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AAC: Effects On Participation and Learning

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AAC: EFFECTS ON PARTICIPATION AND LEARNING

by

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A Research Paper

Submitted in Partial Fulfillment of the
Requirements for the Masters of Science Degree

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AAC: EFFECTS ON PARTICIPATION AND LEARNING

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A Research Paper Submitted in Partial

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AAC: A Helping Hand

Over the course of history, technology has allowed professionals to reach monumental heights regarding provision of services for individuals who have disabilities. Among the many occupations to which technological advancements offer such progress lies speech and language pathology. Imagine for a moment that communication is unattainable due to a cognitive or physical complication and one can no longer iterate basic wants or needs. Nor can that person address acquaintances within the normal confines of conversation. "Normal" is a term referring to any standard means of communication both verbal and non-verbal that is socially acceptable among peer groups and is capable of conveying basic wants and needs.

For a child with depleted communication ability, alternative augmentative communication (AAC) devices are methods that can be utilized to allow noticeable improvements in achieving the communication essential for quality of life. However, is the decision to implement a form of communication outside the norm a wise one? It is believed that AAC devices can have an effect on the attitudes of communication partners and the effect may decrease the AAC user's opportunity for participation in conversation. Furthermore, reducing options concerning participation can cause a decline in learning ability.

AAC may become a necessary but complex measure taken when functional communication deficits inhibit success regarding developmental skills. In regards to both social and academic settings, AAC is implemented to assist communication capabilities and improve the efficiency when one attempts to meet wants and needs. AAC can also aid in permitting the individual to achieve previously unattainable accomplishments, including intelligible interactions with a communication partner. The

extra support from the AAC system may very well be the helping hand some individuals turn to when effective communication is otherwise impossible.

The purpose of this review is to identify how attitudes of parties involved in AAC may correlate with effects on participation and learning. Identifying common characteristics among attitudes both positive and negative may provide further insight into how an AAC user can compensate to ensure adequate participation and learning despite communication deficits. Furthermore this review seeks to enlighten and identify themes regarding attitude characteristics among those who will likely be communication partners with AAC users. With identification of these themes it is expected individuals associated with AAC use may have better understanding of how to shape attitudes to ensure adequate participation and learning. Research included in this review focuses on assessment of communication partners. These include peers, caregivers, and professionals that interact with those using an AAC device within their daily activities. The research seeks to set clear and concise ideas of what AAC is and how it may improve as well as inhibit participation and learning among its users.

Defining AAC

It is crucial that alternative augmentative communication be defined accurately to aid readers in developing a better understanding regarding what AAC is and how it can be used to overcome communication obstacles in everyday life. By using advanced knowledge of communication and the skills it requires, a professional is able to develop an augmentative communication system focusing on one's specific needs. It is unquestionably not the standard means for discourse but rather AAC is an adapted form of communication allowing alternate methods of achieving meaningful communication. It utilizes the strengths of a communicator but also takes into account their weaknesses.

Collection of client specific communication data will aid in developing a system that can compensate for some or all of the deficits inhibiting a person's expressive communication. If not all deficits can be addressed the most pertinent deficits inhibiting functional communication are targeted.

Attitudes Towards Disability

AAC is a vastly different and rapidly improving form of communication. The assistance of AAC devices can take many shapes including construction of a simple alphabet board all the way to complex electronic systems including language learning capabilities as well as audio output. These characteristics describe some of the aided devices that are in use today for both therapeutic and independent settings. AAC devices can be somewhat confusing to both users and communication partners involved in a conversational exchange. The methods of operation differ from normal communication vastly. Discourse involving an AAC system requires the user to participate in a very distinctive way. Implementation of AAC devices is expected to impact the user's form, content, and use of language thus decreasing effective interaction with others. Most importantly an AAC device differs regarding the manner in which messages, thoughts and complex ideas are delivered. Bedrosian, Hoag, Johnson and Calculator (1998) addressed the questions that suggested message delivery along with visual differences might be a key component in determining why negative attitudes form in the first place regarding a student using a device. Bedrosian et al. (1998) concluded that communication partners were not influenced by the differences AAC devices created among communication forms (i.e. message length).

Several aided devices used currently are bulky and have unnatural sounding computer audio serving for verbal output. Baily, Parette, Stoner, Agnell, and Carroll,

(2006) noted that a barrier expressed by parents of children using AAC devices concerned portability of the device into their natural communication settings. These highlighted concerns may cause confusion among the general population and stimulate negative attitudes towards AAC. It is no secret that disabilities are viewed with a stigma. Burke (1994) stated that, "listeners tend to have negative attitudes toward individuals who have voice, fluency, phonology, articulation, and resonance disorders. This population is often viewed as less intelligent than their typically speaking peers" (as cited in Dudek, Beck & Thompson, 2006, p. 18). Attitudes and views have been shaped continuously over the years through cultural ideologies. The opinions formed from societal viewpoints have created problematic obstacles including adverse ideas concerning intellectual and physical ability. For those with disabilities including AAC users, this has become a hindrance with which they have to deal with and overcome daily. In his book "Everybody Belongs", Arthur Shapiro (1999) depicts the way negative attitudes have developed over the years with specific influence from cultural views. He pairs beliefs about disabilities with explanations concerning how these beliefs came to exist. For example Shapiro references characters in popular entertainment such as Tiny Tim and Porky Pig. These characters although popular were seen as less desirable appeals due to their deficits; Tiny Tim for his physically impaired state requiring a crutch and Porky for his clearly dysfluent speech affecting expressive communication. As previously cited by Dudek, Burke (1994) continued to iterate that dysfluency along with other communication deficits were regarded as disabilities portraying lower intelligence. Popular mainstream social opinion has reinforced the idea through a cartoon character inadvertently.

Changes among attitudes in others towards an AAC user, whether they are positive or negative, could likely have an effect on participation. The enlightenment of this cause and effect relationship increased the need to make efforts to reduce societal faux pas that have inspired negative mindsets. Over the course of a person's life, participation is required within social, occupational and even scholastic settings. Children likely gain participation opportunities through scholastic years that help them develop for such interactions. A school setting can be a very crucial and central point concerning a child's development of participation skills. Cappella, Watling and Sahu (2012) noted that classroom participation and importance of this setting may be specific to the child but it remains necessary for development. Capella et al. (2012) insisted understanding of social constructs in a classroom might help children develop appropriate behaviors as well as appropriate methods for resolving inter-classroom conflicts. Increased ability to resolve conflicts might help ensure children more participation opportunities overall.

Children begin to form ideas about who they are through social interaction and extracurricular activities. As cited in Corenblum and Armstrong, Aboud and Skerry (1983) established children of older age groups identified internal and social attributes as being a means of description for their identity group. Among younger children, internal attributes primarily were seen as the essential factor encompassing a person's choice for identity. Correlations between age and factors that influence attitude have been observed and have suggested that as children mature social attributes become necessary to form positive attitudes and relationships with others. With AAC it is possible that these social differences with communication become an issue at an older

age and can be cause for reduction in participation and the learning aptitude of an AAC user.

Corenblum and Armstrong (2012) discussed the idea of implicit and explicit attitudes with in-group and out-group association among children. The child's in-group is referring to a group with which the child identifies. All other combinations of people are considered an out-group. Corenblum and Armstrong (2012) indicated that children harbor internalized stereotypical information causing them to develop negative attitudes towards their in-group. As a whole, people who communicate can be labeled as an in-group and identify themselves through the common factor of communication.

Corenblum and Armstrong (2012) proposed that stereotypical information exists among in-groups when differences are observed within the host. This internalized information among children may lead them to associate negative attitudes with in-group members who are outside the social norm. In the case of an AAC user the lack of communication ability is outside the norm. AAC use has become the inhibiting factor that aids in formation of negative attitudes thus effecting interaction and participation. Through understanding the attitudes of others and how they affect participation, one may be able to comprehend how to shape attitudes towards AAC users. This could prove to be beneficial in cultivating positive attitudes and increasing participation as well as learning among children who implement the use of an AAC device.

Attitudes Towards AAC

Attitudes Among Professionals

Attitudes of AAC users, along with attitudes of communication partners have an effect on participation. Whether or not the effects are positive or negative depends on the nature of the outlook. Research by Soto, Mueller, Hunt and Goetz (2001) focused

on understanding the awareness levels among professionals regarding the skills that are necessary to increase participation among AAC users. Soto et al. (2001) indicated that many experts view themselves as a collective team of professionals with specific skill sets. Each team member's skill set is beneficial when coupled with the others regarding improvement of the students and the professional services they provide them.

The proactive approach of the research design has allowed for identification of attributes that are sought after by professionals working with an AAC user. Throughout selective interviewing and grouping Soto (2001) found that five themes exist and may help to identify the skills necessary to be an effective educator when working with a student requiring the assistance of an AAC system. Among the five, creating social supports (stimulating positive attitudes through participation) was stressed to be an important factor. Soto (2001) elaborated that this entails not only focusing on creation of social interaction for the AAC user with typically developing peers but also focusing on teaching the peers how to become effective communicators with the AAC user.

Teachers felt it was critical they help in generating social interaction opportunities between AAC users and other students while promoting students' unique characteristics and independence. This method is thought to aid both peers and device users in forming positive attitudes towards AAC and the differences that accompany it.

Through this research, positive professional attitude has been identified and aided in development of a framework to improve social interaction among students with an AAC device. Furthermore the research provided a method that may be repeated as technology and student's needs evolve. In a fluctuating world of technological

advancement and interests among students, this approach to research may prove beneficial for current and future issues regarding attitudes towards AAC users.

Attitudes Among Students

The ability to understand adults' attitudes of AAC may ultimately be a more simplistic task, as opposed to understanding a student's attitudes. Adults are generally able to communicate their opinions with more precision than young children. Children may not necessarily know why they feel the way they feel about something as complicated as an AAC device. It may be advantageous to provide clear and concise knowledge to children while developing a process to stimulate positivity towards AAC devices. However, understanding not only the attitudes of the student but the factors that cause them may prove to be a difficult task. Current research towards attitudes of AAC users and their classmates stated that, "Unfortunately among peers, most studies suggest that AAC users are seen as less intelligent individuals" (Dudek et al., 2006, p. 18). Further investigations have considered these negative attitudes towards peers to stem from several different abstract factors that are non-universal to all individuals. Research conducted through administration of standardized rating scales as well as empirical evidence suggested these factors include gender, grade level and the type of AAC devices being used. During a recent study by Dudek et al. (2006), video taken of a child using an AAC device was shown to third and fifth grade children. To ensure confidentiality of the participant, only the child's hands and the devices being used were visible during the movies implemented throughout the study. Data collection was completed by administration of the Assessment of Attitudes Toward Augmentative and Alternative Communication (AATAAC). This tool, essentially a rating scale for children's overall attitudes towards the participants, is comprised of a series of questions

analyzing cognitive and behavioral aspects of peers' attitudes towards students who use AAC devices. Results concluded there were several differences among the attitudes of children watching the videos. School-aged children's feelings were prominently different when research studied the discrepancies between genders. Dudek et al. (2006) concluded that female students have more compassion than males towards AAC users, and nearly 13% of variance observed among the standardized rating scores was due to differences among gender regarding the overall attitude towards the AAC user. In a similar study using the same 5-point Likert rating scale and data collection methods, Beck, Bock, Thompson, and Kosuwan (2001) indicated gender to be largely associated with the determination of attitudes as well. The research conducted procedures in a congruent manner and yielded like results thus establishing the test-retest reliability of the rating scale.

As well as gender, device type was assessed with the standardized scale. Dudek et al. (2006) concluded that device type was not a factor necessary to consider regarding the influence on children's attitudes. This was an unexpected finding as it contradicted older research. Lilienfeld and Alant (2002) found that device type, especially those that used voice output technology, were positively influencing attitudes. This research helped improve support for showing the effects of device types on attitudes, however small sample size and limited diversity of the study's participants weakened the results and decreased ability for clinical application overall.

The previous finding of Dudek et al. (2006) suggested that the device type based on the complexity would not affect attitude. However, conflicts in research have yielded results suggesting that the device type does not only affect children, it can shape a

persons' attitude based on technological sophistication. The inconsistencies in research show that it may be pertinent to consider factors such as age and gender as well as technological advances to effectively shape attitudes and create positive opinions.

Due to these confusions of research, it is undecided whether or not device type is a factor that should be focused on when addressing issues regarding attitudes of associated parties with AAC. Research has supported higher probability that social interaction, age levels, education and understanding the need for use of an AAC system in a school setting should be the focus of efforts among professionals and AAC associates. The ability to rule out factors is as beneficial as finding new ideas to implement. No clear and concise decisions can be made as of yet and further research is necessary to rule out device type entirely from the pool of factors that affect attitude.

Fortunately further research of children's attitudes towards AAC provides evidence as to why attitudes of adolescents may not be affected by aesthetic properties of an AAC device. Weiner and Graham (1984) adopted the genetic theory of emotions proposed in the 1930's and indicated that children of a young age do not have the emotional capacity to initiate precise emotional responses towards anyone or anything. This theory of emotions suggested that children are born with simplistic emotional capability in that they are able to express general emotions such as being happy or sad. It is not until higher cognitive developments are noted that children begin to express more diverse emotional capability. Based on a sample of 200 children with an age range of 6.4-10.4, Weiner and Graham (1984) concluded that outcome-based emotions limit the capacity of response ability for a child in any situation requiring an emotional reaction. An outcome-based emotion is referring to a cause and effect situation where a

general emotion is expressed based on that specific situation. The research is stating that children give a general response consistent with a condition and are incapable of forming abstract emotions until later in life. These findings could indicate that children's emotional responses towards AAC users can be developed throughout their younger school years, as they do not possess abstract feeling towards those implementing use of an AAC device until a later age. Thus cognitive ability is again highly noted to be another factor, among many, to consider while analyzing the formation of attitudes among children regarding AAC use.

Gender and grade level of the child should be considered when providing an AAC device. Dudek et al. (2006) concluded there was no change in attitude observed among children based on age level ranging from third through fifth grade ages but Weiner and Graham (1984) showed that more negative attitudes are possible as age level increases. From a clinical standpoint, this could be valuable information. It may help aid in the understanding of how much stress a child is under due to a peer's negative attitude. Ultimately these research findings could provide initial constructs towards developing counseling and intervention specific to a child's age and gender. Treatment methods and ideas could become more focused and efficient while attempting to simplify a complex situation.

Attitudes Among Parents and Caregivers

Parents as well as non-parental caregivers should be included when considering attitudes and the affect they may have. It is likely that AAC users will have significant amounts of interaction with these individuals. Recent research confirms that parents have both positive and negative attitudes towards AAC devices. Empirical data suggests that parents view AAC devices as both barriers and facilitators for their

children. Through cross-case analysis researchers recorded themes of negative and positive attitudes among parents. Baily et al. (2006) suggested that negative attitudes of parents were present because focal points regarding AAC were revolving around limitations of the device, insufficient training, and unproductive team participation among professionals. Soto (2001) indicated that teachers took positive approaches to understanding credentials necessary for improved team functioning. This controversy of evidence was an unexpected finding and is contradictory to previous research discussed. The controversy could be indicative of professionals and parental figures of AAC users needing more effective means of collaboration to develop before changes in advocating procedures are observed.

Bailey et al. (2006) concluded that positive attitudes focused on increased individuality, and increased efficiency of communication. The information regarding parental attitude is beneficial for understanding how to maintain positive attitudes among parents when providing services. The ability to focus on increased independence and effective communication can help make sure parents are staying positive. It also allows for improved knowledge base of professionals, which could be beneficial when attempting to educate parents concerning their child's communication deficits; it could aid in creating improved attitude and positivity for influencing AAC users overall. Creating positivity is also beneficial for parents of children without communication disorders. As children learn from their parents, increased positive outlook may spill over into the next generation.

AAC: Effects on Attitude in the Classroom Options for Improvement

Methods for shaping attitudes influenced by AAC should encompass all parties

involved with AAC users in an educational environment. Ability to reach not only the students but also the professionals that influence the student could be key in achieving positive attitudes early in education. Educational settings are a likely place in which an AAC user will be participating and experiencing a large diversity of attitudes. All parties, in association with an AAC user become a variable when considering attitude, as these parties are able to form opinions and shape not only their own but the attitudes of others as well. These variables include professionals, caregivers, peers and the AAC users. They all have the capability to form an outlook towards AAC devices. Advancement of knowledge regarding how attitudes within these groups are formed gives added awareness as to how these target groups can be influenced and help provide AAC users with avenues for added participation opportunities.

Among the people most involved in AAC users' lives often times are the caregivers. A caregiver's attitude about AAC can be positively or negatively affected by several variables. Research suggests that themes in attitudes and expectations of parents exist. Bailey et al. (2006) has indicated that parents want their children as AAC users to achieve higher levels of independence along with increased vocabulary for better conversation. These examples of positive attitudes and expectations for their children drive parents to work with professionals for meeting their children's needs. An option for insuring that parents keep their positive drive would be to give them the services that they are asking for. Bailey et al. (2006) proposed that a common concern for parents is effective training. Their research indicated this training was in higher demand and was more appropriately needed as device types advanced technologically. Therefore when training applied towards technologically advanced device types was not

adequate, the use and drive to use the AAC system was depleted overall. The determination to use the system is beneficial for the AAC user when attempting to achieve goals of improving communication. Provision of training would likely ensure that this motivation to use an AAC system is preserved and lead to greater ability to obtain functional communication on the whole.

A parents' capabilities to raise concern for their children has allowed researchers to identify common fears that exist. With current research these fears can also be made relevant and applied to a classroom setting. Bailey et al. (2006) suggested that parents are concerned mostly about limitations that the devices might create for their children in the classroom. The research indicated that this particular theme was common among all participants. The evidence that has been provided can aid professionals in addressing the identified concerns through counseling and therapy with more concision and accuracy. However, parents and caregivers are not the only individuals to interact with an AAC user on a daily basis. Other contacts might include communication with teachers and professionals involved in education along with peers in a school setting. These interactions can also have an affect on attitude.

It may be beneficial to understand the perception of teachers within their classroom settings. Fink, McNaughton and Drager, (2009) focused on students with autism who use AAC devices. Fink et al. (2009) allowed teachers to express the benefits and challenges of having students who implemented the use of AAC in their classrooms. The results of the study indicated both positive and negative attitudes towards those students. Fink et al. (2009) also indicated that inclusion of children in regular classroom settings aided with skill development, improved interaction with

typically developing peers and provided social networks for parents. Not only did teachers show positive attitude towards AAC, they stated, “The other students will often work together and include the child with autism; they may share ideas, or sometimes even discuss things off topic as they are working” (Fink et al., 2009, p. 113). The research indicated that positive attitudes among adults can promote positive attitudes among children.

Negative Attitudes

It is not always the case that parties involved with AAC will have positive attitudes toward a device or its user. Teachers also expressed concern for their typically developing students. Fink et al. (2009) specified that teachers demonstrated negative attitudes by expressing concerns and complaints about increased workloads with curriculum planning, elevated noise levels in the classrooms and the overall stress level that accompanies a student with an AAC device. Fink et al. (2009) also expressed that a main concern among teachers was the length of time it took the students implementing AAC to complete their assignments and the delays it caused in curriculum.

Negative attitudes exist as well as positive and the large concern is if these attitudes are having an effect on the participation of children in their regular classroom settings. It is of interest to professionals to know if the positive or negative attitudes surrounding AAC are creating an effect on participation. This knowledge will allow for provision of better information about what can be done for achieving increases in participation.

Attitude: Effects on Participation

The attitude of an AAC user or others around him or her will have an effect on participation. Beck et al. (2006) indicated that both negative and positive attitudes of adults working within a school system may have an effect on the communicative interaction opportunities for students who use AAC. The article states, "The combination of emotional and cognitive evaluations may then determine how a person acts, or intends to act, toward the attitude object (e.g., a person who uses AAC)" (Beck et al., 2001, p. 256).

After studying emotional and cognitive skills Weiner and Graham (1984) considered it probable that effects seen on participation may stem from attitude based on emotions and intellectual ability based on age. Weiner and Graham (1984) regarded older individuals as higher functioning beings concerning emotional ability. It is a common tendency for older individuals to take over and dominate a conversation with a child. This, however, does not allow for proper turn taking, and the conversation becomes one sided. This does not afford children formidable opportunities in which to communicate and learn about their ability to communicate. The increased constraints of the conversation are limiting the child's ability to respond and ultimately participate in a normal interaction within the communication encounter. Advancements and attention to this matter could likely be very beneficial for therapists and other professionals in a school setting. Noticing instances where an adult may be diminishing their child's communication opportunities offers some support for improving that child's communication not only in the classroom but throughout home life as well. Primarily parents may be trying to make sure their child is heard but inadvertently are inhibiting their communication experience. This is an example confirming the effect attitude and

participation can have on learning as a whole.

To reiterate and summarize the research, attitudes of adults to be the dominant communication partner have been indicated to inhibit a child's communication ability. Comprehension concerning how to limit this effect could be advantageous for AAC users and also the adults who engage them in communication daily. By correlating effects of attitude on participation and finding it to be a significant area of concern, there are several factors that may be considered. Among these concerns resides provision of accurate and appropriate information concerning AAC systems and the users.

Shaping Attitude: What Works?

Positive Information

Most problem areas that are present in any situation can likely be accredited to lack of information. Beck et al. (2001) reported that adults who were given access to positive information regarding AAC were more positive than adults who were given no information when speaking about an AAC user. However, Beck et al. (2001) also observed information provided about a child's cognitive functioning has shown no effect on attitudes and expectations of others. These two ideas are contradicting and should be researched more before any party associated with AAC use adopts a belief.

From recent studies readers of AAC literature have been exposed to knowledge suggesting that aesthetic properties of AAC are not the main cause of negative attitude. Instead research has suggested that other factors outside of the characteristics of AAC itself may be more beneficial overall in shaping attitude. Beck et al. (2001) supports this claim through findings from research that suggested children with increased familiarity with their peer's speech disabilities were not affected regarding their attitude.

The effects of information available to parties involved with AAC users is critical

for shaping the way the world perceives AAC users. If provision of information regarding AAC correlates directly with the attitudes of others, it could be a factor beneficial for shaping the attitudes of those involved with AAC users.

Improving Conversation

Among the influences likely to affect attitude is the AAC user's ability to efficiently use an AAC technique. Beck et al. (2001) reported that attitudes were more positive among communication partners when speech was a more natural rate and can hold the listener's attention. Studies by Bedrosian et al. (1998) showed that attitudes of listeners were more positive when AAC users could effectively use one-word utterances to communicate in non-formal setting. The direct communication style was considered more functional and time appropriate. This speedy communication style could likely have been favored due to time constrictions in academic and occupational setting. In contradiction to the previously stated findings, Hoag, Bedrosian, and McCoy (2004) confirmed that slow adequate information and fast lengthy communication styles were seen as more favorable among listeners. These discrepancies could likely be indicative that listeners may need both types of communication based on the situation in which communication with an AAC user is initiated. Further research is necessary and should focus to understand how a hybrid approach with both succinct and lengthy messages could make AAC systems more functional based on situational variables. Increased naturalness of speech may improve aesthetic value of conversation and the overall opinion of the communication partner but system design must be developed with overall functional use in mind.

AAC Device Type

It was previously discussed that AAC device type had no effect on the attitudes

of others and secondarily did not affect participation. It is unclear at this time whether or not device type is a factor to consider for influence on attitudes. Contradictions with research identified that no clear decision can be made and further research is necessary to have a definitive answer. It could be favorable for professionals to consider device type as a possible influence on attitude when providing services to AAC users.

Participation and Learning

Exploring attitude and the correlation with effects on participation levels can help with understanding another contributing factor that could be affecting children in their everyday life. How does participation affect learning among children? Research has suggested that providing children with improved opportunities for participation enhances their capability for learning and increases their overall quality of life and education. Based on research in favor of advancing participation for quality of life, Topia and Hocking (2012) stated, “Conversation can challenge and stimulate mental capacities and increase feeling of well being. Similarly doing everyday occupations can elicit a sense of belonging” (p. 28). Topia and Hocking (2012) supported furthering inclusion among students through AAC allows for improved literacy, cognitive skills, and language development. Learning ability may be directly affected through loss or gain among these skill sets. Bueckleman and Mirenda (2005) suggested that AAC systems are responsible for creating communication opportunities and secondarily promoting the social participation required for learning and skill development. Kirby as cited by Burton, Smith, Woods (2010) suggested that increasing the participation levels of students might help with personal development. Burton et al. (2010) continued to iterate that improved participation skills may help increase confidence, self esteem, and give

children a sense that their ideas are wanted and needed among adult populations. Through these research attempts we can see that inclusion seems to aid in development and learning in some form. Establishing what types of inclusion and the appropriate forms to improve target areas becomes the main concern at this point.

To facilitate functional use of an AAC system Deruyter, McNaughton, Caves, Bryen and Williams (2007) identified three themes that could likely improve AAC use and the participation capabilities of its users. These themes highlighted improvements in software and mainstream access to standard operating systems. Deruyter et al. (2007) indicated that identification of these themes has not yielded results in development of AAC systems but it has caused development of practical approaches for improvement. This approach could likely define standards with which AAC systems are made and make education and learning the system affordable and more simplistic. With easier learning likely comes increased participation and use of AAC systems. Standard design is currently in developmental stages and needs further research because communication deficits are complex and unique to each individual. However, learning about new approaches and what makes AAC more readily useable and efficient may improve learning overall.

Discussion

Research studies included have suggested that attitude towards AAC may be affected by several different factors including age, gender, device type, cognitive skill levels, emotion, and social interpretations. Although research is contradictory in some areas of evaluation, it can be strongly suggested that social and cognitive aspects are factors to include in the assessment of attitudes. Secondly aesthetic properties of AAC devices (ie device type, modality of use, verbal output type, and verbal output

length) might be considered to have some effects but should at this time not be the main concern of professionals due to the inconsistency of research. Furthermore attitudes should be included in the assessment of participation among children with AAC devices due to the strong correlation shown by popular research between participation and learning ability. With advanced inclusion children can gain exposure to superior conversation opportunities, regular education classroom experience, and social networks. It is with further understanding of all the aspects included that AAC will no longer be a crutch but a vessel for insuring adequate functional skill development.

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