The Impact of Using Augmentative and Alternative Communication Systems (AAC) On the Speech of Students with Autism: Implications for Practice in Saudi Arabia

By

Samya Albuqami

Dissertation submitted to The University of Nottingham for the Degree of Masters of Arts In the School of Education

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Samya Albuqami

School of Education, University of Nottingham, England.

Email: sam100sad@hotmail.com

Abstract:

Autism and Autism Spectrum Disorders are crippling conditions that affect functional and speech among children. Teaching such children is a difficult task for both the parents and teachers as they exhibit a significant deficit in language and social behaviors. One of the most important objectives of an intervention system is to help such children with a system of functional communication and speech. For children with autism disorders, a system that uses alternative and augmentative systems of learning might be needed. This thesis attempts to study Augmentative and Alternative Communication Systems (AAC) on the speech of students with autism, and their overall influence on functional speech acquisition among autistic children. In addition, this thesis will also attempt to study the impact of using AAC systems among autistic children in a Saudi Arabian context. Furthermore, their implications for practice in Saudi Arabia will also be studied, analysed, and evaluated vis-à-vis local customs, traditions and present Saudi educational systems especially those relating to autistic disorders.

Keywords: impact, augmentative communication, alternative communication, speech, autism

أثر استخدام أنظمة الاتصال المعززة والبديلة (AAC) على الكلام لدى الطلاب المصابين بالتوحد: الانعكاسات على الممارسة في المملكة العربية السعودية

سامية البقمي

ماجستير، كلية التربية، جامعة نوتنجهام، انجلترا.

البريد الالكتروني: sam100sad@hotmail.com

الملخص:

التوحد واضطرابات طيف التوحد هي ظروف معيقة تؤثر على الوظائف والكلام لدى الأطفال، ويعد تعليم مثل هؤلاء الأطفال أحد المهام الصعبة على كل من الآباء والمعلمين لأنهم يظهرون عجزًا كبيرًا في تعلم اللغة والسلوكيات الاجتماعية، ويتمثل أهم أهداف النظام التدخلي في مساعدة هؤلاء الأطفال على نظام للتواصل الوظيفي والكلام، ومن ثم قد تكون هناك حاجة ماسة إلى نظام تعليمي يستخدم أنظمة تعلم بديلة ومعززة للأطفال الذين يعانون من اضطرابات التوحد، وتسعى الدراسة الحالية إلى دراسة أنظمة الاتصال المعززة والبديلة (AAC) على الكلام وتأثير تلك الأنظمة بشكل عام على اكتساب الكلام الوظيفي لدى الأطفال المصابين بطيف التوحد، إضافة إلى ذلك، تسهدف الدراسة الحالية بحث تأثير استخدام أنظمة الاتصال المعززة والبديلة AAC على الأطفال المصابين بالتوحد في المملكة العربية السعودية، علاوة على ذلك ، سيتم أيضًا دراسة وتحليل وتقييم آثار تلك الأنظمة على الممارسة في المملكة العربية السعودية وفقًا للعادات والتقاليد المحلية والأنظمة التعليمية السعودية الحالية خاصة تلك المتعلقة باضطرابات التوحد.

الكلمات المفتاحية: أثر، الاتصال المعزز، الاتصال البديل، الكلام، التوحد.

Introduction

Autism is a developmental disorder that influences a child's feelings, opinions, and perceptions of the world and in what manner it learns and understands from accumulated experiences. The term *autism* represents a group of disorders known collectively as autism spectrum disorders (ASD). According to the Autism Society of America (2006), autism is a "multifaceted developmental disability that usually appears during the early childhood years, and it results in a pronounced neurological disorder that impairs the normal functioning of the brain". Autism eventually affects the early development of various primary skills, such as social interaction, language, speech, and communication (National Research Council, 2002).

However, as a group of disorders, autism may affect children differently and to varying degrees of intensity. This thesis will focus on the effect of autism on the development of language and communication skills in young children. According to Law (2006), autism research studies conducted in the last three decades have resulted in defining the core abnormalities and deficiencies that influence the development of early language acquisition and communication skills. In the domain of research studies on autism, one symptom of an acute autism disorder is the extraordinary delay in acquiring speech and communication skills. Communication in children with autism is a fascinating area of advanced study.

Autistic children are usually speech and communication deficit. Because they are speech deficit, they form a neglected part of Saudi Arabian society (Rehman, 2008). The most critical goal of today's autism research is to empower these children (Potter & Whittaker, 2001). Thus, the critical issue of training autistic children to speak and communicate spontaneously assumes a lot of importance. This thesis will demonstrate that this goal is achievable through the creation of a productive school and non-school environments and that useful strategies and techniques would enhance these children's role as enabled communicators.

Research Aims

The main purpose of this study is to investigate the impact of using augmentative and alternative communication systems (AAC) on the speech of students with autism, especially students from Saudi Arabia. This study also deals with the implementation of alternative communication systems to improve the language skills of children who suffer from autism. In addition, the present

study also discusses existing best practices of AAC and their influence on language teaching among autistic children. The study attempts to answer the following questions:

- How does autism affect speech in children? Why do autistic children need proper communication?
- Which communication methodologies are used to communicate with autistic children? Are these methodologies effective?
- Are the AAC methodologies ethical for daily use among autistic children?
- Which AAC methods are currently used for language acquisition among autistic children? Is it possible to use these methods with autistic children in Saudi Arabia?
- What would be the implications of using all such methods with autistic children in Saudi Arabia?

Methodology

The research is limited to an in-depth review of the existing literature on the existing practices of speech and communication training among autistic children. I will also study the AAC methods in practice today and attempt to compare them in order to determine the best method for effective language and communication acquisition.

Conceptual framework

Autism spectrum disorders (ASD) are permanent developmental disabilities that can negatively affect the way autistic people see, hear, speak, and interact with other people. Symptoms of autism include difficulties forming social relationships, poor communication skills, and skewed personal and behavioural patterns.

Kanner first used the term "autism" in 1943 to describe "autism" as "early infantile autism". On the other hand, Asperger (1944)described autistic condition as "autistic psychopathy". Wing and Gould (1979) extended the scope of the definition of autism to include a range of children who have various special needs and included three important areas of impairment: social communication, interaction, and imagination.

Autism has many definitions, each depending on the scholar or researcher who worked to solve the riddles of this disorder. Quoting from the Diagnostic and Statistical Manual of Mental Disorders, DSM-IV (American Psychiatric Association [APA], 1994).

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Autism may manifest as a combination of signs and symptoms may even include a host of other disabilities and needs (Bristol et al. 1996). Within a group of autistic people, autism may affect multiple abilities in some cases, while it may not in others(Minshew et al., 1997).

The cause of autism is still unknown. However, some researchers believe that autism likely has a genetic etiology (Gillberg& Coleman, 2000). Before the 1970's, some geneticists believed that genetics did not influence the onset of autism. However, a noted research paper by Folstein&Rutter (1977) suggested a new theory that that the incidence of autism in identical twins was far higher than that in same-sex fraternal twins. Several authors (Rutter, 2005;Autism Genome Project Consortium, 2007; Gupta& State, 2007) also reported findings of the vital role played by genetic factors. Similarly, a report by Bailey et al. (1995) suggested that autism is linked to genetic parameters, although its causes are still being ascertained.

Communication Skills of Children with Autism

Communication and language development may never occur in children with autism syndrome. One of the prominent effects of autism in children is an apparent weakness in speech learning and an inability to communicate with others. To understand the intricacies of autism, researchers and scientists must understand theory and practice of corrective measures for speech and language impairment and be familiar with child development and developmental milestones in language and communication. Communication skills among autistic children are an important area of autism study because employment of any type of corrective techniques or methods depends on an understanding of autism's effect on them.

Because autism is a neuro-developmental disability, it may lead to the generation of weak and inconsistently timed communicative signals that eventually might eventually result in child's declining attention span (NassanEl-Ghoroury&Romanczyk, 1999). Severe autism may eventually lead to a drastic reduction in language learning opportunities (Reddy et al., 1997). Quoting extensively from McGee and Lord's (2001) work, Cafiero (2008) suggests, "communication is one of the important keys of life-defining skills and it is a core deficit in ASD. Children who suffer from autism show communication deficits that might lead to a complete absence of proper spoken language along with a host of other deficits".

A paucity of language skills may lead to a lack of ability in reading comprehension. Hyperlexia is the ability to decode or decipher words with almost no ability to understand what one is reading; this ability is witnessed among some autistic students, although it usually interferes with academic assessment of the reading ability of a student. A strong ability to read complex words may actually mask certain deficits in the ability to learn and understand what is read. Similarly, the sheer challenge of learning a language, even without a disability, may add another level of complexity to reading and speaking the language (Mueller & Markowitz, 2004).

Young children with autism often display variations in the timing and types of acquisition of language skills. Almost all autistic children begin to speak relatively late and develop speech skills much more slowly than normal children (Le Couteur, Bailey, Rutter, &Gottesman, 1989). The early symptoms of autistic syndrome can be difficult to identify. Currently there is very little information about language deficiencies among very young children; however, research suggests that by the end of the second year of a child's life, the communication patterns and perceived deficiencies in language skills of most children with autism will already be evident (Dahlgren &Gillberg, 1989).

Successful communication is a lifelong process for autistic children. Designing a communication intervention program for an autistic child is a top priority, while its successful deployment depends on a tutor or instructor's ability to handle such programs. Layton & Watson (1995) believe that nonverbal and poor communicators should try hard to become successful communicators. To become successful communicators, autistic children should understand the cause and effect of communication.

Better communication becomes a distinct possibility when policymakers provide autistic children with a means by which to communicate. Layton & Watson (1995) also highlight the importance of introducing meaningful tools with which autistic children can develop proper communication:

"Several research investigations have demonstrated that although nonverbal autistic individuals have a decidedly difficult time learning to speak, they do communicate when using alternative systems such as signing, picture/pictograph exchange, whole word communication boards, and computerized devices"(p. 80).

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Several approaches are available to develop communication skills in autistic children. Referred to as Alternative and Augmentative Communication (AAC), these techniques represent innovative communication tools that help can communicatively impaired children. According to the American Speech-Hearing-Association (ASHA) (2011), AAC is "all forms of communication (other than oral speech) that is used to express thoughts, needs, wants, and ideas."

Relevant Issues in AAC Systems

Communication between two persons should be expressive, effective, lucid, and understandable to both parties. McGee & Lord (2001) highlight the importance of functional and spontaneous communication as essential and critical components of learning programs for children with autism spectrum disorders. AAC involves the use of technology to design and create effective communication systems that can benefit children with ASD. According to Millar & Scott (1998), the deployment of AAC with autism disorders may enhance the generation of functional communication apart from stimulation of development of speech. They can greatly improve an autistic child's life by providing greater independence through efficient communication and speech, thereby by empowering an autistic child to live a happy life in society. MacDonald (1994) cites an instance of an autistic individual who used AAC successfully and reports that:

"The joy of being able to write again and keep in touch with old friends ... is tremendous. Having the security of knowing I will always have some way of talking to those closest to me is too wonderful to describe." (p. 3).

According to Weitz, Dexter & Moore (1997), as many as 25% to 61% of autistic learners do not possess functional speech and that AAC systems have the ability to enhance existing communication skills or provide an alternative to speech. These children are the best candidates for augmentative and alternative communication (AAC) approaches, either to "restore or extend natural speech and/or develop handwriting" (Lloyd, Fuller &Arvidson, 1997).

AAC is defined as the enhancement or substitution of natural communication in the form of speech and/or writing by using aided and/or unaided symbols and signs.
Finally, Beukelman&Mirenda (2005) describe AAC as:

"...a system with four primary components: symbols, aids, strategies, and techniques." (p. 4).

According to Hourcade et al. (2004), AAC is a field of educational dissemination "designed and created to upgrade basic communication skills of autistic children, who are deficit in functional speech and communication". AAC therefore describes an overall concept. In contrast, an AAC system is an implemented system made up of different concepts. For some children, AAC systems may become primary tools for communication, while others might use them to expand or broaden their current speech level (McNairn&Shioleno, 2000).

Four important concepts make up the basic term AAC (Millar & Scott, 1998):

- **Medium of communication:** The medium of communication, or the way an educator transmits the learning messages, can be aided or unaided.
- **Mode of access:** How does an educator get access to the communication medium? These can be tools, gadgets, or even a teaching process or method.
- **Methods to represent meaning:** Some autistic individuals do not know how to speak. Educators can address this by using an entirely different set of symbols, such as picture messages or synthesized sounds.
- **Interacting strategies:** To start a dialogue with the communication partner, and to sort out problem when he or she fails to understand what is being told.

In contrast, an AAC system is a package of all techniques and strategies comprising "overall communication" for a specific or group of individuals. Autistic individuals may use one or many techniques to learn communication.

AAC systems involve two types of communication: aided and unaided (Lloyd et al., 1997). Unaided AAC systems include the use of manual signs; aided AAC systems use technology. According to Mirenda (2003):

> "Unaided communication just needs the use of bodily movements, and it involves using different manual signs and gestures. On the other hand, aided communication systemsinvolve the use of devices that are external to the user, like thematic booksand VOCAs [voice output communication devices], and it engages symbols like photographs, line/pattern drawings or a suitable writing system." (pp. 203–216).

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Advanced AAC systems now use digitized or synthesized speech-generating devices. Also known as SGDs, they are widely accepted as standard AAC devices (Schlosser, 2003). All aided AAC systems also include assorted approaches that include the use of "graphic/thematic symbols, non-mechanical communication boards, speech-synthesizing devices with synthesized, automated and/or digitized speech output, and exchange-based approaches, like the Picture Exchange Communication System" (Mirenda, 2003).

Unaided AAC systems, in contrast, do not require external tools (Bondy& Frost, 2002;Mirenda& Erickson, 2000), employing the use of facial gestures and manual signs. The gestures used can be formal or informal, traditional or modern, simple or complex. Many autistic individuals who need AAC are prescribed manual signs for learning proper communication (Sigafoos, O'Reilly & Green,2007). Researchers have found that nonverbal autistic individuals are able to learn from 10 or fewer (Brady &Smouse, 1978) to as many as 20 different signs (Barrera, Lobato-Barrera &Sulzer-Azaroff,1980; Stull et al., 1980).

Conventional AAC interventions for autistic children rely on unaided methods. However, most autistic individuals display significant difficulties, such as:

- Inability to synthesize spontaneous communication strings
- Inability to use different signs to transmit difficult pieces of information
- Attempts to set up communication with other autistic individuals, who do not understand these signs

In the past, there was a fierce debate over the usefulness of AAC systems vis-à-vis their applications in formal/informal classrooms and everyday life. However, recent seminal work on AAC has suggested that such systems are far more efficient in boosting effective communication and speech among autistic individuals.

AAC systems have had various positive effects on the individuals using them. Kangas& Lloyd (1988) attributed the success of AAC systems to several beneficial aspects of AAC, such as lessened pressure situation to perform orally, the extensive use of graphic symbols, and the creation and development of alternate input and output channels and removal of the pressure triggers from the more traditional auditory and vocal channels.

For autistic individuals deficient or restricted in normal speaking who are on the path to learning to speak, AAC systems are extremely useful in structuring communication messages (Nelson, 1992). If the main goal of using AAC system is to educate an autistic individual, then it can assist people in living a full, productive life through its beneficial effect on language acquisition and verbal expression.

AAC systems are used mainly for two specific purposes: 1) to enhance the communication abilities of autistic individuals who speak in an unintelligible and incoherent manner, and 2) to furnish a different method of communication for nonverbal autistic individuals and those who fail to acquire an amount of speech sufficient to communicating with non-autistic people (Millar & Scott, 1998).

In many cases, aided and picture-based AAC systems are deployed with success because theycorrespond with the characteristics of ASD and with the flexibility of use of these systems (Mirenda& Erickson, 2000). In many cases, autistic individuals find using manual signs very difficult, and this alone may pose difficulties for autistic individuals as well as researchers (Layton, 1988;Mirenda& Erickson, 2000; Yoder & Layton, 1988).

All autistic children display fine motor problems, which makes learning manual signs tedious (Mirenda& Erickson, 2000). For many children, learning picture symbols, which provide a two-dimensional perspective, seems to be easier and more comprehensible. Hence, picture-based communication systems are "preferred over manual sign systems because they are more easily understood by members in the community who are not trained to use the systems"(Rotholz, Berkowitz & Burberry,1989).

The Effectiveness of Augmentative and Alternative Communication Systems (AAC)

In almost all cases, the main service delivery model of AAC system is a holistic approach that encourages extensive and productive partnership between all stakeholders in the system. In addition, the demonstration of skills within the group and enhancing each team member's skill set are also critical to the system's success. Frea, Arnold &Vittimberga(2001) reported that speech/language trainers are consistently using AAC system devices to furnish methods and strategies to improve communication among speech-deficient children and adults.

According to Mirenda (2003) AAC systems act as an effective tool to empower children with autism to learn functional communication and that the main goal for any AAC is to "[m]ake up for the communication deficiency, and to supply generalized, and practical communication gain across diverse natural scenarios" (pp. 203–216).

Hence, for many children who never develop functional speech, any AAC techniques used should accrue effective and functional communication in the context of learning occurring over a long duration. Although AAC has been used extensively in the last few years, there is a perceptible lack of research in this area (Mirenda, 2001) despite that fact that present communication practices for children with autism involve some type of AAC in general and VOCAs in particular.

Beukelman&Mirenda (1998) believe that AAC interventions should be used to help children with severe communication deficiencies, so that they could become communication-competent and empowered to meet ongoing communication challenges. In fact, previous research findings suggest that incorporation of AAC might result in an autistic person's full communication abilities (ASHA, 2006, pp.107-110).

Despite its perceived weaknesses, AAC may still support existing limited speech or help develop independent use of signs, visual symbols, and voice devices. The National Research Council (2002) highlights the importance of AAC in everyday educational programs to teach autistic children who display a lack of speaking ability. A number of researchers and academicians have found AAC to be useful in assisting autistic individuals with partial to full speech impairment and disabilities (Rush, 1996; Grove, 1997;Koul& Harding, 1998).

There is scant AAC and AAC systems research in the context of Saudi Arabia. AreejAsseri's (she was the first AAC tutor to teach AAC course in Saudi Arabia) first-ever AAC course for senior students in the newly established Speech, Language and Hearing Sciences program (SLHS) at Dar Al Hekma College has paved the way for increased awareness of helping autistic children and adults (Augmentative Communication World Network, [ACWN], 2010). The availability of autism intervention services, especially AAC systems, is limited in Saudi Arabia (Almasoud, 2010). In addition to their restricted availability in larger and smaller cities and towns, AAC systems are cost prohibitive even in larger cities (Al-Othman, 2010).

In Saudi Arabia, three specialized autism intervention centres operate and provide assistance using AAC: the Academy of Special Education, Jeddah Centre for Autism, and Prince Faisal bin Fahd Mother's Centre (Al-Othman, 2010). However, the AAC method used (Treatment and Education of Autistic and Related Communication Handicapped Children [TEACCH]) is not completely suitable for autistic children whose condition is more severe (Almasoud, 2010). Three Saudi Arabian research

centres; namely, The Autism Research Centre, the research department of Saudi Autistic Society, and the Prince Salman Centre for Disability Research, are conducting autism- and AAC-related research and intervention development programs.

The National Scientific Council on the Developing Child ([NSCDC], 2007) reported that child brain development depends on the type of experiences and events the child undergoes in the first two or three years of life. In this context, the introduction of AAC interventions could help a child a great deal; in fact, AAC could have a positive effect on early language acquisition and auditory/verbal skills. The NSCDC (2007) also reported that early learning intervention would help lay solid ground for future brain development in relation to language and linguistic concepts (p. 4).

However, the basic abilities of an autistic individual influence the deployment of an AAC program. Hence, no individual should be barred from AAC services based on presumptive deficits in one or two basic skills, such as communication, social, or cognitive skills. In this context, The National Joint Committeefor the Communicative Needs of Persons with Severe Disabilities([NJCCNPSD], 2002) observes that:

"Despite recent policy amendments and eventual elucidations, there is considerable subjective and qualified evidence that local school districts and service agencies continue to provide access to basic communication services on a previously constructed judgment."(p.145–153).

"Available empirical evidence and findings reveal that the systematic dissemination of speech and language by using an organic and behaviouralmethod is quite effective, especially when the AAC deployment starts by 30 months of age" (McGee, Morrier& Daly, 1999).

Beukelman&Mirenda (1998) described "the participation model as a systematic process for carrying out AAC assessments and interventions. In this model, the functional participation requirements of same-age peers without disabilities are weighed relative to participation patterns of the potential AAC user." (pp. 145–169).

Goldstein (1999) reported on several experimental studies of the efficacy of using AAC sign-language teaching to autistic children. Several authors (Barrera &Sulzer-Azaroff, 1983; Layton, 1988;McIlvane et al., 1984; Yoder & Layton, 1988) have demonstrated that training intervention using multiple communication modalitiesresulted in a superior and more rapid dissemination of speech and language among children with

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autism.

Almost all autistic children display numerous problematic behaviours, and they are among the most challenging of all children to manage. Problem-behaviour displays such as property destruction, aggression, self-injury, and unnecessary temper tantrum are the most common social and educational developments (Horner et al. 2000). Such deviant behaviours may pose dangers to autistic children that may include social boycott and exclusion from classrooms and possible expulsion from the school itself (Sprague &Rian, 1993).

Best Practices in Augmentative and Alternative Communication Systems

AAC is a highly respected and much sought after clinical field of practice (Mirenda& Schuler, 1988). Developing countries are recognizing the importance of introducing AAC systems to find practical solutions to autism spectrum disorders. However, the availability of AAC services for active practice in developing countries is hampered by lack of expertise and tools required for successful implementation (Alant& Lloyd, 2005). These are related to problems encountered in speech/language pathology, execution of a suitable action plan, and a presumed lack of skills and expertise among educators and teachers.

Public Law 100-407, also known as Technology-Related Assistance for Individuals with Disabilities Act of 2004 (U.S. Congress, 2004), can be defined in the following manner:

> "…any item, piece of equipment, or product system, whether acquired commercially, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities. (29 U.S.C. Sec 2202(2))"

In other words, an assistive technology refers to any tool, equipment, or product, whether used commercially, modified or changed, or in an experimental setting, that is eventually deployed to enhance, increase, maintain, improve, rectify, boost, or transform the functional capabilities of people who are born with severe to moderate disabilities (20 U.S.C. § 1402(1). A technology that empowers an autistic individual with a serious to moderately serious learning disability to compensate for communication and learning deficits is also an assistive technology (Raskind& Shaw, 1999).

Selecting a suitable assistive technology to train an autistic individual with learning disabilities is quite challenging, and it requires a well-devised strategy and a practical approach. Some assistive technologies are appropriate for a majority of autistic individuals, while many others are not. According to Raskind et al (1998), one may not find a "general purpose" assistive technology; the evaluation of autistic disability should involve a careful analysis of specific functions needed, the particular technology to be used, and the interaction between the individual and the technology.

Existing research on autism-related assistive technology is diverse, and much of it has concentrated on assessing the efficacy of assistive technology for people with special needs (Merbler et al., 1999; Lankutis, 2002). Other areas of research focused on the creation of an all-inclusive classroom (Merbler et al., 1999), separate special need categories (Mirenda, 2001; Weikle&Hadadian, 2001; Pierce & Porter, 1996; Pratt, 2003; Ludlow et al. 2002), specialized solutions to help individuals (Jackson, 2003), and training of special tutors (Bryan, Taylor, & Hinojosa, 2002; Goodale, Carbonaro&Snart, 2002).

Sze et al (2004)reported, "a series of collaborative efforts in the educational domain, speech/language pathology, and applied behavioral analysis are needed to streamline any assistive technology procedures." Assistive technologies are diverse and unique; they offer researchers, and tutor numerous tools to use in combination with approved practices to enhance individualized reading and speaking instruction (Gentry, 2006).

New tools and gadgets that provide assistive technologies, when combined with proven teaching practices, help tutors create a powerful instructional environment that eventually gives children timely cues to experience and fine tune speaking and communication skills (Gentry, 2006; Gentry & Lindsey, 2008). In addition, assistive-technology devices also help learners use new and systematic techniques that enhance their reading comprehension and speaking (Lindsey & Gentry, 2008).

Thus far, relatively few studies on AAC systems have focused on determining the effect of these systems on speaking and communication in children with autism disorders. However, advanced AAC systems, such as the Picture Exchange Communication System (PECS) may work efficiently to reduce the difficulties autistic children experience with communication. A PECS may work very well with an autistic child because of the matching characteristics between the classical characters of ASD

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and the factor of flexibility of using such systems (Mirenda&
Erickson, 2000; Schuler & Baldwin, 1981).

Almost all traditional and conventional speech and
communication skills require that learners first master attending
skills before proceeding to the next steps. These attending skills
include making proper eye contact, getting ready to speak, or
moving the hands while speaking (Bondy& Frost, 2002). Working
with PECS is easy because learners do not need weeks or months
to master the above-mentioned skills (Bondy& Frost, 2002). PECS
also teaches the learner the basic nuances of social approach. In
other words, the PECS system attempts to compensate for those
perceived deficits that exist in a traditional system.

Mirenda and Erickson (2000) have established that a large
number of schools also deploy PECS to train children with autism
disorders. There is an immediate need for ongoing research
efforts on the benefits of using PECS to capacitate children with
functional speech and additional vocabulary. Hitherto, the basic
principles of PECS were to enhance learners' functional
communication system, to improve the total number of words
used in verbal speech, and to bring down the instances of non-
verbal vocalizations and requests (Ganz& Simpson, 2004).

Speech generating devices (SGDs) are voice output
communication aids (VOCAs), and speech therapists have been
using them for almost three decades with diverse outcomes and
tangible results, such as better speech and communication, as
reported by Ogletree&Harn (2001).

SGDs and speech processing software have been used
extensively by many researchers and speech therapists, to help
autistic individuals acquire literary skills and functional speech
(Heimann, Nelson, Tjus&Gillberg, 1995; Tjus, Heimann, &
Nelson, 1998). Heimann et al. (1995) designed an innovative
autism intervention program to enhance communication and
literary skills among children with learning disabilities.

A large body of pre and post-2000 research data on the use
of SGDs exists, while most of the data available, relates to
providing expressive and receptive communication skills to
autistic children (Sigafoos, Didden& O'Reilly, 2003; Trembath et
al. 2009). SGDs may confer numerous benefits, both for the user
and for the tutors, because of the novel way in which they are used
under practical conditions.

In addition, the use of words, syllables, and messages along with picture symbols is a potentially powerful combination that is the best choice for autistic children who demonstrate a liking for such programs (Cafiero, 2001; Light et al., 1998). A good-quality SGD produces better voice output and creates words that are easy for children with autistic disorders to recognize and understand. This enables them to communicate better with their communication partners (Dyches, 1998; Mirenda, 2001; Mirenda& Schuler, 1988; Schepis et al., 1998; Sigafoos&Iacono, 1993).

According to Fujiki& Brinton (2009), the lack or absence of self-initiated communication seems to be the biggest problem among autistic individuals. Lord & McGee (2001) reported that as many as 21% to 66% of autistic individuals fail to develop normal communicative speech. They may never start or initiate correct and communicative speech, and they often are unsuccessful in asking the right types of questions, seeking details from others, or expressing love and affection and may ultimately fail to engage in dialogue with their peers (Carr &Kologinsky, 1983).

In the domain of symbolic language systems that might be used for autistic individuals, using a set of symbols may work when formal speech therapy may not (Lloyd et al. 1997). These authors provide compelling reason for this assertion. First, children receive a simpler and more straightforward communicative input while the tutor speaks in the same way in which an autistic individual uses a specific symbol system. A typical symbolic language system is far more receptive and responsive, because it weans away social stress and pressure, and it does not demand motor skills from an autistic child (Lloyd et al., 1997).

Present Status of Using Augmentative and Alternative Communication Systems to Teach Autistic Children in the Context of Saudi Arabia

Several surveys conducted across the country suggested that the basic lack of advanced and professional training was the main reason for late deployment of autism-related educational services. Until recently, children with multiple and severe disabilities like autism and Asperger disorders received their basic education in separate institutions. However, segregating them from their non-disabled peers may not allow them to acquire social skills or interpersonal abilities. The social situation is now gradually transforming into a great deal of public awareness about the health concerns and effects of autism. With a proactive and concerted campaign, the federal government of Saudi Arabia

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has brought about much change in the way autistic individuals are treated and empowered with necessary education and social skills and in an enhancement of functional speech and communication.

Although the problem of autism is universal, research information about autism and its debilitating effect on individuals is rather limited in Saudi Arabia. Afifi (2005) reported that the quantum of autism-related research information available from Arab world is quite scarce and scanty. Most of the autism research studies have been conducted in the western world. On the contrary, researchers from Arab countries do not report instances of autism research studies in significant numbers (Al-Salehi&Ghaziuddin, 2009). However, Hussein et al. (2011) conducted research on the incidence of autism in two Arab countries, Saudi Arabia and Egypt; this study highlighted the prevalence of autism in children against a trans-cultural background.

Recently some research is emanating from different Middle Eastern countries, including Saudi Arabia. In Saudi Arabia, a study of autism conducted on 49 patients, revealed details about clinical and medical aspects of autism, such as male-to-female ratio, history of seizure disorders, and basic psychological aspects (Al-Salehi, Al-Hifthy&Ghaziuddin, 2009). Al-Salehi et al. (2009) also provide a fair estimate of the prevalence of autism in Saudi Arabia, which is about 18 per 10,000—far higher than the worldwide incidence of 13 per 10,000. The results of the autism study conducted in Saudi Arabia, revealed that there were more than 120,000 autism cases in the country (Al-jarallah, 2005). One important reason for the scarcity of data and statistics on ASD prevalence could be the problems associated with underdeveloped health care and dissemination systems (Korishi et al. 2001).

Saudi Arabia is an oil-rich and prosperous country, but it faces enormous difficulties with access to health care (Al-Yousuf, Akerele& al-Mazrou,Y.Y, 2002). Al-Salehi et al. (2009) reported on the apparent difficulty of conducting research on autism, because of the paucity of necessary data on the subject. Korishi et al. (2011) also reported on the underdeveloped medical, developmental, and psychiatric service sectors for people with disabilities.

A series of measures have been undertaken in Saudi Arabia to provide teaching services to autistic children. However, most of these efforts are on an individual basis. The Al-Faisalya Women's Welfare Society in Jeddah set in motion one of the first visible autism initiatives in the year 1993. An autism-related class

with just four autistic individuals and five teachers provided the necessary training under the supervision of Dr Samira Alsaad. Eventually, this special classroom became the prototype for autism training in Saudi Arabia, and soon many private classrooms started operating across the country and in different parts of the Middle East (Jeddah Institute for Speech and Hearing, 2009).

Educational opportunities for autistic children still need to gather momentum in Saudi Arabia. Saudi public schools are not ready or equipped to handle autistic individuals. Teachers still need to be informed about the nuances of autism training, and the schools need the advanced set-up and tools required to provide it. Right now, autistic individuals are referred to private, specialized centers that provide necessary speech and communication therapy. However, the federal government started government-sponsored autism training centers and educational services in 1998.

The Council of Ministers also recommended establishing centers for training autistic individuals under the banner of the National Project for Children with Autism. The main goals of this 2003 initiative were to provide affordable diagnostic and educational services for autistic individuals; set up three key autistic centers in major cities such as Riyadh, Jeddah, and Dammam; and establish the Saudi Autistic Society to conduct research and address autism-related developmental issues.

Soon after the establishment of the Saudi Autistic Society, the governing body adopted an important by-law, to implement educational courses on autism in leading colleges and universities, in order to develop highly qualified teachers to train autistic children in proper speech and communication (The Saudi Autistic Society, 2009).

Previous research indicates that parents and caregivers' perceptions of the nature of autistic symptoms usually vary depending on the cultural and traditional values of the individuals (Nicholls, 1993; Ibrahim, 2006). In a traditional society like Saudi Arabia, many religious practices and beliefs control disability in an individual, and a serious health condition like autism, if a rational explanation for its occurrence is not given, may produce feelings of shame and guilt among family members (Ibrahim, 2006; Reiter, Mar'I& Rosenberg, 1986).

Parents often fail to attribute the incidence of autism in their children to any particular cause. This might adversely influence their ability to seek and find immediate medical help

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and intervention. Previous research by Ryan & Smith (1986) suggests that severe discrepancies might occur between parents' core beliefs about their culture or customary practices related to physical and philosophical attributes of autistic disability and western medical beliefs, practices, and diagnostic methods. These core beliefs might force parents to forego model medical practices and settle for more socio-culturally traditional folk and native medical remedies (Brookins, 1993).

As per Ministry of Education (MoE) database (2008), as many as 96% of children with multiple and severe disabilities such as autism and Asperger syndrome received their basic and assistive education in separate institutions. These children usually study in segregated classroom settings that do not allow them to mingle with their non-disabled peers. Basic AAC systems and assistive technologies comprise part of the course curriculum. Other activities include introduction of basic AAC intervention programs, management of educational services, and empowering autistic individuals with functional speech and communication.

In an exhaustive survey conducted on the availability of AAC services in Saudi Arabia, Alasseri et al. (2010) reported that there was a lack of reliable detail about AAC services in the country. The authors created an extensive database of institutions and organizations that provide AAC services to autistic individuals. That survey indicated that a majority of institutions faced innumerable risks and challenges to providing AAC services to the individuals who need them. The researchers also reported that the major flaw in the system was the absence of advanced training facilities to enable tutors and teachers. Another pitfall was the perceived bias of teachers in public schools against individuals who were suffering from disabilities like autism.

Implications for Practice in Saudi Arabia

Autism intervention efforts and their implications in Saudi Arabia have significant links to many socio-economic parameters. Intervention provisions in the country still have a long way to go. Most public schools in the country are still unequipped with and the trained workers and necessary tools required for autism-related problems. Previously, state-supported intervention programs were rare, although some private autism centers in larger cities and towns did provide intervention programs to those who had the necessary resources to treat their children.

However, the federal government has recognized autism as a serious health concern among children. Recently, the state

sponsored autism intervention programs have been getting the attention they have needed, more autism centers are being established in the country, and autism educational programs are being recognized as the most important requirement for the treatment of autistic children. Arab News (2010) reported that King Khaled University Hospital of King Saud University (KSU) opened the first research and treatment center for autism in the Middle East. Subsequently, in 2008, the Saudi Autistic Society was founded in Riyadh City and was registered under the banner of the Ministry of Labor and Social Affairs.

The national branches of the autism societies are already working on finding some solutions to these problems. Parent support groups and autism forums are actively pursuing the problems of autism on a national level (Jeddah Institute for Speech and Hearing, 2007; Effat College, 2007).

Integrating effective AAC systems is an intricate issue that concerns both the family of the autistic individual and the classroom teachers. In a traditional Saudi society that is bound by custom and traditions, integrating AAC systems should start in the home, where the parents should initiate the basics of AAC. In other words, autistic children tend to learn best when they get their AAC lessons in a natural learning setting like the home or other relaxed environment affable classroom (Wetherby&Prizant, 1992) or when the individual's family shows active interest (National Research Council, 2001).

The type or system of AAC to be used in a Saudi Arabian classroom depends on the availability of skills, knowledge, and tools (Rehman, 2008). According to the author, conventional autism treatment and intervention methods work best when used along with various AAC systems. For example, some of the early intervention methods used in a classroom might include the following: Applied and verbal behavior analysis, relationship development intervention, occupational therapy, sensory integration therapy, speech therapy, physical therapy and social skills therapy (Myers et al., 2007).

In addition, special centers for autism intervention may also include issues like evaluating conduct, diagnosing properly, finalizing treatment, and designing an efficient action plan for care and management. A model called CARD could be used for evaluation and intervention procedures (CARD, 2008). Rehman (2008) has elaborated a typical plan of action for integrating AAC into the classrooms of Saudi Arabia and this plan included the following points:

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- **Empowered with facilities to diagnose most common autism symptoms,**
- **To carry out necessary evaluation, if the child has not been evaluated before enrolling into the school, and,**
- **When the symptoms manifest just before the child enters the school.**

Now, the school authorities will recommend children to undergo special education within the school ambiance. Special education tutors and trained AAC staff would operate these classes. Rehman (2008) reported that a combination of intervention methods mentioned in the previous paragraph may be integrated into the school curriculum and eventually an AAC program created based on the autistic individual's specific needs and requirements.

The main goal of using AAC systems in a classroom is to provide children with sufficient functional speech to speak with their peers and parents. In addition, the autistic individuals who use AAC at home, in classrooms, and in diverse social situations should be able to interact in a sufficiently competent manner. Lilienfeld&Alant (2005) have found that individuals who use AAC are weak in using social networks but readily communicate with those with whom they are most familiar.

Daily interaction through deployment of AAC systems means promoting communication competence as well as the social skills necessary to interact in an effective manner with others. Social participation is a part of daily interaction and this should form a part of the AAC assessment and implementation process. Light (1989) defined communicative competence as including linguistic, operational, social, and strategic skills.

The attainment of functional speech and communication through AAC systems should not be seen as an abstract event. Rather, policymakers should create a speech therapy system based on specific contexts, so that tutors may address an individual's immediate needs (Beukelman&Mirenda, 1998). While maintaining the goal of enabling an autistic individual with functional speech, policymakers and tutors may need to evaluate several implications of using a specific AAC system.

Many well-known authors have been advocating a slight refinement of previously believed assumptions and research results arguing that most autistic individuals are visual learners (Mirenda&Iacono, 1988; Mirenda& Schuler, 1988; Oxman, Webster &Konstantareas, 1978). However, in a typical Saudi

Arabian school setting, tutors may need to assess the need to introduce functional speech by considering various task demands.

Recommendations

Finding a suitable AAC system for a Saudi Arabian autism classroom is challenging because of the individual complexities involved with each system. However, tutors may want to use the most commonly deployed program, TEACCH, which was designed and created in mid-1960s. The goal of this system is to create an autism-friendly teaching system that considers several parameters, such as the autistic individual's, cognitive ability and requirements, and work ethic and the ambiance where the system is run and managed. Mesibov&Howley (2003) pioneered this system and created a structured teaching curriculum that consists of four important components: physical structures, daily schedules, work system and visual cues and instruction.

Two other often-used AAC systems are Picture Exchange Communication System (Bondy& Frost, 2002) and Pivotal Response Training (Koegel&Koegel, 2006). Both are designed based on Applied Behavior Analysis (Cooper, Heron &Heward, 2007). These two methods rely on critical motivation of children in learning communication. These widely used interventions enhance children's motivation by following their lead, thereby allowing them to choose between intervention stimuli, thereby creating an affable communicative environment, and arranging for a quick natural and positive reinforcement upon communication behavior (Koegel&Koegel, 2006).

Managing autistic individuals in Saudi Arabia is a multi-faceted domain in which researchers may want to consider several conflicting factors concomitantly. For example, the traditional link between the autism symptom and religious/traditional beliefs should be considered before diagnosing the symptom and later integrating the affected individual into the mainstream society. To be able to introduce a viable autism education program, administrators and policymakers may need to set up more affordable diagnostic/autism speech pathology centers in different parts of the country.

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