AAC Training Outcomes for Family Members of Adolescents with Complex Communication Needs

by

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Abstract

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AAC Parent Training Outcomes for Parents and Caregivers of Adolescents with Complex Communication Needs

Thesis directed by Christine Brennan, Ph.D. CCC-SLP

Studies show the need for parent and caregiver involvement in their child's language development. For parents and caregivers of children with complex communication needs, developing their child's language skills may be more difficult. Their children communicate using AAC devices and methods and parents are not used to communicating with these mediums. This study aimed to develop an AAC training for family members of adolescents with complex communication needs who use a high-tech AAC device. The team of Speech-Language Pathologists, including graduate clinicians and faculty from the University of Colorado Boulder, provided the AAC training to families from a Denver, Colorado high school whose adolescent children are new AAC users. All families and their children were involved in an AAC outreach project provided by the Speech-Language and Hearing Clinic at the University of Colorado Boulder. Two questionnaires measured participant AAC knowledge and AAC beliefs and pre- and post-training scores were compared to determine if scores on the questionnaires increased after training. Results show increased scores on AAC knowledge and AAC beliefs during post-testing across all participants. Qualitative analyses show that participants increased accuracy and detail in their knowledge of AAC. Additional qualitative analyses show that

participants felt greater confidence, less frustration, and a better sense of support from other parents and from the AAC outreach team. The family training created for this project can serve as a model for future training and the presentation materials can be shared with other speech-language pathologists who plan to provide their own AAC family training. Future research should aim to evaluate the efficacy of a AAC training with larger groups of participants and with family members from more diverse backgrounds.

DEDICATION

Thank you to the many people who have helped me along the way: my professors, my clinical faculty advisors, my thesis committee, and especially my thesis advisor, Dr. Brennan, for her support along the way. I am grateful to the outreach grant team and Sherri Tennant for leading us for the year, and for the families of the adolescents we worked with.

Table of Contents

TABLES

FIGURES

Introduction

ASHA recognizes augmentative and alternative communication (AAC) as an area of clinical practice that "addresses the needs of individuals with significant and complex communication disorders." The term complex communication needs (CCN) refers to individuals with severe disabilities who do not verbally communicate, have limited speech intelligibility, and would benefit from a non-verbal means of communication. AAC intervention provides the means to achieve personal, educational, vocational, and social goals (Calculator, 2009; Light & McNaughton, 2014; Lund & Light, 2007) and was found to increase communicative competence (an individual's ability to freely express ideas, thoughts, and feelings to a variety of listeners across contexts) among AAC users (O'Neill, Janice, & Pope, 2018). Achieving communicative competence using natural speech differs from the development of communicative competence for AAC users (Light et al., 2003), which depends on the provision of direct intervention, modeling, wait time, and response opportunities. In addition to communicative competence, language learning is an important aspect of communication development for children who use AAC. Children who use AAC systems showed greater language learning when language use occurred in socially meaningful situations and when the children participated in shared activities (Stadskleiv, 2017).

Parents play an important role in supporting their child's communicative competence, including supporting their language development. This can include helping to scaffold their child's communicative interactions; however, parents may find it difficult to scaffold their children's language development when their children use AAC devices (Stadskleiv, 2017). Difficulties can arise from a parent's lack of familiarity with AAC and knowledge regarding how

to support language development of children who use AAC (Anderson, Balandin, & Stancliffe, 2015; Kent-Walsh & McNaughton, 2005). As a result, parents and caregivers with children who use AAC devices require training to best support their child's communication and language development. AAC training for parents/caregivers should include training about AAC system organization, technical knowledge, and methods for scaffolding language to best support communication when their child is a new AAC user (von Tetzchner & Stadskleiv, 2016). Educating parents in AAC scaffolding would also promote use of AAC in a natural setting and give new AAC users an opportunity to practice and build language across settings (e.g., school and home).

Formal, structured AAC training programs for parents and caregivers can be beneficial for providing a foundation of AAC Knowledge that family members can use to help their children communicate using their AAC devices. To support the communication of new AAC users, parents were found to need a basic level of knowledge of several aspects of AAC (Stadskleiv, 2017). These aspects included understanding how a large vocabulary is hierarchically organized in a communication book or electronic device and how such organization allows for easier navigation through the pages to construct intended messages (von Tetzchner & Stadskleiv, 2016). Parents also benefited from understanding the technical aspects of accessing the vocabulary in an electronic communication device (Murray & Goldbart, 2009). If parents understand the layout of the communication device, they can more easily support and model use of the device for their children and can demonstrate or model message construction on the devices (von Tezchner, 2015). AAC training should include all of these aspects to increase the communicative competence of the child. Stadskleiv (2017, page 11) also

found that parents benefitted from “support groups that include[d] both parents and professionals discussing a diverse range of topics that are important to them.” Collectively, this previous research (Stadskleiv, 2017; von Tezchner, 2015) suggests that AAC family training is best in an environment with peers and professionals working together where ideas and information can be freely shared.

Another component that should be included in a parent/family training is aided AAC input. The term “aided AAC input” describes interventions in which partners point to (or activate) AAC symbols (on communication boards, SGDs, or mobile technologies with AAC apps) while speaking with an individual who uses AAC (O’Neill, Janice, Pope, 2018). This intervention approach combines linguistic input using speech and the AAC device so that individuals with CCN can learn how to use the device to communicate (O’Neill, Janice, Pope, 2018). Aided AAC input has been used clinically as a mechanism to facilitate two communicative outcomes: 1) supporting the learner’s comprehension; and 2) modeling expressive output for the learner (Binger & Light, 2007; Kent-Walsh, Binger, & Hasham, 2010, as quoted in O’Neill, Janice & Pope, 2018). Aided AAC input also allows partners to validate the use of a device as an acceptable and effective mode of communication while modeling how the system can be used, in what contexts, and for what purposes (Sevcik, Romski, Watkins, & Deffebach, 1995, as quoted in O’Neill, Janice & Pope, 2018). Aided AAC input is a preferred intervention strategy for new AAC users that family members can learn to implement at home to help a new AAC user learn to use their dedicated AAC device. Aided AAC input can also enhance AAC learning and improve communication outcomes. Stadskleiv (2017) analyzed group discussions of parents whose

children with CCN use AAC devices and the results revealed that parents were particularly interested in learning more about aided AAC input.

Previous research involving parent AAC training identified six overarching themes related to the components needed in such training programs: 1) issues pertaining to child characteristics; 2) general developmental issues; 3) AAC; 4) communication devices; 5) language development; and 6) policy issues (Stadskleiv, 2017). Parents explicitly expressed a need for guidance in organizing symbols, choosing graphic systems, learning navigational principles and most importantly, their need for more knowledge about AAC in general (Stadskleiv, 2017).

There are several ways to support parents of AAC users: a) parent guidance for device use from professionals; b) formally structured intervention-oriented programs; and (c) informal approaches such as support groups (O'Neill, Janice, and Pope, 2018; Stadskleiv, 2017). These methods of parental support can provide a better understanding of AAC devices and aided AAC input. This provides a foundation that makes it easier for parents to work with their children in everyday settings. In addition to AAC training, AAC parent support groups can provide parents and caregivers with a way to connect with and to talk to other parents of AAC users and support one another as they learn to support their children learning to communicate using their AAC devices.

Training for parents and caregivers can address several additional areas of knowledge and skills that are critical for new AAC users. Parents need to be trained on how to provide language models. They also need guidance to overcome the challenges they may face in aiding their children's language development. Parents may also encounter difficulty providing communication opportunities for their children. Not only is language input needed, but

language expression from the child is needed for communication growth in multiple settings. AAC training should provide explicit examples for how their children can participate in social interaction at home across various activities, and in other natural settings with other family members and friends.

Communication partners also need to use increased wait time to help the AAC user learn their system. Wait time is especially important for new AAC users. Newer AAC users are still learning to navigate on their device and accessing the device to communicate may take longer, requiring communication partners to give them more time to respond to questions or communicate messages. Increasing wait time can be effective when implemented by everyday communication partners in naturally occurring environments over relatively short periods, such as at home during family activities. Instruction for parents and other communication partners that teach intervention techniques such as increased wait time can result in improved outcomes for individuals who use AAC (O'Neill, Janice, & Pope, 2018).

Several major barriers in the AAC service delivery model have been identified (von Tetzchner & Martinsen, 2000). The first barrier is that parents and special educators are expected to provide opportunities for an AAC user to work with the device, but they often lack the knowledge and experience needed to create and facilitate these opportunities. Second, parents often lack the skills needed to customize dedicated AAC devices. The third barrier in service delivery is the availability of competent personnel to provide aided AAC assessment and intervention. There is a lack of speech-language pathologists with expertise related to AAC assessment and intervention. The fourth barrier is that there are limited formal training programs available to parents and caregivers and many parents and caregivers are either

unaware that such programs exist or do not know how to access them (Stadskleiv, 2017). These barriers often result in parents and caregivers feeling frustrated and not knowing how to support their children's communication needs (Stadskleiv, 2017).

While high-tech AAC technology is a rapidly growing field, the evidence underpinning intervention is currently underdeveloped and the demand for better family training is of critical importance. AAC training is essential for speech-language pathologists, special educators, and family members of AAC users. If SLPs want to improve communication outcomes for their clients with CCN who are new AAC users, including AAC training can potentially be very beneficial. Unfortunately, there is a lack of research focused on AAC family training efficacy. It is unclear which aspects of AAC training are most beneficial and if training provided to family members really results in improved knowledge and beliefs about AAC. Without knowing how to best support family members, clinicians and educators are potentially addressing each family's needs related to AAC without any formal structure for how the families should be trained. The current study aimed to address this gap in the literature by creating AAC training materials, implementing the AAC training, and comparing pre- and post-training measures of AAC knowledge and AAC beliefs.

Study Aims

The first aim of this study was to create and present a AAC training to the parents and caregivers of adolescents with complex communication needs (CCN) who used new high-tech AAC devices. The second aim of the study was to compare results of a pre- and post-training AAC knowledge questionnaire and pre- and post-training AAC beliefs questionnaire to determine and describe the changes in AAC knowledge and beliefs following training. This study

involved an analysis of quality control data collected before and after a AAC training conducted during the summer of 2021. The AAC training was part of a larger outreach project for adolescents with CCN. The family members who attended the AAC family training were those whose children recently received dedicated AAC systems that they were using in school and at home. The AAC family training aimed to provide knowledge about AAC, guidelines for fostering the use of AAC at home, reinforcing and modeling AAC use for their adolescents (i.e., aided AAC input), and addressing issues or concerns that parents/family members had about AAC. The adolescents were not participants in the AAC training, but they did join their family members at the end of the training so that the family members could implement some of the methods they learned during the training and get guided feedback from the presenters.

Specific Research Questions

1. Were post-training scores on the AAC knowledge questionnaire completed after the AAC family training higher than the pre-training scores?
2. Were post-training scores on the AAC beliefs questionnaire completed after the AAC family training higher than the pre-training scores?
3. Were increased scores maintained during follow-up testing four months after the family training?

Methods

Design

This study utilized a one-group pretest-posttest design to compare AAC knowledge and beliefs before and after a AAC training program. The dependent variables include accuracy on an AAC knowledge questionnaire and Likert scores on an AAC Beliefs questionnaire. In the

analyses, no independent variables were compared and all subjects met the following criteria: family member of an adolescent with CCN who was receiving services through the AAC outreach project (see below). There was no control group as all participants participated in the AAC family training and all completed the pre- and post-training questionnaires.

The AAC Outreach Project

An outreach project, entitled *Empowering Economically Disadvantaged Adolescents with Complex Communication Needs,* was a collaboration between the University of Colorado and the Denver School of Science and Technology (DSST). The project, supported by the University of Colorado's Office of Outreach and Engagement, provided assessment, intervention, professional development, and family/caregiver education for adolescents attending DSST. The outreach project aimed to improve the ability of adolescents with CCN to communicate through evidence-based AAC assessment and intervention paired with AAC training modules for educational teams and family members. The first AAC training was a professional development for the DSST educational teams and included administrators, educators, SLPs, and paraprofessionals. The second AAC training was geared towards family members and was the focus of this study. Under the guidance and supervision of a clinical faculty member who was also a certified and licensed speech-language pathologist, graduate clinicians in the Speech, Language, and Hearing Clinic (SLHC) at the University of Colorado Boulder were trained to support the DSST professionals and family members working with adolescents with CCN.

Participants

Participants for this study included the family members who participated in the AAC family training and self-identified as the adolescent's primary conversation partner at home. Six individuals from six families participated in the May 2021 training, including four parents (mothers), one grandparent (grandmother), and one sibling (sister) of the adolescents with CCN who were being served in the outreach project and were current adolescents at DSST at the time of the study (see Table 1). All participants came from low-income bilingual Spanish-English families living in the Denver, CO Metro area. All participants agreed to have their pre- and post-training data analyzed for the purpose of this study. The University of Colorado Boulder Institutional Review Board reviewed this study and determined it did not meet the definition of human subjects research because it was an evaluation of an existing program, because data had already been collected as part of quality control measure for the family training, and because this was not a systematic investigation designed or developed for generalizable knowledge. As a result, all procedures followed HIPPA guidelines to protect the identity and privacy of the adolescents and their parents.

Table 1. Participants and their relationship to the adolescents with CCN served by the outreach project.

Participant	Gender	Relationship to AAC user	Child's Language Level*	Months child has had AAC Device	Attended Family Training remotely or in-person
1	F	Mother	Word	0	In-Person
2	F	Grandmother	Phrase	11	In-person
3	F	Mother	Word	16	In-person
4	F	Mother	Word	13	In-person
5	F	Sister	Phrase	8	In-person
6	F	Mother	Word	0	Remotely

Notes: *Language level refers to the level of language the adolescent produces using the device.

Materials

The Family Training Curriculum

A slide presentation (see Appendix A) was specifically created for the family training. This training was based on a professional development training created for the outreach project a year prior. The presentation was evidence-based and described AAC terminology, intervention strategies (including aided AAC input), and the relationship between AAC use and the decrease in negative behaviors. The training also included an emphasis on aided AAC input, so that family members could learn how to provide aided AAC input and guide the adolescent when they engaged in conversations with other people. Aided AAC input and all intervention strategies taught during the training were evidenced-based (O'Neill, Janice, & Pope, 2018).

The training ended with a practical activity that allowed parents and family members to practice strategies they learned with their adolescent. After the presentation, the adolescents were brought into the classroom with their family members and worked with graduate clinicians to practice these techniques. The graduate clinicians and the clinical faculty supervisor provided support for the family members during this time. The presentation was translated into Spanish to ensure that the bilingual or Spanish-speaking family members fully benefited from their participation. On each slide, the Spanish translation was included just under or next to the English writing. When the training was implemented, one Spanish-speaking member of the CU team was present to address any questions that arose. This team member also helped to translate the presentation slides.

The presentation was based on evidence from the past 5-10 years. Using this presentation, we then used Stadskleiv's (2017) findings to edit the presentation to include

information about what family member training should include as a first draft. After the draft was completed, we called participants and asked them the questions on the pre-training questionnaire. The presentation was then edited once more to include the information that participants were unable to answer. Videos of CU graduate clinicians providing intervention with the adolescents were added to show intervention techniques.

Questionnaires

Two questionnaires were given to participants before and after the training (pre- and post-training) including an AAC knowledge questionnaire (see Appendices B and C) and an AAC beliefs questionnaire (see Appendices D and E).

The AAC knowledge questionnaire was used to measure participants' knowledge about AAC (terminology, methods, device details, etc.) before and after the AAC training. The knowledge questionnaire was created specifically for this project by the AAC outreach team who created the AAC family training presentation. The questions aimed to assess content that was included in the presentation, such as general knowledge about AAC, terminology (core words, grid size, etc.), AAC intervention methods, and how to support AAC users in different activities. The aim was to ask questions that targeted information or skills the team believed would be most helpful for a family member to know. Additionally, the questions on the knowledge questionnaire were designed to target content identified by previous research as important for family members and parents to support a new AAC user (Calculator, 2009; Kent-Walsh, Binger, & Hasham, 2010; Light & McNaughton, 2014; Lund & Light, 2007; O'Neill, Janice, Pope, 2018; Binger & Light, 2007; von Tetzchner & Stadskleiv, 2016; von Tezchner 2015). The resulting AAC Knowledge questionnaire included 12 questions (see Appendices B and C).

Scoring responses to the AAC knowledge questionnaire was completed by two graduate clinicians (one who created the presentation and one who was fluent in Spanish and provided interpreting for the outreach project). Questions were considered correct if the information provided (1) answered the question and (2) was accurate to a minimal degree. For example, if the answer to "What type of device does your child have?", was only the brand name of the device but not the model, it was considered correct. Responses such as "I don't know" and "I am not sure" were considered incorrect. Responses that were short and simple but accurate were scored as accurate. For example, if a response for the question, "Give an example of a social activity that your son/daughter could engage in with family members using his/her device?" was "To ask for food," it would be scored as correct. Questions that were scored as correct were given 1 point and questions scored as incorrect were given 0 points. An accuracy score was based on the percentage of questions answered correctly (total points divided by 12).

Two graduate clinicians involved in the AAC outreach project and the AAC training individually scored responses and then met to compare scoring with each other to confirm agreement. Inter-rater agreement was 100%.

Participant responses to the pre-training AAC knowledge questionnaire were also used to inform and tailor the AAC training (described in the previous training development section, The Family Training Curriculum). The participant responses were reviewed prior to the AAC training and the training presentation slides were adjusted to ensure that the questions or topics that participants had low accuracy on were clarified and emphasized in the training.

The AAC beliefs questionnaire used a series of beliefs statements about AAC in three categories: beliefs about child's abilities, beliefs about self abilities, and attitudes about

communication training. The AAC beliefs questionnaire used in this study was adapted from Soto (2009) who investigated attitudes of special educators towards AAC use and students who use AAC devices. The beliefs statements were organized into categories or "factors" (Soto, 2009). These categories included "perceptions of students' abilities," "perceptions of own skills and responsibilities," "perceptions of SLP's responsibilities," "attitudes towards communication training," and "intention of use AAC in the classroom." Soto (2009) started with a focus group meeting to identify conditions and variables essential to teachers' willingness to use AAC systems in the classroom. A 66-question survey was created based on the information gathered from the focus group meeting (n=6) and a pilot study was conducted and followed by a larger group study to identify the most valid questions. The focus group discussion was transcribed verbatim and analyzed to yield categories and analyzed independently by the primary investigator and a research assistant. Statements relating to opinion, belief, and/or perception of AAC use by students was typed onto cards and then grouped and labeled into categories. These two individuals then met and discussed card groupings and name of categories until agreement was achieved. Soto (2009) also included additional measures of internal validity and survey validation to ensure the validity of the final survey questions. The final survey resulting from Soto (2009) included a set of 30 validated statements for the beliefs survey. For the current study, sixteen of those beliefs statements were used. The selected statements were those that were most appropriate for family members rather than educators and statements that made sense for the home and community context to which family members would relate most. The statements from Soto (2009) that were not included were those that related to professional staff and administration and/or did not relate to the home setting. For the current

study, wording was also changed because the questionnaire was given to family members in a home setting instead of professionals in a classroom setting.

Participants were asked to agree or disagree with each beliefs statement by selecting one of the following choices: Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree. During scoring, these responses were converted to a 5-point Likert scale with 1 equal to strongly disagree and 5 equal to strongly agree. The total score for all beliefs statements for each respondent was calculated and these scores were used in subsequent statistical analyses to compare pre- and post-training ratings on the AAC beliefs questionnaire.

Procedure

Prior to the AAC training all participants were called and completed the AAC knowledge questionnaire and AAC beliefs questionnaire over the phone with one of the two graduate clinicians involved in the AAC outreach project and the AAC training. The bilingual Spanish-English speaker called the family members who were more comfortable speaking Spanish or who were Spanish-only speakers. All participants were already familiar with both graduate clinicians since they had already been working with their children through the AAC outreach project. Phone calls to complete the two questionnaires were done between 1-2 weeks prior to the AAC family training.

Participants attended the family training in mid-May (2021) in-person in one of the classrooms at the adolescents' high school or via Zoom. Five participants attended in-person and one attended via Zoom. This AAC family training included PowerPoint slides presented by the CU clinical faculty member specializing in AAC intervention (a certified and licensed speech-language pathologist) and two graduate clinicians involved in the CU AAC Outreach Project. One

of the two graduate clinicians was a bilingual Spanish-English speaker who provided interpretation throughout the presentation as needed. All presenters had existing relationships with the family member participants and their children through the AAC Outreach Project. The graduate clinician who was a fluent speaker of Spanish helped translate the presentation slides in advance of the training session.

The family training was planned to be 2.5 hours and included a lecture-style presentation (approximately 2 hours), time for questions and answers (approximately 20 minutes), and several practice activities that would give participants the opportunity to see techniques modeled and to practice the techniques themselves (approximately 10 minutes). Deliberate practice has shown to help individuals learn and retain skills (Campitelli & Gobet, 2011).

Although twenty minutes were set aside for questions at the end of the presentation, participants were invited to ask questions throughout the presentation. Participants were eager to ask questions and were highly engaged with the presenters and each other. They asked many questions during the presentation portion of the training and as a result, the time for questions at the end of the training was reduced to 5 minutes because most questions were asked during the presentation portion of the training. This change was made due to the high level of participant engagement during the presentation and because the spontaneous questions resulted in great discussion between participants and presenters.

At the end of training, participants provided unsolicited feedback about the training through comments made to each other and to clinicians. Additional feedback was elicited during post-training phone calls completed one week after training by the same graduate

clinicians of the outreach team. During these post-training calls, participants completed the post-training AAC knowledge questionnaire and AAC beliefs questionnaire, and were asked for feedback about the training. specifically, they were asked what they felt they received out of the training. As with pre-training calls, all questionnaires were done via phone in the preferred language of the participants.

To measure long-term outcomes (research question 3), participants were called by the same two graduate clinicians four months after the AAC training to complete the same two questionnaires. The aim was to determine if newly acquired beliefs and knowledge had been maintained long-term. Unfortunately, only two participants could be contacted to complete the long-term post-training questionnaires.

It should be noted that some of the participants had received additional informal training prior to the AAC training. This additional training was the result of COVID-19 pandemic-related changes in educational settings. During the summer and fall of 2020, all adolescents in the AAC outreach project were doing remote education and receiving teletherapy or on occasion, therapy in-person at home (usually in a backyard). In January 2021 (several months before the AAC training), families at the high school and middle school were given the option to return to the classroom or continue remote education. The CU AAC outreach team returned to the school to provide intervention in the classroom once per week for adolescents who had returned to in-person education, but the CU team also provided teletherapy once per week for families who elected to have their adolescents not return to in-person education. Because some therapy sessions were held remotely (i.e., telepractice), family members who were present with their adolescents during remote sessions received some additional AAC training.

The remote sessions terminated a couple of weeks before the AAC training and did not resume until several weeks after the AAC training. This difference in exposure to AAC intervention does not interfere with the primary aim of the study, which was to determine if the AAC training resulted in higher scores on the AAC knowledge questionnaire and the AAC beliefs questionnaire.

Statistical analyses

For the first aim, average accuracy on the pre- and post-training AAC knowledge questionnaire for all participants was compared to determine if post-training scores were significantly higher than pre-training scores using the non-parametric Wilcoxon Signed Ranks Test (also known as the Wilcoxon matched pairs test). The Wilcoxon Signed Ranks Test can be used for a repeated measures design with a small sample size and can be used with cardinal data (such as percentage accuracy) (Scheff, 2016; Xia, 2020).

Qualitative analyses

For the second aim, pre- and post-training scores on the AAC beliefs questionnaire were compared qualitatively for all participants to describe the change in ratings following the AAC family training. Qualitative analyses were also conducted for the AAC knowledge questionnaire level of detail of responses. and descriptively for accuracy per question pre- and post-training. Additional qualitative analyses included an examination of post-training comments provided regarding participants' general feedback about the AAC family training.

Results

The first research question aimed to determine if the post-training scores on the AAC knowledge questionnaire following the AAC training were higher than the mean pre- training scores. The Wilcoxon Signed Ranks Test comparing the pre- and post-training scores on the AAC knowledge questionnaire was statistically significant and revealed that the post-test mean score (56%) was statistically higher than the pre-training mean score (29%) ($Z = -2.226$, $p = 0.026$) (see Figure 1 and Table 2). The average accuracy per question on the pre- and post-training AAC knowledge questionnaire is shown in Table 3.

Examples of participant answers to questions in the AAC knowledge questionnaire are shown in Table 4. Answers given during the post-training were more accurate and specific. An example of a change in accuracy can be seen with question 2, "How does your [child] access his/her device?," participant 2 responded, "I'm not sure" during the pre-training (scored as inaccurate) and responded, "He uses his eyes" during the post-training (scored as accurate). An example of a change in detail and specificity can be seen with question 9, "Give an example of how your son/daughter's AAC device could be better tailored to fit your family's culture and/or language?" For this question during the pre-training, participant 6 responded, "We can use it during meal times." During the post-training, participant 6 responded, "She uses Spanish at home and English at school and with her siblings. So she could have food time and holidays in Spanish and school activities in English."

The second research question aimed to compare qualitatively for all participants to describe the change in ratings on the AAC beliefs questionnaire increased following the AAC training. There was a small numerical difference (not evaluated using a test of significance)

between the pre- and post-training scores on the AAC beliefs questionnaire. This was reflected as a higher sum of Likert scale responses (converted to numerical values) for each participant during post-training compared to pre- training (see Figure 2 and Table 5).

Additionally, Table 6 shows the results of the AAC beliefs questionnaire organized by each belief statement. This table shows that for each statement, the average rating for the group had an increasing trend from pre- to post-training, including all three categorical subsets of statements from the AAC beliefs questionnaire: (1) beliefs about child's abilities, (2) beliefs about own abilities, and (3) beliefs about communication training.

Figure 1. Pre- and post-training accuracy on the AAC knowledge questionnaire for each subject.

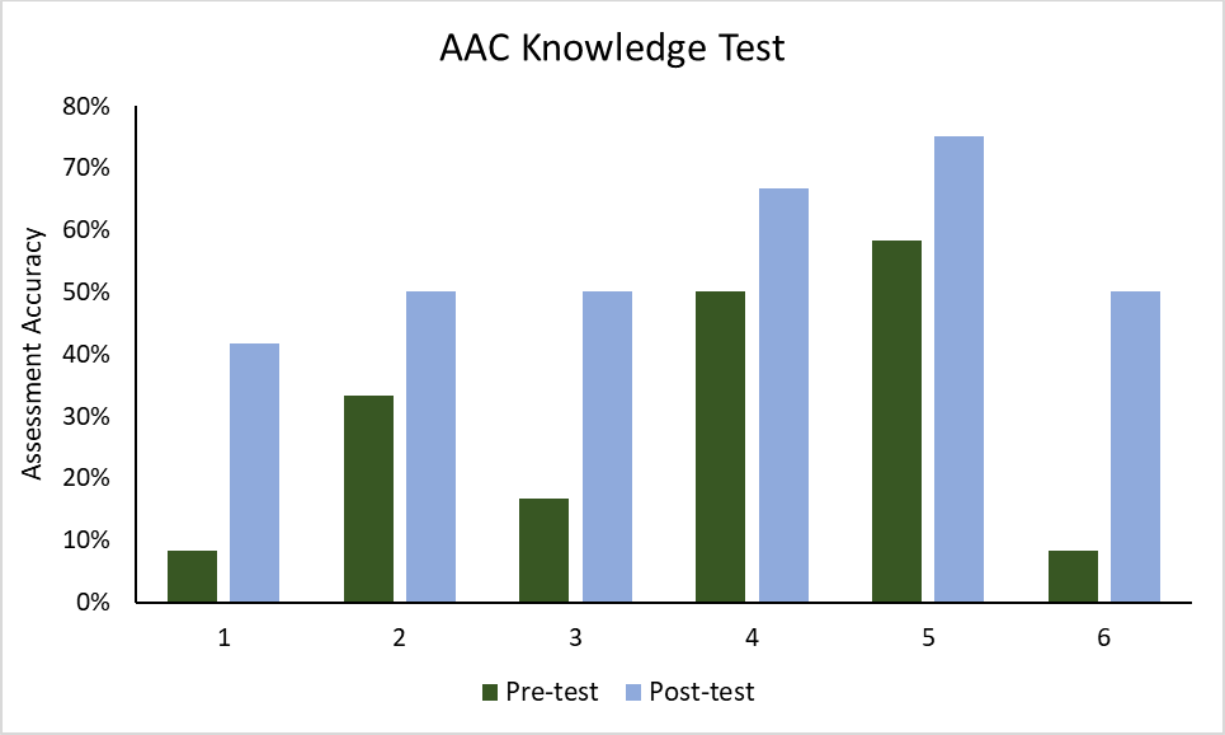

Table 2. Pre- and post-training accuracy on the AAC knowledge questionnaire.

Participant	Accuracy Pre-Test	Accuracy Post-Test	% Difference in Accuracy
1	8%	42%	34%
2	33%	50%	17%
3	17%	50%	33%
4	50%	67%	17%
5	58%	75%	17%
6	8%	50%	42%
Average for all participants	29%	56%	27%

Note: Correct answers were given a score of 1, and incorrect or unknown answers were given a score of 0. The percentage scores listed above are the percent questions correct out of 12 questions.

Table 3. Average accuracy per question on the pre- and post-training knowledge questionnaire.

Question	Accuracy Pre-Test*	Accuracy Post-Test*
1. What AAC system does your son/daughter have?	1/6 (16.7%)	2/6 (33.3%)
2. How does your son/daughter access his/her device?	3/6 (50%)	3/6 (50%)
3. List 5 core words and where you can find them on your child's AAC device?	1/6 (16.7%)	5/6 (83.3%)
4. Please list 5 pre-programmed messages that are already on your son/daughter's AAC device?	1/6 (16.7%)	2/6 (33.3%)
5. What is your son/daughter's grid size?	1/6 (16.7)	1/6 (16.7%)
6. Give an example of a shared activity you would like to do with your son/daughter that will utilize the AAC device.	2/6 (33.3%)	5/6 (83.3%)
7. Which AAC intervention method would you like to try with your son/daughter?	0/6 (0%)	4/6 (66.6%)
8. What words/messages would you most like to see added to your son/daughter's device?	2/6 (33.3%)	5/6 (83.3%)
9. Give an example of how your son/daughter's AAC device could be better tailored to fit your family's culture and/or language?	2/6 (33.3%)	3/6 (50%)
10. Give an example of a social activity that your son/daughter could engage in with family members using his/her device?	5/6 (83.3%)	6/6 (100%)
11. Give an example of a prompt you could use with your son/daughter to help him/her use the AAC device.	0/6 (0%)	3/6 (50%)
12. Identify a challenging behavior that AAC use could help improve for your son/daughter?	1/6 (16.7%)	2/6 (33.3%)

*Shows how many participants correctly answered out of 6 with the percentage shown

Table 4. Selected quotes of responses by participants on the AAC knowledge questionnaire.

	Question	Example of quote from pre-test	Example of quote from post-test
1	What AAC system does your son/daughter have?	P1: "I have no idea"	P1: "Uses a Tobii Dynavox with Snap+Core"
2	How does your son/daughter access his/her device?	P2: "I'm not sure"	P2: "He uses his eyes"
3	List 5 core words and where you can find them on your child's AAC device?	P3: "I don't know what those are"	P3: "There's and, the, him, me, you. They are on the first page and easy to find"
4	Please list 5 pre-programmed messages that are already on your son/daughter's AAC device?	P6: "I am not sure"	P6: "He can talk about his family. Like 'I am from Denver,' 'I like to watch TV,' 'This is my mom,' 'This is my sister,' and 'I am hungry.'It's good to use these with the family"
5	What is your son/daughter's grid size?	P5: "I don't know what that means"	P5: "I didn't know what this meant before but he has a 9 grid size"
6	Give an example of a shared activity you would like to do with your son/daughter that will utilize the AAC device.	P3: "With his brothers"	P3: "He can use it when he watches his brothers play baseball"
7	Which AAC intervention method would you like to try with your son/daughter?	P4: "I don't know"	P4: "I can give meaning to what she says. I didn't do that before"
8	What words/messages would you most like to see added to your son/daughter's device?	P4: "I don't know"	P4: "He really likes to watch his brothers play baseball, so I think things about that would be good"
9	Give an example of how your son/daughter's AAC device could be better tailored to fit your family's culture and/or language?	P6: "We can use it during meal times"	P6: "She uses Spanish at home and English at school and with her siblings. So she could have food time and holidays in Spanish and school activities in English"
10	Give an example of a social activity that your son/daughter could engage in with family members using his/her device?	P3: "To ask for food"	P3: "When we watch a movie together and talk about it"
11	Give an example of a prompt you could use with your son/daughter to help him/her use the AAC device.	P2: "I will ask questions and she doesn't respond"	P2: "I can give her options instead of just asking what she wants"
12	Identify a challenging behavior that AAC use could help improve for your son/daughter?	P2: "When she yells in bed when we help her"	P2: "When she yells meal time for something she can use the device to ask instead"

Note: P indicates participant number.

Figure 2. Pre- and post-training scores on the AAC beliefs questionnaire for each subject.

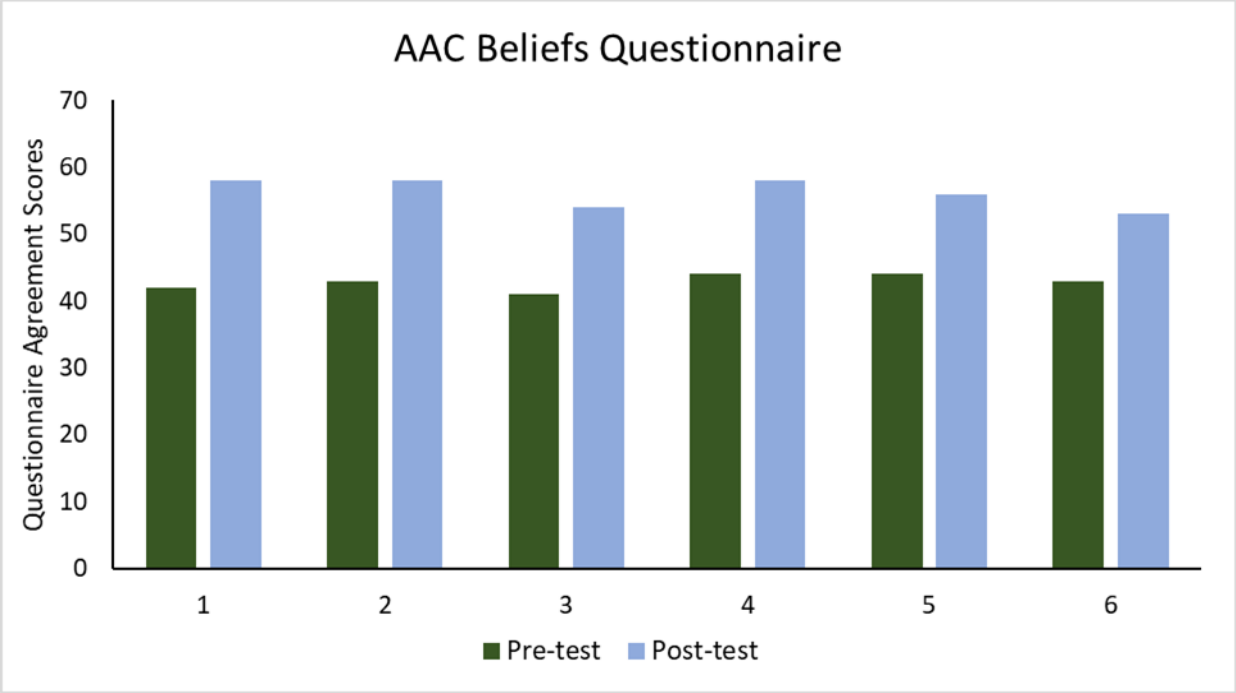

Table 5. Pre- and post-training total ratings on the AAC beliefs questionnaire.

Participant	Total Beliefs Ratings Pre-Test	Total Beliefs Ratings Post-Test
1	42	58
2	43	58
3	41	54
4	44	58
5	44	56
6	43	53
Average for all partcipants	43	56

Note: Scores are the total sum of all ratings for all beliefs statements on the beliefs questionnaire.

Table 6. AAC beliefs questionnaire results organized by belief statement.

Category	Pre-Test Group Average	Post-Test Group Average
Perceptions of students' abilities		
1. All children/adolescents regardless of the severity of their disability have the potential to learn how to communicate more effectively.	2.3	3.8
2. I am confident that my son/daughter/granddaughter/sibling can learn to communicate more effectively.	2.7	3.5
3. There is not much I can do to improve the communication skills of some of my son/daughter/granddaughter/sibling.	2.3	3.3
4. My son/daughter/granddaughter/sibling does not have the cognitive potential to learn how to communicate effectively.	2.7	3.7
5. My son/daughter/granddaughter/sibling does not show any motivation and/or interest in communicating.	2.3	3.2
Perceptions of own skills and abilities		
6. The speech-language therapist and I should work together to develop communication goals for my son/daughter/granddaughter/sibling.	3	3.7
7. My training and experience have given me the necessary skills to try to improve the communication skills of my son/daughter/granddaughter/sibling through the use of AAC.	2	3.5
8. When my son/daughter/granddaughter/sibling makes progress in communicating more effectively, I feel it is because I have exerted a little extra effort.	3	3.7
9. When my son/daughter's communication skills improve it is usually because I have found more effective methods to help him/her.	2.5	3.3
10. I feel that I have the skills to teach my son/daughter/granddaughter/sibling how to communicate more effectively.	2.5	3.3
11. I feel that part of my responsibility as a parent/primary caregiver/family member is to work on improving the communication skills of my son/daughter/granddaughter/sibling.	2.5	3.7
Attitude toward communication training	3	3.7
12. One of the highest priorities for an adolescent with severe disabilities should be to provide them with socially acceptable ways to communicate with family and community.	3	4.2
13. I think it is fundamental to provide son/daughter/granddaughter/sibling, who has a severe disability, with ways to communicate more effectively.	2.7	3.2
14. If we wish to do so, our family can have a clear and significant role in carrying out activities that support our daughter's/son's/granddaughter's/sibling's effective use of AAC at home and school.	2.7	3.2
15. Our family receives direct coaching from the SLP and/or other team members on how we may incorporate AAC usefully and practically at home, if such information is a priority for us.	2.8	3.2
16. The SLP and other team members consider the needs and preferences of both our daughter/son/granddaughter/sibling and family when designing and implementing the AAC program.	3	3.2

Notes: Results show group averages for each statement. Scores are the group average Likert rating (scale 1-5) for each statement on the AAC Beliefs questionnaire.

The third research question aimed to determine if increased scores on either the AAC knowledge questionnaire or the AAC beliefs questionnaire were maintained during follow-up testing four months after the family training. As mentioned, only two participants could be contacted to complete the post-training questionnaires. Due to the small number of responses, this data was not analyzed.

While not initially a specific aim of this study, additional qualitative data was gathered relating to participant feedback about the AAC training. This data was gathered as a way to assess the social validity of the family training. Social validity is the social importance and acceptability of treatment goals, outcomes and procedures (Foster & Mash, 1999). Feedback statements were grouped into categories that Soto (2009) used. Here, each feedback statement was reviewed individually by three individuals (including the first author). Each reviewer categorized the statements into three groups. The three reviewers then compared their categorization and category names. There was some discussion about 4 feedback statements out of 20 until 100% agreement was achieved. The three categories that were agreed upon included: improved level of confidence, reduced frustration, and a general feeling of support from working with the group of other family members during the AAC family training. This method of assessing social validity followed procedures described by Strauss and Corbin (1990). Table 7 shows quotes provided by participants in three categories: support, frustration, and confidence. All six participants provided positive feedback about one or more of the categories identified. For example, a statement about support was made by participant 3, who stated, “it’s been nice to have this support from the other mothers and the team during [the AAC family training].” Participant 6 made a statement about frustration, “I know when we start using the

device that everyone has a hard time with it at first and I won't feel bad if I have a difficult time." Participant 1 stated that she "felt more confident using the device at home and [her daughter] uses it more too." The feedback provided by the six participants all reflect a greater sense of confidence, an appreciation that experiencing difficulty or frustration is common, and having a greater feeling of support from other family members and from the AAC outreach team. They expressed more comfort with using the device at home and knowing they were not alone in having difficulties. Their feedback also reflected increased confidence using the device at home with their child.

Additional qualitative analyses included consideration of the types of questions asked during the AAC training. We observed that one participant, a parent whose child had had a dedicated AAC device for the longest of the group, asked more detailed questions, appeared more comfortable asking questions, and also readily offered ideas and suggestions to other participants. This participant had previously received the most training at the time of the AAC training, specifically during previous AAC teletherapy sessions. She also had more experience providing aided AAC input using her son's AAC system at home. She discussed the difficulties related to using the device at home and the challenge of knowing when was best to use the device. This participant's willingness to be an active participant in the training encouraged other participants to share their difficulties and ask more questions. This resulted in dialogue and group discussion.

Table 7. Thematic categorization of participant feedback for social validity.

Category	Quote
Support	P3: "It's been nice to have this support from the other mothers and the team during this."
	P5: "COVID was hard and I wish I had a group like this to help me before. But I'm glad I got it now"
	P4: "It was tough during COVID but this group helps me feel better and know there are others too."
Frustration	P2: "It was good to see I'm not the only one struggling. I'm not the only one."
	P3: "I was thinking about not using the device anymore, but knowing everyone has difficulties makes it easier for me to keep trying. I felt bad not using it but I know I wasn't the only one. I feel better about not using it and using it more again."
	P6: "I know when we start using the device that everyone has a hard time with it at first and I won't feel bad if I have a difficult time."
Confidence	P1: "I've felt more confident using the device at home and she uses it more too."
	P5: "I mostly used it during meal times but now we can use it during movies and with other family members."

Note: P indicates participant number.

DISCUSSION

This was a brief, questionnaire-based study of parents, caregivers, and family members of six adolescents being served by the outreach project through the CU Boulder's Speech-Language and Hearing Sciences Department (CU-SLHS) and Denver School for Science and Technology (DSST). The purpose of this study was to determine if a training session provided to the parents, families, and caregivers of adolescents with CCN who use new high-tech AAC devices resulted in increased accuracy on the AAC knowledge questionnaire and increased ratings on the AAC beliefs questionnaire. All participants showed higher scores on the post-training for both questionnaires.

The results of this study revealed a trend that that all participants increased their ability to answer questions accurately on the AAC knowledge questionnaire. Additionally, participant responses to the questions on the AAC knowledge questionnaire were more specific and included more detail during the post-training than the pre-training. Questions about social activities had high pre- and post-training scores and we suggest that for future training sessions these topics may be briefly discussed so that topics addressed in other questions, such as the importance of using AAC devices during social activities, can be emphasized. There was also low accuracy for the group during pre-training with small increases in accuracy for questions related to types of AAC device systems, pre-programmed messages, grid size, and challenging behaviors. These topics are important for receiving tech help from the AAC device companies and for home AAC use. The ability for parents to know how to create pre-programmed messages can expand what their child can communicate using their device and parents who

have this skill can preprogram messages for upcoming family events. Future training sessions should aim to focus more on these topics.

The qualitative analysis revealed an increasing trend in overall Likert ratings on the AAC beliefs questionnaire for all six participants. Additionally, the average group Likert rating for each belief statement had a higher rating post-training than pre-training. We suggest that the participants' responses during post-training reflected revised beliefs relating to all three categories of beliefs as determined by Soto (2009): beliefs about child's abilities, beliefs about self abilities, and attitudes about communication training. While it should be noted that the Likert ratings for each statement changed only slightly, it is important to consider that in some cases the change reflected a shift from undecided to agree or agree to strongly agree. We interpreted the change in ratings as reflecting revised participant beliefs that they were now able to use the device in their home and that they recognized the importance of using the AAC devices with their adolescents.

Another consideration regarding the AAC beliefs questionnaire results is why beliefs shifted. It is possible that AAC training increased knowledge about AAC and skill related to programming and implementing aided AAC input. If participants experienced increased knowledge and skill, then it would be logical to assume this facilitated increased confidence. Another possibility is that they did not actually learn much content, but getting feedback from those who ran the AAC family training or being able to talk with other family members of AAC users provided a boost to their confidence levels. We suggest that future studies include additional measures to try and determine why participants have a sense of increased

confidence. Such information would be highly informative for others planning AAC training programs.

Likert ratings on the post-training AAC beliefs questionnaire were higher for all participants compared to pre-training ratings, but as previously mentioned, the change in ratings on the AAC beliefs questionnaire for each statement was slight. It is unclear if the Likert ratings from the questionnaire used here reflected a true change in beliefs and attitudes; however, consideration of statements provided as feedback following the training appear to indicate a true increase in confidence and changed beliefs about their abilities to use and model the AAC devices. The AAC family training presented factual information and modeled intervention methods. Future training sessions may want to address beliefs about AAC more directly and attempt to gather information using measures with better validity. For example, training could involve dedicating a set amount of time to directly discuss attitudes and beliefs about AAC use, beliefs about their children's ability to communicate, and communication training and measures could utilize previously validated questionnaires without modification.

Because only two participants participated in the long-term testing, this study was unable to assess maintenance of changes in AAC Knowledge and beliefs. Future research should aim to gather this information as this will be highly informative for future AAC family training. Since it is unknown if the AAC family training provided here resulted in long-term retention of knowledge and beliefs, future research is needed to determine what types of training result not only in improved knowledge and beliefs, but also maintenance of such gained knowledge.

This AAC training was conducted just one year after the COVID-19 pandemic began. The emotional impact of the pandemic affected the mental well-being of all families involved and

disrupted schooling and intervention, as it did with families and their children everywhere. AAC knowledge has been previously identified as an area of need for family members and primary communication partners (von Tetzchner & Stadskleiv, 2016). The impact of the pandemic may have compounded this area of need for families. Because the context of this training was unique (coming after a year of pandemic shutdowns), participant outcomes may not be typical. We suggest future research is needed to determine if similar outcomes are found for AAC training sessions during times that are less stressful and not in the midst of a global pandemic.

As mentioned, one participant was highly engaged, expressing her personal challenges related to AAC. Inclusion of this participant worked well as her questions and active participation appeared to encourage engagement by other participants. Inclusion of this participant worked well as her questions and active participation appeared to encourage engagement by other participants. Additionally, the feedback provided by participants post-training indicated they appreciated the group aspect of the training and the opportunity the training afforded then, specifically that they got to talk to other parents and family members. We suggest that future AAC training sessions should include participants with varying levels of AAC experience. Additionally, the training should be planned so that there is time for family members to discuss their experiences and challenges with each other. During this study, discussions occurred throughout the presentation resulting in less time for questions at the end. However, many questions were asked and answered during these discussions.

The feedback provided by participants during the post-training calls shows that participants found the training to be beneficial for learning how to implement AAC at home, but maybe more importantly, that the group aspect of the training was cathartic. They reported

that being able to share their experiences with others in similar situations gave them additional confidence. They also expressed that they anticipated feeling encouraged by the group support received, knowing they would find strength in that support as they face new challenges in the future. We suggest that future AAC training encourage participants to share their experiences even when those experiences are about difficulties, challenges, and frustrating situations. If participants can be encouraged to do this, it is possible that all participants will gain confidence by learning they are not alone and knowing others are struggling similarly.

Limitations

There are several limitations of this study. This study included only six participants. All participants had a child or family members in one high school or its feeder middle school. This is a very small group and the results may not generalize to participants in future training sessions. Future studies should aim to have a larger cohort of participants.

Due to the fact that this study was an analysis of quality control data, rather than a true experimental design, the current study lacked a number of controls. Instead of being set up as an experiment, this study evaluated the AAC training already planned as part of the AAC outreach project. Because the adapted AAC beliefs questionnaire used in this study was modified from the validated version created by (Soto, 2009), the current version lacks the same validity. We suggest that future studies include additional measures of validity or use a previously validated questionnaire without making modifications or by ensuring the validity of the questionnaire prior to its use for data collection.

Because the data collected included repeated measures using Likert scales and then those responses were converted into scores, statistical analysis was not performed. Finding a

way to assess changed beliefs in a way that would permit use of statistical analyses would greatly improve future research focused on AAC training outcomes.

Future Research

Future studies should be designed to test AAC training outcomes with more controls in place, such as including a control group or adhering to principles of single-subject experimental design, measures of previous AAC experience for each participant, and measure participant education level or other individual factors that may contribute to changes in the outcome measures. Notably, participants in this study were all women from a lower-SES community and all were either Spanish-English bilinguals or Spanish speaking only. It would be beneficial for future studies to include families that make up a more diverse group, with greater diversity in gender, race, ethnicity, language, and SES.

In order to increase the number of participants in research focused on AAC training, future studies should consider offering training sessions remotely, as well as in-person or hybrid modalities (i.e., some participants attending in-person and others remote) in order to get larger numbers of participants with more diverse backgrounds.

Implications for AAC Training

We believe that conducting pre-training questionnaires via phone calls to each participant prior to the AAC training provided input that helped guide the creation of the training materials and content. Obviously, for a small group this is easy to do. For larger groups, it might be easier to mail or email surveys measuring AAC knowledge and beliefs in advance of the training to assess topics participants are less familiar with and to identify beliefs statements

that get lower ratings. The results of these advanced questionnaires can be aggregated and then the presentation can be tailored to the participant group's specific areas of need.

We strongly suggest that future AAC training sessions include a parent from a previous training to join as a co-presenter. Because one participant with the most experience in this study encouraged others to participate, having one previous participant take on the role of co-presenter would guarantee someone with personal experience as a family member who could share personal experiences and facilitate group discussion. This would also allow participants to hear from a peer, provide a different perspective from the other presenters, and help create a dynamic conversation during training.

Conclusion

This study aimed to develop an AAC training for family members of adolescents with complex communication needs who use a high-tech AAC device. The training team included graduate clinicians and faculty from the University of Colorado Boulder. The same team also provided the AAC assessment and intervention to adolescents in Denver, Colorado. All participants in the AAC training had children who were involved in an AAC outreach project provided by the Speech-Language and Hearing Clinic at the University of Colorado Boulder. Two questionnaires measured participant AAC knowledge and AAC beliefs and pre- and post-training scores were compared to determine if scores on the questionnaires increased after training. Despite several limitations due to the design and purpose of the study— including but not limited to a small sample size and outcome measures— the family members who participated in the AAC training all demonstrated increased scores on post-training questionnaires designed to evaluate AAC knowledge, beliefs, and attitudes. Participants

provided feedback following the training that indicated they found the training to be helpful and that they appreciated that family members of other children who used AAC were present. They reported that having other family members involved provided them with increased confidence knowing that other family members also experienced difficulty at times. We suggest that while additional research on AAC training efficacy is needed, the AAC training provided here could serve as a model for future AAC family training.

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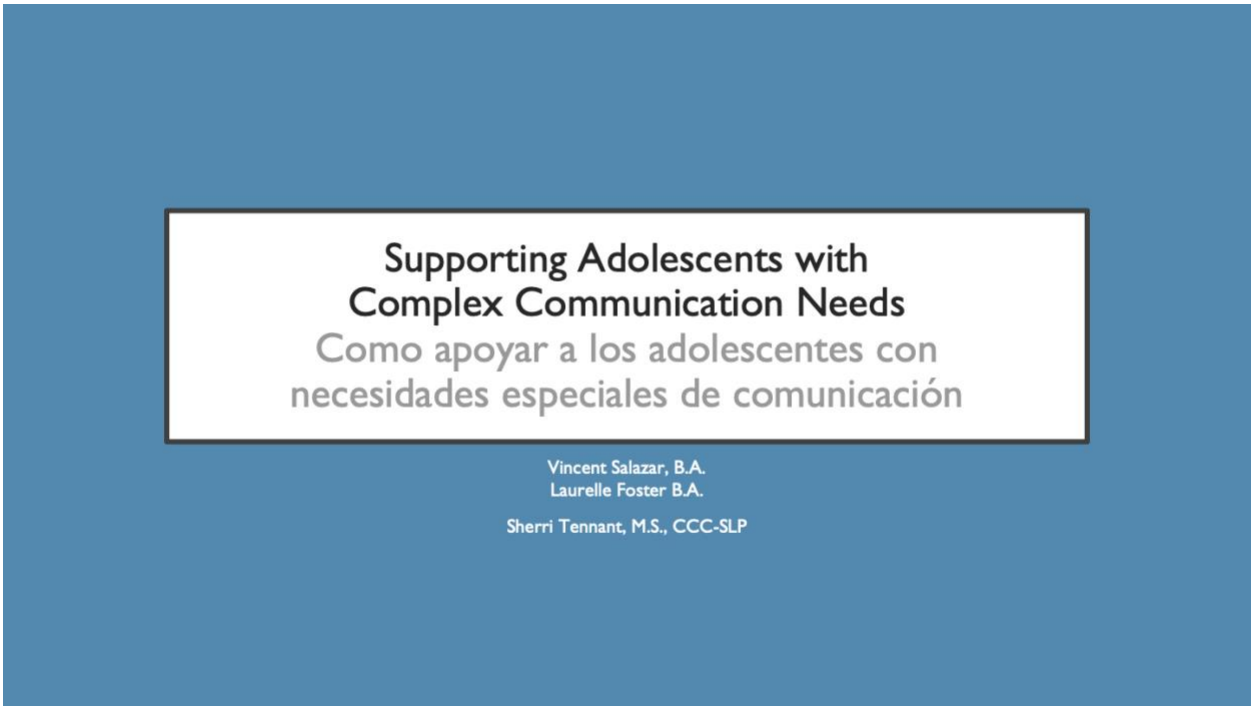
Appendix A (Presentation)

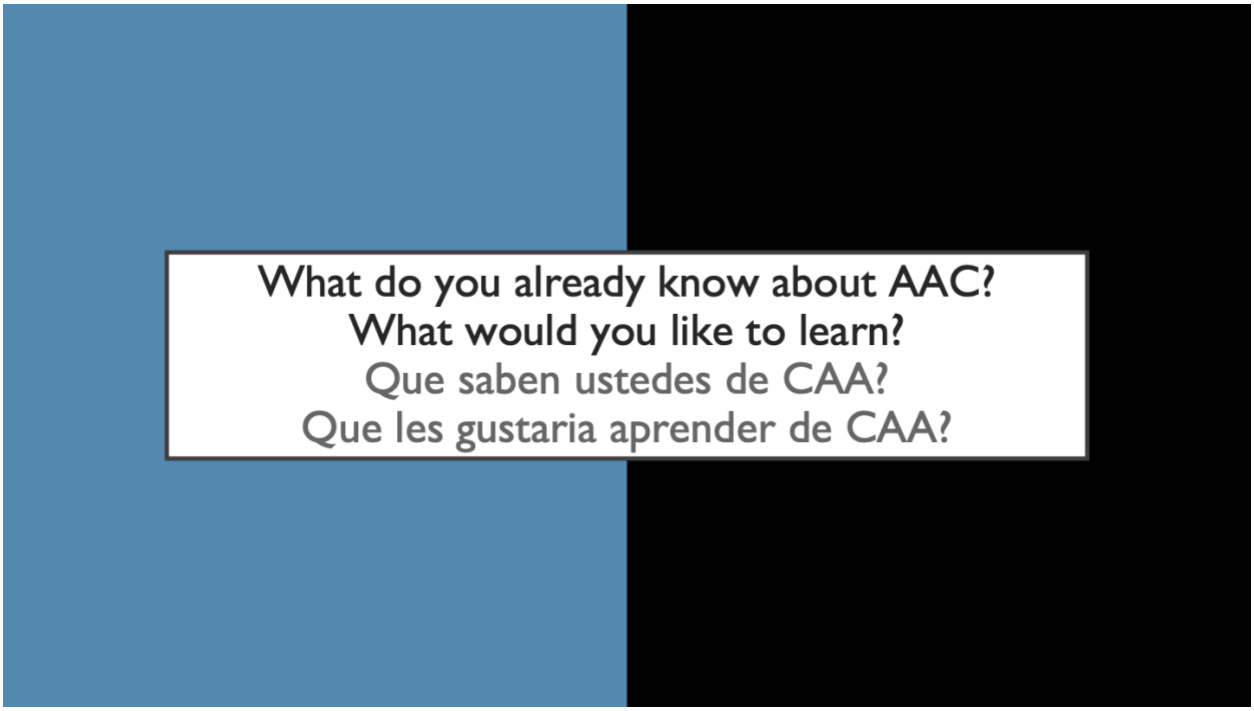


Agenda

- Introductions Presentaciones
- Learning outcomes Los objetivos de hoy
- Terminology overview Terminologia general
- Overview of AAC intervention strategies with practical application of strategies Resumen de las estrategias de intervención con ejemplos
- Break Pausa
- Breakout sessions & activities Reunion separadas y las actividades
- Post-training questionnaire Cuestionario

Learning Outcomes
Los Objetivos de Hoy

- Learn about different types of AAC systems and grow confidence in using. Aprender de tipos de los sistemas de CAA y ganar más seguridad en si mismos.
- Learn specific, evidence-based strategies in AAC intervention that can be used to support and expand your children's communication during daily home activities. Aprender estrategias específicas y basadas en evidencias cuales se puede usar para aumentar las habilidades de comunicación en la casa.
- Apply AAC intervention strategies and techniques to specific situations you may encounter with your individual children. Aplica las estrategias y tecnicas de intervencion a las situaciones específicas y comunes.
- Incorporate principles of AAC intervention at home. Incorporar los principios de las intervenciones de CAA en la casa



Terminology

- Complex communication needs (CCN) Las necesidades especiales de comunicacion
- Augmentative and alternative communication (AAC) Comunicación aumentativa y alternativa
  - Unaided and aided systems Sistemas sin ayuda/con ayuda
    - No-tech sin tecnología
    - Light-tech tecnología menos avanzada
    - High tech tecnologia avanzada
  - Grid Size El tamaño de cuadrícula/ la cantidad de botones
  - Symbols Símbolos/Dibujos
  - Selection techniques Los métodos de acceso
    - Direct selection
    - Indirect selection (scanning, eye gaze)

Terminology

- Communicative competence
  - Linguistic Linguistica
  - Operational Operacional
  - Strategic Estrategico
  - Social/Psychosocial Social
- Communicative functions Tipos de Comunicacion
  - Request Solicitar/Pedir
  - Comment Comentar
  - Sharing information compartir informacion
  - Greeting Saludar
  - Initiation Empezar una conversación
  - Termination Terminar la conversacion
  - Protest Protestar

AAC Intervention Strategies

- Aided AAC input. Entrada CAA asistida.
- Attributing meaning Atribuir significado
- Wait time / expectant delay Tiempo de espera / retraso expectante
- Open-ended questions Preguntas de final abierto
- Prompting hierarchies Incitar jerarquías
- Peer support arrangements Apoyo de los compañeros

Intervention Strategies:
Aided AAC Input
Estrategias de intervención:
Entrada AAC asistida

- **Aided input: the communication partner points to/selects aided AAC symbols while speaking with an individual who uses AAC** Entrada asistida: el interlocutor señala / selecciona los símbolos AAC asistidos mientras habla con una persona que usa AAC
  - **Should be used on an ongoing basis during interactions** Debe utilizarse de forma continua durante las interacciones.
  - **Supports comprehension and models expressive output for the learner who uses AAC** Apoya la comprensión y modela la salida expresiva para el alumno que usa AAC
  - **May use individual key words, multi-symbol messages, or pre-programmed messages** Puede usar palabras importantes individuales, mensajes con múltiples símbolos o mensajes preprogramados
  - **Combine core and fringe vocabulary** Combina vocabulario básico y marginal

Core words and why to work on
Palabras fundamentales y por qué trabajar en ellas

Examples: Aided AAC Input

Entrada CAA asistida

Key Word Aided AAC Input
with Core Words

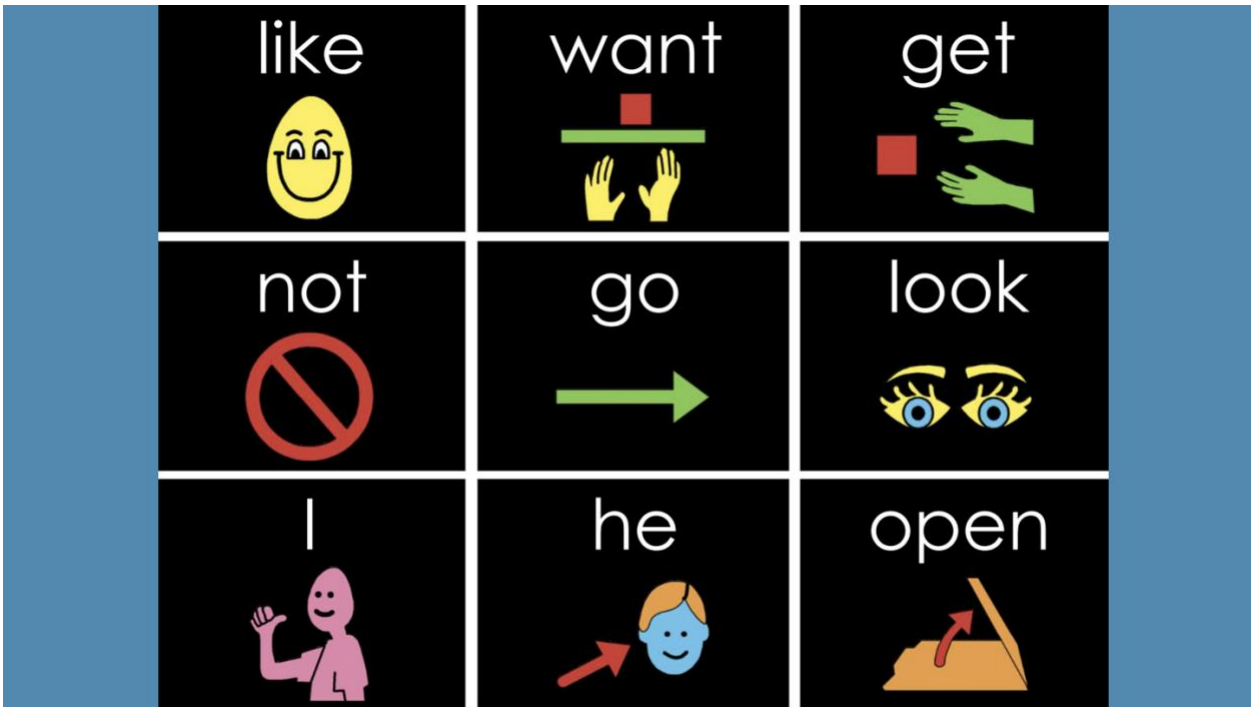
Examples: Aided AAC Input

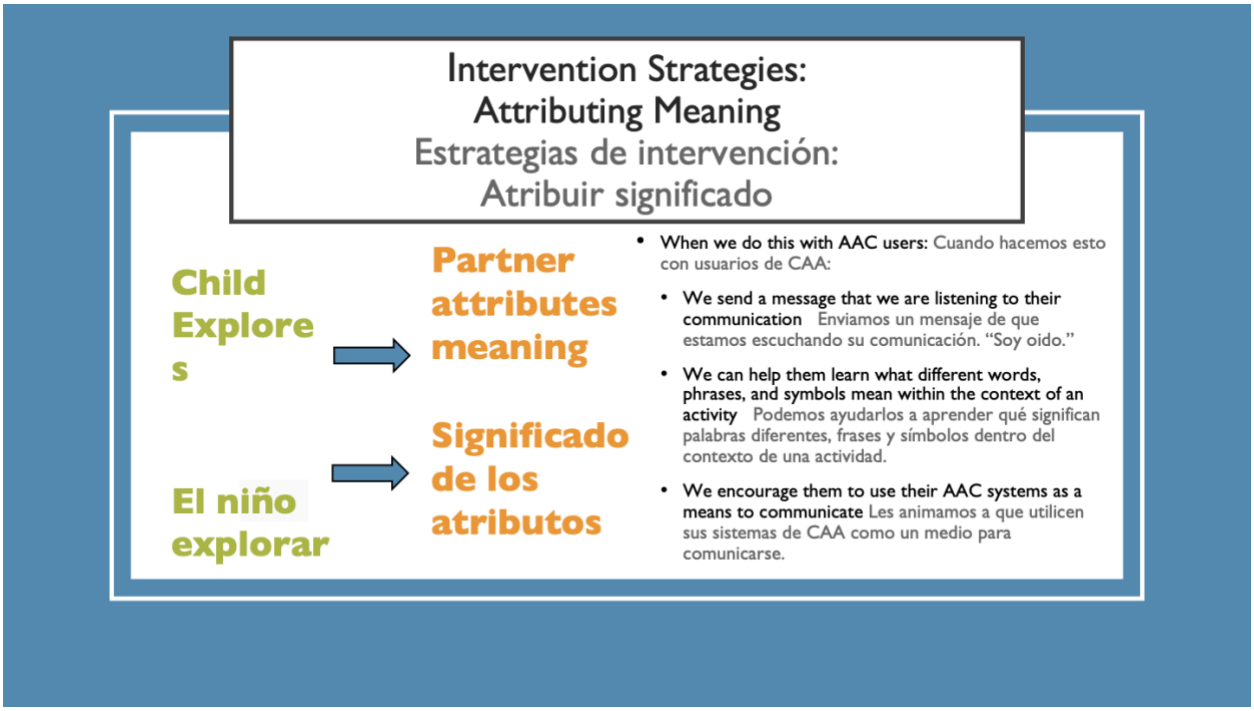
Entrada CAA asistida

Next show **full-phrase, multisymbol messages**

Full-Phrase Single Symbol Messages

Examples:
Aided AAC
Input
Entrada CAA
asistida




Intervention Strategies:
Attributing Meaning
Estrategias de intervención:
Atribuir significado
Child Explores
Partner attributes meaning
El niño explorar
Significado de los atributos
When we do this with AAC users: Cuando hacemos esto con usuarios de CAA:
We send a message that we are listening to their communication Enviamos un mensaje de que estamos escuchando su comunicación. "Soy oido."
We can help them learn what different words, phrases, and symbols mean within the context of an activity Podemos ayudarlos a aprender qué significan palabras diferentes, frases y símbolos dentro del contexto de una actividad.
We encourage them to use their AAC systems as a means to communicate Les animamos a que utilicen sus sistemas de CAA como un medio para comunicarse.


Examples:
Attributing Meaning
Atribuir significado

Intervention Strategies:
Wait Time / Expectant Delay
Estrategias de intervención:
Tiempo de espera / retraso esperado

- **After asking a question, modeling a symbol…wait!** Después de hacer una pregunta, modelar un símbolo… ¡espera!
- **Make eye contact and give an expectant facial expression to encourage them to take a conversational turn** Haga contacto visual y dé una expresión facial expectante para animarlos a tomar un turno de conversación.
- **Optimal wait time will vary among children, settings, and activities** El tiempo de espera óptimo variará entre los niños, los entornos y las actividades.
  - **Preferred vs. non-preferred activities, motivational context** Actividades preferidas versus no preferidas, contexto motivacional
  - **Cognitively demanding tasks** Tareas cognitivamente exigentes
  - **Type of information presented** Tipo de información presentada

Examples: Wait Time/ Expectant Delay

Tiempo de espera / retraso expectante

Open-ended Questions
Preguntas de final abierto

- **Open-ended questions require a full response from a person that is based on their own knowledge and feelings** Las preguntas abiertas requieren una respuesta completa de una persona que se base en sus propios conocimientos y sentimientos.
  - **Allows language to be modeled and gives AAC users the opportunity to learn to express what they think and feel** Permite modelar el lenguaje y brinda a los usuarios de CAA la oportunidad de aprender a expresar lo que piensan y sienten.
- **Ask natural questions, just as you would ask a child who uses conventional speech** Haga preguntas naturales, tal como le haría a un niño que usa el habla convencional.
- **Provide variation in the questions you ask during daily routines** Proporcione variación en las preguntas que hace durante las rutinas diarias.

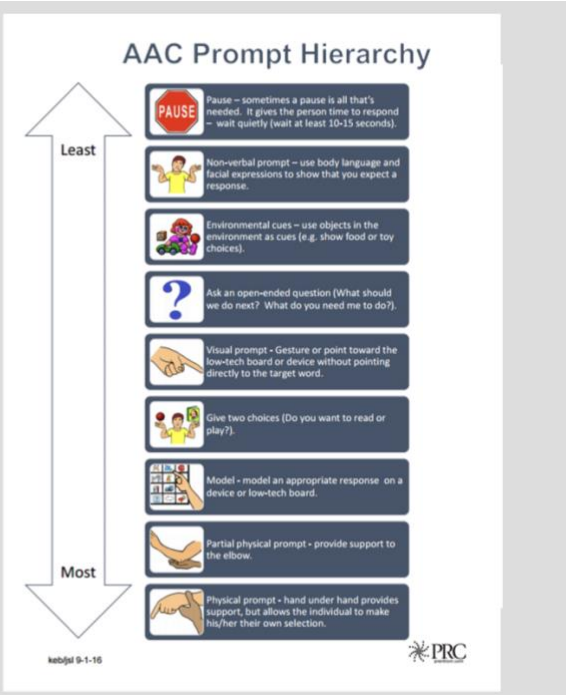
- **What if the child doesn't respond?** ¿Qué pasa si el niño no responde?
  - **Give options using their system.** Dar opciones usando su sistema.

Examples: Open Ended Questions

Preguntas de final abierto

Intervention Strategies: Prompting Hierarchies
Estrategias de intervención: Solicitar jerarquías

- **Types of prompts/cues** Tipos de indicaciones / pistas
  - **Physical** Físico
  - **Verbal** Verbal
  - **Visual/Navigational** Visual/Navegacion
- **Least-to-most vs. most-to-least prompting** Indicaciones de menor a mayor frente a mayor a menor
- **Fade prompting as quickly as possible** Desvanecer las indicaciones lo más rápido posible



Examples: Prompting
Incitar / Pedir

Implementation: Combining Strategies
Implementación: Combinando Estrategias

- Various strategies often work in tandem to effectively support a child's communication Varias estrategias a menudo funcionan en conjunto para apoyar de manera efectiva la comunicación de un niño.
- How could you combine these strategies with your children? ¿Cómo podría combinar estas estrategias con sus hijos?

Aided AAC Input & Challenging Behaviors
Entrada AAC asistida y Comportamientos desafiantes

- Stereotypy Estereotipia
  - Obsessional, compulsive, and ritualistic behavior Comportamiento obsesivo, compulsivo y ritualista
- Self-injury Auto-lesion
  - Head hitting; hand biting Golpes en la cabeza; morder la mano
- Aggression Agresion
  - Directed towards objects or individuals Dirigido a objetos o personas
- Elopement Huir de situacion/Eludir algo
  - Escape Behaviors Conductas de escape
- Sensory Seeking Busqueda de sensaciones
  - Holding objects tightly, putting objects in mouth Sostener objetos con fuerza, poner objetos en la boca

Alevriadou and Pavlidou, "Teachers' Interpersonal Style and Its Relationship to Emotions, Causal Attributions, and Type of Challenging Behaviors Displayed by children with Intellectual Disabilities." ;" Challenging Behavior as Communication."

Aided AAC Input & Challenging Behaviors
Entrada AAC asistida y Comportamientos desafiantes

- **Why do challenging behaviors occur?** ¿Por qué ocurren los comportamientos desafiantes?
  - **To express communication needs, intolerance to environmental conditions, or physical discomfort** Expresar necesidades de comunicación, intolerancia a las condiciones ambientales o malestar físico.
- **Challenging behaviors actually serve a communicative function.** Los comportamientos desafiantes en realidad cumplen una función comunicativa.
- **Behaviors are correlated with deficits in receptive and expressive language** Los comportamientos se correlacionan con deficiencias en el lenguaje receptivo y expresivo.

Alevriadou and Pavlidou, "Teachers' Interpersonal Style and Its Relationship to Emotions, Causal Attributions, and Type of Challenging Behaviors Displayed by children with Intellectual Disabilities." ;" Challenging Behavior as Communication."

Things to Remember
Cosas para Recordar

- Taking system away is equivalent it to closing a child's mouth. Quitar el sistema equivale a cerrar la boca de un niño.
- Layers of learning language Capas de aprendizaje del lenguaje
  - Formulation Formulación
  - Many models needed Se necesitan muchos modelos
- Where in the system the word is. Dónde en el sistema está la palabra.

Things to do at home
Cosas que hacer en casa

- Bilingual vocabulary (Spanish/English) Vocabulario bilingüe (español / inglés)
- Advocate to program and how the device changes with the child. Is a changing system. Abogar por programar y cómo cambia el dispositivo con el niño. Es un sistema cambiante.
- How to train other family members like during a party. What should you tell the family? Cómo entrenar a otros miembros de la familia como durante una fiesta. ¿Qué debería decirle a la familia?

Questions?
Preguntas?

Core Word Activity:
Discuss the picture using a variety of core words and 4+ communicative functions

Actividad de palabras básicas:
Discuta la imagen utilizando una variedad de palabras básicas y más de 4 funciones comunicativas.

Communicative functions:

Request

Comment

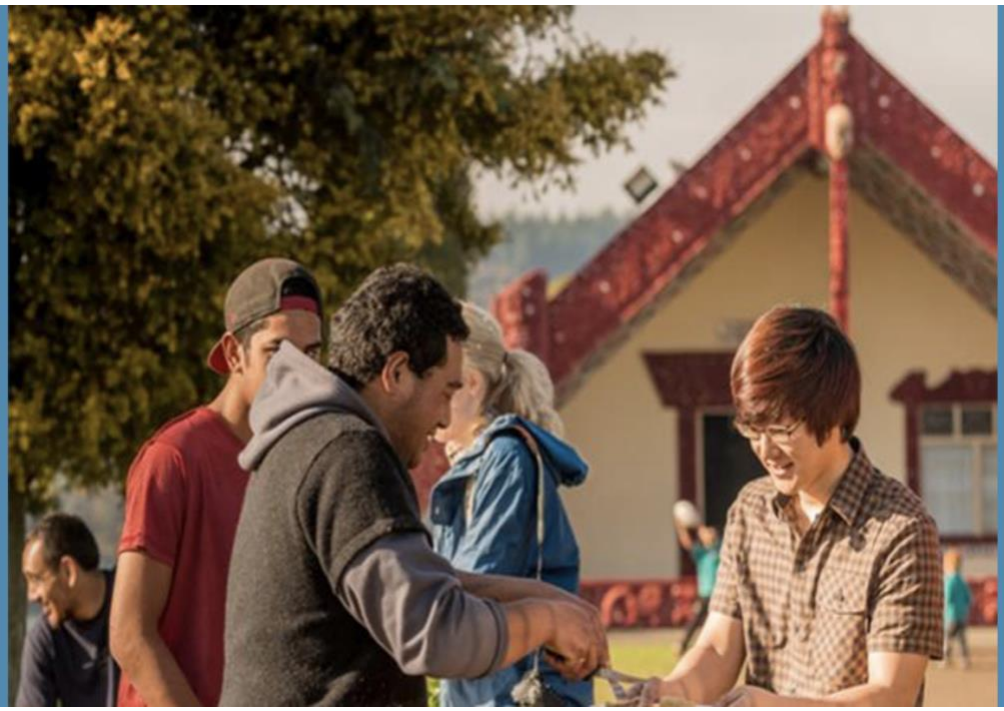
Share information

Greeting

Initiation

Termination

Protest



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Appendix B (Knowledge Questionnaire English)

Directions: Please answer the following questions about your child's AAC device and communication. Your answers will help us improve our training for the future.

1. What AAC system does your son/daughter have?

2. How does your son/daughter access his/her device?

3. List 5 core words and where you can find them on your child's AAC device?

4. Please list 5 pre-programmed messages that are already on your son/daughter's AAC device?

5. What is your son/daughter's grid size?

6. Give an example of a shared activity you would like to do with your son/daughter that will utilize the AAC device.

7. Which AAC intervention method would you like to try with your son/daughter?

8. What words/messages would you most like to see added to your son/daughter's device?

9. Give an example of how your son/daughter's AAC device could be better tailored to fit your family's culture and/or language?

10. Give an example of a social activity that your son/daughter could engage in with family members using his/her device?

11. Give an example of a prompt you could use with your son/daughter to help him/her use the AAC device.

12. Identify a challenging behavior that AAC use could help improve for your son/daughter?

Appendix C (Knowledge Questionnaire Spanish)

Instrucciones: responda las siguientes preguntas sobre el dispositivo de CAA y la comunicación de su hijo. Sus respuestas nos ayudarán a mejorar nuestra formación para el futuro.

1. ¿Qué sistema de AAC tiene su hijo / a?

2. ¿Cómo accede su hijo / hija a su dispositivo?

3. Enumere 5 palabras básicas y ¿dónde puede encontrarlas en el dispositivo AAC de su hijo/a?

4. Enumere 5 mensajes preprogramados que ya están en el dispositivo AAC de su hijo/a.

5. ¿Cuál es el tamaño de la cuadrícula de su hijo /a?

6. Dé un ejemplo de una actividad compartida que le gustaría hacer con su hijo / a que usará el dispositivo AAC.

7. ¿Qué método de intervención de CAA le gustaría probar con su hijo / a?

8. ¿Qué palabras / mensajes le gustaría que se añadieran al dispositivo de su hijo/hija?

9. Dé un ejemplo de cómo el dispositivo de CAA de su hijo / a podría adaptarse major para adaptarse a la cultura y / o el idioma de su familia.

10. ¿Da un ejemplo de una actividad social en la que su hijo / hija podría participar con miembros de la familia usando su dispositivo?

11. Dé un ejemplo de un mensaje que podría usar con su hijo / a para ayudarlo a usar el dispositivo AAC.

12. ¿Identifica un comportamiento desafiante que el uso de CAA podría ayudar a mejorar para su hijo /a?

Appendix D (Beliefs Questionnaire English)

Please circle how much you agree with the following statements.

1. All children/adolescents regardless of the severity of their disability have the potential to learn how to communicate more effectively.

Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree

2. I am confident that my son/daughter/granddaughter/sibling can learn to communicate more effectively.

Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree

3. There is not much I can do to improve the communication skills of some of my son/daughter/granddaughter/sibling.

Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree

4. My son/daughter/granddaughter/sibling does not have the cognitive potential to learn how to communicate effectively.

Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree

5. My son/daughter/granddaughter/sibling does not show any motivation and/or interest in communicating

Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree

6. The speech-language therapist and I should work together to develop communication goals for my son/daughter/granddaughter/sibling.

Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree

7. My training and experience have given me the necessary skills to try to improve the communication skills of my son/daughter/granddaughter/sibling through the use of AAC.

Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree

8. When my son/daughter/granddaughter/sibling makes progress in communicating more effectively, I feel it is because I have exerted a little extra effort.

Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree

9. When my son/daughter's communication skills improve it is usually because I have found more effective methods to help him/her.

Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree

10. I feel that I have the skills to teach my son/daughter/granddaughter/sibling how to communicate more effectively.

Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree

11. I feel that part of my responsibility as a parent/primary caregiver/family member is to work on improving the communication skills of my son/daughter/granddaughter/sibling.

Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree

12. One of the highest priorities for an adolescent with severe disabilities should be to provide them with socially acceptable ways to communicate with family and community.

Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree

13. I think it is fundamental to provide son/daughter/granddaughter/sibling, who has a severe disability, with ways to communicate more effectively.

Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree

14. If we wish to do so, our family can have a clear and significant role in carrying out activities that support our daughter's/son's/granddaughter's/sibling's effective use of AAC at home and school.

Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree

15. Our family receives direct coaching from the SLP and/or other team members on how we may incorporate AAC usefully and practically at home, if such information is a priority for us.

Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree

16. The SLP and other team members consider the needs and preferences of both our daughter/son/granddaughter/sibling and family when designing and implementing the AAC program.

Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree

Appendix E (Beliefs Questionnaire Spanish)

Marque su grado de acuerdo con las siguentes afirmaciones.

1.Todos los niños / adolescentes, independientemente de la gravedad de su discapacidad, tienen el potencial de aprender a comunicarse de manera más eficaz.

Totalmente de acuerdo, de acuerdo, indeciso, en desacuerdo, totalmente en desacuerdo

2. Estoy seguro de que mi hijo / hija / nieta / hermano puede aprender a comunicarse de manera más eficaz.

Totalmente de acuerdo, de acuerdo, indeciso, en desacuerdo, totalmente en desacuerdo

3. No hay mucho que puedo hacer para mejorar las habilidades de comunicación de algunos de mis hijos / hijas / nieta / hermanos.

Totalmente de acuerdo, de acuerdo, indeciso, en desacuerdo, totalmente en desacuerdo

4. Mi hijo / hija / nieta / hermano no tiene el potencial cognitivo para aprender a comunicarse de manera efectiva.

Totalmente de acuerdo, de acuerdo, indeciso, en desacuerdo, totalmente en desacuerdo

5. Mi hijo / hija / nieta / hermano no muestra ninguna motivación y / o interés en comunicarse

Totalmente de acuerdo, de acuerdo, indeciso, en desacuerdo, totalmente en desacuerdo

6. El terapeuta del habla y el lenguaje y yo debemos trabajar juntos para crear metas de comunicación para mi hijo / hija / nieta / hermano.

Totalmente de acuerdo, de acuerdo, indeciso, en desacuerdo, totalmente en desacuerdo

7. Mi formación y experiencia me han dado las habilidades necesarias para tratar de mejorar las habilidades de comunicación de mi hijo / hija / nieta / hermano a través del uso de AAC.

Totalmente de acuerdo, de acuerdo, indeciso, en desacuerdo, totalmente en desacuerdo

8. Cuando mi hijo / hija / nieta / hermano progresa en comunicarse de manera más eficaz, me siento que es porque he realizado un pequeño esfuerzo adicional.

Totalmente de acuerdo, de acuerdo, indeciso, en desacuerdo, totalmente en desacuerdo

9. Cuando las habilidades de comunicación de mi hijo o hija mejoran, generalmente es porque he encontrado métodos más efectivos para ayudarlo.

Totalmente de acuerdo, de acuerdo, indeciso, en desacuerdo, totalmente en desacuerdo

10. Me siento que tengo las habilidades para enseñar a mi hijo / hija / nieta / hermano cómo comunicarse de manera más efectiva.

Totalmente de acuerdo, de acuerdo, indeciso, en desacuerdo, totalmente en desacuerdo

11. Me siento que parte de mi responsabilidad como padre/cuidador principal/miembro de la familia es trabajar para mejorar las habilidades de comunicación de mi hijo/hija/nieta/hermano.

Totalmente de acuerdo, de acuerdo, indeciso, en desacuerdo, totalmente en desacuerdo

12. Una de las principales prioridades de un adolescente con discapacidades graves debe ser proporcionarle formas socialmente aceptables de comunicarse con la familia y la comunidad.

Totalmente de acuerdo, de acuerdo, indeciso, en desacuerdo, totalmente en desacuerdo

13. Creo que es fundamental proporcionar al hijo / hija / nieta / hermano, que tiene una discapacidad grave, formas de comunicarse de manera más eficaz.

Totalmente de acuerdo, de acuerdo, indeciso, en desacuerdo, totalmente en desacuerdo

14. Si deseamos hacerlo, nuestra familia puede tener un papel claro y significativo en la realización de actividades que apoyen el uso efectivo de AAC por parte de nuestra hija/hijo/nieta/hermano en el hogar y la escuela.

Totalmente de acuerdo, de acuerdo, indeciso, en desacuerdo, totalmente en desacuerdo

15. Nuestra familia recibe asesoramiento directo del SLP y / o de otros miembros del equipo sobre cómo podemos incorporar AAC de manera útil y práctica en casa, si dicha información es una prioridad para nuestra familia.

Totalmente de acuerdo, de acuerdo, indeciso, en desacuerdo, totalmente en desacuerdo

16. El SLP y otros miembros del equipo consideran las necesidades y preferencias de nuestra hija/hijo/nieta/hermano y las de la familia al diseñar e implementar el programa AAC.

Totalmente de acuerdo, de acuerdo, indeciso, en desacuerdo, totalmente en desacuerdo