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High-Tech Augmentative and Alternative Communication Training and

Self-Reported Feelings of Facilitator Confidence

by

Allison Early

A thesis

submitted in partial fulfillment

of the requirements for the degree of

Master of Science in the Department of Communication Sciences and Disorders

Idaho State University

August 2015

Committee Approval

To the Graduate Faculty:

The members of the committee appointed to examine the thesis of ALLISON EARLY find it satisfactory and recommend that it be accepted.

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Dr. Jeanne Johnson,
Major Advisor

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Committee Member

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Dr. Elizabeth Horn,
Graduate Faculty Representative

Idaho State
UNIVERSITY

February 4, 2015

Allison Early
1212 Pike St.
Boise, ID 83706

RE: Your application dated 2/4/2015 regarding study number 4232: High-Tech Augmentative and Alternative Communication Training and Self-Reported Feelings of Facilitator Confidence

Dear Ms. Early:

I agree that this study qualifies as exempt from review under the following guideline: 2. Anonymous surveys or interviews. This letter is your approval, please, keep this document in a safe place.

Notify the HSC of any adverse events. Serious, unexpected adverse events must be reported in writing within 10 business days.

You are granted permission to conduct your study effective immediately. The study is not subject to renewal.

Please note that any changes to the study as approved must be promptly reported and approved. Some changes may be approved by expedited review; others require full board review. Contact Tom Bailey (208-282-2179; fax 208-282-4723; email: humsubj@isu.edu) if you have any questions or require further information.

Sincerely,

Ralph Baergen, PhD, MPH, CIP
Human Subjects Chair

Dedication

       I would like to dedicate the research presented here to all those individuals who strive each day to share their thoughts and feelings…and to the Special Education Teachers and Speech-Language Pathologists who strive each day to help them find their voices. We are all enriched by their efforts.

Acknowledgements

Without the love and support of my family I would never have been able to begin, let alone complete this project. I'll never be able to say "thank you" enough to Brad Early, Isabelle Early, Sarah Jane Early, Grayson Early, Patricia Cunfer and Barry Cunfer. I am grateful for my many friends, including Kristin Adams, who shared of themselves to help me. I also deeply appreciate Dr. Jeanne Johnson's guidance and patient, cheerful support. It was critical to my success.

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Abstract

Augmentative and alternative communication (AAC) and the training received by individuals who facilitate its use are of interest in the current investigation, with emphasis on two key questions. First, what are the timing, format, and components of high-tech AAC training received by special education teachers (SETs) and school-based speech-language pathologists (SLPs)? Second, given their training, how confident do they feel in their roles as AAC facilitators? The rationale for these questions arises from previous studies identifying a lack of AAC training for professionals (Costigan & Light, 2010; Matthews, 2001) and research indicating poor facilitator training as a factor in inappropriate abandonment of AAC devices (Beukelman & Mirenda, 2013; Johnson, Inglebret, Jones, & Ray, 2006). Survey methodology was used to test the following hypotheses: There are strong, positive correlations between feelings of facilitator confidence and (a) receiving training that includes direct interaction with AAC users and; (b) receiving follow-up coaching after AAC training. It is expected that discerning patterns of AAC training that lead to facilitator confidence will enable the development of more effective AAC training protocols and hence, better communication outcomes for AAC users.

Introduction

Communication for individuals with co-occurring physical and cognitive deficits can be extremely challenging. Visual, auditory, motor, cognitive and other deficits can complicate their efforts to interact with others. Augmentative and alternative communication (AAC) systems are often utilized to help people with such complex communication needs. The American Speech-Language-Hearing Association (ASHA) describes AAC broadly as "all forms of communication (other than oral speech) that are used to express thoughts, needs, wants, and ideas" (ASHA, 2014a). AAC is not limited to a single method or device but involves a system of communication supports unique to each individual that can include symbols, aids, strategies and techniques (Calculator, 2000). Unaided communication systems utilize a user's body to convey messages, such as with gestures, sign language, and facial expressions (Baxter, Enderby, Evans, & Judge, 2012). Aided communication on the other hand, utilizes tools or equipment. Low-tech AAC aids are non-powered and can include paper and pencil, communication boards or books and picture exchange systems. High-tech AAC aids are electrically powered and include computers, software, and other technology, including devices that generate speech (Baxter et al., 2012).

According to Beukelman and Mirenda (2013), approximately 1.3% of people worldwide, of all ages, have difficulties with communication that are severe enough to necessitate AAC use. In the United States, that equals about 4 million people. Of speech-language pathologists (SLPs) who work in schools,

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45.6% provide AAC services to children with complex communication needs (ASHA, 2014b). Although they hold much promise, AAC systems do not provide benefit to all AAC users who try them, and inappropriate abandonment of the systems can occur (Beukelman & Mirenda, 2013; Johnson, Inglebret, Jones, & Ray, 2006). The following review of literature will discuss a sequence of topics, providing further rationales for the research hypotheses. Topics include the role of AAC facilitators, adult learning styles, preservice AAC facilitator training, AAC facilitator professional development, the effects of facilitator training on AAC user competence and the effects of training on AAC facilitator confidence. Self-reported levels of confidence among AAC facilitators and how these levels correlate to their AAC training history is the focus of the current study.

Review of Literature

Role of AAC Facilitators

      Whether or not a person learns to communicate successfully with AAC systems is impacted by many complex factors. Light (2003) presents a framework for understanding AAC user competence that consists of interacting intrinsic and extrinsic factors. Cognitive abilities and social competence are examples of intrinsic factors. Extrinsic factors range from policies regarding the funding of devices and school use practices to the communication demands related to an AAC user's social role. The amount and quality of interaction with natural speakers in an AAC user's life constitutes a critical extrinsic factor for success with AAC. Parents, special education teachers (SETs), classroom paraprofessionals, SLPs, occupational therapists, friends and others play facilitative roles in the communication of AAC users (Beukelman & Mirenda, 2013; Light, Dattilo, English, Gutierrez, & Harz, 1992). In addition to being communication partners for AAC users, these facilitators are involved in teaching AAC use, providing access to AAC devices, and ensuring that AAC users and their devices are incorporated in to daily routines (Bruno & Dribbon, 1998; Calculator & Black, 2009; McMillan, 2008). The type and amount of AAC training received by facilitators has been shown to affect the communicative competence of AAC users (Light et al., 1992; McMillan, 2008; McMillan & Renzaglia, 2014b). Lack of training for both teachers and classroom aides has been identified as a major barrier to educational inclusion for AAC users and one factor leading to

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inappropriate abandonment of AAC systems (Kent-Walsh & Light, 2003; Johnson et al., 2006).

Adult Learning Styles

Clearly, the quality and effectiveness of AAC facilitator training has a direct effect on AAC user outcomes. In an effort to identify best practices in AAC facilitator training, a general discussion of adult learning styles and how they apply to SLP and SET professional development is needed. The broad, extensively studied field of adult learning theory has firmly established that adults possess different learning styles than children. Andragogy, a teaching style developed to meet the needs of adult learners, is distinct from pedagogy, the traditional style of teaching used with children (Knowles, 1984; Ozuah, 2005). Andragogy is based on the following generally accepted characteristics of adult learners: (1) adults are self-regulated and self-directed, taking responsibility for their own learning (Knowles, 1984; Zigmont, Kappas, & Sudikoff, 2011); (2) adults learn best that which they see as relevant, practical, and immediately usable (Knowles, 1984; Butler, 1989); (3) adults have previous knowledge and experience that they draw upon to enhance their learning (Butler, 1989; Sheckley, Kehrhahn, Bell & Grenier, 2007; Kolb, 1984); and (4) adults prefer intrinsic motivators such as a better quality of life over extrinsic motivators such as salary increases (Knowles, 1984).

Incorporating these aspects of adult learning style into professional development for educators is considered best practice (Butler, 1989). Traditional instructor-centered methods of training, in which the learner is a passive recipient

of information, are less effective with adults than are learner-centered

approaches (Schaefer & Zygmont, 2003; Zigmont, Kappus & Sudikoff, 2011). In

learner-centered education, the instructor highlights the relevance of material to

adult learners' specific situations, capitalizing on the self-direction and intrinsic

motivation of adults.

Additionally, effective adult teaching focuses on experiential learning, or

learning by doing (Lewis & Williams, 1994). Kolb (1984) describes an interview

study of professionals in engineering and social work that compared how much

their professional education and work experience, respectively, had contributed

to their career competency. Both types of professionals consistently felt that they

made up for deficits and supplemented their strengths through experiential

learning on the job. Furthermore, on-the-job learning was reported to be the

primary means through which both types of professionals acquired affective and

behavioral competencies such as interacting with other people, decision-making,

goal setting, seeking and exploiting opportunities, and committing themselves to

career objectives. For adults, past experiences form a foundation for new

learning while new experiences cement that learning and promote future

behavioral change (Butler, 1989). Building on the learner's prior experiences,

and incorporating a range of activities that extend their learning to novel

experiences are important strategies for teaching adults.   Furthermore, learning

in job and life settings is the most effective way to enhance learning while

lecture-based settings are among the least effective (Sheckley & Bell, 2006).

Key to the success of experiential learning is a period of reflection following an

experience when learners assimilate new information (Lewis & Williams, 1994; Zigmont, Kappus & Sudikoff, 2011). Providing objective feedback of a learner's performance facilitates this reflection and enhances learning (Zigmont, Kappus & Sudikoff, 2011).

Generalizing this adult learning and professional development research to the specific area of AAC facilitator training generates several questions. To what extent are these best practices used when AAC facilitators are trained? Is their training learner-centered? Is it relevant and immediately usable? Does it include hands-on experience and feedback with AAC users in the classroom? Research that has focused on the training of AAC facilitators is presented below in two areas: preservice AAC training provided to SLPs and SETs during their undergraduate and graduate programs, and AAC professional development, which SLPs and SETs acquire during the course of their careers.

Preservice AAC Facilitator Training

Despite their key role in successful communication for AAC users, many individuals who fill the role of AAC facilitator are not trained in AAC or communicative interaction (Light et al., 1992). Even during their professional education, SETs and SLPs often receive little or no training in AAC. In a review of special education peer-reviewed journals published between 2000-2006, Okolo & Bouck (2007) analyzed 122 studies that investigated the use of interactive assistive technology for students with disabilities. Included studies collected empirical data but were not evaluated for quality of research. Instead, this review summarized the current nature of research in the field. The authors

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reported ample documentation that lack of SET education is among the major barriers to effective use of assistive technology.

Similarly, Costigan and Light (2010) conducted a literature review to determine the amount and quality of preservice AAC training received by SLPs and SETs. Included studies used primary research methodology and were published in peer-reviewed journals between 1985 and 2009. Their literature search yielded 194 studies, only 15 of which met inclusion criteria. Based on these 15, they reported that 18-38% of SLP programs and 76% of SET programs offered no AAC courses. When offered, a significant percentage of AAC courses were taught by faculty members who were not experts in AAC. Content was most often infused into non-AAC graduate courses, with typical programs offering 1-4 hours of training.

Research by Matthews (2001) conducted in the United Kingdom found a similar lack of SLP preservice training. Based on a survey of 320 randomly selected SLPs, 57% of respondents reported having received preservice training. Additionally, 31% of SLPs reported no skills in high-tech AAC and 37% perceived themselves to have only general knowledge or awareness of AAC. With a documented paucity of preservice training, it is important to explore what types of AAC professional development are available to SLPs and SETs once they are credentialed.

AAC Facilitator Professional Development

Interventions to improve communicative competence in AAC users have historically focused only on the AAC user and not on his or her facilitator (Light et

al., 1992). Especially lacking are interventions that occur in natural environments with teachers, peers, parents or siblings (Snell, Chen, & Hoover, 2006). To address this need, Light et al. (1992) taught facilitators, including peers and personal aides, such strategies as (a) allowing the participant using the AAC system to initiate communication, (b) allowing the participant at least 10 seconds to respond, (c) responding to communication attempts by immediately fulfilling requests, and (d) allowing more complex responses by asking open ended questions. As a result, AAC users became more active social partners, improved their initiation rates and increased their message complexity. Post-intervention, communication patterns were more balanced, with participants and facilitators contributing to interactions more equally.

Bruno and Dribbon (1998) focused on parent facilitators when they conducted a study of at an intensive five-day, overnight AAC camp. The camp included children ages 5 through 16, with an emphasis on recreational activities and AAC device use. The study focused on parent training and the basic provision of access to AAC systems. Parent training occurred concurrently with intervention for the children, and incorporated device operation and interaction strategies. Specific emphasis included extinguishing the habit of limiting their children's access to their devices. Immediately following camp and six-months post-camp, parents reported that their children had increased access to their devices and had improved their expression of pragmatic functions with their AAC devices.

In a study that focused on SETs who are AAC facilitators, Patel and Khamis-Dakwar (2005) found that off-site training combined with training embedded in classrooms improved teacher attitudes about AAC users as well as AAC in general. They conducted a study with 20 SETs in a Palestinian Arab community in Israel to measure their knowledge of AAC, discover the common practice and use of AAC in schools and assess teacher attitudes toward AAC use with children who have severe intellectual disabilities. Teacher training included 25 weekly, four-hour lectures and individualized on-site supervision in teacher's classrooms conducted for one hour every other week. Teachers were first provided with information about the cognitive, communicative, physical, and social characteristics of individuals who might benefit from AAC, various types of AAC systems, and potential goals for intervention. During on-site training, appropriate AAC systems and specific goals were identified. Additionally, trainers provided demonstrations and observed teachers as they implemented AAC systems with their students. In questionnaires given pre- and post-training, teachers reported improved knowledge of AAC, increased AAC use in the classroom and more positive attitudes about using AAC for intervention. They also reported a greater recognition of communication potential for children with expressive impairments.

In a five-year, federally supported project, interdisciplinary early childhood personnel were trained in assistive technology inclusion strategies across the curricula of young children with disabilities (Wilcox & Norman-Murch, 2000). The project included 14 school districts in four states, beginning on a local level,

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extending regionally, and then across states. It focused on developing and field-testing personnel training models and included over 150 interdisciplinary participants. Assistive technology inclusion strategies were taught to SETs, SLPs, physical therapists, occupational therapists, administrators and general education teachers. Following the five-year project, recommendations included providing ample opportunities for experiential, hands-on learning with multiple opportunities for practice and feedback; ongoing support of newly acquired skills; and individualized implementation that directly linked to participants' roles and responsibilities. The successful field-tested training techniques closely follow the best practice strategies for adult learning as discussed above. Of particular interest was the comparison made between training models that combined both workshops and on-site technical assistance, and training models that included only workshops. The first two years of the project provided combined training strategies while the last three years provided only workshops. Project evaluation showed that to implement assistive technology inclusion strategies, workshops followed by on-site technical assistance were overwhelmingly preferred by participants to workshops alone. The "job-embedded" training model resulted in enduring changes in participants' classrooms.

The success of off-site training followed by on-site follow-up and feedback was also found by McMillan (2008) in a study that provided AAC training to SETs. Four eight- to twelve-year-olds who used speech-generating devices (SGDs) were paired with four SETs who received professional development. In this study, the first phase of teacher training was conducted outside the

classroom and taught teachers device operation and programming. This phase did not lead to any changes in AAC user interactions. The second and third phases of teacher training were conducted in the classroom. The second emphasized ways to arrange the environment to embed each student's SGD and the third taught gradual cueing techniques to elicit student responses. These phases of training resulted in significant improvements in student SGD initiation rates, message complexity, and types of generated messages. Students generalized and maintained their SGD use for two months following the end of teacher training.

In a two-part follow-up study, McMillian and Renzaglia (2014a; 2014b) further examined the effect of AAC professional development and on-site support for SETs by focusing separately on teacher behavior and student communication outcomes. Participants included four male students on the autism spectrum, ages eight to twelve. Students had moderate intellectual disabilities, had complex communication needs and utilized SGDs. These four students were paired with four SETs. Teacher-student dyads were recruited from four self-contained special education classrooms in three different public elementary schools. The professional development intervention included three phases. During Phase 1, teachers were taught device operation and programming including how to create overlays, add and link new pages, record speech, add text and symbols, and add new vocabulary to devices. Training for this phase consisted of demonstration, practice and feedback.

Phase 2 provided assistance with embedding devices into classroom activities and taught environmental arrangement strategies to create opportunities for SGD use. Trainers first provided written descriptions of six methods of environmental arrangement meant to encourage unprompted initiation of communication. Methods taught included blocking the student's access to materials ("blocked access"), providing materials that required assistance ("assistance"), providing inadequate portions of materials ("inadequate portions"), providing incorrect or no materials ("sabotage"), presenting an activity that the student would not like ("protest"), and presenting a silly or ridiculous situation, such as wearing a coat backwards ("commenting"). Trainers then joined teachers in their classrooms to practice and provide feedback in the use of these strategies.

Phase 3 included instruction in a time delay communication technique. The methods used here echoed those used when training peers and personal aides of AAC users, described above in research by Light, et al. (1992). Specifically, SETs were taught (a) to move in proximity to the student and wait 3-10 seconds, (b) to reinforce responses, (c) to provide an "expectant look" and/or model a response, and (d) if needed, to provide physical assistance with responding. Time delay instruction included role-playing with the trainer as well as in-class practice with students while the trainer observed and provided feedback.

Part 1 of this study reports changes in SET behaviors (McMillian & Renzaglia, 2014a) regarding the frequency with which they created opportunities

that required SGD initiations or SGD responses. Data collection occurred prior to professional development training and after each phase of training. The researchers found that there was no significant change in the frequency of communication instruction opportunities provided to students from baseline to Phase 1. However, after Phase 2 and continuing through Phase 3, frequency of communication instruction opportunities increased significantly. Part 2 of McMillian and Renzaglia's (2014b) study reports student outcomes and is discussed below in a discussion of how facilitator training impacts AAC user competence.

Effects of Facilitator Training on AAC User Competence

Ultimately, improved AAC user competence is assumed to be the goal of all types of AAC facilitator training. Yet few studies address whether competence in AAC facilitation actually yields increased AAC user competence, especially as it concerns high-tech devices (McMillan, 2008). However, Part 2 of the previously discussed study by McMillan & Renzaglia (2014b) was designed to provide this type of information. Their analysis of student SGD use following SET professional training revealed parallel improvements in student and teacher behaviors. Phase 1 of teacher training (device operation), as described above, had no effect on student outcomes. Phase 2 (integration and embedding) resulted in substantial increases in student SGD initiations for all students, and these levels remained high during Phase 3 (systematic communication instruction). For students with the most significant communication challenges, initiations increased most during Phase 3 of teacher training. Student SGD

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responses, as opposed to student initiations, did not improve over the course of teacher training, however. The authors suggest that the majority of student SGD interaction prior to this study consisted of responses to teacher questions and that this communication did not decrease, but was complemented by the spontaneity seen with increased initiations.

Effects of Training on Facilitator Confidence

Whether AAC facilitator training is acquired during the course of preservice education or through professional development, what effect does it have on the confidence SLPs and SETs feel in their abilities to teach AAC users? A discussion of the concept of self-efficacy is relevant here. For decades, researchers in the areas of cognitive psychology and education have been studying the concept of self-efficacy. Bandura (1977) described self-efficacy as a future-oriented, motivating self-belief about one's level of competence in a given situation. He proposed that this construct was not simply a personality trait, but depended upon specific situations. One may feel a strong sense of self-efficacy in one area, but little or no self-efficacy in another, even within a chosen pursuit. Strong feelings of self-efficacy lead to a person's willingness to pursue a goal, persist in the face of adversity and rebound from temporary setbacks (Bandura, 2012). Bandura (1993) applied the concept of self-efficacy directly to teachers, saying, "Teachers' beliefs in their personal efficacy to motivate and promote learning affect the types of learning environments they create and the level of academic progress their students achieve."

Of interest to the current study is research that relates modes of professional development to teacher self-efficacy and confidence. In a study focused on teaching beginning readers, professional development formats that supported mastery experiences through follow-up coaching showed the strongest effects on teacher self-efficacy beliefs. Conversely, teachers whose training format included demonstration, planning and practice, but no follow-up coaching, experienced a decrease in their self-efficacy (Tschannen-Moran & McMaster, 2009). Greater teacher efficacy improves student efficacy as well as student achievement and motivation (Tschannen-Moran & Hoy, 2001).   By extension, one would expect that AAC facilitators who feel confident in their roles would be able to improve communication outcomes for AAC users. Discovering how various modes of AAC training affect SLP and SET confidence is the emphasis of the current study.

Research Question

The current research sought to survey school-based SLPs and SETs about their preservice and professional AAC training, to establish whether their training history correlates to confidence in their roles as AAC facilitators. Past research clearly demonstrates that many SET and SLP facilitators are inadequately trained in AAC during their degree programs (Costigan & Light, 2010). Of the 320 SLPs in the United Kingdom responding to Matthews' (2001) survey, 60% reported accessing AAC training after certification. Few studies track the myriad opportunities that exist for facilitator training, such as training provided by AAC company representatives, in-service trainings at schools and

self-teaching. Once SLPs and SETs have students in their classrooms with AAC needs, how do they acquire the AAC knowledge needed to serve those students? Do they seek additional in-service, online, or seminar-based training? Are they self-taught? Do AAC company representatives, SLPs, or family members train them? What aspects of AAC training do they get? Is their training experience-based? Does their training occur in the classroom or with AAC users? How confident do they feel providing services to AAC users? The over-arching goal of this research was to answer questions such as these in order to identify best practices in AAC facilitator training.

The current research surveyed SETs and school SLPs to answer these questions:

- **What are the timing, format, and components of high-tech AAC training received by SETs and school-based SLPs who work with AAC users?**

- **Given their training, how confident do they feel in their roles as AAC facilitators?**

Research in adult learning theory shows that relevant, experiential training is the most effective way to teach adults (Butler, 1989; Knowles, 1984; Lewis & Williams, 1994). Cognitive behavioral research in the field of education shows that follow-up coaching leads to higher levels of self-efficacy (Tschannen-Moran & McMaster, 2009).   Research done with SETs shows that AAC professional training which provides feedback in the classroom has the greatest effects on both teacher behavior and AAC user outcomes (McMillian & Renzaglia, 2014a;

McMillian & Renzaglia, 2014b). Based on this information, it was hypothesized

that SLPs and SETs who feel the most confident in their abilities to serve AAC

users (1) will have received preservice and professional training that included

direct interaction with AAC users; and (2) will have received professional

development that included follow-up instruction in the classroom while working

directly with AAC users.

Methods

Survey methodology using an e-mail approach was employed to ascertain the scope of AAC training received by SLPs and SETs in schools, as well as their self-reported feelings of confidence when working with students who use high-tech AAC devices. Prior to beginning this study, the research proposal and survey questionnaire were approved by the Human Subjects Committee of the Idaho State University Institutional Review Board.

Participants

The survey respondents included 63 SLPs and 153 SETs who work in public schools throughout Idaho, Oregon, and the state of Washington. Eligible respondents were fully licensed and credentialed as either an SLP or an SET and were employed in traditional public schools, public charter schools, or public on-line schools. In addition, respondents self-selected as having current or past experience assisting children and/or youth (ages 3-21) who use high-tech AAC devices. High-tech AAC devices were defined for respondents, based on the previously discussed definition by Baxter et al. (2012), as those which are powered by batteries or electricity and which incorporate computer technology. Methods for school district selection and participant recruitment are discussed below under "Procedures."

Materials

An e-mail survey questionnaire was developed using software provided by Qualtrics (2013), and following recommendations by Dillman, Smyth and Christian (2014). The questionnaire included a page-by-page construction that

consisted of up to 24 close-ended questions and 1 open-ended question, depending upon the participants' responses (the entire survey is available in Appendix A). A branched design allowed SLPs and SETs to receive questions worded specifically for each of their professions. In addition, the survey branched according to responses, resulting in faster survey completion by eliminating questions that did not pertain to an individual respondent. The average time required to complete the survey was 6 minutes.

Demographics. Three questions were used to determine respondent eligibility (see questions 1, 3 and 4 in Appendix A) and a "no" response to any one of these questions resulted in termination of the survey. Demographic information gathered from SLPs and SETs included the highest degree attained and the number of years they have been employed in their professions. Survey respondents were also asked to provide information about the number of AAC users they have served over the course of their careers and the number of hours per week they currently spend assisting AAC users. (See questions 2, and 5-7 in Appendix A.)

Preservice AAC training history. Respondents were asked questions about their undergraduate and graduate AAC training, including the number of formal courses they took that were dedicated to the topic of AAC, the number of brief AAC seminars (1-3 days), the number of AAC workshops (1-3 hours), and the number of clinical practicum or student teaching experiences that included face-to-face interactions with AAC users. Respondents were asked to rate preservice training components on a 5-point Likert-type scale that ranged from

"Not Covered" to "Covered In-Depth." The four components queried were (1) facilitation of social interaction and general communication, (2) methods of AAC inclusion in natural settings, (3) technological troubleshooting, and (4) device-specific training. (See questions 8-9 in Appendix A.)

Professional development AAC training history. Survey questions asked respondents about the AAC training they have acquired since entering their respective fields. Respondents were asked the formats of training they received, including continuing education courses (large classes, seminars, workshops), in-service training (small group or individual) and self-taught training. For each type of training they indicated, the survey branched to request more information about that particular training format. Details gathered about continuing education and in-service training included whether AAC users were present none of the time, some of the time or all of the time. Additional information was gathered regarding the four components of training listed above for the preservice training history, using the same 5-point Likert-type scale. Respondents were also asked whether follow-up coaching in the presence of an AAC user was provided during the days and weeks after their training. Respondents who indicated self-taught training were asked to estimate the number of occasions they made time for self-teaching, whether AAC users were present none of the time, some of the time or all of the time, and to provide the same information about the four components of training previously described. (See questions 10-21 in Appendix A.)

Facilitator confidence. Survey questions asked respondents to rate their confidence in overall AAC facilitation on a 5-point Likert-type scale that ranged from "Not Confident" to "Very Confident." They were also asked to use the same scale to rate their confidence in each of the four training components previously described. Using a 5-point Likert-type scale that ranged from "Very Unlikely" to "Very Likely," respondents were asked to rate how likely they are to establish and pursue AAC goals with AAC users, and how likely they are to persist with those goals when difficulties are encountered. (See questions 22-24 in Appendix A.)

Optional, open-ended question. The final survey question gave respondents an opportunity to describe aspects of their AAC training they have found to be the most and/or least effective if they wished to do so. (See question 25 in Appendix A.) Per recommendations from Dillman et al. (2014), to avoid respondent bias caused by question order effects, the questions were presented in randomized order by blocks. Following the demographic section, the two history sections (comprising one block) and the facilitator confidence section (comprising the other block) were presented in random order.

Procedures

School district selection. District demographic data across the three included states were obtained from the US Department of Education's National Center for Educational Statistics (NCES; 2015), using their Common Core of Data for the 2012-2013 and 2013-2014 school years (http://nces.ed.gov/ccd/districtsearch), which was the most recent information available. Several factors, including student enrollment, geographic region, and

locale size were used to determine which school districts to recruit for the survey. These factors as well as the random selection methods used are described next. Appendix B provides the distribution of selection factors across the school districts involved in the current research.

Student enrollment. Student enrollment was included as a factor to account for the possibility that district size might correlate to district resources in terms of staffing and/or staff training. All districts in each state and their respective student enrollment numbers were downloaded and sorted into the following categories: "Small" districts were defined as those which served between 1000 and 3999 students; "Medium" districts were defined as those which served between 4000 and 7999 students; "Large" districts were defined as those which served 10,000 or more students.

Geographic region. Diversity of geographic regions within each state was included as a factor in an effort to obtain varied social and economic representation among respondents. Recruitment continued until each geographic region containing population centers in each state was represented. In Idaho, the geographic regions represented were "North," "East," "West," and "South Central." In Oregon, the geographic regions represented were "North West," "North East," "West," and "South West." In Washington, the geographic regions represented were "North West," "North Central," "North East," "Central," "East," and "South Central" (See Figure 1).
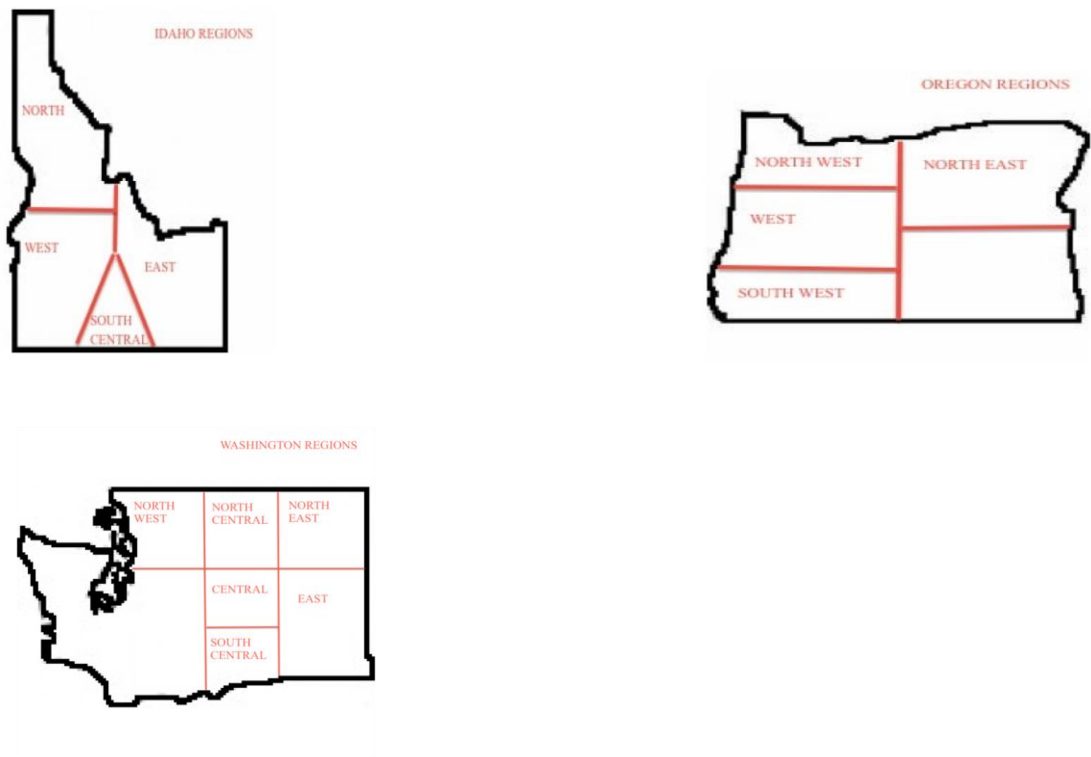
Figure 1. Geographic Regions. Regions were determined by the locations of responding school districts; unlabeled regions had no recruitment.

Locale size. Similarly, diversity of locale sizes was included as a factor to

ensure a balanced representation of social and economic influences on

responses. Districts in each state were sorted into locale categories based on

the size of their populations and their distance from urban centers. Definitions of

locale sizes and data pertaining to each district's locale were obtained from the

NCES (2015). See Appendix C for locale size definitions

(http://nces.ed.gov/ccd/rural_locales.asp). Locale categories used for the current

study included small, rural areas labeled "Rural" or "Town" by NCES; mid-sized

suburban areas labeled "Suburb" by NCES; and large urban areas labeled "City"

by NCES. Recruitment continued until each type of locale was represented in each state.

Random selection. Once all districts across Idaho, Oregon, and Washington were coded for the categories described above, a random number generator was used to select the order in which to recruit districts.

Recruitment methods. The process of obtaining survey respondents began February 17, 2015 and continued through March 12, 2015. From the pool of districts matching the factors described above, contact information for all Special Education Directors was obtained via a combination of searches on school district websites and phone calls to administrative personnel. Once contact information was obtained, the Special Education Directors were contacted simultaneously by phone and e-mail. Almost universally, phone calls resulted in the need to leave voice mail messages. The phone messages left for Special Education Directors alerted them to expect an e-mail regarding AAC survey research. Recruitment e-mails included a brief overview of the research, description of ISU's Institutional Review Board approval. Many of the Special Education Directors requested access to the survey before they would agree to participate. As a result, a hyperlink to a non-active survey that they could review was also included in the initial recruitment e-mail (See Appendix D). Some districts requested that a research proposal specific to their district be submitted, and this was provided when requested. If no response was received from a Special Education Director within two or three days of initial contact, recruitment

continued with the next randomly chosen district in each category that matched needed factors.

Distribution methods. Once Special Education Directors indicated that they were willing to participate, they were asked to contact all SLPs and SETs in their districts who serve students in preschool through high school, including those at public charter schools, and forward an introductory e-mail that requested participants and contained a hyperlink to the survey (See Appendix E). Approximately one week and two weeks after the initial request, the Special Education Directors received additional e-mails, asking that they forward follow-up e-mails to the same group of SLPs and SETs as previously requested (See Appendices F and G, respectively). As survey responses were anonymous, the two follow-up e-mails contained dual messages such as, "If you haven't done so already, please take a few moments to fill out the AAC survey. If you already responded, we appreciate your input." In accordance with the Tailored Design Method (Dillman et al., 2014), the wording for follow-up e-mails changed slightly with each mailing to encourage interest and participation. In order to engage participants whose pattern of responding to e-mails varied throughout the week, the initial and follow-up e-mails were sent on staggered days of the week.

Statistical Analysis. Computer software (Qualtrics, 2013) tracked and tabulated the data, as they were collected. Additional analysis was performed using SAS software (SAS Institute, Inc., 2014). The survey closed on March 14, 2015, having remained open for 26 days as the process of contacting and re-

contacting Special Education Directors for potential participants continued.

Descriptive and correlational analyses applied to the data are described below.

Results

This investigation proposed to address two research questions:

- What are the timing, format, and components of high-tech AAC training received by SETs and school-based SLPs who work with AAC users?

- Given their training, how confident do they feel in their roles as AAC facilitators?

To answer these questions, descriptive data and correlational data are presented. This section is organized with demographic results followed by results pertaining to the two research questions, presented in order and ending with a discussion of the responses given for the open-ended question.

Demographics

School district demographic data. In all, 27 school districts participated in the study, with 10 in Idaho, 10 in Oregon, and 7 in Washington. District demographics were based on the three factors described above. In terms of student enrollment, 36% (10) of districts were "Small," 39% (10) were "Medium," and 25% (7) were "Large." Respondents included 50% (14) from Rural/Town locales, while 29% (8) came from Suburban locales and 21% (5) came from Cities. See Appendix B for district demographics by state, including geographic regions represented.

Respondent demographic data.

Response rates and eligibility. A total of 222 respondents clicked on the survey link and 6 opted out before the first question, yielding a 97% response rate. The total number of potential respondents who received notification of the

survey from their district administrator is unknown. Because of this, the true

response rate is unknown. Of the 216 who began the survey, 63 were SLPs

(29%) and 153 were SETs (71%). In all, 78 (36%) were not eligible to participate

and were exited from the survey. The 138 eligible respondents were comprised

of 37% SLPs (n = 51) and 63% SETs (n = 87). Among those exited from the

survey were individuals who were not credentialed as SLPs (n = 1), who were not

credentialed as SETs (n = 3), and who were not employed in public schools (n =

1). In addition, 10 SLPs and 63 SETs were exited due to lack of high-tech AAC

experience (See Table 1).

     Number of years employed. Table 2 below displays how long

respondents reported they had been employed in their respective professions.

This question preceded those which established survey eligibility, therefore the

sample size more closely approached that of all survey respondents, with 121

SETs and 49 SLPs responding (*n* = 170, total). A one-way analysis of variance

established that the two groups were not statistically different on this measure.

The mean length of employment for SLPs was 13.4 years (*SE* = 1.317) and the

mean length of employment for SETs was 11.9 years (*SE* = 0.838).

     Number of AAC users served. Respondents were queried on how many

high-tech AAC users they had served across their entire career as well as how

many hours per week they currently assist high-tech AAC users. In an effort to

reduce the likelihood that respondents would exit the survey prematurely due to

difficulty of responding, they were allowed to provide estimated quantities via text

entry on these questions. As a result, text entry responses required conversion to

Table 1

Response Rates and Eligibility by Career

	SLPs *n* (% of 219)	SETs *n* (% of 219)
Respondents answering 1st question	63 (29%)	153 (71%)
Not credentialed	1 (2%)	3 (2%)
Not employed in schools	1 (2%)	0 (0%)
Not experienced with high-tech AAC	10 (16%)	63 (41%)
Total # respondents exited	12 (5%)	66 (30%)
Remaining eligible respondents	51 (23%)	87 (38%)
Total eligible respondents = 138 (37% SLP & 63% SET)		

Note. *N* = 219. *n* = number of respondents. SLPs = Speech-Language Pathologists; SETs = Special Education Teachers.

numerical data for analysis. To do this, text was interpreted in the following ways: text for whole numbers was converted directly ("seven" became 7); given a range (i.e., 3-4), the mean was calculated (3.5); and numbers or wording indicating "more than" or "plus" were interpreted as one unit more than the listed number ("50+" became 51, "over 20" became 21).

Career total. Survey respondents reported wide variability in the numbers of AAC users served during their careers. Two data points in the SET sample were determined to be outliers and removed (values = 201, 1200). Regarding the number of high-tech AAC users served across their entire career, SLPs reported a mean of 7.1 (*n* = 48; *SD* = 6.27). With outliers removed, the mean for SETs was 5.32 (*n* = 76; *SD* = 6.93). These data are displayed in Table 2. Due to large standard deviations, median scores were used for statistical analysis. A chi-square analysis of the medians determined that SLPs (*Mdn* = 5) had served

significantly more high-tech AAC users than SETs (*Mdn* = 3) during their careers [$X^2(1)$ = 5.72, *p* = 0.02].

Current hours per week. Text-to numeric conversions were established in the same manner for the number of hours per week respondents currently work with high-tech AAC users. A one-way analysis of variance indicated that SLPs reported a mean of 1.9 hours per week (*n* = 49, *SE* = 0.949) and SETs reported a mean of 4.6 hours per week (*n* = 75, *SE* = 0.767). SETs were found to spend a significantly greater amount of time with AAC users [$F(1)$ = 6.279, *p* = 0.014]. Means and standard errors can be seen in Table 2.

Table 2

Individual Demographics by Career

	SLPs		SETs	
Measure	*M*	*Measure of variance*	*M*	*Measure of variance*
Number of years employed	13.4	*SE* = 1.317	11.9	*SE* = 0.838
AAC users served (career total)	7.1	*SD* = 6.27	5.32	*SD* = 6.93
AAC users served (hours/week)	1.9	*SE* = 0.949	4.6	*SE* = 0.767

Note. SLPs = Speech-Language Pathologists (*n* = 51); SETs = Special Education Teachers (*n* = 87).

Educational level. Results of the question "What is the highest degree you have attained?" reflect the professional qualifications needed for SLPs and SETs. All but two SLPs had attained a Master's degree (96%), one had attained a Doctoral degree (2%) and one reported reaching the level of Bachelor's degree (2%). On the other hand, 30% of SET's reported an educational level of Bachelor's degree and 70% had attained a Master's degree. See Figure 2.
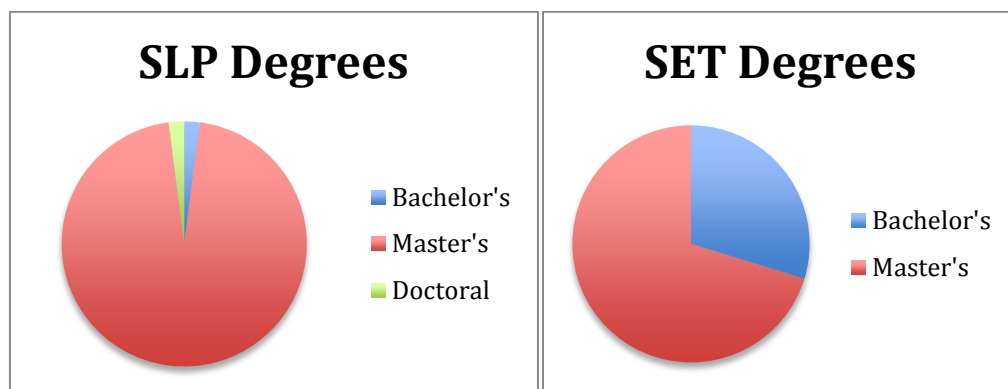
Figure 2. Highest Degree Attained. SLP = Speech-Language Pathologists (*n* = 51); SET = Special Education Teachers (*n* = 87).

Timing of AAC Training

A major focus of the current research concerned the timing of AAC

facilitator training.   When are facilitators taught what they need to know in order

to best serve high-tech AAC users? Survey questions regarding timing asked

SLPs and SETs about preservice training, AAC training received as an

undergraduate or graduate student before beginning to work in their professions;

and professional development, AAC training received since beginning their

careers. The response rate for preservice questions was 94% for SLPs and 86%

for SETs.

Preservice AAC training history.   Respondents were asked to indicate

the amount of undergraduate or graduate training they had received. Table 3

presents this information. Sub-parts to this question included "Formal courses

dedicated to AAC," "Brief seminars (1-3 days)," "Workshops (1-3 hours)," and

"Student teaching or clinical practicum that included face-to-face interactions with

AAC users." More than one answer-type could be chosen. Sub-questions were

grouped for an overall analysis to compare positive responses (any amount of

preservice training) with negative responses (no amount of preservice training).

Chi-square analysis results indicate that overall, SLPs received more preservice

training than SETs [$X^2(1) = 5.152$, p = 0.0232]. Of the SLPs, 85% (n = 48)

received some type of preservice training while only 67% (n = 76) of SETs

received preservice training. Among sub-questions, the number of formal

courses [$X^2(1) = 17.815$, p < .0001] and the number of face-to-face interactions

with AAC users [$X^2(1) = 6.416$, p = 0.0113] were significantly different between

SLPs and SLPs. In each case, SLPs were provided more preservice training

than SETs.

Table 3

Preservice AAC Facilitator Training

Course Format	SLPs, $N = 48$ n (% of N)	SETs, $N = 7$ n (% of N)
Formal courses dedicated to AAC	29 (60%)	17 (23%)
Brief seminars	18 (38%)	21 (28%)
Workshops	20 (42%)	34 (45%)
Face-to-face experiences with AAC users (clinical practicum or student teaching)	25 (52%)	22 (29%)
	$N = 48$	$N = 76$
Trained in any preservice format	41 (85%)	51 (67%)
Not trained in any preservice format	7 (15%)	25 (33%)

Note. SLPs = Speech-Language Pathologists; SETs = Special Education Teachers. N = all respondents who answered the question regarding preservice training. n = number of respondents per sub-question. Respondents were allowed to choose more than one training format.

Data collected from the sub-question regarding "Formal courses dedicated

to AAC" were further analyzed. Recent research indicates that SLPs receive

only moderate levels of preservice training while SETs receive even less

preservice training (Costigan & Light, 2010). It was of interest to determine

whether undergraduate or graduate programs have begun including more AAC

courses in their programs since that time. To this end, the length of employment

for respondents was divided into 5-year segments and these segments were

compared with a positive or a negative response on the sub-question indicating

whether they had received a "Formal course dedicated to AAC." A visual

inspection of the raw data indicated that recent SLP graduates were more likely

to have had formal AAC training; no real increases in this type of training were

seen for SETs (See Table 4).

Table 4

Formal Courses Dedicated to AAC by Number of Years Employed

	Any Formal Courses Dedicated to AAC	
Number of Years Employed	SLPs	SETs
1-5	91%	28%
6-10	67%	29%
11-15	75%	31%
16-20	57%	11%
21-25	50%	0%
26-30	0%	33%
31+	0%	0%

Note. SLPs = Speech-Language Pathologists; SETs = Special Education Teachers.

Professional development AAC training history. Professional

development opportunities were measured with a question asking about the

format of training received since respondents entered their professions. Sub-

questions included check-boxes for "Continuing education (large classes,

seminars, workshops)," "In-service training (small group or individual), "Self-

taught," and "None." Respondents were allowed to select more than one format.

By combining responses for all formats of professional development, an overall data analysis compared any positive answer with any negative answer, across sub-questions. It was found that 100% (n = 48) of the responding SLPs had some type of professional training. Of responding SETs, 83% (n = 77) had some type of professional training. Because no SLPs fell in the "zero training" category, a Fisher's exact test was used to analyze this data. Analysis revealed SLPs had significantly more professional training than SETs (p = 0.001). As described above, there was an overall 96% response rate for SLPs and an 86% response rate for SETs on this question.   Exact n-values for formats in each sub-question can be seen in Table 5.

Table 5

Professional Development AAC Facilitator Training

	SLPs, N = 48 n (% of N)	SETs, N = 77 n (% of N)
Course Format		
Continuing education course	27 (56%)	22 (29%)
In-service training	29 (60%)	38 (49%)
Self-taught	42 (88%)	48 (62%)
	N = 48	N = 77
Trained in any professional format	48 (100%)	64 (83%)
Not trained in any professional format	0 (0%)	13 (17%)

Note. SLPs = Speech-Language Pathologists; SETs = Special Education Teachers. N = all respondents who answered the question regarding professional development training. n = number of respondents per sub-question. Respondents were allowed to choose more than one training format.

No AAC training history. Combining respondent reports of preservice and professional training, 38 of 125 respondents (7 SLPs and 31 SETs) indicated they had not received any AAC training. According to a chi-square analysis,

SETs were significantly more likely to give this response [$X^2(1) = 9.213$, $p = 0.002$]. Table 6 displays these data.

Table 6

Combined Preservice and Professional Development AAC Facilitator Training

Course Format	SLPs, $N = 48$	SETs, $N = 77$
	n (% of N)	n (% of N)
Trained in both preservice and professional formats	41 (85%)	46 (60%)
Not trained in any format	7 (15%)	31 (40%)

Note. SLPs = Speech-Language Pathologists; SETs = Special Education Teachers. N = all respondents who responded questions about preservice and professional training. n = number of respondents per category.

Format of AAC Training

In addition to the *when*, or timing, of AAC training, the current research sought to establish *how* AAC facilitators are trained. Details were collected about the formats used to train AAC facilitators. As described above, options provided to respondents included continuing education, defined as large classes, seminars or workshops; in-service training, defined as small group or individual training; or self-taught training. Respondents were also allowed to indicate "none."

For questions about the amount of each type of training format attended, respondents were allowed to estimate via text entry. Text-to-numeric conversions of these data were created as described above, in the demographics section for the number of AAC users served. In terms of the number of trainings of each format they had received, several respondents indicated large quantities with wording such as "too many to count." Unbiased numeric interpretation of this data was not possible. In an effort to retain the information provided by these respondents, all format data was converted into quartile rankings. Text-to-

numeric conversions and quartiles or median splits were determined based on the ranked distribution of numbers for continuing education training, in-service training and self-taught training, and are described in more detail below.

Continuing education. Based on a ranked distribution of responses regarding the quantity of continuing education trainings, four quartiles were established. Responses falling between 1 and 2 trainings were counted in the 1st quartile. Responses falling between 3 and 5 trainings were assigned to the 2nd quartile. The 3rd quartile included all responses between 6 and 10. Responses of 11 or above, as well as all responses such as "too many to count" were assigned to the 4th quartile (See Table 7). Results of a chi-square analysis showed that SLPs and SETs were not significantly different in the amount of continuing education training they received.

Table 7

Amount of Continuing Education Training by Quartiles

Number of Continuing Education Trainings	SLPs, $N = 26$ n (% of N)	SETs, $N = 21$ n (% of N)
1st quartile: 1-2	7 (27%)	5 (24%)
2nd quartile: 3-5	11 (42%)	5 (24%)
3rd quartile: 6-10	5 (19%)	5 (24%)
4th quartile: 11+	3 (12%)	6 (28%)

Note. SLPs = Speech-Language Pathologists; SETs = Special Education Teachers. N = all respondents who reported amounts of continuing education. n = the number of respondents per quartile.

In-service training. The ranked distribution of in-service trainings revealed such small numbers for the majority of respondents that it was necessary to use a median split to describe the data. Responses falling between 1 and 26 trainings were assigned to the lower half and responses over 27,

including those termed "too many to count" were assigned to the upper half.

The resulting distribution of numbers can be seen in Table 8. A chi-square

analysis showed that SLPs and SETs were not significantly different in the

amount of in-service training they received.

Table 8

Amount of In-service Training by Split-halves

Number of In-service Trainings	SLPs, $N = 29$ n (% of N)	SETs, $N = 36$ n (% of N)
Lower half: 1-26	16 (55%)	19 (53%)
Upper half: 27 +	13 (45%)	17 (47%)

Note. SLPs = Speech-Language Pathologists; SETs = Special Education
Teachers. N = all respondents who reported amounts of in-service training. n =
the number of respondents per half.

Self-taught training. To describe the number of occasions SLPs and

SETs found for self-taught training, four quartiles were established based on a

ranked distribution of responses. Responses falling between 1 and 4 trainings

were counted in the 1st quartile. Responses falling between 5 and 10 trainings

were assigned to the 2nd quartile. The 3rd quartile included all responses

between 11 and 20. Responses of 21 or more, as well as those labeled "too

many to count" were assigned to the 4th quartile (See Table 9). SLPs and SETs

did not show significant differences in amounts of self-teaching according to a

chi-square analysis.

Presence of AAC user during training. Adult learning research

(Sheckley & Bell, 2006) and professional development research in assistive

technology implementation (Wilcox & Norman-Murch, 2000) indicate that new

learning is most successful if it is relevant and applied in practical ways. For this

Table 9

Amount of Self-taught Training by Quartiles

Number of Self-taught Trainings	SLPs, *N* =39 *n* (% of *N*)	SETs, *N* = 44 *n* (% of *N*)
1st quartile: 1-4	2 (5%)	8 (18%)
2nd quartile: 5-10	16 (41%)	22 (50%)
3rd quartile: 11-20	10 (26%)	6 (14%)
4th quartile: 21+	11 (28%)	8 (18%)

Note. SLPs = Speech-Language Pathologists; SETs = Special Education Teachers. *N* = all respondents who reported amounts of self-taught training. *n* = the number of respondents per quartile.

reason, whether or not AAC users were present during AAC facilitator training was of interest. This was explored with questions about preservice face-to-face interactions and with questions about AAC user presence during professional development training.

Preservice training. Regarding their preservice history, respondents

were asked how many face-to-face interactions with AAC users they had

experienced. For analysis, these data were considered negative if listed as zero

and positive if any number of face-to-face interactions was indicated. Response

rates for this question were 96% (*n* = 48) for SLPs and 85% (*n* = 75) for SETs.

Of responding SLPs, 52% (*n* = 25) indicated face-to-face opportunities with AAC

users during preservice training and 48% (*n* = 23) indicated no such

opportunities. Of responding SETs 29% (*n* = 22) reported face-to-face

opportunities and 71% (*n* = 53) did not. These results can be seen in Table 10.

A chi-square analysis revealed that SLPs and SETs are significantly different on

this measure [$X^2(1) = 6.416$, p = 0.011].

Table 10

Face-to-Face Interactions with AAC Users During Preservice Training

Preservice Training Format	SLPs, $N = 48$ n (% of N)	SETs, $N = 75$ n (% of N)
Face-to-face opportunities	25 (52%)	22 (29%)
No face-to-face opportunities	23 (48%)	53 (71%)

Note. SLPs = Speech-Language Pathologists; SETs = Special Education Teachers. $N =$ all respondents who answered the question about face-to-face preservice training. $n =$ the number of respondents per category.

Professional development. For each of the three professional training formats, respondents were asked if they had practiced specific techniques with an AAC user (1) none of the time, (2) some of the time, or (3) all of the time. Results on this measure for all formats can be seen below in Table 11.

Table 11

Presence of AAC User During Professional Development

AAC User Present	SLPs n (% of N)			SETs n (% of N)		
	CE $N = 27$	IS $N = 29$	ST $N = 42$	CE $N = 22$	IS $N = 37$	ST $N = 47$
None of the time	15 (56%)	14 (48%)	4 (10%)	9 (41%)	16 (43%)	7 (15%)
Some of the time	12 (44%)	13 (45%)	33 (79%)	13 (59%)	19 (51%)	37 (79%)
All of the time	0 (0%)	2 (7%)	5 (12%)	0 (0%)	3 (6%)	3 (6%)

Note. SLPs = Speech-Language Pathologists; SETs = Special Education Teachers. CE = continuing education; IS = In-service; ST = Self-taught. $N =$ total number of respondents for each training format. $n =$ the number of respondents per category.

Continuing education. Twenty-seven SLPs and 22 SETs reported continuing education. Of these, no one indicated that AAC users were present "all of the time." Fifty-six percent ($n = 15$) of SLPs reported AAC users were

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present "none of the time," and 44% ($n = 12$) reported "some of the time." Forty-one percent ($n = 9$) of SETs responded that AAC users were present "none of the time," while 59% ($n = 13$) reported "some of the time." These results were not found to be significantly different between professions using a chi-square analysis.

In-service training. In-service training was reported by 29 SLPs and 37 SETs. SLPs reported AAC user presence "none of the time" in 48% ($n = 14$) of the sample, "some of the time" in 45% ($n = 13$) of the sample, and "all of the time" in 7% ($n = 2$) of the sample. SETs were not significantly different on this measure according to a chi-square analysis. Forty-three percent ($n = 16$) of SETs reported "none of the time," 51% ($n = 19$) reported "some of the time," and 5% ($n = 2$) reported "all of the time" regarding the frequency of AAC users present during in-service training.

Self-taught training. Forty-two SLPs and 47 SETs reported self-teaching of AAC facilitator skills. Among the SLPs, 10% ($n = 4$) reported AAC users present "none of the time," 79% ($n = 33$) reported "some of the time," and 12% ($n = 5$) reported "all of the time." Among the SETs responding to this question, 15% ($n = 7$) indicated AAC users were present "none of the time," 79% ($n = 37$) indicated "some of the time," and 6% ($n = 3$) indicated "all of the time." According to a chi-square analysis, these results were not significantly different between professions.

Opportunity for follow-up. Adult learning research has also demonstrated that a period of reflection following a learning experience

enhances learning, and that objective feedback regarding new skills facilitates

this reflection (Zigmont, Kappus & Sudikoff, 2011). This research was applied in

professional training models, therefore survey respondents were not asked about

follow-up in regards to their preservice training. Similarly, follow-up opportunities

do not apply to self-teaching. For these reasons, respondents were asked

whether follow-up coaching was provided in the presence of an AAC user in the

days and weeks following their continuing education or in-service trainings only.

Table 12 displays the results on these measures.

Table 12

Opportunity for Follow-up

Professional Training Format	SLPs n (% of N)		SETs n (% of N)	
	CE N = 27	IS N = 29	CE N = 22	IS N = 37
Opportunity for follow-up	2 (7%)	5 (17%)	3 (14%)	7 (19%)
No opportunity for follow-up	25 (93%)	24 (83%)	19 (86%)	30 (81%)

Note. SLPs = Speech-Language Pathologists; SETs = Special Education
Teachers. CE = continuing education; IS = In-service. N = total number of
respondents who answered questions about follow-up. n = the number of
respondents per category.

    Continuing education. Among respondents answering this question, 27

were SLPs and 22 were SETs. Results showed that follow-up coaching after

continuing education is rare for both SLPs and SETs, with no significant

difference between the professions based on chi-square analysis. Seven

percent (n = 2) of SLPs reported follow-up to their continuing education training,

while 93% ($n = 25$) reported no follow-up. Similarly, 14% ($n = 3$) of SETs reported continuing education follow-up and 86% ($n = 19$) reported no follow-up.

In-service training. This question was answered by 29 SLPs and 37 SETs. Follow-up after in-service training was reported by 17% ($n = 5$) of SLPs, while 83% ($n = 24$) reported no in-service follow-up. Of the responding SETs, 19% ($n = 7$) reported in-service follow-up and 81% ($n = 30$) did not. Chi-square analysis did not find significant difference on this measure.

Components of AAC Training

In addition to the timing and format of AAC training received by professionals, the current research sought to clarify what topics or components of training were covered during facilitator trainings. To this end, for each of the formats they reported, respondents were asked to indicate which of the following areas of AAC were covered: facilitation of social interaction and general communication; methods of inclusion in natural settings; technological troubleshooting; and device-specific issues. In addition, they were asked to rate their training for these components on a 5-point Likert-type scale ranging from "Not Covered" to "Covered In-Depth."   Results of chi-square analysis showed that ratings by SLPs and SETs were not statistically different for any of the training components. For this reason, SLP and SET data is reported in aggregate. Large standard deviations rendered mean values inappropriate; therefore, median values are reported along with the counts and percentages of responses in each category. Table 13 displays median scores for each component across both SLPs and SETs. Table 14 displays SLP counts and

percentages for each training component across all format types. Table 15

displays these data for SETs. For specific components the N-values vary slightly

as some respondents chose not to answer all sub-questions for some formats.

This information is discussed further in the sections below, by format.

Table 13

Median Ratings of Degree of Coverage of Training Components by the Type of

Training Across SLPs and SETs

Type of Training	Training Components			
	Social Interaction and General Communication	Inclusion in Natural Settings	Technological Troubleshooting	Device-Specific Training
Preservice	2	2	1	1
Continuing Education	3	3	2	3
In-service	3	2	1.5	3
Self-taught	3	3	2	3

Note. SLPs = Speech-Language Pathologists; SETs = Special Education
Teachers. Median scores were rated on a 5-point Likert-type scale and indicate
the level of coverage for each training component where 1 = Not Covered, 2 =
Covered Minimally, 3 = Covered, 4 = Covered Moderately, and 5 = Covered In-
depth.

Preservice training. In all, 47 SLPs and 75 SETs responded to the

question regarding the components of their preservice training. This represents

98% of SLPs and 99% of SETs who reported having had preservice training.

Combined, SLPs and SETs reported a median score of 2 for facilitation of social

interaction and general communication and methods of inclusion in natural

Table 14

Counts and Percentages of SLPs' Ratings for Training Components Within Format Type

	Speech-Language Pathologists															
	Preservice, *N* = 47 *n* (% of *N*)				Continuing Education, *N* = 27 *n* (% of *N*)				In-Service, *N* = 29 *n* (% of *N*)				Self-Taught, *N* = 42 *n* (% of *N*)			
Scaled Scores	SG	I	T	D	SG	I	T	D	SG	I	T	D	SG	I	T	D
1	14 (30%)	14 (30%)	32 (68%)	22 (47%)	2 (7%)	3 (11%)	8 (30%)	2 (7%)	2 (7%)	3 (10%)	9 (31%)	4 (14%)	1 (2%)	3 (7%)	4 (10%)	2 (5%)
2	10 (21%)	17 (36%)	12 (26%)	20 (43%)	5 (19%)	8 (30%)	10 (37%)	9 (33%)	7 (24%)	9 (31%)	11 (38%)	4 (14%)	9 (21%)	15 (34%)	17 (40%)	11 (26%)
3	15 (32%)	12 (26%)	1 (2%)	3 (6%)	14 (52%)	10 (37%)	5 (19%)	11 (41%)	14 (48%)	11 (38%)	4 (14%)	15 (52%)	21 (50%)	14 (33%)	12 (29%)	13 (31%)
4	6 (13%)	3 (6%)	1 (2%)	1 (2%)	5 (19%)	6 (22%)	4 (15%)	4 (15%)	4 (14%)	5 (17%)	4 (14%)	4 (14%)	7 (17%)	8 (19%)	5 (12%)	12 (29%)
5	2 (4%)	1 (2%)	1 (2%)	1 (2%)	1 (4%)	0 (0%)	0 (0%)	1 (4%)	2 (7%)	1 (3%)	1 (4%)	2 (7%)	4 (10%)	2 (5%)	4 (10%)	4 (10%)
Mean rating	**2.40**	**2.15**	**1.45**	**1.70**	**2.93**	**2.70**	**2.19**	**2.74**	**2.90**	**2.72**	**2.21**	**2.86**	**3.10**	**2.79**	**2.71**	**3.12**

Note. *N* = the total number of SLPs reporting each type of training. *n* = the number of respondents per category. SG = Social interaction and general communication; I = Inclusion in natural settings; T = Technological troubleshooting; and D = Device-specific training. Scores are on a Likert-type scale where 1 = Not Covered, 2 = Covered Minimally, 3 = Covered, 4 = Covered Moderately, and 5 = Covered In-depth.

Table 15

Counts and Percentages of SETs' Ratings for Training Components Within Format Type

Scaled Scores	Special Education Teachers															
	Preservice, N = 75 n (% of N)				Continuing Education, N = 22[a] n (% of N)				In-Service, N = 36[b] n (% of N)				Self-Taught, N = 47 n (% of N)			
	SG	I	T	D	SG	I	T	D	SG	I	T	D	SG	I	T	D
1	26 (35%)	35 (47%)	59 (79%)	51 (68%)	1 (5%)	2 (9%)	11 (50%)	6 (27%)	7 (19%)	7 (19%)	23 (64%)	7 (19%)	9 (19%)	10 (21%)	8 (17%)	2 (4%)
2	23 (31%)	18 (24%)	10 (13%)	14 (19%)	5 (24%)	5 (23%)	8 (36%)	5 (23%)	12 (33%)	14 (39%)	7 (19%)	13 (35%)	12 (26%)	10 (21%)	18 (38%)	13 (28%)
3	18 (24%)	16 (21%)	2 (3%)	2 (3%)	10 (48%)	11 (50%)	0 (0%)	5 (23%)	10 (28%)	10 (28%)	2 (6%)	9 (24%)	16 (34%)	18 (38%)	13 (28%)	19 (40%)
4	6 (8%)	4 (5%)	2 (3%)	5 (7%)	4 (19%)	3 (14%)	2 (9%)	3 (14%)	6 (17%)	4 (11%)	2 (6%0)	4 (11%)	6 (13%)	7 (15%)	3 (6%)	6 (13%)
5	2 (3%)	2 (3%)	2 (3%)	3 (4%)	1 (5%)	1 (5%)	1 (5%)	3 (14%)	1 (3%)	1 (3%)	2 (6%)	4 (11%)	4 (9%)	2 (4%)	5 (11%)	7 (15%)
Mean rating	**2.12**	**1.94**	**1.36**	**1.59**	**3.00**	**2.87**	**1.91**	**2.70**	**2.51**	**2.41**	**1.73**	**2.61**	**2.67**	**2.60**	**2.52**	**3.02**

Note. N = the total number of SETs reporting each type of training. *n* = the number of respondents per category SG = Social interaction and general communication; I = Inclusion in natural settings; T = Technological troubleshooting; and D = Device-specific training. Scores are on a Likert-type scale where 1 = Not Covered, 2 = Covered Minimally, 3 = Covered, 4 = Covered Moderately, and 5 = Covered In-depth.
[a] For Continuing Education, SG (*N* = 21). [b] For In-Service, D (*N* = 37).

settings. This corresponds to "Covered Minimally." They reported a median

score of 1 for technological troubleshooting and device-specific issues,

corresponding to "Not Covered." See Table 13, above.

Professional training.   SLP and SET ratings of their professional training

are described below by format type.

Continuing education. Ratings of continuing education components were

provided by 100% of SLPs ($n = 27$) and 95-100% ($n = 21$ for social interaction

and general communication; $n = 22$ for all other components) of SETs who

reported having had continuing education training. For three of the components

(facilitation of social interaction and general communication; methods of inclusion

in natural settings; and device-specific issues) both SLPs and SETs reported a

median score of 3, corresponding to "Covered."   For technological

troubleshooting, both professions reported a median score of 2, representing

"Covered Minimally" (See Table 13, above).

In-service training. For this measure, 29 SLPs and 36 SETs rated their in-

service training. For the sub-question regarding device-specific training, 37

SETs responded. Of respondents who reported in-service training, this

corresponds to response rates of 100% for SLPs and 95-97% for SETs.

Facilitation of social interaction and general communication as well as device-

specific issues received a median score of 3, which equates to "Covered."

Methods of inclusion in natural settings was rated as "Covered Minimally," with a

median score of 2. Technological troubleshooting received a 1.5, which falls

between "Not Covered" and "Covered Minimally" (See Table 13, above).

Self-taught training. Of respondents who reported self-teaching, 100% of SLPs (*n* = 42) and 98% of SETs (*n* = 47) provided ratings of the components included in their self-taught training. Combined, SLPs and SETs gave a median score of 3 ("Covered") to facilitation of social interaction and general communication; methods of inclusion in natural settings; and device-specific issues. Technological troubleshooting received a median score of 2 ("Covered Minimally"). See Table 13, above.

Levels of Facilitator Confidence

Facilitator confidence was measured in two ways. Respondents were asked to report their feelings of confidence on a range of training components and to report the actions they take that indicate confidence. These measurements followed recommendations by Bandura (2012): to measure a range of performances or sub-domains across an overall domain (AAC facilitation), and to measure action-based activities such as goal pursuit and persistence. All eligible respondents were asked about their confidence, and 124 responses were made. For all measures of confidence, 94% of SLPs (*n* = 48) and 87% of SETs (*n* = 76) responded.

Feelings of facilitator confidence. The overall domain of facilitator confidence and confidence in each of four sub-domains listed as training components (facilitation of social communication and general communication; methods of AAC inclusion in natural settings; technological troubleshooting; device-specific training) were rated by respondents on a five-point Likert-type scale.   A score of 1 equated to "Not Confident," and scores ranged up to 5 for

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"Very Confident." Table 16 displays the means and standard deviations for both

SLPs and SETs in the overall and sub-domains of AAC facilitator confidence.

Based on chi-square analysis, there were no significant differences between

SLPs and SETs on any of the self-rated feelings of confidence.

Table 16

Descriptive Data for Ratings of Facilitator Confidence About Aspects of AAC

	SLPs, *N* = 48			SETs, *N* = 76		
Feelings of Confidence by Component	*Mdn*	*M*	*SD*	*Mdn*	*M*	*SD*
Overall AAC facilitation	2.5	**2.69**	1.03	2	**2.25**	0.99
Facilitation of social interaction and general communication	3	**2.94**	1.08	2	**2.38**	1.03
Methods of AAC inclusion in natural settings	2	**2.56**	0.99	2	**2.25**	0.91
Technological troubleshooting	2	**2.13**	1.06	2	**1.75**	0.08
Device-specific training	2	**2.04**	1.01	2	**1.73**	0.81

Note. SLPs = Speech-Language Pathologists; SETs = Special Education
Teachers.   *N* = the total number of SLPs and SETs who self-rated feelings of
confidence. Scores correspond to a 5-point Likert-type scale where 1 indicates
"Not Confident"; 2 indicates "Minimally Confident"; 3 indicates "Confident"; 4
indicates "Moderately Confident" and 5 indicates "Very Confident."

Action-based measures of confidence. Two questions were designed

to examine confidence for specific AAC facilitator skills. The first question was,

"How likely are you to establish and pursue goals with AAC users?" The second

question was, "When the AAC users you work with encounter difficulties with

AAC devices or AAC communication, how likely are you to persist in the pursuit

of their AAC goals?" Five-point Likert-type scales ranging from "Very Unlikely,"

through a neutral midpoint of "Undecided," to "Very Likely" were used for these

questions. A chi-square analysis was conducted with the scores grouped as

either negative values ("Very Unlikely;" "Unlikely;" "Undecided"), or positive

values ("Likely;" "Very Likely"). With this method of analysis, SLPs were found to be significantly more likely than SETs to establish and pursue AAC goals [$X^2(1)$ = 7.125, p = 0.008]. In addition, SLPs were significantly more likely to persist through difficulty than SETs [$X^2(1)$ = 10, p = 0.002]. At a future date, further analysis will be made with the "Undecided" responses re-assigned to their own category and/or as belonging with the positive values. There is some dispute within the field of self-efficacy as to how Likert-type scales such as this one should be interpreted (Bandura, 2012). Table 17 presents counts and percentages of positive values and negative values, with "Undecided" responses re-assigned to their own category.

Table 17

Action-based Ratings of Confidence

	SLPs, N = 48 n (% of N)			SETs, N = 76 n (% of N)		
	Response Type					
	Negative	Un-decided	Positive	Negative	Un-decided	Positive
Establish and Pursue Goals	0 (0%)	9 (19%)	39 (81%)	18 (24%)	14 (18%)	44 (58%)
Persist Through Difficulties	0 (0%)	5 (10%)	43 (90%)	13 (17%)	14 (18%)	49 (64%)

Note. SLPs = Speech-Language Pathologists; SETs = Special Education Teachers. N = the total number of SLPs and SETs who answered the two action-based confidence questions. n = the number of respondents in each category. "Negative" includes "Very Unlikely," and "Unlikely." "Positive" includes "Likely," and "Very Likely."

To determine the factors that had a significant influence on facilitator confidence, chi-squared analyses were conducted across demographic data as

well as data indicating the timing, format and components of AAC facilitator training. Where significant, the differences between SLPs and SETs on their action-based confidence ratings are described below.

Demographics

Among demographic questions, two were found to correlate to confidence levels: the estimated number of AAC users SLPs and SETs had served over their entire career, and the current number of hours per week they spend helping AAC users. Both of these measures affected action-based confidence levels for SLPs and SETs.

Number of AAC users served and confidence. There was wide variation in the number of AAC users served across SLP and SET careers. Two outliers (values = 201, 1200) were removed from the analysis. Because these data contained large standard deviations, a chi-square analysis of medians was made. As previously discussed, "Undecided" responses were included with the "Very Unlikely" and "Unlikely" responses. For SLPs, serving more AAC users did not change the likelihood of pursuing AAC goals or persisting when AAC use became difficult. In contrast, SETs who served more AAC users were significantly more likely to pursue AAC goals [$X^2(1) = 3.94$, $p = 0.05$]. Raw data indicated SETs were *less* likely to persist through difficulty with *higher* numbers of AAC users served; however, this was not a statistically significant finding. Median numbers of AAC users served for SLPs and SETs are presented in Table 18.

Table 18

AAC Users Served Across Careers Compared with Confidence

Confidence measures	SLPs Mdn # AAC Users	SETs Mdn # AAC Users
Likely to pursue AAC goals	5	5
Unlikely to pursue AAC goals	5	2.5
Likely to persist through difficulty	5	3
Unlikely to persist through difficulty	2	5

Note. SLPs = Speech-Language Pathologists; SETs = Special Education Teachers.

Timing of AAC Training

The timing of AAC training, specifically preservice training, was found to affect SETs' confidence ratings. A chi-square analysis of medians indicated that SETs who reported any preservice training were significantly more likely to pursue AAC goals than those without preservice training [$X^2(1) = 5.907$, *p* = 0.02]. Table 19 provides counts and percentages for SETs who reported less or more action-based confidence. One hundred percent of SLPs reported preservice training, so they showed no differences on this measure. Recall that in these analyses, "Undecided" responses were included along with "Very Unlikely" and "Unlikely" responses for analysis.

Format

AAC user present. Whether or not an AAC user was present during various training formats was compared with SLP and SET responses regarding confidence levels and their likelihood to pursue goals with AAC users and persist through difficulties. Because few AAC users were reported to be present during continuing education and in-service training, differences between means were

Table 19

SET Preservice Training Related to Confidence

Confidence measures	N	SETs With No Preservice Training n (% of N)	SETs With Preservice Training n (% of N)
Likely to pursue AAC goals	44	9 (20%)	35 (80%)
Unlikely to pursue AAC goals	32	15 (47%)	17(53%)
Likely to persist through difficulty	49	13 (27%)	36 (73%)
Unlikely to persist through difficulty	27	11 (41%)	16 (60%)

Note. n = number of respondents in each category. *N* = sample size.

low for these measures. However, for self-taught training, whether or not an

AAC user was present when learning impacted SLP and SET likelihood to

pursue AAC goals. See Table 20 for sample sizes, means and standard

deviations. Respondents indicated the frequency with which AAC users were

present during self-taught training (1 = "none of the time," 2 = "some of the time,"

3 = "all of the time"). For these analyses, "Undecided" responses were included

with the negative responses of confidence ("Very Unlikely;" "Unlikely"). Based on

a chi-square analysis, SLPs who self-taught with an AAC user were more likely

to pursue AAC goals than those whose self-teaching did not include an AAC user

at a level that approached significance [$X^2(1) = 3.34$, *p* = 0.07]. Results were

clearer for SETs. Those who self-taught along side an AAC user were

significantly more likely to pursue AAC goals than SETs whose self-teaching did

not include AAC users [$X^2(1) = 12.62$, *p* = 0.0004].

Table 20

Action-based confidence in relation to AAC user presence during self-taught

training

| | Frequency of AAC User Present During Self-Training[a] | | | | | |
| | SLPs | | | SETs | | |
Confidence measures	*n*	*M*	*SD*	*n*	*M*	*SD*
Likely to pursue AAC goals	34	**2.09**	0.45	32	**2.06**	0.35
Unlikely to pursue AAC goals	8	**1.75**	0.46	16	**1.56**	0.51
Likely to persist through difficulty	38	**2.03**	0.49	33	**1.97**	0.47
Unlikely to persist through difficulty	4	**2.00**	0.0	15	**1.73**	0.46

Note. SLPs = Speech-Language Pathologists; SETs = Special Education
Teachers.
[a] Mean values reflect the amount of time AAC users were present where 1 =
"none of the time," 2 = "some of the time," 3 = "all of the time."

Open-ended Question

The final, open-ended question provided respondents an opportunity to

discuss which aspects of AAC training they found to be the most and/or least

effective. Sixty-six respondents answered this question, with a fairly even

distribution between SLPs (*n* = 35) and SETs (*n* = 31). Their responses were

analyzed and coded for recurring themes. To reduce researcher bias in

interpretation of responses, the author of the current study as well as a second-

year SLP graduate student independently identified themes and coded

responses. After identifying and coding themes separately, the two readers

discussed theme coding until consensus was reached. Responses that did not

use the specific words "most effective" or "least effective" were interpreted on a

case-by-case basis. For example, the response "Hands on experience with

professionals" was interpreted to include positive training features and was

coded among the "most effective" themes. Training features that were "wished-

for" were coded among the "most effective" aspects of training. Likewise, features described as "least effective" because they were *omitted* from training were coded as "most effective".

Six themes were identified as "most effective" and are described here from most to least commonly occurring. Among the comments were 23 regarding device-specific training, such as, "Specific device training with follow up has been most effective. The least effective was short seminars on all Speech Generating Devices." Seventeen comments fit the theme of student-specific training, such as, "I have not yet found satisfactory training. I would like training in specific methods of initial implementation with a student and on increasing usage/generalization." The previous comment was also coded among the 15 regarding social and classroom integration. There were 13 comments that fit the theme of expert assistance, such as, "Hands with a trainer on-site, trial and error followed by a call to tech support, and availability of device company reps for consultation. Follow-up with an expert has been invaluable." Twelve comments fit the theme of hands-on practice, including the previous quote and others such as, "hands-on learning." Finally, 10 comments fit the teaming theme, such as, "I wish we had more training of integrating AAC use in the classroom with staff. That is one area here that is a struggle for us."

"Least effective" responses varied widely and only two themes recurred frequently enough to code. Ten regarded outdated training and/or technology, such as, "Most effective: reading through case studies and discussing approaches to a variety of treatments. Least effective: watching videos from the

1980s with outdated treatment models." Seven comments fit the theme of

unhelpful experts, such as, "The district has provided no training. We have an

"Assistive Technology Specialist" who provides equipment, but there is no time

given to "teach" me. I am also often frustrated that the SLP is not an expert

either. AAC is sooo important to some of my kiddos, yet it is one of my biggest

challenges with time to address." Counts of comments that fit most and least

effective themes can be seen in Table 21. All verbatim responses as well as

coded themes are available in Appendix H.

Table 21

Open-ended Question Themes

Theme	Number of Comments
Device-specific training	23
Student-specific training	17
Social and classroom integration	15
Expert assistance	13
Hands-on practice	12
Teaming	10
Least Effective Aspects of Training	
Outdated training and/or technology	10
Unhelpful experts	7

Discussion

The purpose of this study was to identify patterns of preservice and professional development AAC training among SETs and school-based SLPs and to relate their training to their self-reported feelings of confidence in their roles as high-tech AAC facilitators. Survey respondents answered numerous questions detailing the timing, format and components of their training. They also self-rated their confidence on two types of measures. It was expected that several factors would be positively correlated with high feelings of confidence. These factors are discussed below in conjunction with discussions of the demographics of the sample, confidence findings, and significant results regarding training characteristics. Lastly, the insights provided by the open-ended question are discussed.

Confidence

Confidence in teaching leads to improved student outcomes. This has been demonstrated by self-efficacy research in the field of education (Tschannen-Moran & Hoy, 2001). What we know from the current research is that no respondents, either SLPs or SETs, feel very confident about facilitating high-tech AAC communicators.   The median confidence for most measurements in the current research can be described as "Minimally Confident." A major finding of the current research was that SLPs do, however, feel more confident than SETs, at least in terms of their likelihood to pursue AAC goals and persist when AAC communication proves difficult.

The difference between action-based ratings of confidence and self-rated feelings of confidence was of interest. It is possible that this difference was caused by survey methodology. When rating on a Likert-type scale, respondents tend to avoid rating themselves on either the high or low extreme. As overall confidence was minimal, this may have effectively reduced the survey scales to a 3-point spread, eliminating variability in the data. In future research, 7-point Likert-type scales may provide better information. The possible reasons SLPs reported slightly higher confidence on measures of action-based AAC facilitation are explored below, with preservice education and inclusion of AAC users having the most impact on SLP confidence.

Demographics

Because it inherently relates to communication, AAC is often considered to belong in the realm of SLPs. However, demographic questions in the current research revealed that SETs spend more time working with AAC users each week than SLPs do. This, combined with lower action-based confidence among SETs, highlights the importance of finding ways to improve the AAC training provided to SETs.

AAC Training Characteristics

Timing. Based on research by Costigan and Light (2010), SLPs were expected to report formal AAC courses in preservice training with more frequency than SETs. Indeed, this study replicates those findings. In the last five years, based on this sample, the numbers of SETs who had formal AAC preservice training remain low. SLPs, on the other hand, were approximately

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20% more likely to have had a formal AAC course compared to those who graduated six to ten years ago. This may reflect the greater emphasis professional credentialing organizations for SLPs versus SETs place on having knowledge and skills in the area of AAC.

Individuals who reported preservice AAC training were expected to report higher feelings of confidence than those who did not, and this result was found to be true for SETs. Results revealed that having any type of preservice training did increase confidence for SETs. Amounts of training did not affect SLP confidence in the same way, likely because all SLPs reported preservice training. This is an important finding that should be considered by institutes of higher education, when establishing course requirements for SLPs and SETs.

Format.   Salient findings in terms of professional AAC training formats indicate that continuing education is rare, in-service training is somewhat more common, and self-taught training predominates among both SLPs and SETs. It must be acknowledged that school district funding and release time for training AAC professionals is limited and this is likely related to the overall low confidence felt by AAC facilitators. With this in mind, optimizing the time spent in training is critical.   There is a high likelihood that self-teaching will continue to be a common means for AAC facilitators to learn skills. Incorporating opportunities for follow-up into professional training, including online and "live" trainings, and dovetailing further self-teaching of newly learned skills with follow-up opportunities may result in higher confidence levels for SLPs and SETs.

Another expected finding included strong positive correlations between ratings of confidence and training that incorporates the AAC user, particularly self-taught methods. Self-taught skills are typically tailored to functional needs and implemented in real-world situations in a timely fashion, and this fits with recommendations from adult learning research (Knowles, 1984; Butler, 1989). Including AAC users during training was found to increase confidence, especially for self-taught training. This finding supported research by Wilcox & Norman-Murch (2000), which demonstrated better assistive technology training outcomes when hands-on practice with students occurred. Based on these results, a strong recommendation can be made to educators to include AAC users during their process of self-teaching.

When opportunities for professional training are limited, as many survey respondents indicated, educators may require a shift in perspective. Instead of viewing training time as something set apart, educators should be informed that the most effective way to learn AAC skills (for students and facilitators) is to do so in real communicative interactions, throughout the school day. Functional communication in natural settings, including in the classroom, is a critical goal for students with complex communication needs. In the author's view, teaching SLPs and SETs to approach some of their teaching time as personal, professional AAC training time will allow all the communication partners (students and facilitators) to "work through" difficulties, gain the skills they need, and increase their confidence.

Components.   A visual inspection of the raw data indicated that across professions, AAC facilitators are somewhat more confident when facilitating social interaction and general communication and least confident with technological troubleshooting. Survey findings were not significant, however, and from the current research it is unclear how these components of training relate to confidence levels of SLPs and SETs. It is possible that *what* is taught is less important than *how* or *when* it is taught.

Open-ended Question

The overall direction of responses to the open-ended question was toward a desire for more and better AAC facilitator training. This echoes research in which SLPs raise concerns about premature abandonment of AAC devices due to a lack of training (Johnson, Inglebret, Jones, & Ray, 2006) and in which SETs indicate that lack of training is a major barrier to implementation of assistive technology in the classroom (Okolo & Bouck, 2007).

An interesting, but not unexpected pattern of opposite relationships was noted regarding experts. Mentioned 20 times, expert assistance was listed as either among the most or the least effective aspects of training, presumably depending upon the skill of the expert. This highlights the important role of AAC specialists or well-educated SLPs and SETs in the training of AAC facilitators. Most impactful on SLP and SET confidence may be the quality of follow-up provided by AAC specialists. Although follow-up to training did not show a significant impact on AAC facilitators because it was so infrequently experienced, adult learning research (Zigmont, Kappus & Sudikoff, 2011) and responses to the

open-ended question indicate that this is important. With so many opportunities for communicating via technology, AAC specialists who provide ongoing follow-up to educators could have a significant impact on confidence. Resource-saving options could include video conferencing, video review of AAC use in natural settings, e-mail and phone calls.

The strongest general theme that emerged from survey comments was that effective AAC training focuses on specific students or specific devices. Combining the themes of hands-on training, device-specific training, student-specific training as well as frustration with outdated technology, it was found that within the 66 comments, a desire for specificity in training was mentioned 62 times. Of these 62 comments, 33 indicated frustration with outdated training and technology, emphasizing that the need for device-specific training interacts with the need for up-to-date technology.

Question order effects may have influenced responses to the open-ended question. It was the final question of the survey, and survey content may have influenced responses. However, some themes that might have been drawn from survey content, and which were indicated as important by research, were not strongly recurrent in survey comments. Of note, few people listed general AAC training or follow-up coaching among the most effective themes. No one clearly mentioned a desire for more preservice AAC training, despite the findings that this improves confidence for SETs.

Conclusions

Overall, the current study indicates a continued need for improved preservice AAC training, especially for SETs. In addition, past research, survey results and candid responses to the open-ended question all point to the need for on-going, hands-on, student-specific and device-specific AAC training. With the support of effective AAC specialists, and self-teaching focused on including AAC users in classroom interactions, SLP and SET confidence levels in the area of AAC is likely to improve. This will give students who rely on high-tech AAC the opportunities they deserve to be fully functioning communicators.

It must be considered that the sample of SETs and SLPs who chose to respond to the current study may not be representative of SETs and SLPs as a whole. Despite efforts to acquire a randomized and unbiased sample, if respondents who chose to participate in the current survey had strong feelings about the contents of the survey, this may limit the results. This possible limitation could be explored through replication and additional research.

It is the author's hope that information gleaned from the current study might be used to craft AAC training protocols that will lead to increased skills and improved confidence for facilitators. To further this line of research, experimental comparisons between two such AAC training protocols could be implemented. In addition, the results of this research may be used to advocate for an increased emphasis on the importance of AAC training for school-based facilitators, including the training of SETs, SLPs and other school personnel such as general education teachers, classroom paraprofessionals and special education aides.

The ultimate goal of this study was to promote increased and improved AAC training in order to effect better communication outcomes for children who utilize high-tech AAC devices. Children with complex communication needs deserve competent, confident facilitators, and a growing body of research points to AAC training as a means to this end.

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Appendix A

Survey Instrument

AAC Survey

Q1 I am currently licensed/credentialed as a
- ❍ Special Education Teacher (1)
- ❍ Speech-Language Pathologist (2)
- ❍ Not currently licensed/credentialed as a Special Education Teacher (3)
- ❍ Not currently licensed/credentialed as a Speech-Language Pathologist (4)

If "Not currently licensed/credentialed as a Special Education Teacher" or "Not currently licensed/credentialed as a Speech-Language Pathologist" was selected, then the survey software skipped to the end of the survey.

Q2 How many years have you been employed as a
(Special Education Teacher or Speech-Language Pathologist filled in automatically according to answers on Q1)?

Q3 Are you currently working in public schools in your state? This may include traditional, charter or on-line schools.
- ❍ Yes (1)
- ❍ No (2)

If "No" was selected, then the survey software skipped to the end of the survey.

Q4 Do you currently assist, or have you ever assisted, children and/or youth (ages 3-21) who use high-tech AAC devices? High-tech devices are those which are powered by batteries or electricity and which incorporate computer technology.
- ❍ Yes (1)
- ❍ No (2)
- ❍ If "No" was selected, then the survey software skipped to the end of the survey.

Q5 Please provide your best estimate of the number of high-tech AAC users you have assisted over your entire career.

Q6 Please provide your best estimate of the number of hours per week you currently spend assisting high-tech AAC users.

Q7   What is the highest degree you have attained?
- ❍   High school diploma (1)
- ❍   Associate's degree (2)
- ❍   Bachelor's degree (3)
- ❍   Master's degree (4)
- ❍   Doctoral degree (5)

The following questions pertain to the AAC training you received as an undergraduate or graduate student before you began working as a (Special Education Teacher or Speech-Language Pathologist filled in automatically according to answers on Q1)?

Q8 Please indicate the amount of undergraduate or graduate instruction you've had that fits the following descriptions:

	Number (1)
Formal courses dedicated to AAC (1)	
Brief seminars (1-3 days) (2)	
Workshops (1-3 hours) (3)	
Student teaching or clinical practicum that included face-to-face interactions with AAC users. (4)	

Q9 Which of the following areas of AAC were covered in the undergraduate and graduate education you received?

	Not Covered (1)	Covered Minimally (2)	Covered (3)	Covered Moderately (4)	Covered In-Depth (5)
Facilitation of social interaction and general communication (1)	○	○	○	○	○
Methods of AAC inclusion in natural settings (2)	○	○	○	○	○
Technological troubleshooting (3)	○	○	○	○	○
Device-specific training (4)	○	○	○	○	○

The following questions pertain to AAC training you have received since you began working as a
(Special Education Teacher or Speech-Language Pathologist filled in automatically according to answers on Q1)?

Q10 Please indicate the format(s) of AAC training you have received since entering your profession. Check all that apply.
❑	Continuing education (large classes, seminars, workshops) (1)
❑	In-service training (small group or individual) (2)
❑	Self-taught (3)
❑	None (4)

Regarding the continuing education trainings you have attended since entering your profession, please answer the following questions:

Q11 Approximately how many continuing education trainings have you attended?

Q12 Regarding the continuing education trainings you attended, did you practice specific techniques with an AAC user
❍   None of the time? (1)
❍   Some of the time? (2)
❍   All of the time? (3)

Q13 Which of the following areas of AAC were covered in the continuing education trainings that you attended:

	Not Covered (1)	Covered Minimally (2)	Covered (3)	Covered Moderately (4)	Covered In-Depth (5)
Facilitation of social interaction and general communication (1)	❍	❍	❍	❍	❍
Methods of AAC inclusion in natural settings (2)	❍	❍	❍	❍	❍
Technological troubleshooting (3)	❍	❍	❍	❍	❍
Device-specific training (4)	❍	❍	❍	❍	❍

Q14 During the days and weeks after your continuing education training, was follow-up coaching provided to you in the presence of an AAC user?
❍   Yes (1)
❍   No (2)

Regarding the in-service trainings you have attended since entering your profession, please answer the following questions:

Q15 Approximately how many in-service trainings have you attended?

Q16 Regarding the in-service trainings you attended, did you practice specific techniques with an AAC user
❍   None of the time? (1)
❍   Some of the time? (2)
❍   All of the time? (3)

Q17 Which of the following areas of AAC were covered in the in-service trainings that you attended:

	Not Covered (1)	Covered Minimally (2)	Covered (3)	Covered Moderately (4)	Covered In-Depth (5)
Facilitation of social interaction and general communication (1)	❍	❍	❍	❍	❍
Methods of AAC inclusion in natural settings (2)	❍	❍	❍	❍	❍
Technological troubleshooting (3)	❍	❍	❍	❍	❍
Device-specific training (4)	❍	❍	❍	❍	❍

Q18 During the days and weeks after your in-service training, was follow-up coaching provided to you in the presence of an AAC user?
❍ Yes (1)
❍ No (2)

Regarding your self-taught training, please answer the following questions:

Q19 Please provide your best estimate of the number of occasions you made time to teach yourself AAC concepts and practices.

Q20 During your self-training, did you practice specific techniques with an AAC user
❍ None of the time? (1)
❍ Some of the time? (2)
❍ All of the time? (3)

Q21 Please indicate which areas of AAC you taught yourself, and to what degree.

	Not Covered (1)	Covered Minimally (2)	Covered (3)	Covered Moderately (4)	Covered In-Depth (5)
Facilitation of social interaction and general communication (1)	○	○	○	○	○
Methods of AAC inclusion in natural settings (2)	○	○	○	○	○
Technological troubleshooting (3)	○	○	○	○	○
Device-specific training (4)	○	○	○	○	○

Q22 Please rate how confident you feel as an AAC facilitator in each of the following areas:

	Not Confident (1)	Minimally Confident (2)	Confident (3)	Moderately Confident (4)	Very Confident (5)
Overall AAC facilitation (1)	○	○	○	○	○
Facilitation of social interaction and general communication (2)	○	○	○	○	○
Methods of AAC inclusion in natural settings (3)	○	○	○	○	○
Technological troubleshooting (4)	○	○	○	○	○
Device-specific issues (5)	○	○	○	○	○

Q23 How likely are you to establish and pursue AAC goals with AAC users?
- ❍ Very Unlikely (1)
- ❍ Unlikely (2)
- ❍ Undecided (3)
- ❍ Likely (4)
- ❍ Very Likely (5)

Q24 When the AAC users you work with encounter difficulties with AAC devices or AAC communication, how likely are you to persist in the pursuit of their AAC goals?
- ❍ Very Unlikely (1)
- ❍ Unlikely (2)
- ❍ Undecided (3)
- ❍ Likely (4)
- ❍ Very Likely (5)

Q25 (Optional) What aspects of AAC training have you found to be the most and/or least effective?

Thank you for being willing to participate in this survey, we appreciate your time.

Appendix B

School District Demographics

Idaho			
District	Student Enrollment[a]	Geographic Region	Type of Locale[b]
1	Large	East	Suburb: Small (23)
2	Medium	South Central	Town: Remote (33)
3	Small	West	Town: Distant (32)
4	Large	East	City: Small (13)
5	Medium	West	Town: Fringe (31)
6	Small	North	Town: Remote (33)
7	Small	West	Town: Remote (33)
8	Large	East	City: Small (13)
9	Medium	North	Suburb: Small (23)
10	Small	North	Rural: Distant (42)
Oregon			
District	Student Enrollment[a]	Geographic Region	Type of Locale[b]
1	Large	North West	City: Large (11)
2	Medium	South West	Suburb: Midsize (22)
3	Large	North West	Suburb: Large (21)
4	Small	North East	Town: Remote (33)
5	Medium	North West	Suburb: Large (21)
6	Large	South West	City: Small (13)
7	Small	South West	Town: Remote (33)
8	Medium	North West	Town: Fringe (31)
9	Small	West	Suburb: Small (23)
10	Large	North West	Suburb: Large (21)
Washington			
District	Student Enrollment[a]	Geographic Region	Type of Locale[b]
1	Small	North West	Town: Fringe (31)
2	Medium	East	City: Small (13)
3	Medium	Central	Suburb: Small (23)
4	Small	North Central	Town: Remote (33)
5	Medium	North East	Town: Remote (33)
6	Medium	South Central	Town: Distant (32)
7	Small	North East	Rural: Distant (42)

Note. Demographic information obtained from the National Center for Education Statistics (2015a) Common Core of Data for the 2012-2013 and 2013-2014 school years.
[a] "Small" indicates district-wide enrollment of 1000-3999 students; "Medium" indicates district-wide enrollment of 4000-7999; "Large" indicates district-wide enrollment of 10,000 or more students. [b] See Appendix C for a description of locale categories.

Appendix C

Locale Codes

11 - City, Large:
Territory inside an urbanized area and inside a principal city with population of 250,000 or more.

12 - City, Midsize:
Territory inside an urbanized area and inside a principal city with population less than 250,000 and greater than or equal to 100,000.

13 - City, Small:
Territory inside an urbanized area and inside a principal city with population less than 100,000.

21 - Suburb, Large:
Territory outside a principal city and inside an urbanized area with population of 250,000 or more.

22 - Suburb, Midsize:
Territory outside a principal city and inside an urbanized area with population less than 250,000 and greater than or equal to 100,000.

23 - Suburb, Small:
Territory outside a principal city and inside an urbanized area with population less than 100,000.

31 - Town, Fringe:
Territory inside an urban cluster that is less than or equal to 10 miles from an urbanized area.

32 - Town, Distant:
Territory inside an urban cluster that is more than 10 miles and less than or equal to 35 miles from an urbanized area.

33 - Town, Remote:
Territory inside an urban cluster that is more than 35 miles from an urbanized area.

41 - Rural, Fringe:
Census-defined rural territory that is less than or equal to 5 miles from an urbanized area, as well as rural territory that is less than or equal to 2.5 miles from an urban cluster.

42 - Rural, Distant:
Census-defined rural territory that is more than 5 miles but less than or equal to 25 miles from an urbanized area, as well as rural territory that is more than 2.5 miles but less than or equal to 10 miles from an urban cluster.

43 - Rural, Remote:
Census-defined rural territory that is more than 25 miles from an urbanized area and is also more than 10 miles from an urban cluster.

Note. Data retrieved from the National Center for Education Statistics (2015b) Common Core of Data for the 2012-2013 and 2013-2014 school years.

Appendix D

Initial Recruitment E-mail Sent to District Special Education Directors

Hi Ms./Mr. _____,

My name is Allison Early and I am a second year graduate student in the Master's program in Speech-Language Pathology at Idaho State University. I am writing to ask about the possibility of your forwarding an e-mail survey to the Special Education Teachers and Speech-Language Pathologists in your district.

If that is a possibility, what information do you need and/or what process shall I go through to be approved?

Here is a brief overview of my research: I am conducting a study to identify patterns of Augmentative and Alternative Communication (AAC) training received by Special Education Teachers and Speech-Language Pathologists and to find out how confident professionals feel when serving students who use high-tech (computerized) AAC devices. **The survey is anonymous and takes approximately 10 minutes to complete. It does not collect any personal or identifying information.**

I am including a link to provide the text of my survey for approval. This link is not a "live" survey and data will not be collected from any responses made here: https://isudhs.az1.qualtrics.com/SE/?SID=SV_6PhflfVtwRLYyfH
The actual survey will have identical questions. If you choose to review the survey, you should select that you are licensed, that you are currently employed in schools, and that you have AAC experience. Otherwise, you will be exited from the survey before you have a chance to see it all.

The study has been reviewed and approved by the Idaho State University Institutional Review Board for human subject participation. If you have any questions concerning this study, please contact Allison Early, Graduate Student at Idaho State University-Meridian at earlalli@isu.edu, or Dr. Jeanne Johnson, Associate Chair & Professor in the Department of Communication Sciences and Disorders at Idaho State University-Meridian at johnsjm@isu.edu.

I appreciate your consideration,

Allison Early

Appendix E

First Survey Distribution E-mail, Including Instructions to Participants

Ms./Mr. _____,

Thank you for being willing to assist with my research. Below is a letter for your staff and a link to the survey. Please forward it to all the Special Education Teachers and Speech Language Pathologists in your district. I will also send two short reminder e-mails over the next two weeks.

Sincerely,
Allison Early

To: Special Education Teachers and Speech-Language Pathologists
Subject: AAC Survey from Idaho State University

Hello,

My name is Allison Early and I am a second year graduate student in the Master's program in Speech-Language Pathology at Idaho State University. I am contacting you because I need your input.

I am conducting a research study to identify patterns of Augmentative and Alternative Communication (AAC) training received by Special Education Teachers and Speech-Language Pathologists and to find out how confident professionals feel when serving students who use high-tech (computerized) AAC devices.

Your unique experiences will help us to identify what aspects of AAC training have been the most successful for you. Knowing this will lead to designing better training for all so that students who use AAC devices can best achieve their communication potential.

Participation in the study is voluntary and will take approximately 10 minutes.   All responses will be anonymous and no personal information will be collected. Please click on this link to share your valuable experiences: https://isudhs.az1.qualtrics.com/SE/?SID=SV_dg6hAhdRZqG8Mjb

This study has been reviewed and approved by the Idaho State University Institutional Review Board for human subject participation. If you have any questions concerning this study, please contact Allison Early, Graduate Student at Idaho State University-Meridian at earlalli@isu.edu, or Dr. Jeanne Johnson, Associate Chair & Professor in the Department of Communication Sciences and Disorders at Idaho State University-Meridian at johnsjm@isu.edu.

Thank you for your time!
Allison Early

Appendix F

Second Survey Distribution E-mail

Hello,

Thank you again for forwarding the ISU e-mail survey about AAC to all of your Special Education Teachers and Speech-Language Pathologists.

Please send this reminder e-mail at your earliest convenience.   Feel free to contact me with any questions or concerns.

Thank you,
Allison Early

To: Special Education Teachers and Speech Language Pathologists

Recently you received an e-mail survey about your experiences with Augmentative and Alternative Communication (AAC) training. As noted in that e-mail, I am a graduate student at Idaho State University gathering data to identify best practices in high-tech AAC facilitator training.

If you have already responded to the survey, thank you! If you have not yet replied, please consider doing so. Your personal experience in this area can provide valuable information to help others. Click on this link to begin the survey:
 https://isudhs.az1.qualtrics.com/SE/?SID=SV_dg6hAhdRZqG8Mjb

Thank you,
Allison Early

Appendix G

Third and Final Survey Distribution E-mail

Hello,

Included below is the final reminder for the ISU e- survey about AAC. Thank you in advance for forwarding this e-mail to all of your Special Education Teachers and Speech-Language Pathologists.

With this e-mail, the survey process will be complete. Please let me know if you have any questions or concerns. I sincerely appreciate your time and assistance!

Allison Early

To: Special Education Teachers and Speech Language Pathologists

Time is running out for responding to the Idaho State University Augmentative and Alternative Communication survey. The last day to respond is Saturday, March 14th.

If you haven't done so already, please take just a few minutes to answer the confidential survey on your AAC training history. Your participation will provide valuable insights.

Please click https://isudhs.az1.qualtrics.com/SE/?SID=SV_dg6hAhdRZqG8Mjb to begin. Thank you for your time and information! Again, I really appreciate your help.

Best wishes,

Allison Early

Appendix H

Verbatim Responses to the Open-Ended Question

Question 38: What aspects of AAC training have you found to be the most and/or least effective?

- Least effective: access to various devices, reps that will come to our rural area and assist in purchasing, / Most effective: which students are in need of devices / / I am currently working with Tobii and Dynavox to purchase 2 different devices for 2 different students. I am finding the process of purchasing a hi-tech device very frustrating and time consuming. In rural areas we have little access to technology and the representatives that sell these devices. We have accessed our technology center in Ellensburg, but would love to have training on assessing students that are in need of higher tech devices and a template for the report that is needed for Medicaid to pay for such a device. (2, 8)

- I have been denied any type of training! I have requested it multiple times with no luck. I have had students throughout my career who have had devices and the SLPs have always been those who knew what to do with them, got them from Central Washington University to use on trial basis. I have always been excited about it but get no support.\:-((8)

- When attending a class that showed how to use various AAC devices. I used to attend Intelli-tools training, but they are basically obsolete now due to being able to use I-Pads. I like Pix Writer and Pix REader often, but they no longer work on the new computers and the district will not purchase the new software. I have used switch toys, switches, Dynavox, Tech Talk 8 and Tech Talk 16 and other "buttons" for facilitated communication. Other than Intelli-tool training, I have never had any specific training on the specific devices. I use the I-Pad minimally (free sites or introductory sites) , but the school district will not purchase the APPS to facilitate communication at this time. (1, 7)

- i graduated with my degree in 1987. Nothing was covered then. I got my masters in 2007 and it was not covered in that program either.

- Training that teaches us to work with specific devices for specific kids words for me. \\I already know what the general purposes of the devices, but they are so different and aren't really that useful until they are tailored to the child. \The thing that would be most effective for me is having the SLPs and the AAC person, along with parents, general ed teachers, and my staff, all be together and write goals and approaches to helping the student use the device so we're all on the same page............Then, we would need some intensive time to help the student learn the basics and some functional uses for it. From there, we could expand. (1, 2, 3, 6)

- With technology constantly changing it is hard to keep up. Hands on AAC assessments done by outside agencies that have access to many devices and programs have been the most helpful. Idaho Assistive Technology Program has been good to work with. (1, 4, 7)

- Hands-on training helps me much more than "book larnin'." I often don't generalize/maintain proceedural knowledge until having had a chance to practice with devices/students. (1, 2, 5)

- Consults on individual children with a person who uses the same device as the individual student (2, 4)

- I found the aspects that are most effective are how to use AAC training with autistic students, who have difficulty with oral expression. (2)

- Most: App specific workshops\Least: history of AAC (1, 7)

- Most effective: device-specific practice, interaction with colleagues who are confident with AAC, lesson plans and or direct instruction by a confident AAC facilitator, video modeling. \Least effective: text books, practice and information not linked to the specific skills, needs or device of an AAC user\\The need for professional development in this are is huge! (1, 4, 5)

- I have found the AAC training to be non-effective and feel that I have learned what I know by having to figure it out on my own!! Tech/ACC people come do assessments and make suggestions that children don't or can't cognitively utilize (8)

- I would most appreciate device-specific training and opportunities for a student's educational team to receive similar training. (1, 6)

- General communication devices

- ATIA conference in Orlando was amazing. You could see and talk with different vendors and try out stuff. The breakout sessions gave you indepth practice. Least effective was when one vendor came to the scholl and tried to sell us on his product. (4, 5, 8)

- My experience working with children with significant communication and developmental delay supports the idea of using low-tech options prior to introduce high tech options for maximal independence and functionality of AAC. I believe strongly in the Pyramid Education Picture Exchange System and believe in diligently working through all 6 phases prior to expecting students to utilize more complicated AAC systems.

- Least: Chew and spew training...no follow up or practical hands experience (5)

- Continuity and follow up of training. My students change so frequently, that I may have an AAC user for one or two years and then not have another one for three or four. My biggest frustration has been being spoon fed information and then expected to apply it to my students. This kind of training and the devices used are so specific, I need frequent (weekly or at least bi-weekly) feedback and access to support to make sure my students and myself are getting the most out of their AAC device. (1, 8)

- I wish we had more training of integrating AAC use in the classroom with staff. That is one area here that is a struggle for us. (3, 6)

- More training in all areas would be helpful.

- AAC is becoming increasingly accessible through IPAD's and smaller hand-held electronic equipment. This has increased ease and options to use these devices in functional or general education environments. I would like to see increased focus and attention toward implementation toward apps and these type of devices, as opposed to separate AAC devices such as Vantage. (1, 3)

- Facilitation of communication using AAC devices. The device-specific training I received in graduate school was useless because the devices were already outdated. (7)

- Specific device training with follow up has been most effective. The least effective was short seminars on all Speech Generating Devices. (1)

- Hands on demonstration of use and lists of set-up opportunities (3, 5)

- Usually seems to be related in a reactive way (i.e. student arrives with specific device or need) rather than proactively (gather a lot of information before student need arises).

- Most effective: reading through case studies and discussing approaches to a variety of treatments. \Least effective: watching videos from the 1980s with outdated treatment models. (7)

- For me, general courses are both good and bad; while they provide good information, I always found that I knew just enough to know that I didn't have enough information. Courses specific to a certain population or device are much more useful to me, as are clinical experiences like the AAC camp offered through ISU. (1, 2, 3)

- Least helpful is training for specific devices because the technology changes so rapidly that in less than a year many of the techniques are not applicable. Social integration and social communication in multiple settings would be beneficial. (3, 7)

- Client/student specific, device specific based on current students (1, 2)

- The training provided for use in the general classroom. (3)

- I have had so little training that most of my experience has been trial and error with a couple of AAC users in the past. Most effective was modeling use of device with AAC user and teacher in the classroom. (2, 3, 6)

- Parent trainings focusing on helping troubleshoot problems with high-tech devices, as well as low-tech to no-tech backups... more specifically, helping parents learn the reality that a device is not a "magic wand," nor will it provide a solution for every situation, and if the family is unable to maintain it that it will likely go unused. (6)

- Technology is continuously evolving. This constant change is difficult to keep up with when dealing with large caseloads. Social interaction with peers is the largest weakness of AAC training I've been involved in. (3, 7)

- Device-specific training from AAC company websites have been effective in developing goals and treatment plans. (1)

- getting teachers and parents on board to use the devices in all settings\trouble shooting for different devices (1, 3, 6)

- very little. I usually have to call a specialist from SETC or the Washington School for the Blind or Visually Impaired

- Hands with a trainer on-site, trial and error followed by a call to tech support, and availability of device company reps for consultation. Followup with an expert has been invaluable.   (3, 4, 5)

- small group specific training with devices and strategies (1)

- Hands on experience with professionals. (4, 5)

- I feel like actually working with the student and the device is the most beneficial training vs. just talking about it. I have the BEST SLP that set up for AAC sales reps to come and show my students' parents and their private SLPs to show what they can do and how the ACC device and help with communication. She will even help the private therapist to fill out the paperwork for Medicaid so that we can have devices for my students.\\ What is difficult for me is that in my

classroom I have several different types of devices and each is created/set up differently so it is hard to work with one child one way and switch gears to teach another child another way. It is also difficult when the device is sent in to be fixed and it is gone for months at a time. I am currently trying to keep a standard AAC device in my classroom for students to use when this happens, but currently all I have is PECs form Boardmaker & program from Pyramid. (1, 2, 4, 6)

- If a student doesn't have another form of communication, they tend to lose all interest in communication if the AAC device is down for repairs or maintenance.

- no inservices have been available to me

- Utilizing the opportunity to have the state do an evaluation and work together with me and the sped teacher to determine what would meet the needs of the particular student. This is particularly helpful because of changing technologies and all the options available it is impossible to stay informed myself. (2, 4, 6, 7)

- Most effective- watching videos or real life examples. Clear explanation of the right assessment and implementation procedures. \Least effective- giving too many different examples without a clear process of assessment and implementation

- Lack of application within the school setting, availability of current technology, lack of hands-on opportunities to troubleshoot issues that arise with technology use in schools. (3, 5, 7)

- The thing that you must consider when getting information from someone in this profession for 32 years is how much technology has changed in that time. AAC use to be very difficult to learn and use. It was not cost effective. Not easily accessible. With the advent of computers, ipads, tablets, laptops . . . the options for communication are significantly more available and easy to use. I really have not received any specific training in the implementation of AAC in social and academic settings. I'm not convinced that extensive training will even be necessary as people grow up using electronic devices to communicate even when they do not possess a communication disability. Communicating with alternative devices is already an integral part of our society and this should facilitate the use of AAC for people with disabilities. (7)

- I have not yet found satisfactory training. I would like training in specific methods of initial implementation with a student and on increasing usage/generalization. (2, 3)

- I feel like focusing on high tech AAC is not the key. Starting with Low tech devices that don't cost a lot of anything that you can even make yourself is the

way to start. If a client can show intent to communicate, pointing skills, joint attention and ability to discriminate between icon then you can move up from there. Many expensive devices have been left dusty in the corner and not been used because they were too advanced to begin with. This gives SLPs, caregivers and the client the idea that the client can't communicate in this way when really its the technology level of the device not the concept of AAC that failed.

• Matching/Evaluating Cognitive Abilities with devices, in specific, how to match the device to the student has been an area of difficulty. I teach students with significant cognitive disabilities and often receive technology (scanning switches, computer interfaces) that are difficult to access. (2)

• AAC (mostly low tech) has come up as an option for a couple of my students, but the hardest thing for me has been to get staff buy in. It requires a lot of staff training and extra effort on their part to implement any AAC strategies and I have found that it is often hard to get staff to be on board when they are already so busy. (6)

• It has never been touched on by my graduate program or in district training. However, none of my current students use an AAC, I imagine if one of my students did- I would be given support by our one district AAC specialist. (4)

• Fortunately, our district has an AAC specialist who is very knowledgeable and experienced with a variety of switches, devices, etc. and I have learned a lot from him. Hands-on use and training with specific devices with an AAC user is most effective. (1, 2, 4, 5)

• The district has provided no training. We have a "Assistive Technology Specialist" who provides equipment, but there is no time given to "teach" me. I am also often frustrated that the SLP is not an expert either. AAC is sooo important to some of my kiddos, yet it is one of my biggest challenges with time to address. (8)

• The most effective are with a specific student on his/her specific device. (1, 2)

• Most effective: Evaluation of AAC for users; device specific trainings from specific companies / / Least effective: Most seminars/trainings focus on eval and device specific technology. There are not many opportunities for trainings on general use of AAC devices with users. (1, 3)

• To get commitment from SPED staff to use ACC even non-tech communication board in their setting on routine basis. (6)

- Practical powerpoint/information hard-copies; hands-on experiences; person to check in with for additional questions (4, 5)

- Most Effective: device-specific training with follow up with the trainer and the user. / / Least Effective: receiving lists of apps and devices which may be used (1, 2, 4)

- I found it ineffective in my class when they told me someone else would know how to use them and could train me because that hasn't been entirely true. I've read about how to use AAC in my class, but I struggle to make it a natural transition since I have never seen it effectively done. (3, 8)

- When it is specific to students using the device and hands on/activity specific (1, 2, 5)

- Learning how to program the AAC device and trouble shooting the device. (1)

- The most valuable time has been spent with SLPs in our district helping one-on-one with specific students, their AACs and working toward the students' maximizing the use of their own AAC devices. (1, 2, 4)

- What does the acronym AAC mean? I marked that I worked with one person with AAC, because she had an electronic device that had specific pictures to produce voice communication. Is that what you mean? I worked with her in an adult setting and she was already proficient with using her device.

- I have had no trainings on anything related to computer or computer technology. I have had to learn how to use any technology by myself, on the job as needed.

- We borrowed the device for about six weeks, hence the minimal exposure. A permanent device was just approved this week, so I will have much more exposure to device specific self-teaching and integration into all aspects of the student's school setting and possibly the home setting. I am confident that the device will increase the student's communicaiton capabilities.

- hands-on learning (5)

Note. Most Effective Theme Codes: Device-specific training (1); Student-specific training (2); Social and classroom integration (3); Expert assistance (4); Hands-on practice (5); Teaming (6). Least Effective Theme Codes: Outdated training and/or technology (7); Unhelpful experts (8).