

Game Changer: Why Assistive Communication Devices Lead to Improvement in Students with Speech and Language Impairments

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Abstract

This paper explores the impact of Augmentative and Alternative Communication (AAC) devices on students with speech and language impairments. Central to this discussion is Scarlett, a child with a rare genetic disorder who communicates non-verbally as she transitions into the school system. The narrative highlights the pivotal role of AAC devices in enhancing communication abilities, promoting social inclusion, fostering academic success, and supporting greater independence among affected students. It addresses various AAC options ranging from low-tech solutions like Picture Exchange Communication Systems to high-tech devices such as speech-generating devices and eye-tracking technology.

The paper delves into the benefits these technologies offer, such as improved social interactions and increased academic engagement, while also confronting challenges like stigma, high costs, and accessibility issues. Through a review of literature, the paper underscores the necessity for tailored approaches to maximize the effectiveness of AAC devices in educational settings. It advocates for ongoing research and policy support to optimize these tools for students' needs, aiming to bridge the communication gap and enhance the educational experience for students with communication impairments.

Keywords: assistive communication devices, inclusion, technology, speech and language



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Vignette

Like many other children approaching kindergarten age, Scarlett was ready for kindergarten. Not everyone would agree that she was ready, however. As Scarlett was getting ready for her first day of school ever, she was excited. She was laughing and excited as her mom did her hair in the morning. Her parents, on the other hand, were nervous about Scarlett entering the school system. Scarlett's parents knew what made Scarlett happy, what scared her, and what made her angry, but it was through body language and visual cues. Due to a very rare genetic disorder, Scarlett is unable to speak words, she communicates through hand gestures, babbles, and sounds. They had concerns about how Scarlett would fit into the school system, and how other students and staff would react and interact with her. During intake meetings leading up to Scarlett starting school, the school-based team assured Scarlett's parents that they would work together to ensure Scarlett would participate in an inclusive school environment and would learn to use some assistive communication devices to communicate with others but also her peers and staff to communicate with her. As the meeting finished, her parents were still worried about the unknown regarding Scarlett's ability to communicate in a school setting, but they were hopeful...

Introduction

School-aged children communicate with other people hundreds of times a day. They rely heavily on communication, both verbal and non-verbal, through day-to-day interactions. From giving a quick smile as they meet someone walking down the hall to participating in classroom discussions, communication forms the backbone of learning and social integration in the school environment (Light & McNaughton, 2012). What can schools do for those students (like Scarlett) who are unable to communicate traditionally for one reason or another? Assistive communication devices, also known as Augmentative and Alternative Communication (AAC) devices are the support needed to make the school system an inclusive place to learn for students with speech and language impairments.

AAC devices are tools designed to support individuals with speech and language impairments in expressing themselves, understanding others, and participating more fully in their environments. These devices can range from simple picture boards to advanced speech-generating technology. Beukelman & Mirenda (2013) state that 'by bridging the communication gap, AAC devices enhance the quality of life, academic performance, and social interaction for users. This has a profound impact not only on the individuals using the devices but also on their peers, family, educators, and the broader community.

This paper will explore the different types of AAC devices available for students with speech and language impairments, the benefits they offer, the challenges associated with their use, and evidence-based practices that can maximize their effectiveness in supporting student learning and inclusion. By examining the theoretical implications of AAC research within educational and psychological frameworks, this study aims to highlight the transformative potential of AAC devices in creating inclusive educational environments where all students can thrive.

Guiding Questions

- What are the different types of assistive communication devices available for students with speech and language impairments?
- How do AAC Devices benefit students with speech and language impairments?
- What are some challenges associated with AAC Devices and how can they be addressed?
- What evidence-based practices or strategies can school professionals use to maximize the effectiveness of AAC devices in supporting student learning and inclusion?

Theoretical Implications

The theoretical implications of research on ACC devices extend significantly into the broader theories of education and psychology. These implications support but also expand on existing theories.

Vygotsky's Sociocultural Theory

Vygotsky's sociocultural theory emphasizes the importance of social interaction in cognitive development, stating that learning occurs through the mediation of language and social interaction (Vygotsky, 1978). ACC research supports this theory by demonstrating that AAC devices facilitate communicative interactions for students with speech and language impairments who might otherwise be excluded from learning and social experiences. Light and McNaughton (2012) speak to how ACC devices provide the means for individuals with speech and language impairments to engage in social interactions, resulting in them participating in the zone of proximal development where most learning occurs.

Bandura's Social Learning Theory

Bandura's social learning theory states that people learn from one another via observation, imitation, and modeling (Bandura, 1977). Research done on AAC devices extend this theory by proving that observation and imitation can be achieved through use of technology and not just human interaction. Ganz et al. (2012) show that students with speech and language impairments can learn new communication behaviors by observing others use AAC devices, effectively modeling behavior that improves communication and social inclusion. This challenges traditional views of Bandura's learning theory but incorporates technology assistance as a component of the social learning process.

Theories of Inclusive Education

Inclusive education theories advocate for adapting educational environments to meet the needs of all learners to fully participate in educational activities (Florian & Black-Hawkins, 2011). ACC research supports this by providing evidence that the use of AAC devices can remove barriers for students with speech and language impairments. McNaughton & Light (2013) explored how ACC technologies not only support the inclusion of these students in classrooms, but also improve their academic achievement and social interactions, thereby reinforcing the principles of inclusive education.

ACC research not only supports existing educational and psychological theories by providing practical applications that guide learning and communication but also challenges these theories to expand to incorporate the role of technology in human development and communication. These studies showcase the potential of AAC devices to be used in educational practices to ensure greater accessibility and inclusivity.

Literature Review

The use of Assistive Communication Devices (AAC) devices has been increasingly recognized as a vital intervention for students with speech and language impairments, providing them with essential tools to enhance communication, social interaction, and academic performance. Current scholarly literature emphasizes that AAC devices, significantly improve the communication abilities of students who otherwise struggle to express their needs and thoughts verbally.

Beukelman and Mirenda (2013) highlight that AAC devices not only facilitate basic communication but also promote more natural and meaningful interactions by allowing users to engage in conversations in ways that are personalized to their specific communication needs. This personalization is crucial for reducing the stigma often associated with using such devices, as it enables more fluid and less stigmatized interactions in various social settings (Light and McNaughton, 2014).

Overall, the scholarly literature underscores the transformative potential of AAC devices for students with speech and language impairments. While the benefits of AAC are well-documented, ongoing research is needed to continue improving device accessibility, reducing stigma, and enhancing the effectiveness of these tools in diverse educational settings.

Research Question 1: What are the different types of AAC devices available for students with speech and language impairments?

AAC devices can range from simple, non-electronic tools to sophisticated electronic systems designed to facilitate expression, interaction, and understanding (Beukelman & Mirenda, 2013). These devices range in complexity and design and can broadly be categorized into low-tech, mid-tech, and high-tech.

Low-tech AACs do not require batteries and have no electronic components, making them simple to use and maintain. These devices are normally used by students with milder communication impairments. Some examples include Picture Exchange Communication Systems (PECS) and communication boards or books. The PECS system uses pictures or symbols that the student can point to or exchange to communicate. PECS is often used with students on the Autism Development Spectrum and other communication difficulties (Bondy & Frost, 1994). Communication boards or books have pictures, symbols, words, or letters that the students can point to or touch to express themselves (Beukelman & Mirenda, 2013).

Mid-tech AAC devices are more advanced than low-tech but still relatively simple. They often have limited electronic components and pre-recorded messages. Clarke and Wilkinson (2019) describe voice output communication aids (VOCA) as devices that allow users to press a button or symbol to play a pre-recorded message. Some VOCAs come with limited vocabulary options while others can be customized to fit the user's needs. Referring to the vignette, Scarlett used switch-activated buttons that would play a pre-recorded message in kindergarten class during sing-along, she would hit a button that would "say a phrase" at a certain point of the song

High-tech AACs involve more complex technology. These devices are more sophisticated and are designed to meet the needs of students with more severe communication challenges and can be customized extensively to meet the needs of the users. Speech-Generating Devices (SGDs), Eye-Tracking Devices, and iPads and Tablets with AAC apps are the main examples of high-tech AACs.

SGDs convert text or symbols into spoken language, allowing users to communicate verbally. They often come with customizable vocabulary and voice options (Romski & Sevcik, 2005). Eye-tracking devices allow users to control a computer or AAC device using only their eye movements. Eye-tracking technology is beneficial for individuals with severe physical impairments who are unable to use their hands (Schlosser & Wendt, 2008). The improvement of mobile technology has led to the development of various AAC apps that turn standard tablets into powerful communication devices (Flores et al., 2012). High-tech AAC systems, such as eye-tracking devices, "allow for users to generate speech by controlling the device through gaze, providing them with greater independence and communication abilities" (Schlosser & Wendt, 2008, p. 220).

The range of ACC devices available for students with speech and language impairments allows for personalized and adaptive communication solutions. The

selection of the appropriate device depends on the individual needs of the student and the specific communication challenge they face.

Research Question 2: How do AAC Devices benefit students with speech and language impairments?

Enhanced Communication Abilities

AAC devices provide multiple benefits to students with speech and language impairments by enhancing their communication abilities. They allow individuals with speech and language impairments to express their needs, wants, feelings, and interests more effectively and provides a voice to those who might otherwise be unable to participate (Light & McNaughton, 2014). The customization features of high-tech AAC devices allow for personalization to fit the specific language needs and preferences of each user, as discussed by Beukelman and Mirenda (2013). This customization enhances the naturalness of communication for the user, making interactions more fluid and less stigmatized.

Enhanced Social Inclusion

Studies by Light & McNaughton (2012) have shown that students using AAC devices can experience significant improvements in social interaction. These individuals can form stronger relationships with peers, family, classmates, and community because of the access to improve their communication skills, which may help reduce social isolation. The use of AAC devices was shown to significantly enhance the quality of interactions between children with and without speech impairments, fostering greater inclusivity and acceptance with peer groups (Clarke & Wilkinson, 2008) and making interactions more fluid and less stigmatized (Beukelman & Miranda, 2013).

Increased Independence

Gaining the skills to use AACs to communicate, the users will develop increased independence which will empower the students to perform tasks, communicate what their needs and wants are, and make more decisions independently which fosters greater autonomy (Schlosser & Wendt, 2008). These AAC devices empower individuals by providing them with the means to initiate and control interactions with their environment providing greater self-reliance (Ronski & Sevcik, 2005). Mobile technology has allowed for readily accessible communication support for students to be able to communicate effectively in a variety of settings (McNaughton & Light, 2013).

Academic Engagement and Success

AACs are proving to be a game changer for students with speech and language impairments by providing opportunities to enhance academic engagement and success. For students who use AAC devices, these devices can support educational goals by enabling students to participate in classroom activities, complete assignments, and engage with academic content (Beukelman & Mirenda, 2013). A study by Caron et al.

(2016) showcased that those students using AAC devices showed improved engagement in classroom activities, which correlated with better academic performance. The ability to communicate effectively with peers and teachers helped bridge the gap between students with and without speech and language impairments.

Research Question 3: What are some challenges associated with AAC Devices and how can they be addressed?

Stigma

Students who use AAC devices at times may experience challenges related to stigma and social acceptance. The visible nature of these devices may lead to students feeling different or standing out from their peers and may lead to an unwillingness to use the devices in social situations (Light & Drager, 2007). This social stigma surrounding the use of AAC devices comes from society's views of disabilities and communication norms. The stigma may show through in various ways such as teasing and exclusion from peer groups. If a student is hesitant to use the device, it hinders their communication which may lead to feeling lonely or isolated, and these students may choose to remain silent rather than draw attention to them using AAC devices (Clarke & Wilkinson, 2008).

Education is one of the most effective ways to address the stigma of using AACs at schools. Schools can implement awareness programs that educate staff, students, and the community about the benefits of AAC devices that will lead to understanding and acceptance. According to Mirenda (2001), well-informed peers are more likely to interact positively with AAC users, which can reduce the feeling of stigma. Allowing classmates to see and use the AAC device and gain an understanding of its purpose may lead to some students attaching a stigma to using their AAC device. When other students see AAC users having academic success, and participating in extra-curricular and social activities, it challenges negative stereotypes and emphasizes the importance of all students, regardless of whether or not they have a speech and language impairment (Light & McNaughton, 2012).

High Cost

The cost of AAC devices, especially high-tech devices, is one of the major barriers for families and school divisions (Beukelman & Mirenda, 2013). It is not just the initial purchase cost of the device, but ongoing costs for maintenance, updates, and software subscriptions. Insurance coverage for families varies, with some plans providing partial coverage while others requiring a complicated process to secure funding which may discourage some families (Schlosser & Wendt, 2008). Schools can assign a professional to help families navigate the various paperwork, which may include seeking funding through grants or charities, that is associated with securing a device.

Accessibility

Light & McNaughton (2012) state that the accessibility of ACC devices can cause some challenges. Some of these accessibility challenges include access to AAC devices can be limited in rural and/or underserved regions due to a lack of nearby suppliers, specialists, and costs. The lack of specialists may delay customization needs as often AAC devices require customization to fit individual needs. Effective use of AAC devices requires training for users and the professional team assisting the student, and this training might not always be available promptly. Another accessibility challenge that Light & McNaughton (2012) discuss is that not all families have the same amount of technological literacy. Some students may need time to develop the skills to use the technology. This may become a barrier if they are not confident learning how to use the AAC devices. School staff, students, and other stakeholders may benefit from training and changes to educational practices (Schlosser & Wendt, 2008). Through the training, people will have the skills and confidence to use the device in a meaningful way to enrich the student's learning (Kent-Walsh & McNaughton, 2005).

Research Question 4: What evidence-based practices or strategies can school professionals use to maximize the effectiveness of AAC devices in supporting student learning and inclusion?

To maximize the effectiveness of AAC devices in supporting student learning, school professionals can adopt several evidence-based practices and strategies. Educators, school professionals, and support staff must receive adequate training to effectively implement AAC strategies in the classroom (Ronski & Sevcik, 2005). The success of the communication interaction between a student with a speech and language impairment is dependent on the communication skills of the other individuals participating in the exchange (Kent-Walsh & McNaughton, 2005). Mirenda (2001) agrees that effective ACC integration requires systemic training and commitment to ongoing support.

Implementing peer-mediated strategies encourages interactions between AAC users and their peers. Peer-mediated approaches have been shown to be highly effective in promoting the use and social acceptance of AAC. By involving peers in training and everyday activities, users of AAC are more likely to engage in meaningful interactions and develop stronger social networks within their educational environments" (Light & McNaughton, 2014).

The use of AAC devices should tie into all curricular activities. School professionals need strategies to incorporate AAC use into regular classroom lessons, enabling students who use AAC devices to participate fully in all learning activities. By addressing these factors, educators can enhance engagement and ensure meaningful class participation (Caron & Drager, 2016).

Transition programs, which prepare older students with disabilities for adulthood, also benefit from AAC applications. Kent-Walsh and McNaughton (2005) explore how AAC devices are used in transition settings to teach communication skills that are vital for employment and independent living. AC technologies are essential tools for imparting life skills to students transitioning to the adult world, providing them with the means to communicate effectively in diverse situations" (Kent-Walsh & McNaughton, 2005). This application demonstrates the versatility of AAC devices in adapting to the evolving needs of students as they grow older.

Future Research Recommendations

Although research in the use of assistive communication devices has expanded there are still some gaps that should be addressed. There is limited research tracking the long-term academic and social impacts of AAC use from early education through secondary education and beyond. Lund & Light (2009) participated in the first study to document long-term outcomes for individuals who used AAC. They acknowledged that 'the conclusions of this study are based on one small sample of seven young men with cerebral palsy who used AAC' (p. 296). One of the unique things about AAC is that it involves not only one specific intervention for all, but rather a range of technologies and interventions for individuals with a variety of impairments whose speech is not adequate to meet their daily communication needs and that is important to evaluate outcomes further for individuals who use AAC and have received different interventions (Lund & Light, 2009). Understanding how AAC devices impact students with various speech and language impairments can help tailor approaches to meet diverse needs.

Some other possible research recommendations are studying the impact on family and community. The effects of AAC devices go beyond the classroom and future research could examine how the devices affect family dynamics, peer interactions, and community participation. It would help in understanding the broader social implications of AAC use.

As technology continues to change and develop, research could be done to investigate the benefits of AAC devices being connected with things such as interactive learning platforms, AI, and virtual and augmented reality. Light & McNaughton (2014) state that less attention has been directed towards improving the design of AAC systems specifically to reduce the operational demands of the user and that 'future research is required to investigate the basic visual, cognitive, linguistic and motor processing demands of ACC systems' (p. 10) to improve the user interface for the students.

Key Takeaways

- AAC devices are pivotal in enabling students with speech and language impairments to express their thoughts, feelings, needs, and wants more

effectively. This improvement in communication skills is essential not only for personal expression but also for academic success and social integration.

- AAC devices significantly contribute to social inclusion by allowing students to interact more seamlessly with their peers. The ability to communicate effectively reduces barriers to participation in group activities, fosters relationships, and enhances the overall school experience for students with communication impairments.
- By facilitating communication, AAC devices enable students to more actively participate in classroom discussions and access educational content. This engagement is crucial for academic achievement and helps to bridge the educational gap between students with and without speech and language impairments.
- Several challenges associated with AAC, such as stigma, cost, and technical issues, and suggests practical solutions to address these problems. Increased awareness and education, financial support, and robust training for both users and educators are critical for maximizing the effectiveness of AAC devices.

Conclusion

AAC devices are transformative tools for students with speech and language impairments. These devices not only enhance communication, but also foster social inclusion, improve academic achievement, and increase independence. Despite the challenges associated with their use, including cost and accessibility barriers, the benefits of AAC devices far outweigh the difficulties.

As AAC technologies continue to advance, their potential to improve the lives of students with speech and language impairments will only grow. It is essential for educators, policymakers, and researchers to continue to support the development and implementation of AAC devices in educational settings, ensuring that all students have the opportunity to be successful.

Acknowledgments

In the development of this conference paper, I integrated Artificial Intelligence, specifically ChatGPT, in several capacities to enhance the research and writing processes. Initially, ChatGPT served as a brainstorming tool, assisting in generating foundational ideas and relevant examples, which provided a structured basis for the initial draft.

Subsequently, I utilized ChatGPT to refine the content, utilizing its suggested improvements for different sections of the paper. This iterative feedback mechanism was vital in enhancing the clarity, coherence, and overall quality of the manuscript.

Importantly, while ChatGPT facilitated the initial ideation and refinement phases, the substantive scholarly content was developed through research. I conducted extensive literature reviews to ensure the paper was grounded in credible academic work.

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Conflict of Interest

The author does not declare any conflict of interest.

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