The Incorporation of Augmentative and Alternative Communication Devices into the Classroom to Assist Neurodivergent Learners

A Review of the Literature

By

Michael Harrell

Department of Educational Leadership, Lamar University

EDLD 5315: Assessing Digital Learning and Instruction

Dr. Kristi Meeuwse

April 27, 2025

Introduction

The concept of teaching and learning has greatly changed over the past decades. Early forms of education, basically the millennial generation and before, predominantly consisted of the "sit and get" style. The "sit and get" style of education is the transfer of information based on test criteria and verbal instructions. As a student, I can vividly recall throughout much of my educational years feeling emotionally detached from learning and just seeing it as a chore that needed to be completed, same like any other. Thankfully, innovative alterations to education, such as digital learning and blended learning, have forever changed the landscape of learning, however, there are those individuals who are egregiously underserved by traditional forms of education and are still not seeing enough support through some of the improved learning innovations.

One of the biggest concerns in both the classroom and the workforce is connecting to individuals on a communitive level. Some individuals suffer from delayed speech, language development, selective mutism, dyslexia, sensorineural hearing loss, or Autism who simply don't feel comfortable enough to raise their hands, ask, or answer a question when they need extra help. My innovative solution to combat this issue is based on an advocacy initiative aimed at promoting the introduction of Augmentative and Alternative Communication (AAC) devices and apps in the classroom on a larger scale. Through this advocacy initiative, the goal is to better empower neurodivergent individuals to find their voice, maximize the capabilities of available educational support tools, and assist in the development of more beneficial options. My literature review will lay out further researched evidence on the lack of technological support neurodivergent individuals face, results of the incorporation of AAC devices in the classroom,

the conclusion that can be made through these studies, and what challenges lie ahead in efforts to improve the overall learning experience for neurodivergent learners.

Review of the Literature

Understanding the Problem

"Neurodiversity, the idea that a kid's brain functions differently from those of children who are 'neurotypical comes in many forms. That includes learning disorders, ADHD, autism spectrum disorder, and sensory processing issues" (Garey, 2024, para. 1). For many, these conditions are viewed as weaknesses and often misinterpreted, regarding the individual's capabilities. "Many experts believe the number of students with brain differences that fit under the neurodivergent umbrella is growing" (SDF, 2024, para. 19). The rise in neurodivergent diagnoses has led to more awareness but a huge disconnect in understanding. Langford in 2024 discussed the many challenges both educators and students face, giving examples of how neurodiversity should be addressed from an individual aspect, highlighting the diversity in which neurodivergent individuals communicate and the different forms of support each style of communication requires. Misinterpretation and lack of understanding by educators can create a poor learning environment for the individual and make it almost impossible for two-way communication between student and educator. "Neurodivergent people struggle with understanding social dynamics and cues, or with social anxiety. Requiring social interaction puts them at a disadvantage." SDF, 2024, para. 30) Educators with minimal knowledge or understanding can completely overlook or be unaware of imperative information the individual might be trying to relay. "Additionally, attitudes and misconceptions about neurodiversity can further impede inclusive education and prevent the adaptation of teaching methods to cater to diverse student needs" (Cook, 2024, para. 2).

Over the last few decades, there have been amazing technological advancements in the education field, and some of these advancements directly address the communication issues present between neurodivergent individuals and educators. Unfortunately, these tools are not utilized or even known about on a large enough scale to properly support the diverse needs of neurodivergent individuals. “Though it’s estimated that 15 to 20% of the world’s population exhibits some form of neurodivergence, the arbitrary biases against those with minority neurotypes continues to exclude many intelligent, hardworking ND people” (Goulet, 2022, para. 11). This lack of technological support further highlights the lack of understanding regarding neurodivergent individuals and the impact technological support tools have. “The use of AAC has opened a whole new world for so many who had no options to communicate with the world around them. From low tech picture exchange systems to high tech eye gaze systems there are endless possibilities for finding an effective communication system” (Boudreaux, 2020, para. 1). Awareness is key to this issue, with many individuals from family member to educators simply not being informed on the impactful technological tools available and how to go about getting those tools provided to them. “Whilst there are forms of AAC used by lots of people around the world, there are other forms of AAC such as visual communication books and electronic communication devices that not commonly used” (Higgins-Walsh, 2023, para. 2). With very murky understandings of the full spectrum, education institutions and technology companies have shown little interest in doing business to improve the current state of affairs from both a developmental and financial aspect. “Although there have been specific regulations put in place to assist schools with funding like the American Disability ACT, fear of stigmatization, perception that accommodations are discriminatory, and some neurodiverse students not disclosing their disability, consequently, has assisted in the lack of accommodations

provided to neurodivergent individuals" (Embracing an asset-based model of neurodiversity, 2023, para. 5).

Advocacy and Implementation

"In recent years, 'neurodiversity' has gained significant attention in educational and psychological conversations" (Christner, 2024, para. 1). There has been a shift in overall conceptual thinking of what it means to be neurodivergent. This change in thinking emphasizes the value of human diversity, promoting societal changes that allow all individuals to thrive and be appreciated for their unique strengths and abilities (Christner, 2024, para. 2). The first step to improve knowledge and support of the neurodivergent is understanding. The biggest way to impact understanding is by raising awareness through advocacy.

The Autism Society of America has called on federal lawmakers to reauthorize and expand the Autism Collaboration, Accountability, Research, Education, and Support (CARES) Act, which funds autism research and services; to pass laws that ensure equitable access to education and employment for neurodivergent individuals; and to fund training for law enforcement and healthcare professionals to help them engage safely and effectively with neurodivergent populations (Alderton, 2023, para. 12).

Getting information out to organizations, institutions, and communities greatly raises awareness and helps bridge the gap of misunderstanding, so that everyone is addressed and handled with the proper level of knowledge needed. Thomas Armstrong's (2011) book *The Power of Neurodiversity: Unleashing the Advantages of Your Differently Wired Brain* is a seminal work advocating that society should embrace all forms of neurodiversity and recognize that individuals with neurological differences can make unique contributions (Christner, 2024, para. 3).

In addition to advocating and educating people on what truly means to be neurodivergent, so that educators and employers can better provide communicative support, the tools available must be accessible to the extent necessary to make a difference. One of these technological tools in particular would be AAC devices. Donaldson, in 2021, conducted a study of just how impactful the use of AAC devices was among some neurodivergent individuals. In the study, it was shown that many neurodivergent individuals enjoyed the ability to have autonomy over the way they communicated, leading to a more inspired effort towards learning and other activities. In conclusion, Donaldson found, “Historically, AAC intervention was considered a 'last resort' for children who did not develop functional speech. Speaking autistic adults encourage families, professionals, and society to promote and accept all communication as equal, ensuring opportunities for all children to develop full and rich communication without delay and stigma” (2021, p 1). This study points to the effective capabilities AAC devices can have throughout the diversified landscape of neurodivergence. With studies like these pointing to AAC devices' effectiveness, implementation on a large scale is the next important step. When it comes to incorporating technology on a large scale into educational institutions, one of the main setbacks will always be financial, but the price for such advanced tools is not always what they seem. “Although many equate AAC with high-end technology and high expense, for some potential users the most ideal AAC systems are often low-tech solutions with a minimal price tag” (Downey, 2004, para. 1). The key to implementing AAC devices in large amounts, which are at least palatable from a price perspective for the institution is based around strategic curricula strategizing. The task of integrating a student’s AAC system into a given curriculum should begin with the team reviewing the student’s goals and identifying the child’s academic and communication levels as well as needs (Downey, 2004, para. 2).

Viable AAC options

• (A) Pocket Go-Talk 5-Level Communication Device: A compact 25-message talker with five easy-to-activate buttons and five levels. Each message has 12 seconds of recording time. Lightweight and small size make Pocket GoTalk very portable. It has a larger speaker than the other GoTalks, so it plays back speech at a higher volume. Scanning through switch access is also built in for tabletop use, with five adjustable scanning speeds. Pocket GoTalk lets you change Level Five to a one-minute message. Great for the Pledge of Allegiance!

• (B) The MegaBee Assisted Communication and Writing Tablet: Designed specifically for users who, due to ALS, a traumatic brain injury, stroke, ALS, muscular dystrophy, etc., are unable to use most of their body's voluntary muscles. The device is held by the listener who looks through the opening in the center of the device to view the direction of the user's eye movements. A series of colored buttons allows the listener to push them as the user moves his or her eyes, first at one of six colored blocks, and then at a specific color (representing a letter) within that block. The goal is to spell out what the user wants to say on the LCD screen. The device also features a shorthand option, so the user and listener can come up with a personal set of abbreviations for their most commonly used terms.

• (C) Roloquo2Go: AAC app that enables non-speaking children and adults to express themselves confidently and initiate conversations. With more than 27,000 symbols, Proloquo2Go enables users with varying literacy levels to communicate effectively through easily recognizable images. Proloquo2Go features over 100 free, natural-sounding voices in English, Spanish, French, and Dutch. It supports multiple accents and bilingual use, including switching languages mid-sentence.

• (D) Enabling Devices Tactile Symbol Communicator: portable symbol communicator, which can store up to 36 messages, has a total of six removable tactile symbols that allow the user to push a button to relay a message. As a tactile symbol communicator, it is perfect for users who are blind or visually impaired. The device offers six levels of communication, with six messages per level. When setting up this device, it provides up to six seconds of record time per message.

• (E) GoTalk Express 32 – Advanced Communication Aid: This laptop device features a grid of pictures that allow users to combine them to form sentences. It features two methods of operation: standard and express. When the standard method is chosen, the user simply presses a message key, and the device speaks the word. When the express method is chosen, the user can press multiple message keys to create a sentence. Some of the other features of this device include a shoulder strap for easy carrying, a rugged design with a carrying handle, and LED lights for visual prompts.

Research and results

A major stream of AAC research has focused on studying everyday conversations involving people and AAC. This research has tended to adopt either quantitative, distributional perspectives of interaction, focusing on quantifying the use and functions of language, or qualitative perspectives, providing insights on the ways that social actions are achieved in everyday conversations through conversational analysis (Ibrahim et al. 2023, par. 1). Studies like this take recorded accounts of social interaction between neurodivergent students and non-divergent students, as well as neurodivergent students and their respective educators to highlight the differences between the three groups based on having the assisted capabilities of the AAC devices versus not having it. This study was encapsulated with 10.5 hours of recorded video footage over 14 weeks. In conclusion, the study found that with the inclusion of AAC devices,

children were able to regulate power dynamics by establishing common task interests, mutual understanding of what both participants were expressing, and could pick up the signs of what the other was intending. Often, by combining multiple modes, children could express themselves for a broader range of functions, could regulate shades of intensity, and were able to advance their interests to a greater extent (Ibrahim et al., 2023, par.20). These particular findings showcase the major influential difference between students having the ability to blend technological communication with motion communication. When dealing with neurodivergent learners, the aspect of communication awareness is where the biggest difference is made, which is why the AAC device is so critical in a neurodivergent student learning environment. Taking from the study, there is a clear disconnect when students are utilizing more traditional communication methods. by focusing on the persuasive ways that children expressed themselves during particular tasks through full bodily action, as an important component of interactional activity. In the case of one child participant, Grace, bodily action coupled with the adult conversation partner's sensitivity to her actions, enabled Grace to arrange her environment in ways that made it possible for them both to access the tabletop craft task more readily (Ibrahim et al.,2023, par. 27). By having a heighten level of sensitivity and display good communication awareness the educator was able to pick up on the learner's bodily movements couple with the AAC device to create a better functioning learning environment for the student. This level of attention will be critical in the further implementation of AAC devices into learning environments permanently. The findings have several implications for school staff and therapists who are responsible for supporting the communication and learning needs of children who use AAC. By being equally sensitive to a wide range of modes, the findings showed that it was possible to focus on

interactional features that might traditionally have been treated as secondary to talk (Ibrahim et al., 2023, p.10).

The Payoff

"Children need to feel safe, connected, and regulated for optimal learning. When children feel safe, their nervous system isn't in survival mode, it's free to explore, learn. A supportive, collaborative relationship builds trust and connection with the student, which supports the student's regulation and participation in school (Quirk, 2024, para. 9). Raising awareness, not only fosters a more inclusive environment but also improves the chances that tech companies will be inspired by this awareness to develop better technological tools. As society continues to expand its knowledge and support on such an important issue, the individuals directly affected also see an expansion of quality of life in many different aspects. "It is important to understand intersectionality between disability, race, gender, and sexual orientation. Listening to Autistic people who experience intersectionality helps us better understand our students." (Quirk, 2024, para. 11). With increased understanding and increased usage of technological support tools, many limitations once normally placed on neurodivergent individuals can become a thing of the past. "After 13 years in the classroom, I realize now what I wish I knew then: Students who cannot rely on speech to be understood don't have to be educated in segregated classrooms. And for educators who have students who require communication supports, training or preparation doesn't have to be complex" (Villegas, 2021, para. 2). Evidence like this further supports the need to ensure the proper supply of AAC devices and hold education institutions accountable in this effort. "AAC is a powerful communication tool that can positively impact a child's life" (Beyond the Spoken Word, 2023, para. 23).

Summary

The literature review detailed evidence that highlighted the lack of technological support neurodivergent individuals face in the classroom and gave insight into what in incorporation of AAC devices into the classroom on a large scale looks like for all involved. Much of the research discussed showed just why there is a huge lack of understanding regarding neurodivergent learners and what their in-class needs truly consist of. Educators, moving forward, can utilize the information found in many of these literature pieces to fundamentally change how they go about constructing learning environments. Education is shifting from what the learning experience used to be to the endless possibilities of what it can be, and that is the biggest takeaway educators can gain from the information provided.

Pros and Cons

Many educators are faced with curricula restrictions and a lack of knowledge in dealing with neurodivergent issues, as well as the technological tools that could greatly improve this disconnect. The issue, however, goes beyond the educator, falling on the educational institutions and family members. Studies and research show a critical need for more direct, driven efforts. Educators, administrators, and family communities have to continue to work as one. Educational institutions have little to no desire to cover expenses for something they lack understanding of. This lack of understanding places a huge responsibility, yet huge opportunity for family members to advocate for their loved ones and hold educational institutions accountable to acquire the technological support tools needed to facilitate the learning environment deserved by all.

Focus

My innovation plan is designed to build on the research and case studies to further advance what capabilities can be added to AAC devices and other learning tools in the future, while creating monumental changes for neurodivergent learners in the present. Research efforts are only designed to capture a small window at a time of what the results are and what changes need to be implemented. My plan goal is to gradually expand the incorporation projects from K-5, 6th-9th, and eventually have programs covering K-12. To ensure productive incorporation throughout each of these phases, the research must delve into more specific, data-based studies and less generalized groupings.

References

Abby Barnes, M.S. (2024, March 22). How to get the right AAC device. Expressible. https://www.expressable.com/learning-center/speech-and-language-issues/how-to-get-the-right-aac-device

Alderton, M. (2024, January 18). Nurturing neurodiversity: How can we build a more neuro-inclusive society? Insight Digital Magazine. https://www.thechicagoschool.edu/insight/psychology/nurturing-neurodiversity-neuro-inclusive-society/

Beyond spoken words: Augmentative and alternative communication (AAC). HealthyChildren.org. (2023, October 10). https://www.healthychildren.org/English/health-issues/conditions/developmental-disabilities/Pages/augmentative-and-alternative-communication-for-children.aspx

Boudreaux, L. (2020, August 13). AAC: The big myth. Therapist Neurodiversity Collective. https://therapistndc.org/aac-the-big-myth/

Christner, R. W. (2024, March 8). Understanding and supporting neurodiversity in the classroom. *Psychology Today.* https://www.psychologytoday.com/intl/blog/living-psyched/202403/understanding-and-supporting-neurodiversity-in-the-classroom

Cook, A. (2024, March 11). Conceptualizations of neurodiversity and barriers to inclusive ... https://nasenjournals.onlinelibrary.wiley.com/doi/full/10.1111/1471-3802.12656

Donaldson, A. L., Corbin, E., & McCoy, J. (2021). “Everyone deserves AAC”: Preliminary study of the experiences of speaking autistic adults who use augmentative and alternative

communication. *Perspectives of the ASHA Special Interest Groups*, 6(2), 315–326. https://doi.org/10.1044/2021_persp-20-00220

Downey, D., Daugherty, P., Helt, S., & Daugherty, D. (2004). Integrating AAC Into the Classroom. *ASHA Leader,* 9(17), 6–36. https://doi.org/10.1044/leader.ftr2.09172004.6

Embracing an asset-based model of neurodiversity: challenges and academic supports. (2023, December 7). OSU Center for Teaching and Learning.

Garey, J. (2024, August 7). How schools can support Neurodiverse Students. Child Mind Institute. https://childmind.org/article/how-schools-can-support-neurodiverse-students/

Goulet, J. (2022, December 15). Stop asking neurodivergent people to change the way they communicate. Harvard Business Review. https://hbr.org/2022/10/stop-asking-neurodivergent-people-to-change-the-way-they-communicate

Higgins-Walsh, E. (2023, January 27). What is augmentative and alternative communication, and how can it benefit autistic people? undefined. https://www.autism.org.uk/advice-and-guidance/professional-practice/aug-alt-comm

Ibrahim, S., Clarke, M., Vasalou, A., & Bezemer, J. (2023). Common ground in AAC: How children who use AAC and teaching staff shape interaction in the multimodal classroom. Augmentative and Alternative Communication, 40(2), 74–85. https://doi.org/10.1080/07434618.2023.2283853

Quirk, F. (2024, September 26). *Becoming neurodiversity affirming: Listening to autistic people to inform our approaches with neurodivergent students in schools*. Alliance Against Seclusion and Restraint - Opening Doors to Safer and More Inclusive Schools.

https://endseclusion.org/2024/09/16/becoming-neurodiversity-affirming-listening-to-autistic-people-to-inform-our-approaches-wit

SDF. (2024, August 29). Autism, dyslexia, ADHD: How colleges are helping “Neurodivergent” students succeed. San Diego Foundation. https://www.sdfoundation.org/news-events/sdf-news/autism-dyslexia-adhd-how-colleges-are-helping-neurodivergent-students-succeed/

Villegas, T. (2021, March 17). Students with limited verbal capabilities can thrive in inclusive classrooms. Edutopia. https://www.edutopia.org/article/students-limited-verbal-capabilities-can-thrive-inclusive-classrooms