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Recommended Augmentative and Alternative Communication Competencies for Special Education Teachers

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Abstract

Empirical evidence supports the notion of special education teachers receiving limited pre-service training in augmentative and alternative communication (AAC). This lack of training is not only evident in the United States but in other countries such as United Kingdom, India, and Israel. Yet the teaching demands for the use of AAC are increasing as more students with complex communication needs are entering the school systems. As a result, this paper outlines four special education teacher competencies needed to effectively address the communication needs of these students. The four competencies consist of the needs for training in the areas of (1) communication development and communicative competencies, (2) teamwork and collaborative practices, (3) role and functions of AAC systems, and (4) AAC assessment and instructional strategies. These competencies are aligned to the standards from the Council for Exceptional Children and the literature available on AAC training. Evidence suggests there is a lack of training for special education teachers and other professionals in this area and limited research to guide teacher preparation programs.

Key Words: Augmentative and Alternative Communication, Special Education, Teacher Preparation, Teacher Training

Special education teacher preparation programs need to train special education teachers to meet the teaching demands of students with complex communication needs (CCN; Costigan & Light, 2010; Council for Exceptional Children, 2012a). Students classified as having CCN are typically diagnosed with disabilities including autism spectrum disorder, deaf-blindness, intellectual disabilities, multiple disabilities, and traumatic brain injuries. For most students with CCN, functional communication can be enhanced with augmentative and alternative communication (AAC) strategies (e.g., picture communication systems [PCS], speech-generating devices [SGDs], manual signs and/or gestures). There is an increased number of individuals with CCN (Beukelman & Mirenda, 2013), and professional organizations such as the Council for Exceptional Children (CEC) have acknowledge the needs for special education teachers to be trained in AAC strategies. In fact, CEC (2012a) stated that special education teachers should be "familiar with augmentative and alternative communication systems and a variety of assistive technologies to support the communication and learning of individuals with exceptionalities" (p. 6-7). It also states that "beginning special education professionals use strategies to enhance lan-

guage development and communication skills of individuals with exceptionalities" (p. 7). This standard along with other professional standards are designed to promote accountability by outlining the specialized knowledge and skills that professionals must possess to educate students with special needs (CEC, 2015). CEC has outlined in their *Special Educator Professional Preparation Standards* (2012a) the knowledge and skill competencies that special education teachers should demonstrate to effectively serve students with CCN. CEC, a pioneer organization, recognizes the importance of professional standards for special education teachers and consistently updates and develops professional preparation standards that support the training of special education teachers. The updated standards reflect the current special education teacher training needs, and knowledge and skills specific to AAC indicated across the seven recently-approved CEC Core Standards (2012a). These include: Standard 1- Learner Development and Individual Learning Differences, Standard 2- Learning Environments, Standard 3- Curricular Content Knowledge, Standard 4- Assessment, Standard 5- Instructional Planning and Strategies, Standard 6- Professional Learning and Practice, and Standard 7- Collaboration. Furthermore, CEC's Special Interest Divisions developed Specialty Set Standards (2012b) that outline specific knowledge and skills needed by special education teachers based on their areas of expertise or specialization. According to CEC (2012b), "these Specialty Sets are composed of two parts: the knowledge and skills that are shared across all special education disciplines combined with the knowledge and skills idiosyncratic to each the respective disciplines" (CEC Initial and Advance Specialty Set, para. 2). For example, the Division of Autism and Developmental Disabilities developed standards for working with students with autism and intellectual disabilities.

Research suggest that special education teachers could benefit from knowledge and skills in AAC (Costigan & Light 2010), specifically in the areas of teamwork and collaborative practices (DePaepe & Wood, 2001; Locke & Mirenda, 1992; Srinivasan, Matthews, & Lloyd, 2011), role and functions of AAC systems (Heller, Fredrick, Dykes, Best, & Cohen, 1999; McGregor & Pachuski, 1996; Srinivasan et al., 2011), and AAC assessment and instructional strategies (DePaepe & Wood, 2001; Heller et al., 1999; McGregor & Pachuski, 1996; Srinivasan et al., 2011). Given the professional standards set forth by CEC and the empirical evidence suggesting there is a training gap in AAC (e.g., Costigan & Light, 2010; McMillan, 2008; Srinivasan et al., 2011), the purpose of this paper is to highlight four broad special education teacher competencies relevant to supporting the communication needs of students with CCN in the United States, the United Kingdom (U.K.), India, and Israel. These competencies consist of specialized needs for special education teacher training in the areas of (1) communication development and communicative competencies, (2) teamwork and collaborative practices, (3) role and functions of AAC systems, and (4) AAC assessment and instructional strategies. These four areas stem from results obtained from a systematic literature review on AAC training of special education teachers in the U.S. (Boesch & Da Fonte, 2016), a follow-up search to identify additional evidence from countries beyond the U.S. (which yielded studies from only the U.K., India, and Israel), and overlapping competencies addressed in the CEC Core and Specialty Set Professional Preparation Standards. In addition to outlining the four key training areas, this article discusses several implications pertaining to the need for future research in AAC.

METHOD

A search was conducted to identify literature pertaining to the AAC competencies expected of special education teachers. The article selection criteria consisted of: (a) empirical studies about special education teachers at the pre- and in-service level, (b) articles aimed at the AAC needs of special education teachers, (c) articles that were peer-reviewed, and (d) articles that were published within the last 40 years (1975-2015). From the initial search of databases, we excluded literature reviews (e.g., Costigan & Light, 2010) and articles whose focus was not special education teacher training (e.g., Calculator & Black, 2009; Soto, Muller, Hunt, & Goetz, 2001; Wormnæs & Malek, 2004). To increase the accuracy of the inclusion criteria, a *pre-service teacher* was defined as a person enrolled in a university-level training program for the purpose of obtaining a teaching certification. An *in-service teacher* was defined as a person who was currently working as a school teacher of students with special needs.

Three phases were used to retrieve relevant literature. In Phase 1, articles were systematically obtained from four database search engines, the Cumulative Index of Nursing and Allied Health (CINAHL), Educational Resources Information Clearinghouse (ERIC), ProQuest, and PsycINFO. Database searches followed the same sequence and used 10 keywords: augmentative communication, alternative communication, augmentative and alternative communication, AAC, pre-service training, in-service training, training, teacher training, special education teacher training, and pre-professional. In Phase 2, additional articles were obtained through ancestral searches. This included scanning the reference list of all included articles to identify additional articles not located during Phase 1. In Phase 3, we hand-searched the *Augmentative and Alternative Communication* (AAC) journal from the first issue published in 1975 to 2015 (30 years).

Table 1
Summary of Supporting Evidence

Reference	Participants	Methods	Country	Training Needs: Competency 1	2	3	4
DePaepe & Wood (2001)	Pre-service	Survey	United States	-	X	X	X
Heller, Fredrick, Dykes, Best, & Cohen (1999)	Pre-service In-service	Survey	United States	-	-	X	X
Lebel, Olshtain, & Weiss (2005)	In-service	Descriptive	Israel	X	-	X	X
Locke & Mirenda (1992)	Pre-service In-service	Survey	United States	-	-	X	X
McConachie & Pennington (1997)	In-service	Between-group design	United Kingdom	-	-	X	X
McGregor & Pachuski (1996)	In-service	Survey	United States	-	-	X	X
McMillan (2008)	In-service	SSD; MB across teacher and student	United States	-	-	-	X
Payne & Ogletree (1995)	In-service	SSD; A-B with follow-up	United States	X	X	-	-
Srinivasan, Matthews, & Lloyd (2011)	In-service	Survey	India	-	X	-	X
Van Laarhoven, Munk, Zurita, Lynch, Zurita, & Smith (2008)	Pre-service	Pre-Post Survey	United States	-	-	X	X

Note. 1= Communication Development and Communicative Competencies; 2 = Teamwork and Collaborative Practices; 3 = Role and Functions of AAC Systems; 4 = AAC Instructional Strategies; MB = multiple baseline; SSD = single subject design.

Based on this article retrieval process, we identified 10 articles aligned to the purpose of this paper. These 10 articles included in the paper ranged from 1992 to 2011. Three out of the 10 articles were conducted in the U.K., India, and Israel (i.e., McConachie & Pennington, 1997; Lebel, Olshtain, & Weiss, 2005; Srinivasan et al., 2011) while the remaining 7 were conducted in the U.S. (i.e., DePaepe & Wood, 2001; Heller et al., 1999; Locke & Mirenda, 1992; McGregor & Pachuski, 1996; McMillan, 2008; Payne & Ogletree, 1995; Van Laarhoven et al., 2008). These articles were evaluated to identify emerging themes specific to AAC competencies and were compared to the CEC Core and Specialty Set Standards across all Special Interest Divisions. Based on the comparison four main themes were identified and included: (1) communication development and communicative competencies, (2) teamwork and collaborative practices, (3) role and functions of AAC systems, and (4) AAC assessment and instructional strategies.

RESULTS AND DISCUSSION

International AAC Training Needs

Similar to the United States, the U.K., India, and Israel are experiencing gaps in AAC training for special education teachers at the pre- and in-service levels (see Table 1 for summary of empirical evidence found). In a study by Srinivasan and colleagues (2011), they surveyed 18 special education teachers, speech language pathologists (SLPs), and behavior therapists about current AAC trends in southern India. Professionals reported AAC training was a major component of communication interventions in their classroom setting (Srinivasan et al., 2011). Given the outcome of this survey, the authors suggested it was best that training not be limited to speech-language pathologists or to a single professional. Instead, AAC training should be provided to all team members. That is, special education teachers and all service providers working with students with CCN could

Table 2
Competency 1-Communication Development and Communicative Competencies and CEC Special Educator Professional Preparation Standards

CEC Standards	Relevant Specialty Sets	Total Number of Initial Specialty Sets Standards
1- Learner Development and Individual Learning Differences	BVI, DB, DDA, DHH, EBD, EC, IGC, IGIC, LD	9/12
2- Learning Environments	BVI, EBD, GT	3/12
3- Curricular Content Knowledge	BVI, DHH, EBD, PHD	4/12
4- Assessment	EBD, DB, IGIC	3/12
5- Instructional Planning and Strategies	BVI, DB, EBD, PHD	4/12
6- Professional Learning and Practice	DB	1/12

Note. BVI = Blind and visually impaired; DB = Deafblind; DDA = Developmental disabilities and autism; DHH = Deaf and hard of hearing; EC = Early childhood; EBD = Emotional ad behavior disorders; GT = Gifted and talented; IGIC = Individualized general independence curriculum; IGC = Individualized general curriculum; LD = Learning disabilities; PHD = Physical health disabilities; SS = specialty set.

benefit from receiving current AAC training, having accessible training materials, and engaging in frequent sharing of experiences with other professionals in the field. Srinivasan and colleagues (2011) assertions are aligned to others in the field (e.g., Beukelman & Mirenda, 2013; Lloyd, Fuller, & Arvidson, 1997) in that AAC services should be delivered using a team-approach model.

Lebel and colleagues (2005) developed a web-based course for special education teachers in Israel that covered a variety of AAC-related topics. Special education teachers who participated in the web-based course reported a desire for further educational opportunities in AAC. Practitioners in the United Kingdom also demonstrated that practitioners were undertrained in AAC. McConachie and Pennington (1997) implemented a training program to increase the team member collaboration skills of special education teachers and their assistants. This training yielded positive outcomes including increased communication skills and increased interactions of students who used AAC. These outcomes suggest training provides team members with the knowledge and skills needed to implement AAC strategies and intervention programs which, in turn, enhances the students' communicative outcomes.

Although Wormnæs and Malek (2004) did not meet the inclusion criteria, as participants were SLPs, it is important to highlight that SLPs in this study expressed the need for teachers and parents to receive AAC training. Furthermore, the SLPs suggested that many parents and teachers changed their resistances towards AAC after they realized that AAC strategies were helpful in increasing students' functional communication skills and decreasing aggressive behaviors (Wormnæs & Malek, 2004).

Recommended Special Education Teacher Competencies

Upon reviewing the CEC Standards related to communication and AAC strategies as well as the available research specific to the training in AAC of pre- and in-service special education teachers (Boesch & Da Fonte, 2016), and the results obtained in the search for evidence in the U.K., India, and Israel, four broad training components emerged that were specific to practitioners of students with CCN. These included training competencies in: (1) communication skill development and interaction (e.g., Calculator & Black, 2009; Chung & Douglas, 2014), (2) collaborative practices (e.g., Calculator & Black, 2009; Fallon & Katz, 2008), (3) role and functions of AAC systems (e.g., Costigan & Light, 2010; Sutherland, Gillon, & Yoder, 2005), and (4) instructional strategies on the use of AAC and assistive technology (e.g., Costigan & Light, 2010; Van Laarhoven et. al, 2008).

Competency 1: Communication development and communicative competencies. Typical and atypical communicative development (e.g., Fillmore & Snow, 2000) and the different levels of communicative competence (e.g., Light & McNaughton, 2014) are core areas of knowledge necessary for special education teachers. The content of Competency 1 aligns with the knowledge and skills embedded in Standards 1-6 from the CEC Core Standards and some of the Specialty Set Standards. Table 2 provides detailed information on the CEC standards that address knowledge and skills in *communication development and communicative competencies* and additionally, it outlines the various CEC Special Interest Divisions that have Specialty Set Standards related to Competency 1.

This competency suggests that special education teachers need to have a clear understanding about the

stages of communication development beginning with the notion that social communicative interactions begin at birth. These early interactions revolve around sharing affection and attention, which contribute to the infant's awareness about how his/her behavior can affect the environment (Hoff, 2013). It is early in infants' lives when they learn their behaviors (e.g., crying) can impact their environment (e.g., obtain attention, comfort). For children with developmental disabilities, the communicative patterns are often unpredictable and complex (Schweigert, 2012). This makes communication difficult to interpret as these behaviors can be very subtle, unusual, distinctive, or specific to isolated events or situations that are not shared with the communication partner (Meadan, Halle, & Kelly, 2012; Schweigert, 2012). To successfully increase these communicative behaviors, intervention programs should provide opportunities for intentional communication and improve the responsiveness of the communication partner, which lead to future language development (Brady, Marquis, Fleming, & McLean, 2004; Cress & Marvin, 2003; Kaiser, Hester, & McDuffie, 2001; Keen, Sigafoos, & Woodyatt, 2001; Sarimski, 2002; Yoder & Warren, 2001; Yoder & Warren, 2002).

For special education teachers working with students with CCN, it is necessary to understand and acknowledge the student's communicative forms and functions. That is, special education teachers must be aware of the *form* or *how* a student is communicating (e.g., body language, gestures, signs, symbols, verbalization, or vocalizations). They must also understand the *function* or the *reason* for the student's communication attempts (e.g., requesting, refusing, or commenting). When special education teachers can recognize, identify, and provide meaning to the form and function of students' communicative attempts, steps can be taken to increase or modify the student's communicative skills to be more effective in a myriad of settings.

Special education teachers should also have the ability to understand and acknowledge the areas of communicative competence their students display. According to Light (1989), communicative competence requires skills in four main areas: (1) linguistic, (2) operational, (3) social, and (4) strategic competencies. *Linguistic competence* involves an understanding of the linguistic rules required of the person's language including the language code of the AAC system the person is using. A user of AAC needs to understand the meaning of each symbol available to him or her that includes following syntactic and semantic rules required to express meaning using these symbols in his or her communication system. *Operational competence* refers to the user's ability to technically operate his or her AAC system which includes the skills to:

> (a) produce the hand or body positions, shapes, orientations, and movements for gestures, signs, or other forms of unaided communication (e.g., eye blink codes, head nod/shake); (b) utilize selection technique(s) for aided AAC systems (e.g., direct selection with a finger or fist, eye gaze, scanning with a single switch); and, (c) navigate and operate aided AAC systems accurately and efficiently (e.g., navigate between pages, enter codes to retrieve pre-stored vocabulary items; Light, 1989, pp. 3).

Social competence is when a user of AAC demonstrates the ability to determine when, where, and with whom to functionally communicate using his or her system in a socially acceptable manner. Finally, *strategic competence* is when a user of AAC has knowledge of how to avoid and/or repair communication breakdowns while using his or her AAC system (Light, 1989; Light & McNaughton, 2014). As evident in Table 2, six out of the seven CEC Core Standards address Competency 1 highlighting the need for special education teachers to be knowledgeable in the area of communication development and communication competencies.

Competency 2: Teamwork and collaborative practices. Special education teachers are responsible for the educational programming of students with disabilities; however, in the U.S., U.K. and India, they are not the only individuals involved in the planning process. Others individuals may include general education teachers, the students' family members, and/or other related service providers (e.g., behavior specialist, SLPs, occupational therapist, physical therapist). Thus, collaborating with other individuals in a team-based framework is a key component in the effective educational planning of students with CCN (Chung & Douglas, 2014; Fallon & Katz, 2008). Not only are collaborative skills important, but special education teachers are also in favor of such training (DePaepe & Wood, 2001; Locke & Mirenda, 1992). This was evident in a survey conducted by Srivinvasan and colleagues (2011) in which special education teachers and related service providers in Southern India specified the need for AAC training and indicated that intervention should be a team approach. Similarly, in the United Kingdom, McConachie and Pennigton (1997) also reported an increase in the communication skills of students when special education teachers and their assistants received AAC training together, and collaboratively implemented AAC interventions with related service providers. Together, these studies suggest that special education teachers and related service providers would benefit from training in AAC competencies as it helps them implement effective communication interventions.

Collaboration practices are a core component in the CEC *Special Educator Professional Preparation Standards*. Competency 2 highlights the need for special education teachers to work in teams that include families and related service providers when part of the assistive technology (AT) and/or AAC teams. This key practice is addressed not only in Standard 7 from the CEC Core Standards, but there

Table 3
Competency 2-Teamwork and Collaborative Practices and CEC Special Educator Professional Preparation Standards

CEC Standard	Relevant Specialty Sets	Total Number of Initial Specialty Sets Standards
1- Learner Development and Individual Learning Differences	BVI, EBD, EC	3/12
2- Learning Environments	BVI, EBD, EC	3/12
4- Assessment	BVI, EC, GT	3/12
5- Instructional Planning and Strategies	BVI, DHH, EBD, EC, GT, IGIC	6/12
6- Professional Learning and Practice	EBD, EC	2/12
7- Collaboration	BVI, DB, DHH, EBD, EC, GT, IGC, IGIC, LD, PHD	10/12

Note. BVI = Blind and visually impaired; DB = Deafblind; DDA = Developmental disabilities and autism; DHH = Deaf and hard of hearing; EC = Early childhood; EBD = Emotional ad behavior disorders; GT = Gifted and talented; IGIC = Individualized general independence curriculum; IGC = Individualized general curriculum; LD = Learning disabilities; PHD = Physical health disabilities; SS = specialty set.

are components also in Standards 1-6. Table 3 lists the various CEC Core Standards and CEC Specialty Set Standards related to Competency 2.

Collaborating with other service providers is typically expected of special education teachers. Although special education teachers are tasked with the fundamental responsibility of working in a team, training on collaborative practices can often be overlooked. Yet, training on these skills is recommended in order to assist special education teachers and other service providers in working effectively as a team to make programmatic decisions, plan, and provide services (Costigan & Light, 2010; DePaepe & Wood, 2001; Fallon & Katz, 2008; Locke & Mirenda, 1992; Wormnæs & Malek, 2004).

Training in teamwork and collaborative practices should include learning about the differences among team models and how these are implemented in various settings. This is important as service providers may find themselves working under different service delivery models including multidisciplinary, interdisciplinary, and transdisciplinary team models. For example, members of a *multidisciplinary* team exchange information about the student with each other but do not set student goals or address issues collectively (Lloyd, Fuller, & Arvidson, 1997). An *interdisciplinary* team may set student goals or address issues jointly; however, collaboration between team members is more structured in that a case manager may be selected to coordinate the team. A *transdisciplinary* team is the most collaborative of the three service delivery models; team members using the transdisciplinary model work closely with each other to develop an appropriate program and provide services to the student (Lloyd et al., 1997).

Given the differences between models, adequate training for special education teachers and other service providers is necessary to prepare them to successfully fulfill their roles as members of the AAC team, even within the constraints of the various models. In fact, the literature supports the notion that school personnel working with students using AAC require knowledge and skills pertaining to AAC competencies as well as collaborative practices to effectively fulfill their roles in AAC teams (Costigan & Light, 2010; DePaepe & Wood, 2001; Fallon & Katz, 2008). This is especially true for special education teachers and SLPs who will continuously collaborate to ensure intervention programs are progressing as intended and students are making appropriate gains. Furthermore, special education teachers may need to instruct and collaborate with others who will be working with the student (e.g., families, paraeducators, peers) on how to engage, acknowledge, and interact with students with CCN and the students' AAC systems (Binger & Light, 2006; Calculator & Black, 2009).

Competency 3: Role and functions of AAC systems. Competency 3 stems from research that demonstrates special education teachers throughout the world desire training in the roles and functions of various AAC systems in order to gain the necessary knowledge and skills to support their students (DePaepe & Wood, 2001; Heller et al., 1999; Lebel et al., 2005; Locke & Mirenda, 1992; McConachie & Pennington, 1997; Srinivasan et al., 2011). This competency suggests that special education teachers need to demonstrate an understanding of a variety of assistive technology including the purpose of these systems, the roles, and the functions of each system when working with students with multiple types of disabilities. Although the majority of the standards related to Competency 3 fall under the CEC Core Standard 5, a few can also be found under CEC Core Standards 1-4 and 6. See Table 4 for a list of CEC Core and Specialty Set Standards related to Competency 3.

Table 4
Competency 3-Role and Functions of the AAC Systems and CEC Special Educator Professional Preparation Standards

CEC Standards	Relevant Specialty Sets	Total Number of Initial Specialty Sets Standards
1- Learner Development and Individual Learning Differences	EC	1/12
2- Learning Environments	BVI, EC, IGIC	3/12
3- Curricular Content Knowledge	IGIC, PHD	2/12
4- Assessment	DHH, IGIC	2/12
5- Instructional Planning and Strategies	BVI, DB, DHH, EC, IGC, LD, PHD	7/12
6- Professional Learning and Practice	DHH	1/12

Note. BVI = Blind and visually impaired; DB = Deafblind; DDA = Developmental disabilities and autism; DHH = Deaf and hard of hearing; EC = Early childhood; EBD = Emotional ad behavior disorders; GT = Gifted and talented; IGIC = Individualized general independence curriculum; IGC = Individualized general curriculum; LD = Learning disabilities; PHD = Physical health disabilities; SS = specialty set.

Given that special education teachers will be supporting students with CCN, it is important that they understand how AT is defined and the differences between AAC and AT. This is essential because some components will share the same classification of low- and high-technology. The Assistive Technology Reauthorization Act (2004) defines AT as "... any item, piece of equipment, or product system, whether bought off the shelf, modified, or customized, used to increase, maintain, or improve the functional capabilities of students with disabilities (p. 118)." In other words, AT is a broad term that encompasses a variety of potential resources a student can use such as assistive, rehabilitative, and educational technologies, and within these categories, AAC devices are classified from low to high technologies. These systems can be commercially available or obtained as customized technologies (Cook & Polgar, 2014; Odor 1984). *High technology systems* are defined as computerized systems that use a computer chip or integrated circuit (Lloyd et al., 1997) and designed to provide the individual with opportunities to type or select words and phrases. Students with motor impairments can benefit from using high technology devices that are set up with scanning features/alternate selection methods (Lloyd et al., 1997). One critical component of high technology systems is that training is needed for these to be programed. Therefore, it is highly recommended that special education teachers collaborate and receive training by an AAC service provider or the manufacturing company. This will provide special education teachers the opportunity to match the system to the student's communicative needs. On the other hand, *low technology systems* are referred to as any system that does not use a computer chip or integrated circuit (Lloyd et al., 1997). They are typically inexpensive, easy to make or obtain, and do not have speech output (Lloyd et al., 1997). Low technology systems can be beneficial for students with motor impairments, those who need partner assisted scanning, and/or are in the beginning stages of communication development given that little to no formal training is needed (Lloyd et al., 1997). However, training is needed during the overall set-up of the system, in selecting the vocabulary, matching the student's needs to the system, and implementing the system. The most commonly used low technology AAC systems in the classroom setting include (a) visual supports (e.g., material labeling, word wall), (b) communication boards and symbols, (c) behavior supports (e.g., first-then boards, choice-boards, token reward systems), and (d) classroom schedule or routines (e.g., task analysis). By possessing the knowledge and skills on various types of AAC systems, special education teachers can better match the student's communication needs and abilities to the systems in an effort to support each student within the classroom.

Competency 4: AAC instructional strategies. Competency 4 is supported by the AAC literature, and it is also addressed in the CEC *Special Educator Professional Preparation Standards*. The purpose of this competency is to highlight instructional strategies that are considered evidence-based practices for students with CCN. In fact, five out of the seven CEC Standards (i.e., Standard 2-6) outline specific competencies that special education teachers should demonstrate when working with students with varying disabilities. Furthermore, under CEC Core Standard 5, 10 out of the 12 CEC Specialty Sets Standards encompass knowledge and skills needed under this competency. Table 5 provides detailed information on CEC Core and Specialty Set Standards that are related to Competency 4.

Table 5
Competency 4-AAC Instructional Strategies and CEC Special Educator Professional Preparation Standards

CEC Standard	Relevant Specialty Sets	Total Number of Initial Specialty Sets Standards
2- Learning Environments	BVI, DHH, EC,	3/12
3- Curricular Content Knowledge	BVI, DB, DDA	3/12
4- Assessment	DDA, IGC, PHD	3/12
5- Instructional Planning and Strategies	BVI, DB, DDA, DHH, EBD, GT, IGC, IGIC, LD, PHD	10/12
6- Professional Learning and Practice	DHH	1/12

Note. BVI = Blind and visually impaired; DB = Deafblind; DDA = Developmental disabilities and autism; DHH = Deaf and hard of hearing; EC = Early childhood; EBD = Emotional ad behavior disorders; GT = Gifted and talented; IGIC = Individualized general independence curriculum; IGC = Individualized general curriculum; LD = Learning disabilities; PHD = Physical health disabilities; SS = specialty set.

According to Light and McNaughton (2014), communication competence requires users of AAC to have functionality of communication in order to move towards demonstrating communication competence. They specify that "in order to ensure the attainment of communicative competence, AAC interventionists need to focus not on the demonstration of isolated skills within labs, clinic rooms, or therapy sessions, but rather on actual communication performance within naturally occurring context" (Light & McNaughton, 2014, p. 2). As such, it is recommended that special education teachers consistently monitor and evaluate the students' progress during AAC implementation. A key component in the assessment and intervention program is for special education teachers to consider the student's overall strengths and areas of needs. This includes assessing the student's vocabulary needs, the type and size of symbols appropriate for the student, and the routines and opportunities where communication skills can be addressed and enhanced. Because many communicative opportunities occur at school, special education teachers require training in increasing communicative opportunities and participation in the classroom (McMillan, 2008). To do so, the special education teacher needs the knowledge and skills in setting the stage for successful communication and instructional strategies to enhance communicative interactions so that they create a classroom environment that encourages successful communication and participation with various communication partners (i.e., classroom and school staff, other students, and family members).

Setting the stage for successful communication. When adapting specific environments to foster communicative interactions, special education teachers should: (a) identify and prioritize communication activities, (b) provide tools for communication, (c) model communication interactions including how to use the AAC system, (d) provide frequent opportunities for communication interactions, (e) facilitate independence, and (f) allow for opportunities to increase active participation (Goossens, Crain, & Elder 1994; Sigafoos, 1999). The goal is to foster successful communicative interactions within the environment by providing the necessary tools to the student with CCN. One method is for special education teachers to follow the SETT Model to assess the student's need and appropriately plan his/her instruction. This model focuses on engineering the learning environment in a person-centered manner by considering four main components including the (1) *S*tudent, (2) *E*nvironments, (3) *T*asks, and (4) the *T*ools used (Zabala et al., 2000). For example, while painting a picture in art class, a student may need to request red paint by using a picture communication book. When the student realizes that red paint is missing and thus unable to finish the painting to her liking, she uses the communication book to request paint from the special education teacher (e.g., "I want red paint please"). By using the SETT model in this example, the special education teacher considers the *student's* preferences for painting and encourages communication by "sabotaging" the *environment* (i.e., purposefully does not provide red paint knowing it is the student's favorite color). In this activity, the student's *task* is to request paint by using an attribute (red) with her communication *tool* (e.g., communication book with picture symbols containing the pertinent vocabulary based on the student's preferences, goals, and setting). By having an understanding of this model and the importance of the environment, special education teachers can (a) prioritize communicative opportunities, (b) provide the tools needed for successful interaction and participation, (c) create opportunities to use the AAC system, (d) plan and provide opportunities for communicative interactions, (e) facilitate independence, and (f) increase active participation.

Instructional strategies to enhance communicative interaction. Special education teachers of students with CCN should create opportunities for students to become active participants in the classroom. These opportunities may occur during story-time (e.g., commenting on stories, responding to questions), mealtime (e.g., making requests, refusing, commenting), play-time (e.g., making requests, social conversations), morning routine (e.g., story telling, responding to questions), outings (e.g., commenting, asking questions), and academic instruction (e.g., asking content related questions). To provide students with CCN the opportunity to engage and participate throughout the day, special education teachers may consider using choice boards, token reinforcement systems, visual schedules, and adapted activities. Furthermore, by labeling specific areas in the classroom (e.g., word wall, work task areas, behavior supports, bathroom task analysis, and the contents of bins/cabinets), language is more visible. As a result, language becomes more concrete and accessible to students who may benefit from the extra support. Similarly, *naturalistic teaching strategies* further enhance these communicative opportunities by encouraging learning based on the student's interests. Naturalistic teaching is a collection of skill building practices that are appropriate for reinforcing within the natural environment (Nunes & Hanline, 2007). Naturalistic teaching uses interaction techniques (e.g., modeling, following the student's lead, prompting, matching the student's activity level, positioning yourself at the student's eye level), environmental arrangement to encourage communication (e.g., using tasks that require assistance, keeping materials/items out of the student's reach but within view, not providing the student all of the necessary materials to complete an activity, using highly interactive and novel activities), and other strategies based on the principles of applied behavior analysis (Franzone, 2009).

It is important to consider *vocabulary selection* prior to implementing the intervention program as it is a crucial aspect. Selecting appropriate vocabulary for each setting and activity helps students have meaningful, functional, and flexible vocabulary to use across various activities, settings, and people (Beukelman & Mirenda, 2013). Special education teachers should be aware that vocabulary needs will vary based on the communication partners, contexts (e.g., answering questions in class vs. socializing at a sporting event with friends), and communication strategies used (e.g., using an SGD vs. a communication board). It is equally important to select vocabulary that is developmentally appropriate, interesting, and motivating to the student (Trembath, Balandin, & Togher, 2007). With these considerations in mind, the vocabulary should allow the student to meet his or her communication needs while also being reflective of the student's personality, age, gender, and cultural background (Beukelman & Mirenda, 2013).

In essence, Competency 4 is one of the most critical areas for special education teachers to understand and implement. Yet, it is unlikely that it can be effectively used without special education teachers having the knowledge and skills outlined in Competencies 1-3. Therefore, these four competencies should be key components in the training of all pre- and in-service special education teachers.

FINAL THOUGHTS

AAC training is important given that students with CCN receive most of their education in an environment with the special education teacher. Although the literature is sparse, there is support on the need for special education teachers to be trained on AAC as indicated by the CEC (2012a) standards. The professional standards from the Council for Exceptional Children and the current literature review supports the four competencies areas. Teacher preparation programs and in-service staff development should include training strategies that promote these competencies. Furthermore, special educators who are well-prepared and feel supported are more likely to stay in the field long-term (Gersten, Keating, Yovanof, & Harniss, 2001). By enhancing the skillsets of pre- and in-service special education teachers and other professionals, it is reasonable to expect that the communication skills of their students will further develop. The main goal is for special education teachers to have the necessary knowledge and skills to enhance the participation and communicative interactions of students with CCN as well as to increase the use of AAC strategies within the classroom setting to promote the independence of these students. By embedding the use of AAC strategies during classroom routines and activities, special education teachers can exemplify the competencies needed to effectively address the communication needs of all students. Special education teachers who are able to support students with CCN using AAC may be more likely to identify their students' communication development and competencies, collaborate with other professionals, understand the functions of their students' AAC systems, and implement have access to teaching strategies that will yield further AAC use.

Future Research Directions

It is necessary to acknowledge the gap in the literature. Given the limited studies, it is uncertain how much general knowledge and skills special education teachers and other related professionals have in AAC. A potential area of research is to identify which specific competencies are fundamental for special education teachers to effectively and efficiently support students with CCN. Additionally, future research could consider if there are any region-specific or cultural barriers. Lastly, in order to strengthen teacher preparation programs, it is important to evaluate the outcomes of various types of training programs on

special education teachers' knowledge and skills. These research directions are critical as the field moves towards further developing the current and future state of training in AAC at the national and global levels.

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Note: *From the list of articles meeting the inclusion criteria, studies conducted outside the United States are denoted with an asterisk (*) while studies conducted in the United States are denoted with an open circle (°).*

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