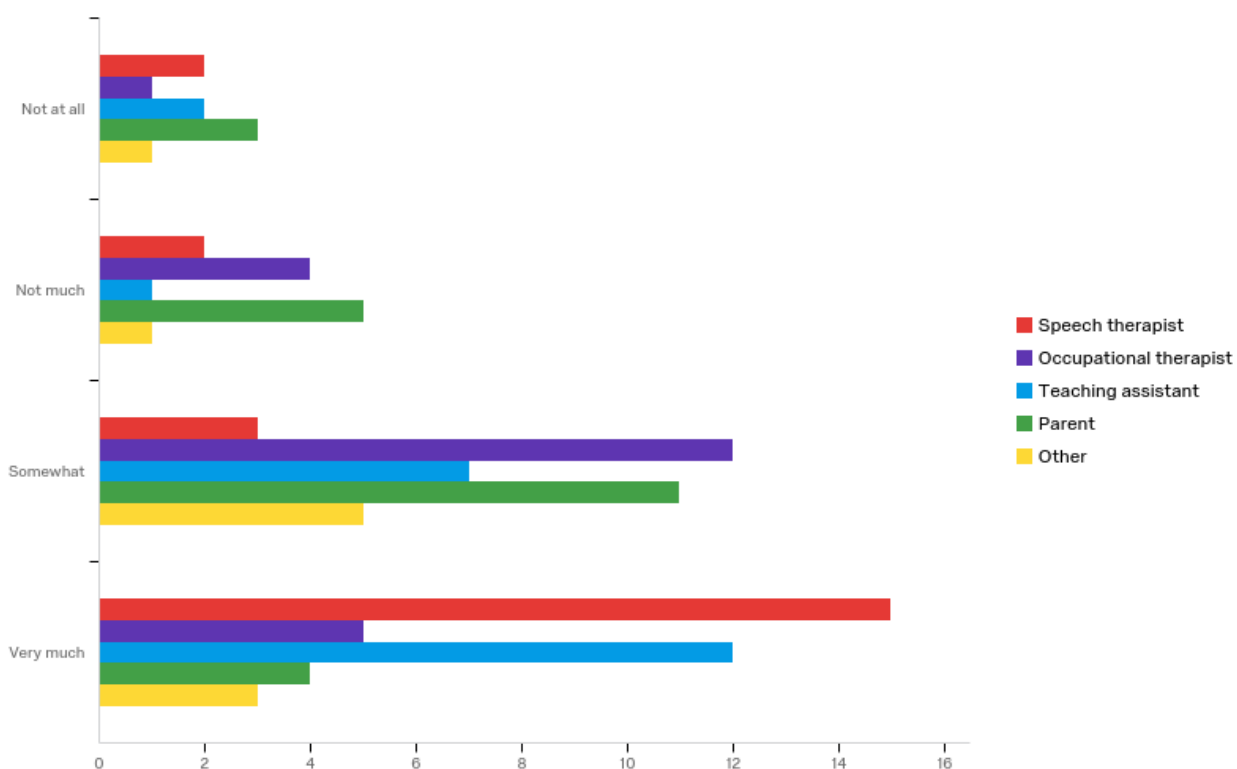
# Which of the following do you perceive to be part of your role in supporting the learners using communication devices. Please check all that apply. Figure 7



- ■ Making sure the learner has access to the aid in class

- ■ Making sure the aid is in proper working condition (e.g. not damaged, checking batteries)

- ■ Reporting malfunctioning equipment

- ■ Choosing appropriate vocabulary for the device to enable the learner to participate in lessons

- ■ Telling another team member what vocabulary needs to be added to the device so that the team member can add it

- ■ Adding new vocabulary items to a communication book, board or overlay (e.g. drawing, printing or cutting out symbols and adding them to a book/board)

- ■ Programming new vocabulary items into electronic aids

- ■ Teaching in such a way that the learner can participate using his/her device during lessons

- ■ Teaching a learner how to use his/her device

- ■ Facilitating the learner's social interaction with peers using the the device

- ■ Teaching others to communicate with the learners using the device

- ■ other

Figure 8

Q27 - Overall, how competent do you feel in supporting learners who use communication devices?



Figure 9: If you identified any challenges, please answer Question 17. If not, please move on to question 18. Do you have any suggestions as to what could help you overcome the challenges you identified?
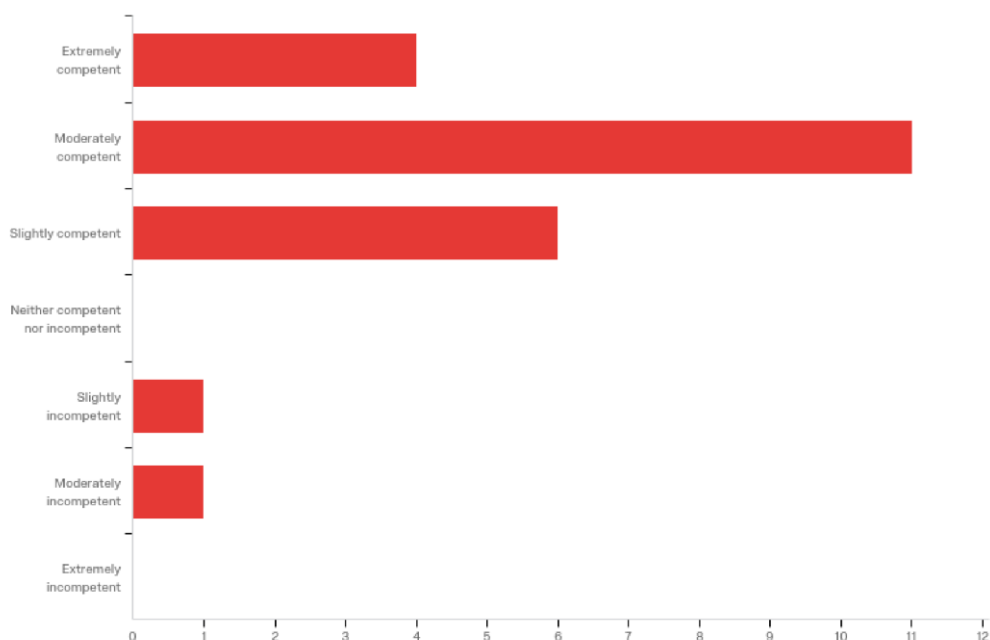
| If you identified any challenges, please answer Question 17. If not, please move on to question 18. Do you have any suggestions as to what could help you overcome the challenges you identified. |
|---|
| Making the devices easier to use and not so hard to to find vocabulary or words to use when talking. |
| unfortunately solution would be more funds to provide either more or more current resources for when we have a malfunction |
| More collaboration with other team members on campus. |
| More district training for special and general eduation personnel on how to utilize devices |
| Training/Exposure |
| Become more familiar with AAC devices |
| More training |
| Emough I-pads for each student to have one. |

Figure 10: Would you like further training in communication devices utilized by learners with limited speech?
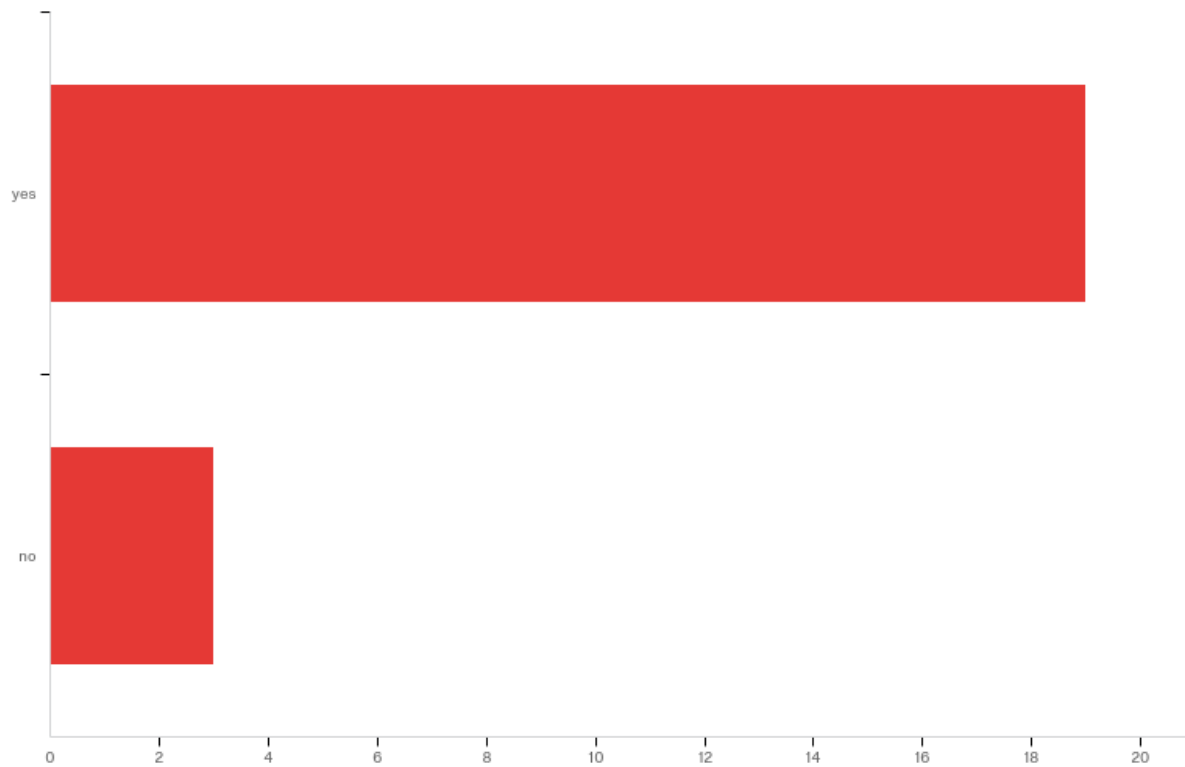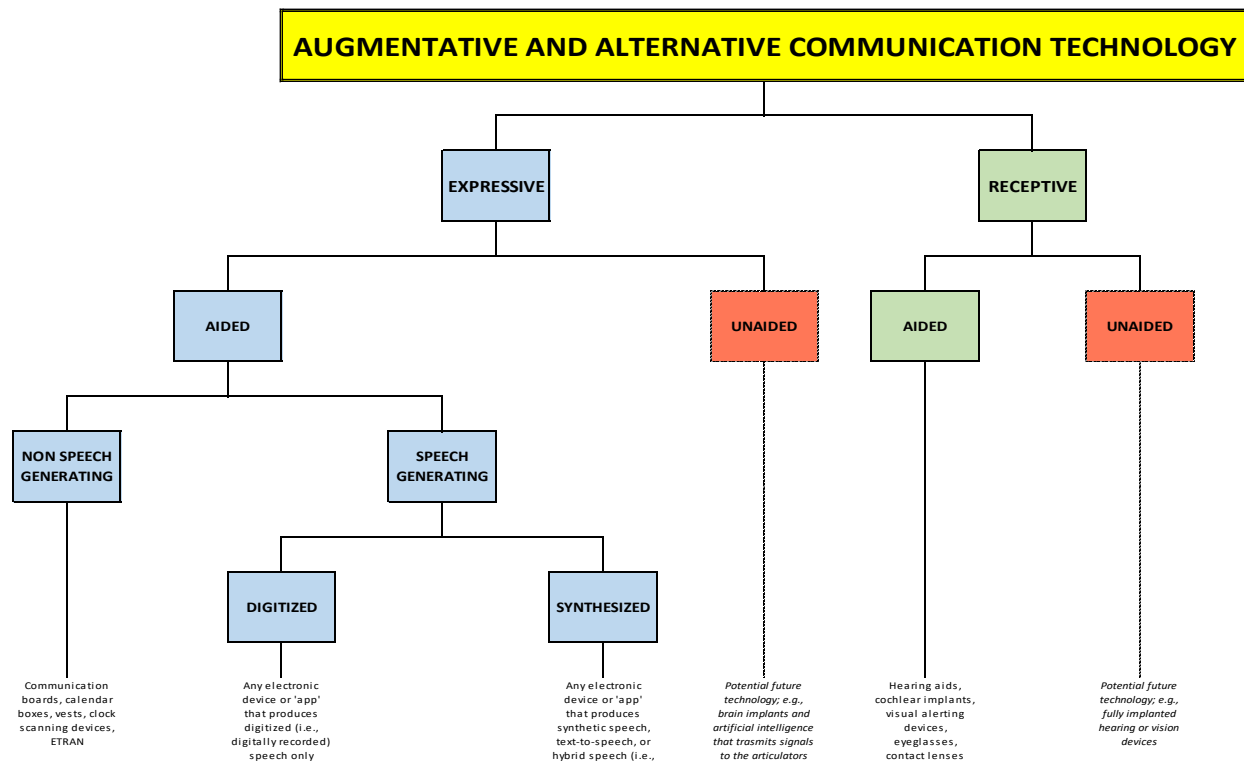
Figure 11

Q34 - Are there any further comments you would like to make that may help me to understand your experiences and perceptions regarding the use of communication devices by learners in your class?

| Are there any further comments you would like to make that may help me to understand your experiences and perceptions regarding the use of communication devices by learners in your class? |
|---|
| It is hard for the student to find the words to answer questions or just to socialize. |
| Communication devices in the classroom vary depending on the needs of the students and the availability of resources.  Most of our self contained students benefit from use and support of visual cue cards and communication boards.  Our students who have limited verbal abilities start with those and as we introduce resources transition to include Go Talk systems, laptops, phones and tablets.  Most of our students start with us in 1st grade and may or may not have had prior instruction in schools and in use of items.  The prevalence of tablets has made communication apps more accessible across home and school connections which has had the greatest impact on student growth and confidence as prior to that systems were often unable to be afforded in home settings. |
| If used with fidelity, they are extremely beneficial! |
| The use of communication devices is not a topic explored or discussed within the special eduation department. |
| Not at this time! :) |

Figure 12



**AUGMENTATIVE AND ALTERNATIVE COMMUNICATION TECHNOLOGY**

EXPRESSIVE

RECEPTIVE

AIDED

UNAIDED

AIDED

UNAIDED

NON SPEECH GENERATING

SPEECH GENERATING

DIGITIZED

SYNTHESIZED

Communication boards, calendar boxes, vests, clock scanning devices, ETRAN

Any electronic device or 'app' that produces digitized (i.e., digitally recorded) speech only

Any electronic device or 'app' that produces synthetic speech, text-to-speech, or hybrid speech (i.e.,

*Potential future technology; e.g., brain implants and artificial intelligence that trasmits signals to the articulators*

Hearing aids, cochlear implants, visual alerting devices, eyeglasses, contact lenses

*Potential future technology; e.g., fully implanted hearing or vision devices*

# BIOGRAPHICAL SKETCH

Vanessa Medina is a graduate student at the University of Texas Rio Grande Valley. Here, she obtained her Bachelor's degree in Communication Sciences and Disorders in 2017. After completing her undergraduate degree, Vanessa applied to the graduate program and was formally accepted in April 2017. She then began her graduate education in the Fall 2017 semester. After a year of clinician work at the UTRGV Speech and Hearing Center, Vanessa began her externship. During her first semester of externship, Vanessa was assigned to a public-school, then for her second semester, Vanessa was assigned to a medical hospital. It was during her time at the public school where she saw the need for more awareness in the area of AAC.

Moreover, Vanessa obtained her Master's of Science degree on May 2019. She wishes to work with children of all backgrounds in the public-schools where she can effectively utilize the knowledge she has acquired during her academic course.

Vanessa's personal email is: vanessa.medina01@yahoo.com.