Implementing evidence-based strategies in the classroom

Augmentative and alternative communication (AAC) strategies are widely used among parents and educators of students with autism spectrum disorders (ASDs).

However, questions have arisen regarding the efficacy of such interventions, and concerns have been expressed about AAC inhibiting the development of verbal speech and language.

AAC AND AUTISM REPORT

Implementing evidence-based strategies in the classroom

Fortunately, there is now evidence to support the use of AAC for students with ASD

Recent publications by the National Autism Center and the National Professional Development Center on Autism Spectrum Disorders provide professionals with research data to support the use of AAC tools and strategies for individuals with an autism spectrum disorder.

Both of these organizations conducted comprehensive literature reviews to establish best practices for interventions commonly used with this population. The National Autism Center's National Standards Report identified speech generating devices (SGDs) as an "emerging treatment;" while the National Professional Development Center on Autism Spectrum Disorders determined that the use of SGDs is an "evidence-based practice."

AAC strategies, such as the Picture Exchange Communication System (PECS), functional communication training, visual supports and story-based intervention were also examined, with mixed results. In this article, the definition of evidence-based practice (EBP) and its application for speech-language pathologists is reviewed, followed by a discussion of the methods used to conduct the literature reviews.

Results of the two literature reviews are compared and contrasted. Current research, published after the distribution of these reviews, is also investigated, and the direction for further research considered. School-based speech-language pathologists (SLPs) can use this data to make decisions regarding AAC service delivery. Specific assessment methods and interventions are proposed, and tips for successful implementation of AAC are shared.

Evidence-Based Practice and Implications for Speech-Language Pathologists

When discussing evidence-based practice (EBP), it's important to clarify exactly what this term means and how it is determined. The American Speech-Language Hearing Association (ASHA) has outlined three components of EBP: external scientific evidence, clinical expertise/expert opinion and client/patient/caregiver perspectives. Given this model, SLPs are obliged to make decisions regarding therapy and services based not only on professional judgment and clinical expertise, but also on the wishes and preferences of the client. In addition, the SLP should be able to support these decisions with current, relevant scientific research.

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The National Autism Center/National Standards Project (NAC/NSP) Findings

The results of the NAC/NSP's research are provided in their publication, Evidence-Based Practice and Autism in the Schools: A Guide to Providing Appropriate Interventions to Students with Autism Spectrum Disorders. A summary of these findings, as related to AAC, is provided below:

Established AAC treatments

- Schedules
  - Visual strategies used to communicate a series of activities, as well as required steps for a specific activity (see photo three)
- Story-based intervention package
  - Written stories depicting specific situations or events, describing expected behaviors (see photo two)

Emerging AAC treatments

- AAC devices
  - Interventions include high- and low-tech strategies, such as pictures, photos, symbols used to facilitate communication (see photo one)
- PECS
  - AAC strategy based on behavioral principles
- Sign instruction
  - Direct teaching of sign language to improve functional communication skills

Unestablished Treatment

- Facilitated communication
  - Providing physical support to assist a person with significant communication deficits in pointing to pictures, objects, words or letters

When making decisions regarding treatment, the NAC encourages professionals to first consider established treatments, as there is compelling scientific research to indicate the efficacy of these strategies. However, emerging treatments should not be ruled out and should be considered if established treatments are deemed inappropriate. Unestablished treatments do not have conclusive research to support efficacy and should not be considered until such research is available.

National Professional Development Center on Autism Spectrum Disorders (NPDC on ASD) Findings

The NPDC has published their findings on their website (see References). The website also provides links to online modules for identified evidence-based practices (EBPs), as well as a chart that compares their findings to those of the National Standards Project. There are six EBPs related to AAC identified by the NPDC, including:

- **Speech generating devices/VOCAS (voice output communication aids)**
  - Low- and high-tech devices with voice output (see photo one)
- **Functional communication training**
  - Use of AAC tools and strategies to replace unconventional communicative forms/behaviors
- **PECS**
  - Picture Exchange Communication System
- **Social narratives**
  - Describe social situations, behavioral expectations and/or routines in a story format using visual aids, including pictures and text (see photo two)
- **Video modeling**
  - Use of video recording/display to model targeted behaviors or skills.
- **Visual supports**
  - Visual tools/strategies that assist students in transitioning and completing activities throughout the day (see photo three)

Findings

Photo 1- SGDs are identified as an Emerging Treatment by the NAC, and an Evidence-Based Practice by the NPDC on ASD.

Photo 2 - Social Narratives and Video Modeling are identified as "evidence-based" by both the NAC and the NPDC on ASD.

Photo 3 - The efficacy of visual schedules and supports is well documented and substantiated by scientific research.

Overlap Between Evidence-Based Practices Identified by the National Professional Development Center (NPDC) on ASD and the National Standards Project (NSP)

Evidence-Based Practices Identified by the National Professional Development Center (NPDC) on ASD	Established Treatments Identified by the National Standards Project (NSP)										
	Antecedent Package	Behavioral Package	Story-based Intervention Package	Modeling	Naturalistic Teaching Strategies	Peer Training Package	Pivotal Response Treatment	Schedules	Self-Management	Comprehensive Behavioral Treatment for Young Children	Joint Attention Intervention
Prompting	x			x						The NPDC on ASD did not review comprehensive treatment models. Components of The Comprehensive Behavioral Treatment of Young Children overlap with many NPDC-identified practices.	The NPDC on ASD considers joint attention to be an outcome rather than an intervention. Components of joint attention interventions overlap with many NPDC-identified practices.
Antecedent-Based Intervention	x										
Time delay	x										
Reinforcement		x									
Task analysis		x									
Discrete Trial Training		x									
Functional Behavior Analysis		x									
Functional Communication Training		x									
Response Interruption/ Redirection		x									
Differential Reinforcement		x									
Social Narratives			x								
Video Modeling				x							
Naturalistic Interventions					x						
Peer Mediated Intervention						x					
Pivotal Response Training							x				
Visual Supports								x			
Structured Work Systems								x			
Self-Management									x		
Parent Implemented Intervention	The NSP did not consider parent-implemented intervention as a category of evidence-based practice. However, 24 of the studies reviewed by the NSP under other intervention categories involve parents implementing the intervention.										
Social Skills Training Groups	Social Skills Training Groups (Social Skills Package) was identified as an emerging practice by the NSP.										
Speech Generating Devices	Speech Generating Devices (Augmentative and Alternative Communication Device) was identified as an emerging practice by the NSP.										
Computer Aided Instruction	Computer Aided Instruction (Technology-based Treatment) was identified as an emerging practice by the NSP.										
Picture Exhcahnge Communication	Picture Exchange Communication System was identified as an emerging practice by the NSP.										
Extinction	Extinction (Reductive Package) was identified as an emerging practice by the NSP.										

Image 1 - Overlap Between Evidence-Based Practices Identified by the National Professional Development Center (NPDC) on ASD and the National Standards Project (NSP)

Discussion and Comparison of NAC/NSP and NPDC on ASD Findings

The NAC is a nonprofit organization located in Randolph, MA, that serves children and adolescents with autism spectrum disorders (ASD), and is the May Institute's center for the promotion of evidence-based practice. One of the primary goals of the NAC's National Standards Project (NSP) was to identify established treatments for autism spectrum disorders, based on a review of scientific research. Their literature review includes studies conducted over a 50-year period, from 1957 through the fall of 2007. Strict inclusionary and exclusionary criteria were established, resulting in a total of 775 studies used for analysis. Based on their findings, they identified three categories of treatment: established, emerging and unestablished. When determining the efficacy of AAC devices (low- and high-tech), they looked for evidence to support improvement in verbal communication. AAC devices were identified as an emerging treatment. PECS was also found to be an emerging treatment, based on evidence to support its efficacy in improving verbal communication and interpersonal skills.

The NPDC is a multi-university center (FPG Child Development Institute at the University of North Carolina at Chapel Hill, the M.I.N.D. Institute at the University of California Davis Medical School and the Waisman Center at the University of Wisconsin at Madison) that has identified 24 evidence-based practices based on a literature review spanning 12 years (1995-2007). Rigorous criteria was used to determine evidence-based practices (as opposed to established treatments identified by the NAC)

through peer-reviewed research in scientific journals. The NPDC identified the use of speech generating devices (SGDs) , including voice output communication aids (VOCAs) as an EBP, concluding that they were effective in increasing expressive language for learners with ASD who struggle with verbal speech. They also identified PECS (Picture Exchange Communication System) as an evidence-based practice, based on evidence that supported an increase in functional communication.

When comparing these two literature reviews, readers should take note that the NAC/NSP reviewers focused on evidence to support improvement of verbal communication for both AAC devices and PECS, while the NPDC on ASD considered evidence to support an increase in expressive language for SGDs/VOCAs and an increase in functional communication for PECS.

In addition to their findings regarding AAC devices, the NPDC on ASD identified the following factors for successful implementation of SGDs:

- **Motivating vocabulary**
- **Symbol size and number**
- **Accessibility/ease of use across environments**
- **Providing environments and opportunities that encourage communication**
- **Training of communicative partners**

Readers are encouraged to refer to the chart developed by the NPDC on ASD (see image one) for a complete list of all evidence-based practices and established treatments and a comparison of findings.

Recent Research

Two important research reviews regarding the use of AAC, published after 2007 and not included in the above research reviews, will be discussed in this section. The first, Schlosser and Wendt (2008), reviewed research conducted between 1975 and 2007 to determine the effects of AAC on speech production in children with autism.

The second review, published in 2009 by Calculator and Black, determined best practices in providing AAC services to students with severe disabilities in general education classrooms. Although the second study did not focus primarily on students with an autism spectrum disorder (ASD), the practices identified by the reviewers can be considered best practices for all students with complex communication needs, including those with ASD. Summaries of these studies are provided below.

Schlosser and Wendt focused on three AAC interventions in their review: SGDs, PECS and manual sign. Their search resulted in a total of 76 studies that met their inclusion criteria. None of the studies they reviewed reported a decline in speech production as a result of AAC intervention. In fact, most studies reported an increase in speech production with the use of AAC strategies. The authors concluded that AAC intervention did not impede speech production.

Calculator and Black conducted a comprehensive review of literature published between 1976 and 2009 to develop an inventory of best practices in providing AAC for students with severe disabilities (defined as severe to profound intellectual disability

Sample AAC Implementation Plan

KEY: V-vocalizations; S/G - signs and gestures; CB-communication board; SGD- speech generating device

Created by Betsy Caporale, M.S., CCC-SLP

ACTIVITY	COMMUNICATION STRATEGY	LOCATION	FACILITATOR	WHEN
Arrival	V, S/G SGD (announce date, weather, etc.)	Classroom	Staff, Peers	a.m.
Small Group	CB (choose activity) SGD - make announcement, share about a personal event	Classroom	Teacher, Para, Peers	a.m.
Music	CB, (choose song)	Classroom	Music Teacher	a.m.
P.E./Motor	S/G, CB (choose activity)	Classroom	Adatpive P.E. Teacher, Peers	a.m.
Speech Therapy	CB (introduce new vocabulary) SGD (training/ practice)	Classroom / Speech Room	Teacher, SLP	a.m. / p.m.
Story Time	CB (choose book), SGD (announce title of book or repeated story line)	Classroom	Teacher, SLP	a.m. / p.m.
Lunch / Recess	V, S/G (interact with peers), CB (request food)	Classroom / Luchroom	Lunch Helper, Peers	a.m. / p.m.
Computer	CB (choose computer activity)	Computer room, Classroom	Teacher, Para, OT	a.m. / p.m.
Classroom Job	CB (choose job)	Classroom, school grounds	Teacher, Para, OT	a.m. / p.m.

Image 2 - Sample AAC implementation plan.

and associated challenges with adaptive behavior). Only one of the studies looked specifically at students with autism.

Practices were reviewed by a panel of eight experts who had between 15 and 30 years of experience in the field of AAC. Based on their review, the authors developed 91 best practices within eight categories. Many of the best practices identified by Calculator and Black overlap with those identified by the NAC/NSP and the NPDC on ASD. Common best practice strategies and recommendations include:

- **Use of a multi-modality approach to communication**
- **Close collaboration among staff**
- **Staff and peer training**
- **AAC implementation within relevant, meaningful and motivating activities**
- **Providing functional communication strategies across environments**
- **Involving family in AAC assessment and implementation process**
- **Speech-language pathologist plays a primary role, but implementation of AAC is shared by many.**
- **Consultative role of speech-language pathologist is supported by team and parents**

Directions for Future Research

As SLPs, we are often challenged by parents, teachers and administrators when recommending AAC strategies that we judge to be sound and efficacious. This can be a source of great frustration and discouragement. Fortunately, we have research to support the use of these strategies for students with ASD and can now move forward in implementing them as EBPs. However, in order to further our efforts in serving this population, we need to look beyond the efficacy of AAC as a tool to increase verbal communication and expressive language and consider the other benefits that we know exist, but don't have adequate research to support. These include:

- **Increasing functional communication (verbal and nonverbal)**
- **Enhancing vocabulary and sentence formulation skills**
- **Reducing problem behaviors**
- **Increasing personal responsibility**
- **Gaining independence**
- **Improving social skills**

Best Practice Guidelines for AAC Assessment and Implementation

Providing AAC assessment and implementation services is no easy task. It requires the skills of many team players to review relevant research, analyze assessment data and use clinical experience and professional judgment to make informed decisions. Unfortunately, many AAC assessments focus primarily on the acquisition of sophisticated, high-tech devices and, in the process, common sense is thrown out the window. Expectations regarding the acquisition and use of AAC must be explicit and realistic. This requires the assessment team to be truthful and candid about a student's strengths and weaknesses and the skill sets needed to access AAC. Having worked in the field of AAC for over two decades, I have developed my own "best practice guidelines" for serving this population, which I will share with you now.

• Assessment Process

The word "process" is key here, as an AAC assessment is collaborative and ongoing. I'm often asked how long an AAC assessment takes, and my response is always the same: a lifetime! An AAC user's needs, environments and skills are constantly changing over time, as are AAC technologies. Therefore, the assessment process must continue over the span of an AAC user's lifetime.

Determining appropriate AAC tools and strategies for a student is a highly individualized process that requires careful planning and strategizing. The assessment should always include:

- Interviews (family, friends, service providers, school staff, etc.)
- Observations across settings, within natural contexts
- Review of educational and medical records
- Individualized assessment, often using alternative means, such as:
  - Cause/effect toys
  - Choice making activities
  - Picture books (see photo four)
  - Communication board trials (see photo five)
  - Matching games
  - Adapted computer hardware and software
  - Observation checklists
- Trials with a variety of AAC tools and strategies (no tech, low-tech and high-tech)

An AAC assessment should never start with device trials and should always be a collaborative process. A "drop in" or "drive-by" assessment by an "AAC specialist" is not best practice and typically results in a poor feature match. This causes frustration on the part of the student, family and school staff and, in turn, leads to device abandonment, a situation that occurs far too often!

• Determining a Feature Match

Only after a comprehensive assessment is completed can the selection of AAC tools and strategies begin. The assessment team must carefully consider variables, such as skill sets (those that are acquired and those that need to be taught), mobility, fine and gross motor skills, visual acuity, accessibility across environments, family support and motivation of the student. Allowing the AAC user to make choices regarding features, such as device color, voice, symbol sets and vocabulary, will give him or her a sense of control and increase motivation. Likewise, including the user in the selection of vocabulary will help ensure "buy-in," and provide incentive to communicate. When selecting vocabulary, it's

Best Practice Guidelines for AAC Assessment and Implementation

important to include functional, meaningful words and phrases that are relevant to a specific environment or activity. For example, you would not want to include "bathroom" or "break" on a communication board designed to be used during an art activity. Also consider age-appropriateness: "bubbles" and "Dora the Explorer" are not part of a typical teenager's vocabulary!

• **Implementation**

Most SLPs will agree that the implementation of AAC in the classroom is extremely challenging, whether it be a general or special education setting. Common complaints and concerns shared by teachers, staff and family members include:

- Teacher and staff aren't using the recommended AAC tools and strategies
- The student is rejecting the system/device
- The student's communication needs are not being met by AAC

As with AAC assessment, AAC implementation requires careful planning and a collaborative team approach. I have discovered that when provided with a user-friendly implementation plan (see image two), classroom staff is almost always willing and eager to use AAC. This tool clearly defines which communication strategies will be used across all activities of the school day and who will help facilitate. The implementation plan is a working document, which changes as the student's needs and environments change, and is developed collaboratively by the entire AAC team. With this document in place, the implementation of AAC becomes a shared responsibility, and expectations for both staff and student are made clear. When developing an implementation plan, consider the following:

- Provide frequent practice and training opportunities
- Plan motivating activities where highly predictable vocabulary can be pre-determined
- Allow opportunity for independent exploration and use of a device
- Don't expect too much too soon! Learning to communicate using a new tool or device takes practice, patience and perseverance
- Train family, friends, staff and peers how to be efficient communicative partners using AAC
- Use a multi-modality approach – do not rely on one tool or strategy
- Keep in mind that AAC will never replace natural verbal speech

Photo 4 - Picture books are a great tool for informal assessment of vocabulary skills, initiation and motivation to communicate.

This poses a crucial question: Who has the time and resources to conduct this important research?

High quality, publishable research typically requires extensive funding, subjects who are followed over a period of time, as well as careful data collection and analysis. The financial and time constraints inherent in this process prevent school-based SLPs, who work directly with the students on a regular basis, from participating in research studies. Marilyn A. Nippold (2010) offers a realistic solution to this problem: combining the efforts of school-based SLPs with university faculty and graduate students to conduct research directly at school sites. Nippold suggests starting with "questions whose answers are likely to have a positive impact on the profession." For example, a school-based SLP might pose the question: "Does the use of communication boards at recess increase peer interaction for nonverbal students with ASD?" This would provide the university "investigator" with a clear focus for creating a data collection tool. Graduate students (and perhaps school staff) could then be trained how to use this tool to collect data. Once the data is collected, it could be analyzed by university staff and students. The finished document could then be submitted for publication in a professional journal, such as ASHA's Perspectives on Augmentative and Alternative Communication. As Nippold points out, by partaking in this type of cooperative research design, everyone benefits; graduate students expand their knowledge of the field, faculty members conduct useful research, school-based SLPs contribute to important research and the field of speech-language pathology is provided with data to support EBPs!

Final Thoughts

SLPs who serve students with complex communication needs must remain focused on the student and not get caught up in the technology madness! This is not easy, especially given the demands often placed on SLPs to acquire devices based on media hype or emotional reactions. Remember, AAC is a process, not a tool! Also, keep in mind that AAC is not an exact science. Strive to implement interventions that are evidence based, while also relying on your clinical judgment and that of other team members. Most importantly, always consider the individual needs and preferences of the AAC user, and remember that they will change over time.

Photo 5 - Low-tech AAC boards/books can be used to assess vocabulary, symbol recognition, navigation and categorization skills.

References

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National Autism Center http://www.nationalautismcenter.org/

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