Augmentative and Alternative Communication in Classrooms: Special Education Teacher Competences

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Abstract

Augmentative and Alternative Communication systems (AAC) are used to support communication abilities of children with severe communication impairments; as a result, teachers should be prepared to teach in their classrooms those students who use AAC. The purpose of this paper is to provide an overview of AAC, in terms of what teachers need to know about AAC, and how to support the use of AAC in classrooms. Finally, this paper discusses teacher competencies in teaching students who use AAC with respect to identification, assessment and implementation AAC. Recommendations and implications for practice are presented.

Keywords: Assistive technology, Augmentative and alternative communication system, autism, communication impairments, communication skills, special education teacher competences

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Introduction

The desired and optimal classroom environment should address the needs of all students, however unique or typical. This includes students with severe communication impairments who use augmentative and alternative communication [AAC] (Schlosser & Lee, 2000). AAC systems are often used by students who have disabilities that impair their ability to communicate verbally (Mirenda, 2005). The use of an AAC system has many implications for classroom instructional practices. While use of AAC has become virtually universal in classrooms, students who use these systems typically require support from their teachers and schools (Zangari et al., 1994). This article reviews the literature on AAC systems and discusses the implications of this research relevant to augmentative and alternative communication systems (AAC) in classroom settings.

Children with significant communication needs and challenges are more likely to use AAC (Collins, 2007). This includes children with disabilities such as autism spectrum disorder (ASD), intellectual disability, deaf-blindness, and communication impairments. Because it is helpful to understand the characteristics and needs of these children, and how they often necessitate use of AAC, this article begins with an overview of these disabilities, particularly with respect to communication needs. The second section of this article examines the history, importance, types, and effectiveness of AAC systems within a classroom setting. The presence of students with a disability significant enough to necessitate use of an AAC system places a particular set of demands on the classroom instructor, so the third section of the article addresses teacher competencies in instructing such students and guiding other students in accepting and using the system. These competencies concern identification and assessment methods; implementation methods; and teacher, student and parental acceptances regarding AAC systems. Specfically, this

article attampts to answer these questions: What are types of disabilities are commonly associated with significant needs and challenges related to communication? What are types of AAC systems are used within classrooms? What are teacher competencies in instructing students who are in need for AAC systems?

Sources of Information

Several databases were employed in the research for obtaining the information discussed in this article. The EBSCO databases, including Academic Search Complete, Education Full Text, OmniFile Full Text Mega, General Science Full Text, EBSCO Professional Development Collection, and Social Sciences Full-Text, provided most of this study's sources. In addition, EBSCO's eBook Collection and ebrary, which contain the full texts of books, were utilized, as were the databases Google Scholar, Educational Resource Information Center (ERIC), and ProQuest Dissertations & Theses. The keywords searched included individual or paired searches of the following terms: augmentative and alternative communication systems, severe/multiple disabilities, severe communication impairments, pre-service special education teachers, communication disorders, competencies, knowledge and skills, special education, and AAC. To compensate, research was expanded to encompass all teachers (i.e., not just special-education) and support staff.

Developmental Disabilities and Communication Impairments

The 1990 Individuals with Disabilities Education Act (IDEA) defined a child with a disability as having mental retardation (now referred to as intellectual disability), a hearing impairment (including deafness), a speech or language impairment, a visual impairment (including blindness), a serious emotional disturbance (referred to in this part as "emotional disturbance"), an orthopedic impairment, autism, traumatic brain injury, other health impairment, a specific learning disability, deaf-blindness, or multiple disabilities, and who, by reason thereof, needs special education and related services. Students with more than one disability can be served under the multiple disabilities category, defined by IDEA as, "concomitant impairments . . ., the combination of which causes such severe educational needs that they cannot be accommodated in a special education program solely for one of the impairments" (U.S. Department of Education, 2004b). Students served under IDEA may have communication difficulties, even if they do not receive special education services under the speech and language impaired service category. In fact, communication problems are a prominent feature of many physical, mental, and developmental disorders that qualify students for special education services, for example, deaf-blindness, autism, or intellectual disabilities. It is possible for students to be typically functioning in one area but still have a need for communication assistance. For example, a student can have typical cognitive development but limited communication ability due to motor impairment associated with cerebral palsy. However, the majority of students who require communication assistance through AAC have multiple impairments. This section presents a description of communication disorders and AAC from the highly regarded American Speech-Language-Hearing Association (ASHA) followed by brief examples of other impairments where AAC can be useful for students and teachers.

First a disorder that is associated with communication impairments is autism spectrum disorders (ASD). According to a criteria in the Diagnostic and Statistical Manual of Mental Disorders, ASD is associated with "persistent deficits in social communication and social interaction across multiple contexts" (American Psychiatric Association, 2013). In most cases, ASD "significantly affects a student's verbal and nonverbal communication" (U.S. Department of Education, 2004b). Approximately 35-40% of children with autism are nonverbal (Ryan et al., 2011), and up to half have only limited speech and language abilities (Ganz et al., 2012). Therefore, a student with ASD may find it difficult to shift and target attention or engage in verbal reasoning. Teachers should provide students with ASD explicit, direct instruction, and a teaching method that provides multiple opportunities for expression and interaction. Effective communication interventions, which ideally are simple and utilize multisensory approaches, are designed to improve the student's level of communication skills and independence during performance of routine daily tasks. Communication interventions are one of the most important interventions undertaken with those children. Early focus on augmented communication strategies often helps students develop these skills.

Intellectual disabilities

Second a disability that is affected communication abilities is intellectual disability. Intellectual disability refers to deficits in cognitive capacity and intellectual functioning from early developmental stages on through life, adversely affecting communication, reasoning, problem-solving, planning, abstract thinking, judgment, experiential learning, and traditional academic learning (Cheung, 2013). Because of the range of severity in intellectual deficits, the needs of such children vary greatly with respect to communication. Of all children diagnosed with severe intellectual disabilities, 90% are estimated to have some type of language disorder (McLean, Brady, McLean, & Behrens, 1999; Schalick, Westbrook, & Young, 2012). Without an effective means of communication, these students may become isolated and fail to develop interpersonal relationships (Dalton & Sweeney, 2013). AAC resources offer a way for teachers to "optimize what communication is possible" by improving reading and listening comprehension skills for all students with intellectual disabilities (Schalick et al. , 2012, p. 4).

Deaf-blindness

Deaf-blindenss is another a disabilty that is required to use alternate means of communication. Deaf-blindenss condition in which severe losses in sight and hearing cause communication impairments that impact the developmental and educational achievement of the student (Miles, 2008). No matter what degree of deaf-blindness a student possesses, touch is an important means for these students to offer and receive communication. Teachers must, therefore, find meaningful ways to teach them to interact with and communicate with others. For children who possess some sight and/or hearing ability, a teacher can capitalize on these skills and employ techniques such as touch cues, object symbols, gestures, picture symbols, fingerspelling, sign language, Braille, lip reading, and enlarged print in teaching (Oklahoma State Department of Education Special Education Services, 2013).

Communication impairments

The American Speech-Language-Hearing Association (ASHA) defines communication impairment as: "An impairment in the ability to receive, send, process, and comprehend concepts or verbal, nonverbal and graphic symbol systems. A communication disorder may be

evident in the processes of hearing, language, and/or speech, and they range in severity from mild to profound. It may be developmental or acquired. Students may demonstrate one or any combination of communication disorders. A communication disorder may result in a primary disability or it may be secondary to other disabilities" (ASHA, 1993, p. 1).

Communication impairments fall under four primary categories: speech disorder, language disorder, hearing disorder, or central auditory processing disorder (ASHA, 1993). The disorder may manifest in a variety of ways, including an inability to speak and some physical problem that inhibits the individual's ability to speak or hear (Gonzales, Leroy, & De Leo, 2009). As a result, education of students with communication impairments is directly related to the totality of educational planning used to treat this and other existing conditions. Attempts to communicate may become sources of frustration for students with communication impairments. All of these manifestations may make students with communication impairments reluctant to learn new communication strategies that do not utilize speech (Lasker & Bedrosian, 2001).

Augmentative and Alternative Communication Systems

Sevcik and Romski (2008) define augmentative and alternative communication (AAC) as a clinical practice is used either temporarily or permanently as alternative communication for individuals with severe communication impairments. AAC systems are a part of Assistive Technology (AT), a term that refers assistive, adaptive, and/or rehabilitative devices or systems for supporting individuals with disabilities to improve their communication skills (U.S. Department of Education, 2004a). The purpose of AAC systems is to support communication of non-traditional communicators, such as those with ASD, intellectual disabilities, and communication disorders. Thus, AAC is truly multimodal, permitting individuals to use every mode possible to communicate (Sevcik & Romski, 2008). For children with autism and other disorders affecting speech and communication, facilitating implementation of AAC as early as possible, in as many places in the child's life as possible, is critical (Beukelman & Mirenda, 2005). Since AT including AAC is designed to increase the independence of persons with disabilities (Alkahtani, 2013), AAC tends to be fully integrated into a student's life, at home as well as at school.

History of AAC

How did the benefits of AAC come to be recognized in education? The time from the 1950s through the 1970s marked increased awareness in American society of the need for inclusion and extension of rights to all citizens (Zangari et al., 1994). The passage of the Education for All Handicapped Children Act in 1975, which called for free and appropriate education for every child, mandated provision of school-based services for all children with disabilities and spurred increased research into AAC systems (Hourcade et al., 2004; Zangari et al., 1994). The Education of the Handicapped Act Amendments of 1986 and the Technology-Related Assistance for Students with Disabilities Act of 1988 were enacted to increase access to and availability of assistive technology to students who needed it (Hourcade et al., 2004; Zangari et al., 1994). During the 1990s, the American education system shifted its focus from pullout instruction to inclusion, i.e., "mainstreaming" of students with disabilities. Teachers began seeking ways to differentiate instruction and provide additional resources based on students' unique needs. In education, AAC services can be seen as a result of inclusion of the students, as teachers

attempted to find ways for children with severe disabilities to participate more effectively and successfully within classrooms (Hourcade et al., 2004; Zangari et al., 1994).

Types of AAC
AAC is divided into two subcategories: unaided and aided (Hourcade et al., 2004,; Mirenda, 2005; Zangari et al., 1994).

Unaided AAC. Unaided AAC does not involve any devices external to the human body for communication (Sigafoos & Drasgow, 2001) and, thus, includes sign language, body language, manual signs, gestures, grunts, and other types of body language (Mirenda, 2005). Students having fine motor skills can easily employ these forms of communication (Sigafoos & Drasgow, 2001). Another form of unaided AAC involves the eye-gaze technique in which the user indicates an object or symbol by directing his or her eyes toward it (Johnson, 2009; Light & McNaughton, 2013; Skuby, 2009).

Aided AAC. Aided AAC consists of systems that are externally used such as pictures, drawings, letters, numbers, books, computers, electronic devices, and words (Mirenda, 2005; Partridge, 2009). High-tech computers used in AACs feature keyboards, touch screens, and switches but also technology that tracks eye movement and/or head movement (Partridge, 2009). Aided AAC includes visual graphics such as pictures, photographs, drawings, printed letters, or printed words and may employ speech-generating devices that produce natural (digitally recorded) or synthetic speech (Ganz, 2014). Many aided devices can perform multiple tasks, depending on the needs and cognitive level of the user (Sigafoos & Drasgow, 2001). Aided AAC options range from single buttons, which play pre-recorded messages, to sophisticated computers with speech output that can be programmed (Ganz, 2014). Over time, the emphasis has shifted increasingly from unaided or low-tech aided AAC to high-tech aided ACC. While aided AAC has enormous potential for use by nontraditional communicators, care must be taken to provide the correct device based on the student's goals and needs (Ganz, 2014; Sigafoos & Drasgow, 2001).

Selection of an AAC System
Helling and Minga (2014) discussed AAC evaluation strategies based on the three traditional domains of positioning, cognitive-linguistic capabilities, and sensory or perceptual capabilities. Like the communicative competence inventory developed by Chung and Douglas (2014), this evaluation is also adapted from the work of Beukelman and Mirenda (2013) based on the participation model, which was presented at the beginning of the article. Each domain should be assessed within the framework of the user's communication impairment, the user's perceived needs, current and future communication needs, and knowledge of best practices in AAC. One goal of this evaluation is to physically assess optimal seating, positioning, and motor skill capabilities to provide the best access. Another goal is assessing the user's cognitive skills, receptive and expressive language capabilities, and potential for literacy. These assessments all provide insight into the best strategies and types of devices or systems to use for the individual user. A final goal is to evaluate hearing and vision to determine the size, type, and placement of symbols. These will help the educator select the best input and output options; therefore, teachers of students with severe communication impairments should be knowledgeable about how to select and evaluate an AAC system based on specific and unique needs of each individual student (Helling & Minga, 2014).

Effectiveness of AAC. Over the past several decades, several studies involving differing disability types have examined the effectiveness of various AAC systems. For example, several studies have been found that picture exchange communication system (PECS) as an element of AAC is effective and supportive for improving communication abilities of students with communication impairments. For example, Hourcade et al. (2004) found that picture exchange communication system (PECS) has demonstrated effectiveness with children with autism, developmental disabilities, cortical blindness, traumatic brain injury, and encephalopathy. Stoner et al. (2006) found that all children learned the PECS system, demonstrated improvement in verbal speech and social communicative behaviors, and experience fewer problem behaviors. Millar et al. (2006) also examined the effectiveness of unaided or general non-electronic aided AAC systems with students diagnosed with intellectual disabilities and/or ASD. They found that 89% of participants showed gains in speech and language skills, and only 11 percent exhibited no change. Multiple studies have found SGDs to yield positive results. Rispoli, Franco, van der Meer, Lang, and Camargo (2010), having conducted a meta-analysis of studies on SGD effectiveness, reported that 86% of the studies included in the review showed positive outcomes.

While the use of AAC is an important tool for promoting communication and supported by research, the use of AAC does not guarantee child success (Sze, 2009). The goal of both special education and general education teachers should be improving the ability of students with severe disabilities to access the general curriculum (Alquraini & Gut, 2012; Kent-Walsh & Light, 2003). AAC is best viewed as a tool for achieving these goals for students who need alternate means of communication.

Today, education is a team effort. A student requiring the use of an AAC system requires an extensive support network consisting of a speech-language pathologist, general education teachers, special education teachers, paraprofessionals, school administrations, peers, and family members (Zangari, 2012). All team members must possess the skills and training to use the system effectively, have clearly defined roles in the teaching process, and collaborate effectively, both within the team and with parents (Kent-Walsh & Light, 2003). Other factors involving the successful teaching of a student with an AAC system may originate outside the classroom. Selecting the system that most effectively meshes with the student's capabilities and needs is increasingly complex as technology expands the options available. In addition, parents are increasingly demanding to be involved and collaborate in the process of their children's education. Each of these challenges and barriers may negatively impact the teacher's investment in integration of AAC in their teaching (Soto et al., 2001).

Supporting Student Communication Competencies
Teachers and others who work with students with severe communication impairments should understand the communicative competence needs of the students and how AAC systems address those needs. The competencies are broken into categories: student as active communicator, peers as competent communication partners, families as active collaborators, educators as active facilitators (Chung & Douglas, 2014), and educational team members as operators.

Student as active communicator. Active communication means the student should be motivated to communicate with both peers and adults using AAC independently and take responsibility for the AAC resource (Beukelman & Mirenda, 2013; Chung & Douglas, 2014). As an active communicator, the student should be able to (1) use a range of multimodal communication techniques effectively; (2) use a primary form of communication that expresses needs appropriate to the environment; (3) operate the AAC system independently; (4) use a wide range of vocabulary and display age-appropriate social skills; and (5) respond and adjust the message when the communicative partner does not understand. Finally, Chung and Douglas (2014) developed an inventory adapted from Beukelman's and Miranda's (2013) participation model that can be helpful in addressing active communication in the classroom. Important is the acceptance of the student himself or herself toward the AAC. A student who does not like the device or finds it difficult to use, may not use it or do so only reluctantly. Thus, teachers should attempt to show the AAC-using student the advantages of employing it in communication

Peers as competent communication partners. Peers should be competent as communication partners with students who use AAC systems. The teacher and supportive staff should help peers learn about the specific disability and how to communicate effectively with the student with disabilities. Educators can teach peers interaction strategies through direct instruction and modeling. The teacher can also facilitate interaction through peer buddies, seating arrangements, and interactive opportunities (Beukelman & Mirenda, 2013; Chung & Douglas, 2014). The acceptance of the student's peers in the classroom is also vitally important to its success. One way to address student attitudes is by introducing them to the device prior to its actual use so they are familiar with it and with its use in communication (Kent-Walsh & Light, 2003; King & Fahsl, 2012).

Families as active collaborators. Families also must be involved in developing communicative competence. The educational staff should help families understand the benefits of using AAC. The family should be encouraged to use the AAC system outside of the school environment. The educational team can ensure that the family knows how to use and program the AAC device and provide training as appropriate (Beukelman & Mirenda, 2013; Chung & Douglas, 2014). Educators can use facilitation skills they learn in the classroom to engage parents for using AAC systems out of schools. Essentially, family acceptance and influence has a significant impact on a student`s acceptance of AAC and academic success. Thus, a student using AAC, his or her family, and the community are influenced by and influence the perception of AAC use (Bailey et al., 2006; Rackensperger, 2012).

Educators as active facilitators. Educators do more than tolerate AAC system for children who need them. The educator should perceive AAC as beneficial and understand how to match the appropriate AAC system to the student's needs. This means the educator, working with the educational team, should know how to operate, program, and use the AAC and be able to create multiple opportunities for interaction. The educational team will need to collaborate with one another, as well as with the family, to support communicative competence. Finally, once the educational team, including the educator, learns more about AAC resources and how to locate them, they will be able to increase their ability to provide AAC resources as needed (Beukelman & Mirenda, 2013; Chung & Douglas, 2014).

Educational team members as operator. The role of the educationional team with respect to the AAC system is more extensive, and collaboration among these team members is critical to its success (Downing, 2005). The educational team includes the school district administration on down to the paraprofessional who helps the student's teachers. The role of school administration members includes modeling acceptances toward the system and toward the student using it; ensuring that roles, responsibilities, and expectations related to use of the AAC are clearly delineated; and providing appropriate support and training for AAC implementation (Zangari, 2012). Moreover, Downing (2005) emphasizes the importance of inter-school collaboration and district-wide support in the integration of the AAC in the classroom.

Facilitating the use of AAC. Although research addressing teachers' knowledge about AAC shows they are willing to acquire new knowledge and modify their practices, some practicing special education teachers still lack sufficient training and skills in AAC (Alkahtani, 2013; Alquraini, 2014; Andrews, 2007; Costigan & Light, 2010; Hanline, Hatoum & Riggie, 2012; Koul & Lloyd 1994; Nigam & Koul, 2009; Soto, 1997). Almost 25 years ago, Koul and Lloyd (1994) conducted a survey to determine the extent to which special education and speech-language pathology programs across the United States provided preparation training on AAC. Their study concluded that preparation and training on AAC was insufficient (Koul & Lloyd, 1994). As recently as 2014, Alquraini cited lack of knowledge and training on the use of AT with students having multiple disabilities as a factor in readiness to use it. Other researchers in the past decade also found that special education preparation programs still do not offer adequate training on ACC, nor do they cover the topic comprehensively (Costigan & Light, 2010; Koul & Lloyd 1994; Subihi, 2013). Alkahtani (2013) concluded with that there is a need to provide more content and knowledge addressing AAC as a part of AT in both pre-service and in-service teacher education.

Successful implementation of AAC systems requires a broad layer of support (Ogletree, 2007) from the school, education team, teacher, classmates, family, and curriculum (Kent-Walsh & Light, 2003). The National Research Council [NRC] (2001) has recommended several tactical instructional guidelines for integrating AAC into educational programs. First, intervention should be started as early as possible. Second, the child should be provided access to the AAC system at least 25 hours per week. Third, a low teacher-to-student ratio and use of systematic and developmentally appropriate instruction should be available, as this to provide the classroom teacher with more time to dedicate to student using AAC. Fourth, as stressed previously, collaboration with families is vital to the success of AAC. Finally, performance goals should be set, and progress measured against them at regular intervals so that programming can be adjusted as necessary (NRC, 2001; Ogletree, 2007).

For AAC to be effective, it is important to encourage its use in social interaction (Hundley, 2009). Chung, Carter, and Sisco (2012) found that students who used AAC preferred to interact with adults rather than peers. Most participants in this study did not initiate interaction but responded only when a peer did so. Participants, when given the option, preferred to use facial expressions, gestures, and vocalizations instead of devices. The study did find, however, that participants increased social interaction with peers who initiated contact with them using AAC (Chung et al., 2012). One technique to promote social interaction is to introduce the AAC device or system to the students' peers prior to its use. In doing so, classmates and staff should be

instructed in how to respond to the student using the AAC system (Fransone & Collet-Klingenberg, 2008).

Summary and Conclusion

More students with severe communication impairments who use AAC are entering the school system, and there is increasing awareness of their communicative needs. At the same time, the nation experienced a growing awareness of human rights and inequality. As education of students with disabilities has been greatly developing, the use of AAC has been increased effectively, in order to support the students who, have communication impairments socially and academically (Chung et al., 2012; Hundley, 2009; King & Fahsl, 2012; Light & McNaughton, 2012; Millar et al., 2006; Rispoli et al., 2010; Soto et al., 2001; Stoner et al., 2006; Zangari et al., 1994). Progress in the technological capabilities and the uses of AAC implementation can be seen over time. Increased dissemination of knowledge of AAC, in particular its use and selecting the correct system to fit each child, is still needed, both for speech-language pathologists and for special education teachers. This article attempted to explore what the literature has been found in term of teachers` knowledge and skills about the use of AAC for students with communication impairments.

By the end of this article, it is important to state that AAC methods have been identified as necessary tools for teachers educating students with communication impairments. Thus, teachers should understand that students with communication impairments have various abilities and these aspects should be used to establish opportunities for their growth and learning. Beliefs about the inabilities of these students in communication should be eliminated. One basic challenge to use of AAC is that it requires extensive observation of the students before a teacher can identify the right AAC to use. In addition, teacher`s skills and knowledge about AAC are essential to educating students with communication impairments in general classrooms.

For that reason, effective application of AAC on communication expectations of the students can only be attained if a teacher provides a positive learning experience. This goal can be achieved through careful training, follow-ups to ensure consistency, and willingness by teachers. Likewise, teachers working with students with communication impairments must have a certain level of understanding of the conditions which lead to the need for AAC, know how to identify the best AAC resource based upon specific student needs, understand how to implement and support the use of AAC, and know how to educate others about the purpose and benefits of using AAC. It is expected that research will continue the implementation of AAC systems and what teachers need to know for successful using AAC in classrooms. This will help to enhance providing inclusive education for students who use AAC and to increase educating those students along with their typically developing peers; which helps to facilitate interaction between the students within natural settings.

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