Assistive Technology Resources for Children and Adults with Disabilities

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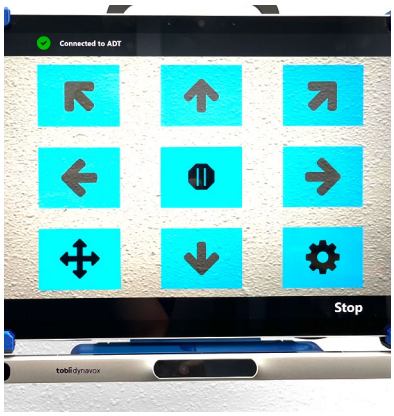

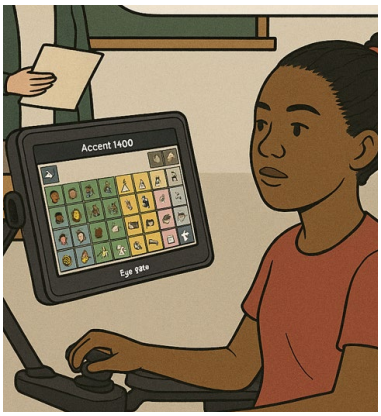

Adapting the Playbook:
Structuring Adapted PE for Joyful Play

Summary: This article will detail creative strategies an Adapted Physical Education (APE) teacher will implement to engage students with complex support needs in physical activities, particularly around a Super Bowl theme. It will highlight challenges in traditional PE for students with disabilities and will offer low, mid, and high-tech adaptations, including switch-adapted equipment and unique party games. The core message will emphasize fostering participation, skill development, and joy through inclusive play, ensuring every student can experience the thrill of sports

Philadelphia, Pennsylvania: home of the Philadelphia Eagles, the 2025 Super Bowl LIX Champions, and a unique and passionate "phanbase" (see what I did there?). Eagles fans are a different breed. They embody a level of dedication, determination, unbridled joy, and intensity not seen in other fans. This is also true for the students at my school with complex support needs.

The student population at HMS School for Children with Cerebral Palsy in Philadelphia, PA, consists of students aged 5 to 22 years old who have complex, multiple disabilities, typically resulting from cerebral palsy, traumatic brain injury, or other neurological impairments. Every student relies on a wheelchair for mobility, utilizes augmentative and alternative communication (AAC) systems to express themselves, and uses assistive technology to access their environment.

As an Adapted Physical Education (APE) teacher, my role necessitates creative adaptations of popular events, such as the Super Bowl, to ensure active engagement and meaningful participation for all students. This year, I wanted my students to be actively engaged during PE groups, our Super Bowl pep rally party, and our post-victory celebration. This article will focus on a football theme; however, most of the activities discussed could be tweaked to fit a variety of themes. Fly, Eagles, Fly!

FROM NON-FOOTBALL FAN TO ADAPTED PE ENTHUSIAST

Historically, I have not been a very big football fan (or, frankly, a fan of any professional sports). My transition into leading our PE groups, as well as my own teenager's love of sports, has forced me to explore these sports in a more nuanced way. I've made it my role to try to see the joy they bring others and experiment with ways to adapt and design activities that bring engagement and fun to my students. Occasionally, I have to text my 17-year-old and ask for the proper terminology or rule nuance (who knew hitting the goal post was called a "donk"!?), but even he has commented that my questions are "no longer stupid" and show that I have begun the process of starting to understand the fundamentals of the games. For my students, it is all about finding ways for them to be able to interact, engage, and learn through play. And I am fortunate to get to learn alongside them every day.

THE CHALLENGES OF TRADITIONAL PE

Traditional PE programs often rely on standardized activities, equipment, and teaching methods. This one-size-fits-all approach can present significant challenges for students with complex needs, such as physical or motor impairments, intellectual disabilities, sensory processing differences, or visual impairments.

TERESA GIARDINA, M.Ed. (she/they) has spent more than ten years championing inclusive play at HMS School for Children with Cerebral Palsy. Teresa's diverse professional background, from paraprofessional to education administration, underpins her expertise in DIY assistive technology and creating joyful, engaging learning environments. She actively shares her innovative adapted play strategies at national conferences and on the Instagram account @Adapt_Play_Connect (co-founded with Courtney Grimes), continually seeking new ways to connect and empower. Outside of school, Teresa officiates roller derby and enjoys exploring her community.

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Common barriers include:

- **Inaccessible Equipment:** Standard sports equipment may be too large, too heavy, or require fine motor skills that some students may not possess.
- **Lack of Adapted Activities:** Traditional games and sports may not be easily modified to accommodate diverse abilities, limiting participation and engagement.
- **Limited Teacher Training and Confidence:** Educators may lack the training and resources to effectively adapt activities and integrate AT, leading to feelings of uncertainty and a reluctance to include students with complex needs fully.
- **Environmental Barriers:** The physical environment of the gym or playing field may present obstacles, such as uneven surfaces, limited space, or sensory overload.

These barriers can lead to students with complex needs being excluded from PE, either through direct exclusion or by being relegated to passive observation. This lack of participation has significant consequences, impacting not only physical development but also social-emotional well-being, self-esteem, and overall quality of life. Every student, regardless of ability, deserves the right to play (Liberman et al., 2002). Access to play and leisure is crucial for development at all ages (Nestor & Moser, 2018).

All students at my school participate in Adapted PE. As their teacher, I control the scope, sequence, and curriculum for our groups. I have the flexibility and autonomy to pivot based on student interest, current events, weather, or material availability, which is not always the case when pushing into a general education PE group. However, even within this population, each student may require different supports to be successful and make progress. Through this article, I will start with low/light-tech adaptations and move along to mid- and high-tech adaptations and include some non-traditional, sports-related activities we had at our Super Bowl party.

THE POWER OF PLAY AND COMMUNICATION IN PE

PE is an ideal time for encouraging all kinds of multi-modal communication. Whether it's on-topic or off-topic, students often use their voices or communication devices in the heat of the game, and that's okay! Laughter and joy abound during PE games, often inspiring students to make unique utterances, even if those utterances aren't typical PE vocabulary. We embrace it all, and it adds to the fun! Additionally, I have found that some students are highly motivated by a little friendly trash talk. Some students will compose their own cheering or jeering messages on their communication devices, and others will enthusiastically activate a recorded switch to share some thoughtful insights such as "that's all you got?" or "woo-hoo," or "whomp, whomp!"

TACKLING THE BARRIERS WITH PHILLY SWAGGER

Alright, let's tackle those barriers with a bit of Philly flair! Now, we all know that trying to fit every student into a "one-size-fits-all" PE program is like trying to fit a square peg into a round hole – it just ain't gonna work. We're talking about hurdles that can sideline even the most determined athletes, like equipment that feels more like an immovable object than a friendly football, or activities that seem designed for a different planet. And let's be honest, sometimes teachers feel like they're trying to assemble a complex piece of furniture without the instructions when it comes to adapting activities. We need to "Eagles-ize" our approach, making sure everyone gets a fair shot at the end zone.

But here's the kicker: we're not just aiming for participation, we're going for a Super Bowl-level performance. It's about building a team where every student feels like an MVP, not just a spectator on the bench. We're going to create a culture where inclusion isn't just a buzzword, it's a touchdown dance. We'll be working on our "Eagle Eye" to spot barriers and then blitzing them with creative solutions. So, get ready to "Fly, Eagles, Fly" into some seriously fun, adapted football activities that'll have everyone feeling like they just caught a game-winning pass from Jalen Hurts.

NOTE: For those looking to dive deeper into these adapted activities, a comprehensive resource Padlet has been created. This Padlet serves as a one-stop shop, offering a detailed materials shopping list to ensure you have everything needed, photos and videos showcasing the games in action, and step-by-step instructions for each activity. Additionally, you'll find contact information for further inquiries, and even more resources to support your adapted PE endeavors. Whether you're a seasoned adapted PE teacher or just starting out, this Padlet is designed to provide you with the tools and information necessary to create inclusive and engaging experiences for all your students. https://padlet.com/tgiardina/flyeaglesfly

LOW/LIGHT-TECH ACTIVITIES

- **Body Part Isolation:** During this activity, students first chose different body parts to place an inflatable football on (feet, hands, lap, etc.), then worked to isolate that body part to knock the football to the ground. A package of multiple inflatable footballs enabled everyone to participate simultaneously. Students were able to choose the body part using their voice, their communication device, by moving the part of the body they wanted to use, by rolling a die with body parts on each side, etc. The game complexity could be increased by asking students to balance the ball for an amount of time before knocking it down. This activity required no adapted materials and was used across the spectrum of student abilities.
- **Beach Ball Pop:** Using a slightly deflated beach ball (in this case, a football-shaped beach ball) and a foam football (stress ball) to engage in a throwing/tossing activity. The slightly deflated beach ball is placed on a table, tray, or lap; then, the foam football is placed on top. Using a gross motor arm

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action, the beach ball is compressed, sending the smaller football flying! This can be a big "bang-for-your-buck" activity, as the flying ball will sometimes go so high it hits the ceiling! For an added challenge, students can also work on aiming the ball at a target or receiver. This activity does not require anyone to build anything.

MID-TECH ACTIVITIES

- **Catapulting Footballs:** Now we are getting into some building. This is a catapult activity that can be done with a variety of different types of catapults. The catapults could be store-bought, custom-made, 3D printed, etc.
- **Slap Koozie Catapult:** The slap koozie catapult is cheap and easy to make using a slap koozie. A slap koozie is a drink koozie designed to quickly form around a bottle or can. Inside the neoprene rectangle are two slap bracelets. When the slap koozie is pulled in the opposite direction it is intended to go, it creates a spring-back catapult action. For this catapult, I like to attach Velcro to one end and some kind of holder to the other end for the ball. I use a slant board, Velcro the catapult onto the board, pull back, load up a ball, and let it fly. You can add adaptations such as a strap to hold down the loaded catapult and use a small strap, industrial twist tie, or other apparatus to pull back on the strap, thus firing the catapult. For football catapulting, I like to set up this game on one end of a table and set up a field goal at the other end. The field goal could be made of PVC pipes or pool noodles. I also found a Mylar balloon field goal that worked very well for this and other field goal activities. The same basic setup works with any catapult.

HIGH-TECH ACTIVITIES

- **Leaf Blower/Blower Fan Throwing:** Another way to throw a football is using a PowerLink, a fan or leaf blower, and an inflatable football. A PowerLink enables anything that plugs in with a dedicated on/off feature to be switch-accessible. Setting up a leaf blower or strong fan with a stand and an inflatable football can make throwing (or kicking) the football accessible to switch users. The inflatable football is preferred to a regular or Nerf football because it is lighter and more easily thrown by the fan/leaf blower. Some additional ways to enhance this activity include altering the switch access for different skills. For instance, if working on kicking, then use a wobble or string switch and tie on a football. The student can then kick that football, and a small movement can activate the leaf blower and launch the inflatable football a long distance. If working on throwing, then the switch might have a football on it, and the student could use their hand or another appropriate switch location to activate the blower. Altering the switch access so that the student is interacting with a football and not just a flat plastic switch is another enhancement to this activity.
- **Balloon Variation:** A variation on this activity uses a smaller stress ball football and helium balloons. Tie the helium balloons to the small football (ideally, these would be football-shaped Mylar balloons). This will create more lift as the small football flies. This is a great activity for a blower (especially from a smaller bounce house) to use as the propellant. The blower is typically quieter than a leaf blower. I like to add a tube to the blower. This could be a 4-inch PVC pipe or a cardboard tube from carpet or sheet linoleum (the cardboard tubes are great if you can get them from a business that is going to recycle them anyway; they are lighter and easier to cut and easier to decorate than PVC, but PVC also works). Place the football tied to balloons inside the tube. Then students activate the blower, and the football and balloons fly out. The balloons will often catch some air and do some very cool flying, and they head towards the goal and/or receiver. The balloons also slow the descent of the football, adding more time that someone can try and catch the ball or simply allowing more time to visually track the ball through the air.
- **Switch-Adapted All-Pro Passer Robotic Quarterback:** The All-Pro Passer Robotic Quarterback is a battery-powered toy that throws a football using compressed air. It is possible to switch-adapt this toy. It must be opened, and a switch port wired in. While this is a more advanced switch adaptation (because it is not a simple on/off switch), it is totally worth it! Once switch-adapted, this robotic quarterback will rival any quarterback in its force! The ball is placed on the launcher and then locked into place with a button press. Next, the air must be manually pumped to create pressure. This can be difficult, and as the pressure increases, pumping becomes more difficult. During this activity, some students were able to pump independently, some with assistance, and others chose a number of pumps that a staff member did. After the robotic quarterback is set up (ball on, locked in, pumped up), the switch user can activate the quarterback, sending the ball flying! If using inside, I would recommend never pumping more than one-third of the way because otherwise things might break!
    - **Important Note:** Opening and modifying electronic toys can be complex and may void any warranties. If you are not comfortable with electronics, seek assistance from someone experienced in switch adaptation or electronics repair.
- **Goal Posts, Receivers, and Moving Targets:** Now that we have lots of ways to throw, we need to discuss what we are throwing at/towards! I found a very large Mylar balloon goal post. This worked perfectly for a lot of the throwing activities previously described, bonus is it's yellow like a real goal post. I used a balloon inflator (and PowerLink and switch) to have students inflate the large Mylar goal post, and then we were able to use it for multiple sessions. Another option is to throw

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it toward another student or staff member and get them to catch the ball, which is always fun (especially when a staff member misses!). Students can choose who to throw it to and maybe even someone to run interference! Want to take it up a notch? Using a moving target can really increase the fun and engagement. I like to use a motorized Nerf-style target. These move back and forth on their own (no real rhyme or reason to their movements!). Instead of the target design included, I place a shirt or jersey over the frame and add a football helmet (usually just a picture of one), and then we have our own moving receiver! It's fun to try and time the toss to hit the motorized receiver whose movements are unpredictable!

SUPER BOWL PARTY ACTIVITIES

At our Super Bowl Pep Rally Party, I wanted some additional activities that we had not explored during adapted PE groups. I included a photo booth, two different surveys, a "decipher the symbols" Super Bowl-themed game, and an an opportunity to throw snowballs at Travis Kelce.

- **Photo Booth:** For the photo booth, I hung up a green background. Using a green screen enabled me to go back and edit students directly into the stands, the halftime show, or directly onto the field! We had props and balloons available to add into the photos. I set up an iPad on a stand which gave a larger screen for students to visually see where they were in the frame before taking pictures. I used a Bluetooth selfie button (that I had switch-adapted) for students to take their own pictures. Even without adapting the selfie button for a switch, it works as a remote control for pictures. There are some low-tech adaptations one can use for the selfie button as well, including adding small bumper dots (like the ones for cabinets) onto the button to make it easier to find and press.
- **Surveys:** I set up two surveys for students and staff to answer. I used icon symbols to fill in the answers and create a bar graph chart that students could later analyze. The questions were "Who do you think will win the Super Bowl?" with the options of the Philadelphia Eagles and the other team (j/k Kansas City Chiefs). The second question was "What is your favorite part of the Super Bowl?" with the options of the football game, the commercials, the halftime show, or snacks. This activity prompted conversations. Students were able to use a variety of means to answer the questions, e.g., their communication devices, eye gaze, partner-assisted scanning, pointing, etc. It also created an artifact that could be used later in lessons to discuss the graph, the predictions, the trends, etc.
- **Symbol Deciphering Game:** I also created a game using communication symbols where students and staff had to decipher the football term. For example, a picture of a field and a picture of a goal for "Field Goal," or a picture of touch and a picture of a downward arrow for "Touch Down," or a picture of a fly then some eagles and then another fly for "Fly, Eagles, Fly," or my personal favorite, a picture of brothers and push for "Brotherly Shove" (another variation has a picture pointing to someone's backside and push for "Tush Push"). People were able to see the unlabeled images only; the answers were covered up, and they made their guesses together before lifting the flap covering the answer and seeing if they were correct.

END ZONE

In conclusion, adapting traditional physical education activities to meet the diverse needs of students with complex support needs is not only possible but also profoundly rewarding. By embracing creativity, utilizing readily available materials, and incorporating assistive technology, educators can transform seemingly inaccessible activities into engaging and meaningful experiences. The football-themed activities described in this article, from simple body part isolation to the switch-adapted robotic quarterback, demonstrate the power of adaptation in fostering participation, promoting skill development, and sparking joy. Furthermore, the inclusion of party activities like the green screen photo booth and interactive surveys highlights the importance of creating inclusive and celebratory environments. Ultimately, by prioritizing accessibility and embracing the spirit of play, educators can empower all students to experience the thrill of sports and the excitement of shared events, ensuring that every student, regardless of their abilities, has the opportunity to fly high, just like their beloved Philadelphia Eagles.

REFERENCES

Liberman, R. P., Kopelowicz, A., Ventura, J., & Gutkind, D. (2002). Operational criteria and factors related to recovery from schizophrenia. *International Review of Psychiatry, 14*(4), 256–272.

Nestor, O., & Moser, C. S. (2018). The importance of play. *Journal of Occupational Therapy, Schools, & Early Intervention, 11*(2), 247–262. ■

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TOLT TECHNOLOGIES

Mobility Through the Eyes:

The Innovation Behind Ability Drive®

The ADT is the "Bridge" between the eye-gaze device and the powered wheelchair.

Summary: This article explores the development, technology, and real-world impact of Ability Drive®, an eye-gaze-powered wheelchair system. It begins with the clinical foundation for alternative drive controls, then explains how the system works and highlights safety features and customization. The importance of independent seating adjustments is also addressed. Through user stories and caregiver insights, the article illustrates the system's life-changing effects and concludes with practical guidance on access, support, and funding.

Imagine navigating your world with only your eyes, turning toward a friend, moving from the kitchen to the living room, or tilting back to relieve pressure. For individuals who can no longer use their hands, these everyday actions aren't simple gestures; they're milestones of independence. That's what Ability Drive® makes possible. Using eye-tracking technology, it enables users with severe motor impairments to drive a powered wheelchair, adjust seating positions, and reclaim autonomy over their environment. For those living with ALS, cerebral palsy, spinal cord injuries, and other complex conditions, it's not just about movement, it's about choice, dignity, and participation.

WHY EYE-GAZE MATTERS: THE CASE FOR ALTERNATIVE DRIVE CONTROLS

Approximately 10% of powered wheelchair users depend on alternative drive controls—such as sip-and-puff systems, head arrays, chin controls, or eye-gaze interfaces—because they cannot operate a traditional joystick (Borg et al., 2021; Fehr et al., 2000). Clinical research and field-based evaluations continue to demonstrate the value of these technologies in providing essential access and mobility for people living with complex physical disabilities (Andrich et al., 2013; Wand et al., 2019).

AUSTIN HOWELL, earned his degree in Psychology from Calvin College, where he also studied Business and developed a person-centered approach to both work and life. This perspective continues to shape his role in Technical Support and Testing at Tolt Technologies, where he helps ensure the safety, reliability, and usability of assistive technologies like Ability Drive®. He is committed to advancing mobility justice through tools that promote independence and support individual autonomy. Austin is also motivated by a belief in idea meritocracy and a desire to improve systems, products, and businesses in ways that address real human needs. He lives in Duvall, Washington, and enjoys learning about emerging technologies and playing pickleball in his free time.

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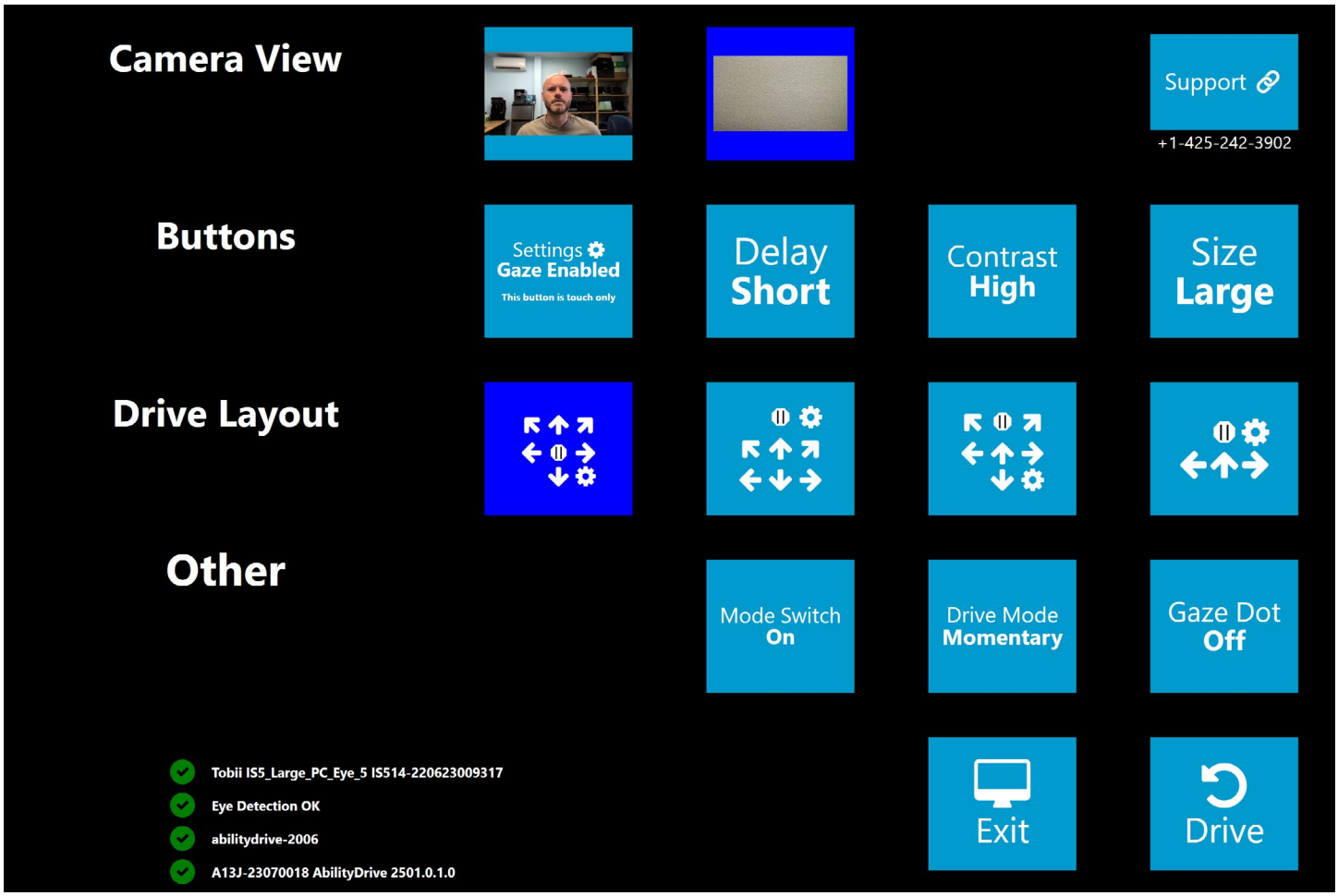
A pilot study by Elliott et al. (2019) confirmed that individuals with amyotrophic lateral sclerosis (ALS) could safely and reliably navigate a powered wheelchair using only their eyes, reporting high satisfaction and usability. Building on this evidence, Tolt Technologies offers a commercially available solution through ongoing collaboration with durable medical equipment (DME) providers and Assistive Technology Professionals (ATPs). Supporting hundreds of Ability Drive® evaluations each year, we've seen firsthand how the system restores meaningful mobility to individuals with complex motor impairments. It enables them to navigate using what is often their last remaining voluntary movement: their eyes.

THE TECHNOLOGY BEHIND ABILITY DRIVE

Eye-gaze technology has emerged as a transformative advancement in assistive technology, offering individuals with severe motor impairments an intuitive way to communicate, control their surroundings, and be more mobile. These systems use infrared light to track eye movements with precision, projecting near-infrared light onto the eyes and capturing reflections with specialized cameras. By analyzing the corneal reflection and pupil position, the system calculates the user's point of gaze in real time (Tobii, 2022). For individuals who cannot use their hands or voice, including those with ALS, cerebral palsy, or spinal cord injuries, eye-gaze provides a non-invasive, highly responsive input method for augmentative and alternative communication (AAC) devices, as well as for operating powered wheelchairs and other essential assistive tools. This combination of communication and control restores significant autonomy and personal agency in everyday life (Majaranta & Räihä, 2002; Ates et al., 2021).

Ability Drive® converts eye movement into functional mobility through an integrated system of five components: (1) the Ability Drive® app, which displays a forward-facing camera view with a semi-transparent directional button overlay, allowing users to see both their controls and the path ahead; (2) the ADT (Ability Drive® hardware interface), a compact microcontroller that connects a compatible eye-gaze device to a powered wheelchair via an alternative drive input; (3) a supported eye-gaze device, such as a Tobii Dynavox I-Series, Smartbox GridPad, Tolt Technologies A13J, or other models listed on Tolt's compatibility page; (4) a secure mounting system, like those from Mount'n Mover or Rehadapt, to ensure proper positioning, visibility, and user comfort; and (5) a Class 3 powered wheelchair capable of supporting alternative drive inputs. Together with wheelchair programming



App settings menu where users can configure aspects of the drive screen.

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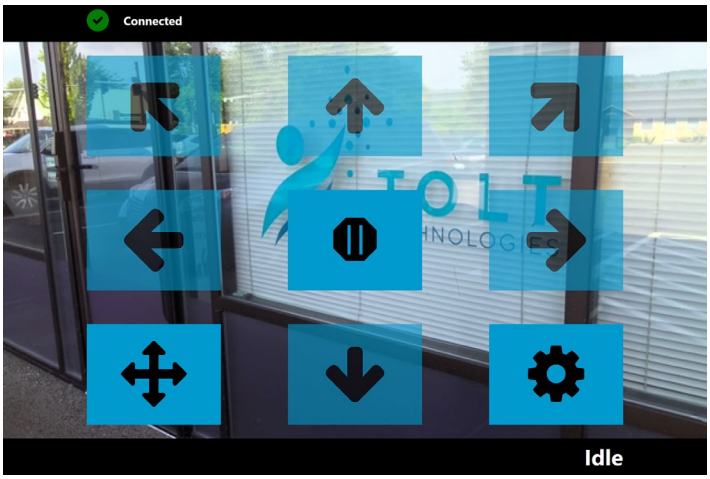

App drive screen with semi-transparent button overlay.

by an ATP, these components allow users to navigate their environment safely and confidently using only their eyes

While the Ability Drive® system includes several essential hardware components, the primary point of interaction for users is the software, the Ability Drive® app. Designed with a simple and intuitive interface, the app features two screens: the drive screen and the settings menu. On the drive screen, directional arrows activate instantly when looked at, enabling instinctive control of the powered wheelchair. Additional buttons—pause, settings, and mode switch—support essential non-driving functions. For users who demonstrate proficiency with eye-gaze navigation and a high level of driving skill, ATPs can choose to enable a semi-latched feature within the app. Semi-latched allows the chair to continue in the last selected direction as the user's gaze moves between drive arrows until a new command is given, offering smoother, more fluid navigation.

The settings menu allows users and clinicians to tailor the interface to individual needs and preferences, including options to toggle between forward or rear-facing camera views, adjust dwell-to-click timing for non-drive buttons, and customize button appearance through contrast levels, sizes, layout configurations, and gaze dot visibility for tracking feedback. The mode button, which enables access to power seating adjustments, can also be turned on or off depending on user needs. These features deliver a personalized, responsive experience while preserving a simple, easy-to-use interface.

SAFETY FIRST: A PRIMARY DESIGN PRINCIPLE

Safety is at the forefront of Ability Drive®'s design, ensuring users can confidently operate their powered wheelchair with minimal risk. The system incorporates an advanced, patented safety mechanism (U.S. Patent No. 12,204,687) that quickly halts the wheelchair when certain conditions are met, preventing unintended movement. While users have the ability to stop the wheelchair by closing their eyes, looking off-screen, gazing in the margins between the drive buttons, or activating the pause button, the system also stops the wheelchair under unexpected conditions, such as a disconnection between system components, like the ADT and eye-gaze device, or the eye-tracker and the app. In such cases, or whenever communication is lost between the user's eyes and the powered wheelchair, a stop command is sent within a second, ensuring the chair comes to a safe stop as quickly as possible.

In addition to the built-in safety controller in Ability Drive®, a "buddy button" or stop switch is recommended to power off the wheelchair, adding an extra layer of safety and allowing a caregiver or family member to stop the wheelchair manually in the event of an emergency. Together, these features provide a comprehensive, fail-safe system that prioritizes user safety, giving individuals the freedom to regain mobility without compromising their security. With over one million driving sessions completed, Ability Drive® systems have proven reliable, providing users with peace of mind and control while navigating with their eyes.

Alternative profile programming on the power wheelchair also plays a role in safety, particularly in how the chair decelerates. ATPs should tailor drive profiles to match the user's environment, familiarity with their chair, and level of experience with eye-gaze navigation. This is especially important when semi-latched mode is enabled, as it allows continuous movement between commands and may require additional user training or clinician oversight.

To ensure the reliability and safety of Ability Drive®, each app version undergoes rigorous testing through an iterative process. This meticulous approach identifies and resolves potential issues, ensuring a stable and dependable user experience. Recognizing the diversity of assistive technology setups, extensive testing is also conducted across all compatible eye-gaze devices and their native software. This thorough evaluation ensures compatibility and optimal performance across different hardware configurations, reinforcing Tolt Technologies' commitment to user safety.

SEATING: RESTORING AUTONOMY IN DAILY POSITIONING

While hands-free driving is the hallmark feature of Ability Drive®, its support for independent seating adjustment is equally essential and frequently praised by users. With a simple activation of the mode button in the app, users can switch from drive mode to seating mode. This transition is confirmed on the power wheelchair's OMNI2 or Enhanced Display, which visually highlights the section of the chair available for adjustment. Users can scroll through seating options using the left and right arrows, then modify the selected section by gazing at the up or down arrows. Once the desired position is set, reactivating the mode button returns the system to drive mode. This functionality requires the mode button to be enabled, which can be done once the OMNI2 or Enhanced Display is properly mounted near the eye-gaze device and within the user's line of sight.

App drive screen accessing seat functions via the mode switch.

This seamless integration allows users to reposition themselves independently, enhancing comfort and autonomy without relying on caregiver assistance. That independence matters. Research shows that caregivers of individuals with severe motor impairments, especially those who are non-verbal, immobile, or have tracheostomies, face substantial physical and emotional strain. Tasks such as adjusting seating positions can be frequent, time-consuming, and interruptive to other responsibilities. Jones et al. (2012) found that dependence in daily activities like these contributes significantly to caregiver burden. Likewise, Rushton et al. (2017) reported that caregivers of powered wheelchair users often experience psychological stress related to safety concerns and the need for constant availability. Pousada et al. (2018) found that over 70% of caregivers supporting individuals with neuromuscular diseases experience burden that negatively affects their well-being.

By enabling users to manage seating adjustments through eye-gaze alone, Ability Drive® reduces the frequency and urgency of these caregiving tasks. The result is not only increased user independence, but also reduced caregiver workload, supporting a more balanced and sustainable caregiving relationship.

SUCCESS STORIES: WHERE THE RUBBER MEETS THE ROAD

A powerful illustration of Ability Drive®'s impact comes from Donnie Graham, a former engineer who lived with ALS in Portland, Oregon. After becoming quadriplegic and reliant on non-invasive ventilation, Donnie adopted an early version of Ability Drive® in 2019 to regain control over his power wheelchair using only eye-tracking. According to his wife and primary caregiver, Jan Steinbock, the technology provided more than just mobility. It restored a sense of independence and dignity in daily life. Using eye-gaze, Donnie was able to navigate their home and make subtle, frequent adjustments like turning to face a conversation or looking out the window, actions that would have otherwise required assistance. He also operated his chair's tilt, recline, and leg elevation functions, essential for comfort and health management. For Jan, the impact extended beyond Donnie's autonomy; it eased her physical and emotional burden as a caregiver, giving her peace of mind and allowing others to engage with Donnie more directly. As she described, "It's all these little moments during the day... they make a huge difference for a caregiver" (J. Steinbock, personal communication, May 8, 2024).

The benefits of Ability Drive® are also evident in the experience of Melissa Kelbley, a working professional in an office leadership role, living with type-2 spinal muscular atrophy. As her condition progressed, conventional driving systems like joysticks, mini-joysticks, and fiber-optic switches became less

Melissa Kelbley, an early adopter of Ability Drive.

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effective, limiting her independence and ability to work. Melissa recalled being hesitant at first but was quickly impressed: "Even in the clinic where I tried it, I was moving more freely than I had in years!" Ability Drive® enabled her to continue living independently and leading her office team without relying on others for support. "I am able to operate as the lead in the office without the assistance of others for 95% of the work," she said. For Melissa and her support network, the system reduced anxiety and allowed her to engage more confidently in public and professional settings (Kelbley, personal communication, May 18, 2025).

In Denmark, the transformative potential of Ability Drive® is also evident in the experiences of Tasja and Andreas, two individuals whose lives have been changed by the technology. Tasja, the first person in Denmark with progressive generalized dystonia and cerebral palsy to independently control her powered wheelchair with her eyes, describes the experience as a "liberation." Installed by Aabentoft at the end of 2023, Ability Drive® allowed her to move and reposition herself freely, enhancing her independence and quality of life: "I used to feel like my wheelchair was a shackle, but Ability Drive® has taken that away" (A. Lund Kobberø, personal communication, May 5, 2025).

Similarly, 17-year-old Andreas Witt Demant, who had long relied on a head-controlled 0/1 switch, found new excitement in independent driving. Prior to using Ability Drive®, driving was difficult and often led him to relinquish control to caregivers. With the new system, however, his desire to drive returned. "It's so magical to see him whizzing around," his parents shared. His curiosity blossomed, stopping to look at details others might pass by, exploring off-road, and taking full advantage of his environment. The intuitive control and seamless integration with his communication device gave Andreas smoother movement and an easier everyday experience (Aabentoft, 2025).

YouTube Video - Tasja driving in the Aabentoft offices in Denmark.
https://www.youtube.com/watch?v=d725PkX9h5U

Andreas Will Demant, in his home in Denmark.

YouTube Video - Andreas Will Demant, navigates his home in Denmark.
https://www.youtube.com/watch?v=TNllEemo4HU

TECH SUPPORT: A PERSONAL NOTE

As a technical support liaison, I work closely with clients, families, ATPs, and clinicians, and I've seen firsthand how Ability Drive® improves people's lives in tangible ways. Whether it's the relief of adjusting one's own seating or the pride of navigating independently, these moments reflect more than just technical

success; they represent freedom. Anything that lowers the barrier to autonomy and gives people the ability to move through the world on their own terms is deeply meaningful. That impact comes through clearly in how users and caregivers describe the difference Ability Drive® makes in their daily routines.

I often hear from caregivers and family members as well, who appreciate what it means to have one less task to manage. When someone can reposition themselves or navigate their home without asking for help, it's not just a technical win; it's a meaningful shift in daily dynamics. It lightens the caregiver's responsibilities and restores a sense of independence, comfort, and personal agency for the user. These moments may seem small, but they add up to a substantial improvement in quality of life. Most of us take for granted how often we shift in our chairs or change posture throughout the day. For our users, being able to do that with their eyes brings back a feeling of normalcy and self-direction, something many of us never have to think twice about.

FACING COMPLEXITY, DELIVERING INDEPENDENCE

Ability Drive® represents more than just a technological innovation, it's a tool that restores independence, dignity, and choice to individuals with severe physical disabilities. By enabling users to control their power wheelchair with their eyes, Ability Drive® opens a path to greater mobility, self-determination, and participation in daily life and work.

Developing and supporting a solution like Ability Drive® comes with significant challenges. Integrating an app with various eye-gaze devices, each with its own hardware, software, and calibration systems, requires extensive coordination and testing. The diversity of power wheelchair models, configurations, and alternative drive inputs adds yet another layer of variability. Working in the accessibility space means confronting these challenges head-on, often tailoring solutions to meet highly individualized needs. But it is precisely this complexity that makes the success of Ability Drive® so impactful. Every system delivered, every configuration solved, and every user who gains independence reflects the dedication behind the product.

Despite these challenges, the system's design prioritizes safety, ease of use, and compatibility, backed by a rigorous testing process and personalized support from experienced distributors. Whether a user is navigating independently for the first time or regaining mobility after years of dependence, Ability Drive® helps make those moments possible.

COST, ACCESS, AND FUNDING

The Ability Drive® hardware interface (ADT), which includes access to the app, has a manufacturer's suggested retail price (MSRP) of $8,600. A complete system also requires a compatible eye-gaze device, mounting hardware, and a Class 3 powered wheelchair capable of alternative drive controls. To request a trial or purchase the system, individuals and clinicians should contact an authorized distributor listed at www.tolttechnologies.com.

Ability Drive® may qualify for reimbursement through insurance, disability grants, or nonprofit programs. Funding eligibility varies by location and insurance provider, so we encourage clinicians and ATPs to explore local resources. Tolt Technologies is a woman-owned company committed to advancing independence through socially motivated innovation. With U.S.-based technical support and a focus on continuity of care, we're proud to stand behind a solution that is helping people reclaim mobility, dignity, and control, one eye movement at a time.

REFERENCES:

Andrich, R., Caracciolo, A., Rossi, S., & Spadaro, L. (2013). The role of assistive technology in supporting the mobility of people with severe disabilities. *Disability and Rehabilitation: Assistive Technology, 8*(5), 393–400. https://doi.org/10.3109/17483107.2012.759636

Ates, S., Tuncer, S., Kose, H., & Akin, H. L. (2021). An eye-gaze controlled wheelchair with dynamic speed and direction adjustment. *Assistive Technology, 33*(6), 361–369. https://doi.org/10.1080/10400435.2019.1676767

Borg, J., Smith, E., & Lindström, A. (2021). Assistive technology use is associated with lower age and better health in people with mobility impairments in three UK NHS Trusts. *BMC Health Services Research, 21*, 878. https://doi.org/10.1186/s12913-021-06863-1

Elliott, M. A., Malvar, H., Maassel, L. L., Campbell, J., Kulkarni, H., Spiridonova, I., ... & Scanlan, J. M. (2019). Eye-controlled power wheelchair performs well for ALS patients. *Muscle & Nerve, 60*(4), 393–399. https://doi.org/10.1002/mus.26655

Fehr, L., Langbein, W. E., & Skaar, S. B. (2000). Adequacy of power wheelchair control interfaces for persons with severe disabilities: A clinical survey. *Journal of Rehabilitation Research and Development, 37*(3), 353–360. https://pubmed.ncbi.nlm.nih.gov/10917267/

Jones, B., Miller, S., & Green, T. (2012). The impact of dependence in activities of daily living on caregiver strain. *Journal of Rehabilitation Research & Development, 49*(7), 1029–1038.

Majaranta, P., & Räihä, K. J. (2002). Twenty years of eye typing: Systems and design issues. *Proceedings of the 2002 Symposium on Eye Tracking Research & Applications*, 15–22. https://doi.org/10.1145/507072.507076

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Pousada, T., Groba, B., Nieto-Riveiro, L., Pazos, A., Díez, E., & Pereira, J. (2018). Determining the burden of the family caregivers of people with neuromuscular diseases who use a wheelchair. *Medicine, 97*(24), e11039. https://doi.org/10.1097/MD.0000000000011039

Rushton, P. W., Labbé, D., Demers, L., Miller, W. C., Mortenson, W. B., & Kirby, R. L. (2017). Understanding the burden experienced by caregivers of older adults who use a powered wheelchair: A cross-sectional study. *Gerontology & Geriatric Medicine, 3*, 2333721417703736. https://doi.org/10.1177/2333721417703736

Silverstein, J. (2024, September 17). Inside the eye-tracking wheelchair improving quality of life. *Mobility Management*. https://mobilitymgmt.com/voices/inside-the-eye-tracking-wheelchair-improving-quality-of-life/

Steinbock, J. (2024). [Personal communication regarding Donnie Graham's use of Ability Drive®]. Unpublished internal communication.

Tobii. (2022). *Tobii PCEye: Technical specifications*. Tobii Dynavox. https://www.tobiidynavox.com/

Wand, R., Huang, J., Liu, T., & Zhou, X. (2019). An eye-gaze controlled wheelchair for users with severe disabilities: A user-centered design and evaluation. *Assistive Technology, 31*(3), 149–158. https://doi.org/10.1080/10400435.2018.1458625

Aabentoft. (2025). *Client testimonial and case information about Ability Drive® installation* (H. Lund Kobberø, personal communication). Unpublished internal communication.

Kelbley, M. (2025). [Personal communication regarding Ability Drive® use and impact]. Unpublished internal communication. ■

Closing The Gap 2025 CONFERENCE

TUESDAY - FRIDAY, OCT. 21-24 MINNEAPOLIS, MN

Pre Conference Workshops: Monday and Tuesday, Oct. 20-21

43RD ANNUAL CONFERENCE

OCTOBER 21-24, 2025

Pre Conference Workshops: Monday and Tuesday, October 20-21, 2025

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See why Closing The Gap has earned a reputation for exceptional learning and plan now to join us for Closing The Gap 2025!

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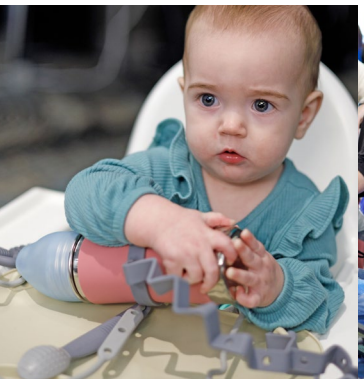



THE CONFERENCE FOR EXCEPTIONAL LEARNING

INSIGHT

What Makes Closing The Gap Unlike Other AT Conferences?

Immersive Learning: Each day is packed with engaging educational sessions led by experienced and expert presenters. The conference (Wednesday – Friday) is offered for up to 17 hours of CEUs. *Add pre conference Monday and/or Tuesday for up to 14 more hours!*

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Actionable Insights: In the exhibit hall, participants will discover valuable information, strategies, and products that can be directly applied to their work and improve their lives.

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Renowned for its exceptional learning opportunities and vibrant networking atmosphere, this conference is truly one-of-a-kind!

Who should attend?

ANYONE interested in finding practical and readily available AT solutions for ALL disabilities, mild to significant, infant through adult.

Topics include:

- accessibility & UDL
- assessment & IEPs
- augmentative and alternative communication (AAC)
- autism spectrum disorder (ASD)
- blind / low vision
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- early childhood development
- instruction, literacy & inclusion
- leadership, policy & implementation
- mathematics
- mobility, mounting, seating & positioning
- research
- transition, employment & vocational rehab

- Speech Language Pathologists
- Occupational Therapists
- Physical Therapists
- Autism Specialists
- Vision Specialists
- Special Educators
- Special Education Directors
- Administrators
- University Instructors
- Technology Specialists
- Parents
- End Users
- Manufacturers / Producers / Company Representatives

CALL FOR PROPOSALS

Share Your Knowledge and Expertise

Closing The Gap will consider proposals for one-hour or multiple-hour sessions that describe and/or demonstrate successful applications of assistive technology for persons with disabilities.

Groups or individuals who wish to participate should submit their proposals for one-hour and multiple-hour presentations as soon as possible.

LEARN MORE

Assistive Technologies
What would you do?

The Assistive Technology (AT) industry is represented by a wide variety of specialties. Since there are only a handful of AT-degreed programs, many come to the AT field from varied programs of study. This paper takes advantage of that diversity of knowledge by asking "What would you do?" in various AT scenarios (actual cases from the AT team at Ernst & Young (EY) over the past nine years). Any personally identifiable information has been changed or deleted to maintain privacy/confidentiality.

EY is a professional services firm operating in over one hundred fifty countries. Its AT team (a mighty team of two) have worked with customers in almost one hundred of these nations (all in a virtual environment). Since the team offers support for any assistive tech topic, there is no way team members will be highly knowledgeable in all medical areas. Also, their methods of helping customers may differ significantly from readers of this publication.

This paper consists of various case studies from the AT team at EY. The goal is to spark curiosity in each reader because he/she/they may have different ideas to help each customer.

SCENARIO 1 – CUSTOMER LOSES ACCESS TO JAWS SCREEN READING SOFTWARE

A customer reached out to the AT team at EY just before the end-of-year holidays and reported they could not access JAWS on their work computer. Up until this day, the individual had encountered zero issues with the program. A few extra challenges existed:

- This was the individual's last workday of the calendar year and they wouldn't be back in the office until January (almost a month away) and needed JAWS access during the break.
- It was 11:00 PM local time in the customer's area and they were the only person in the office building. Seeking assistance from an onsite person was not an option.

WHAT DID THE AT TEAM DO?

By asking open-ended questions (where answers could not be "Yes" or "No"), the team determined how the individual originally obtained their copy of JAWS and when the transaction was carried out. The individual had JAWS for one year and had not renewed their copy (it was a 1-year subscription). The AT team reached out to their contacts at the vendor to obtain a 90-day trial code (was obtained in a matter of minutes) and then passed that along via a Skype meeting to the customer.

Fortunately, the AT team had built connections with the vendor who supplied software to EY in the specific country where the customer resided. The team reached out to their contacts at the vendor and the customer's copy of JAWS was formally renewed before the end of the 90-day trial code. Scenarios like this led to a formal request for "Fusion" software (contains both JAWS and ZoomText software titles) and its inclusion in the "EY App Store". Currently, anybody at EY in need of JAWS or ZoomText software can request "Fusion" from the "EY App Store" and it will download to their machine. The AT team also works with in-country IT teams to install "Fusion" on one's EY machine before their first day of work (for new joiners).

KEVIN GROGG is a Product Manager for Assistive Technologies (AT) for Ernst & Young (EY) and has occupied the position for 9 years. His primary duty is to provide 1-1 AT services "at a distance" via Microsoft Teams. Before EY, he worked fifteen years at Shepherd Center, the last ten in the Assistive Technology department. He provided AT services for patients with spinal cord injuries or brain trauma. Mr. Grogg holds a BS in Management from Georgia Tech and a MS in Exercise Science & Biomechanics from Georgia State.

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SCENARIO 2 – ACCIDENT WITH A BANDSAW

On Monday morning, the AT team received a call from a member of the EY Talent Team with an emergency request. A customer had been involved in an accident the past weekend with a bandsaw and severed the tips of three fingers. Since the standard method of typing could not be accomplished, the individual was very concerned for their productivity. The goal was to incorporate technology to maintain their high productivity level and not fall behind their peers.

The team met with the individual on Tuesday and the following topics were discussed:

- **Dictation software** – Since EY uses the Microsoft suite of products, the team brought up "Microsoft Dictate", which was available in Word, Outlook, PowerPoint, and OneNote. This was a tool the individual could enact "at that moment" and test its use. The team also mentioned Dragon Naturally Speaking dictation software to extend dictation to Microsoft Edge and to help with voice commands to substitute for mouse movements.
- **Sticky Keys** – The team discussed this feature (built into Windows) that eliminates the need to hold down multiple keys at a time to enact keyboard commands.

The customer made use of each function and was satisfied with the productivity gains achieved through their use.

SCENARIO 3 – DIAGNOSIS OF PROGRESSIVE EYE DISEASE

The customer reported increasing difficulties focusing on their screen. They were diagnosed with a progressive eye disease and wished to test various methods to make their screen easier to view throughout their day.

The team focused on a few different areas:

- **Larger monitor** – The customer preferred a single large monitor (42 inches) versus multiple smaller screens (32 inches). The AT team worked with the in-country Talent/HR team to procure a 42-inch model.
- **Changing Text Size** - The team helped to change the overall text size of Windows icons and system programs. Also, the team enabled a slider bar for text size in the lower-right corner of Word & Outlook. The team also made sure the customer knew how to adjust the settings for the future.
- **Audio playback of screen text** – The team guided the customer through use of the "ReadAloud" feature in Word and Outlook. This enabled the customer to hear their emails and Word documents. They also worked through the audio playback features within PDF programs.
- **Dictation of emails via the Outlook mobile app** – The customer was not interested in using dictation software on their work laptop. Instead, the team focused on the dictation feature in the Outlook mobile app. This allowed the customer to dictate their messages and briefly scan for completeness before sending.

SCENARIO 4 – CUSTOMER RECEIVED NEW HEARING AIDS AND ENCOUNTERED DIFFICULTIES USING THEM IN VIRTUAL MEETINGS

The customer had previously used a single hearing aid (in-the-ear) and recently switched to dual over-the-ear hearing aids. While the new Bluetooth connectivity was great, the customer reported significant discomfort with their on-the-ear headset (pressing against the hearing aids). The customer was seeking an alternative headset.

- A few alternative form factors were proposed – earbuds and/or bone conduction headset (with built in microphone).
- The team was curious if the customer would prefer a direct connection from their EY laptop to their hearing aids.
- The customer wanted to try a bone conduction headset, and the results were fantastic! The customer was appreciative and has used this model since.

SCENARIO 5 – RECENT DIAGNOSIS OF ADHD

The customer reached out to the AT team after a recent diagnosis of ADHD and was seeking ways to better maintain pace during virtual meetings where information is always exchanged quickly.

- **Current method of notetaking** – The AT team asked the customer about their current notetaking methods and where they felt it was lacking in the fast-paced work environment. The team asked for specific examples of when the pace became too much. This helped the team check for patterns and were there specific occurrences within a meeting where troubles were most apparent.
- **Connections between OneNote and Microsoft To-Do** – The customer made heavy use of OneNote and reported their To-Do list was scattered with items from multiple OneNote pages. The team demonstrated the connections between OneNote and Microsoft To-Do (both programs are available to everyone at EY), specifically the "Outlook Tasks flag in OneNote. By placing a flag on a line of text (a To-Do item) in OneNote, the task is automatically synchronized in Microsoft To-Do. All To-Do items are available on one screen in Microsoft To-Do, versus multiple OneNote pages. This made it much easier for the individual to keep up with their To-Do items.
- **During the meeting** – The team mentioned "Teams Captioning", a feature built into Microsoft Teams and available to everyone at EY. For the customer, the process of "seeing" the words in addition to hearing them made a significant positive difference in their initial level of understanding.

SCENARIO 6 – DEBILITATING BACK INJURY

The team received an emergency request from the Talent team regarding an individual who suffered a debilitating back injury that prevented the individual from working anywhere other than their couch. Because of this, the individual could not hold their laptop in any static position for long. Their main concern was maintaining high productivity and their role primarily involved the sending/receiving of email.

- **Dictation using the built-in microphone of the laptop** – Given the severity of the injury, the customer could not easily wear a headset. While the laptop microphone is more susceptible to environmental noise, the customer was fine with it since they would be working 100% from home (in a controlled environment).
- **Emphasis on "Microsoft Dictate"** – Since the individual was primarily concerned with email, the team worked through "Microsoft Dictate" in Outlook until the individual felt comfortable to use it on their own. The individual felt the injury would be temporary and did not see the need to use Dragon Naturally Speaking software.
- **Mobile use of Outlook app** - The team also worked with the customer to take advantage of the Outlook mobile app, especially for dictating emails.
- **"ReadAloud" feature in Outlook** – In addition to dictation, the team wanted to provide a way to play back audio of Outlook email to lessen the amount of time one must spend in any one position (staring at the screen).

SCENARIO 7 – MANDATORY ELEARNING COURSE INCOMPATIBLE WITH SCREEN READING SOFTWARE

A customer reported that a mandatory course for their job role could not be accessed using JAWS screen reading software. The customer was a veteran JAWS user and had tried numerous workarounds to rectify the issue, to no avail. The course had a due date within two weeks and the customer was highly concerned about completing the learning before the deadline. In addition to the course material, there was a mandatory quiz that could not be accessed.

- **A different AT approach** - Instead of attempting to "make" the course software compatible with JAWS, the AT team worked with the Talent and Learning teams to produce an alternate version of the course and the quiz sections. Within a few days, the Learning team supplied a Word version of the course. This was possible because numerous online courses start as Word documents before being made into the eLearning format.
- **Providing the alternative to the custome**r – Before sending the Word document to the customer, the AT team tested it with JAWS to make sure all was well. After JAWS read back the content successfully, it was passed along to the customer. The customer then worked with their Talent representative once they completed the class to then complete the quiz. Talent and Learning teamed to provide a JAWS-compatible quiz section, and the customer was able to complete the class and successfully pass the quiz by the deadline.

SCENARIO 8 – MIGRAINES EXACERBATED BY HEAVY SCREEN USE

A customer reached out after experiencing increased incidence of migraines, brought on by heavy screen use (a requirement of their role). They used two screens: a 14-inch laptop screen and a 20-inch external monitor.

- **Recommendation of larger screens and solely using external monitors** – The AT team worked with the customer to determine how they felt about larger monitors while shifting away from the small laptop screen. The team proposed two 24-inch monitors due to customer preference and the amount of desk space available (customer worked from home almost all the time). Also, the customer was amenable to using an external keyboard and mouse (had been solely relying on the built-in keyboard and trackpad from the laptop). A docking station allowed for all items to be plugged into a single source. This made a significant positive difference for the customer.
- **Physical placement of monitors** – Along with new monitors, the team worked with the customer regarding optimal ergonomic placement of the screens. Beforehand, the customer was performing significant left/right and up/down neck movements to go between their laptop screen and external monitor. The team recommended the new monitors to be placed around a center point (directly in line with the individual's straight-ahead view) and to be at the same height (where one's eye level was in line with the top of each monitor).

SCENARIO 9 – HYPERFOCUS (MAINTAINING STATIC SEATED POSITION FOR 10 HOURS AT A TIME

The team received a call from a customer who reported becoming highly engrossed in their work to the point where they did not take breaks through a full day of work (sometimes 10 hours non-stop). The individual mentioned this lack of activity resulted in negative health effects that lasted for days but also admitted that it's difficult to break the habit.

- **Automated break-reminder software** – A direct result of Covid, the team rolled out two options for break-reminder software that automatically prompted the individual to take a break. These software titles are available via the "EY App Store" globally. Anyone who works for EY can request the software and it will download to their machine. Neither program requires Internet access to function (after installation).
- **Wireless headset** – The AT team also recommended a wireless headset to ease the ability to "walk around" and

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continue to participate in virtual calls.

SCENARIO 10 – NEW JOINER ENCOUNTERED DIFFICULTIES HEARING ALL PARTIES DURING IN-PERSON MEETINGS

The customer was a new joiner, and in-person meetings comprised almost one hundred percent of their role. They mentioned being hard-of-hearing and said the number of speakers (and the fast pace) of each meeting made it difficult to follow (and understand the content). The customer found themselves taking extra time with notetaking and review afterwards (compared to their peers) and were concerned this would affect their job standing.

- **Software portion of the solution** - Within EY, Microsoft Teams is the preferred virtual platform for meetings. Even though these meetings were in-person, the AT team found that an individual can set up and join a Teams meeting on their own (without any other participants). It was found that Teams Captioning could still be activated (even when a meeting only had one participant).
- **Hardware contribution to the solution** – Even though the individual could use Teams Captioning during the in-person meeting, the built-in microphone on their laptop was insufficient to pick up all voices in the room. The AT team recommended an external Bluetooth speaker/microphone that could be placed anywhere in the room.
- **Combining hardware & software** – The customer could place the Bluetooth unit in an optimal location without attracting attention. Within Teams, they set the audio input (microphone) to be the Bluetooth unit. Once these settings were ready to go, the customer started their Teams meeting (where they were the only participant) and activated captioning.
- **End Result** – The combination of a single-participant Teams meeting, the Bluetooth speaker/microphone, and activating Teams Captioning allowed the customer to follow the spoken words from everyone in the meeting! While speaker attribution was unavailable (since only one person joined the Teams meeting), Teams did separate the spoken words from different users (for those inevitable times when people spoke over each other).

The ten scenarios listed in this paper are only a small sample of the types of cases the AT team at EY works with daily. Readers may have different ideas for solutions, given the high diversity of thought in the AT field. It is hoped that the ideas in this paper will be beneficial when readers encounter similar situations. ■

Reframing Writing Instruction for AAC Users in the Age of AI: Is It Cheating or Is It Access?

Part 1 of a 3-part series: The intersection of artificial intelligence, augmentative and alternative communication (AAC), and writing instruction for students who need and use AAC

As new artificial intelligence (AI) technologies such as large language models (LLMs) emerge (e.g., ChatGPT, Perplexity, Claude) educators are increasingly confronted with a familiar question: "*Can my student use this to complete schoolwork?*" More often than not, the answer is a reflexive "No." This response, however, reflects a longstanding pattern in the history of educational technology: initial resistance followed by gradual acceptance, especially when these tools become mainstream (e.g., speech-to-text). Such resistance is particularly familiar to the field of assistive technology (AT), where innovative tools designed to support access and increase independence have often been met with skepticism, especially when their use challenges traditional notions of authorship, effort, or fairness.

The fear that assistive technology will "do the work for the student" isn't new, and it certainly isn't unique to AI. Teachers have seen this with every major technology introduced into schools. In the early 2000s, programs like Co:Writer and DraftBuilder, which supported writing with word prediction and idea organization, raised concerns about fairness. Submitting assignments via a student's email account was once considered unsafe or impractical. Tools that are now commonplace (i.e., speech-to-text and text-to-speech) and often still are, seen as shortcuts or "cheating" when used by students with disabilities. Speech-to-text, when used as a transcription tool by students who cannot write by hand or type efficiently, has been viewed as giving an unfair advantage. Similarly, the use of text-to-speech to access grade-level content is often questioned by educators or parents who worry that students will stop learning to read. But these tools aren't shortcuts; they're access. Just like a pencil grip or glasses, they give students access to the task, not the answers. These reactions reflect more than just concerns about learning, they expose a deeper discomfort with change itself. As classrooms become more inclusive, our focus must shift from policing the tools students use to recognizing assistive technology as a legitimate and necessary means of access, not an unfair advantage.

BRENDA DEL MONTE, MA, CCC-SLP. Brenda is a speech language pathologist and an assistive technology evaluator and facilitator. Brenda Del Monte is a co-founder of Believe Beyond Ability, a non-profit organization that evaluates, determines, provides and trains those with multiple disabilities on assistive technology to increase independence. Brenda is also an author of the newly published book, "I See You In There," a collection of stories from her 20+ years of experience working with children and adults with disabilities. She is currently a co-host of the Awe and Wonder Podcast hosted by the Special Ed Tech Center.

SHARON REDMON, M.S. ATP. Sharon is a SpEd, GenEd teacher, and AT Specialist with almost 30 years of experience. She holds an M.S. in Adaptive Education: Assistive Technology from St. Norbert College and ATP from RESNA and is a Doctoral Candidate at Penn State University. Sharon's passion for AT and especially AAC began with her first teaching assignment in WI, where she became involved in WATI, and continues today with the WI AAC Network school committee and founding member of the Wisconsin Assistive Technology Regional Networks (WATRN). She also serves as a member of the Education Committee for USSAAC. Her varied career placements within WI, WA, and overseas schools have given her unique opportunities to combine her passion for AAC, literacy, and Assistive Technology. She is passionate about sharing her experiences with others so that we can all continue to learn together

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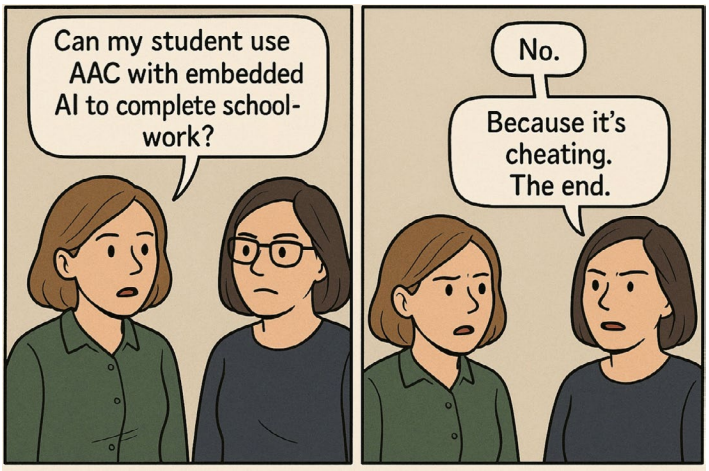
AI AND AAC: THE NEW FRONTIER



Unfortunately, this concern is all too familiar for individuals who use Augmentative and Alternative Communication (AAC). As AI becomes integrated into AAC systems, through predictive text, content generation, or enhanced writing supports, some educators and stakeholders are quick to question the legitimacy of these tools, often labeling them as threats to academic integrity. Fears that assistive technology replaces student effort have long existed, but they are now amplified by the visibility and rapid development of AI. These reactions, however, often arise without a deeper understanding of how these tools function or why they are necessary. While AI may be new, the skepticism it provokes is not.

Often, the label of "cheating" is less about the tool and more about our discomfort with change. Sitting in the uncomfortable and asking the right questions is how we move the needle forward. Today's panic about AI mirrors these past anxieties. But if we fail to examine the motivations behind our objections and resistance, we risk repeating history, denying access in the name of protecting tradition. Rather than asking whether AI tools represent "cheating," a more constructive question might be: *Under what conditions can AI be used ethically and equitably to provide equitable access to learning, especially for students with disabilities?* We argue that framing the issue this way invites educators to consider how new AI tools can reduce barriers, promote access, and foster inclusion, principles central to both Universal Design for Learning (UDL) and inclusive education frameworks (CAST, 2024). As we begin to navigate the role of AI in education, we must also draw from the lessons of AT integration: that the purpose of technology is not to provide an advantage but access.

For students who need or use AAC particularly those using alternative access methods (e.g., eye gaze or switches), this resistance has serious consequences: it can limit not just how they complete assignments, but whether they are truly taught and integrated into the process. Written expression is one area where our students who need or use AAC are often not provided the same access to high quality instruction as their peers.

"Writing is a process of meaning-making through which students construct knowledge, communicate ideas, and demonstrate understanding. It is both a cognitive and social act that develops through instruction and practice."

— National Council of Teachers of English (NCTE), 2004

WHAT THE LAW SAYS: AI, AT AND IDEA

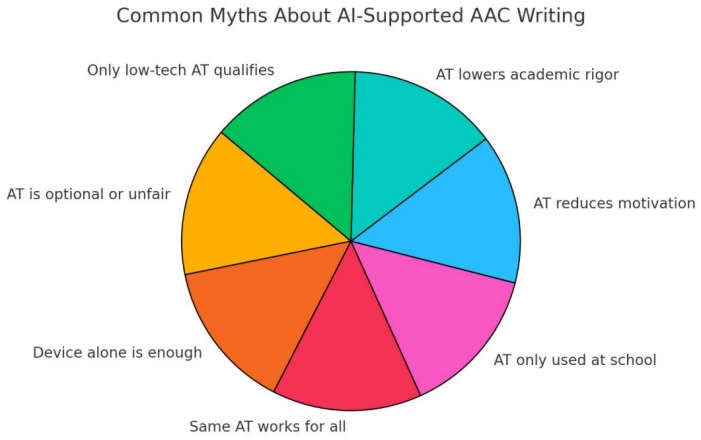
The integration of artificial intelligence AI into writing supports for students who need or use AAC has sparked questions about fairness, academic integrity, and educational equity. However, guidance released by the U.S. Department of Education in January 2024 titled *Myths and Facts Surrounding Assistive Technology Devices* directly refutes this idea. This federal document reinforces that assistive technology AT, which includes AI-supported writing tools and those embedded in AAC systems, is not an unfair advantage, but rather we argue is a required AT support to access a Free and Appropriate Public Education under the Individuals with Disabilities Education Act (IDEA).

Assistive technology is about equity, not reducing standards or undermining academic rigor (Myth 15, p. 21). AT allows students to demonstrate their knowledge and skills despite physical or communicative barriers. AT includes a wide range of tools, from low- to high-tech, as long as they meet the child's functional needs (Myth 9, p. 16). This includes not only traditional supports but also emerging technologies. AI-powered supports embedded in AAC devices fall squarely within this definition. Just as a word prediction feature or symbol-based sentence strip is a valid support, so is an AI-based feature that suggests relevant phrases, prompts topic development, or reformulates unclear sentences. If these supports allow the student to author their content more independently and effectively, then they fulfill the very purpose of AT. Using AI within an AAC system to support writing is analogous to a student using a calculator when math computation is not the skill being assessed. Rather than shortcutting the writing process, AI features scaffold the same stages all students encounter: idea generation, vocabulary selection, sentence construction, and revision. If the educational goal is to communicate ideas in written form, then the AI becomes the pencil, not the brain. The student is still responsible for approving, selecting, editing, and organizing their writing.

Equally important is the principle that assistive technology must be individualized. AT must be personalized to each student's needs. What helps one student may not be appropriate for another, even with the same diagnosis (Myth 12, p. 17). For some AAC users, co-constructing writing with AI offers a unique solution to the motor, cognitive, and linguistic challenges they face. While peers may use spellcheck, Google Docs, Grammarly, or peer support, AAC users may require a more robust tool embedded within their device to co-author text. This is not an unfair advantage, it is a tailored intervention. Students using

AI to support writing are not bypassing learning; they are engaging in it more meaningfully (Myth 16, p. 21). AI does not replace students' ideas; it helps them structure, expand, and refine those ideas. In fact, without these supports, many AAC users would be left with yes/no questions or limited word-by-word construction, often facilitated by adults. With AI, students move from passive responders to active co-authors, a shift that promotes agency and deeper engagement.

The Department of Education's 2024 *Myths and Facts Surrounding Assistive Technology Devices* document strongly supports the use of AI-supported writing tools as legitimate assistive technology under IDEA. Far from being a form of cheating, these tools offer students who use AAC a meaningful, equitable way to participate in writing tasks alongside their peers. Educators and IEP teams must move past outdated notions of what constitutes "authentic" work and recognize that modern AT, including AI, is essential for many students to express themselves, meet academic standards, and gain independence. Denying access to these tools not only contradicts federal guidance, it undermines the very principles of inclusive education.



WHAT WRITING INSTRUCTION REALLY LOOKS LIKE FOR AAC USERS

In many educational settings, students who need or use AAC face significant barriers to meaningful participation in writing. For direct selectors, writing goals are often reduced to copying model sentences, selecting pre-programmed words, or using forced choice construction to produce syntactically and grammatically correct sentences. For students using eye gaze or switches, writing instruction may not progress beyond letter identification, even into adolescence or adulthood.

In general education settings, writing accommodations may include extended time or shortened assignments, but these often substitute for robust instructional strategies. As a result, AAC users may complete writing tasks without ever learning the cognitive processes of ideation, planning, creation and revision.

To minimize fatigue, educators sometimes employ multiple-choice or bimodal options, where students select from pre-generated content. These choices are often created by teacher, therapist and paraeducators with limited knowledge of the course content or the student's ideas.

In creative writing, this becomes even more limiting. The student may be brimming with ideas, but unless someone gives them the "right" choices, those thoughts remain inaccessible. The result? Students select from limited options that are provided to them in a con-constructed setting, a product is created, boxes are checked. While this approach may produce a completed product, it often masks a lack of authentic student authorship and voice. Ironically, these heavily scaffolded approaches, where the student has limited control over their content and limited agency are accepted as "support," even if they strip students of autonomy, independence and ownership. Yet in this scenario, where the student's writing is essentially constructed by others, we don't call it cheating. Why? Because it fits our traditional, comfortable model of what "help" looks like. But for students with access barriers who need or use AAC, this "help" strips students of any true authorship.

REFRAMING THE QUESTION

The focus on whether AI constitutes cheating is the wrong question. Instead, educators must ask:

- Is the tool providing equitable access?
- Does it promote authentic expression?
- Is it building the student's capacity to engage in the writing process?

Often writing is viewed only as the act or transcription or the mechanical act of putting words on a page. According to the National Council of Teachers of English (2004), writing is "a process of meaning-making through which students construct knowledge, communicate ideas, and demonstrate understanding." It is a cognitive and social act that requires support and practice. All students, even those without barriers to their written expression, engage in both the transcription of writing and the process or cognitive act of written expression in a co-constructed process.

AI-enhanced AAC tools can help students that have significant barriers in accessing writing, meaningfully participate in that process, perhaps for the first time. AI-supported writing tools can help AAC users do just that. If a student is finally able to generate a sentence, brainstorm an idea, or revise their work using tools embedded in their AAC system, that's not cheating, that's access.

If we allow students without disabilities to use Grammarly, Google Docs, or ChatGPT to plan, write, and revise, why would we deny these tools to students who need or use AAC?

Educators must provide meaningful opportunities for growth by explicitly teaching the full writing process (i.e., planning, drafting, revising, and publishing) even when AT supports

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are required at every stage. Promoting independence means prioritizing tools and strategies that reduce reliance on adult prompting and encourage students to take ownership of their ideas. At the same time, it is essential to validate alternative methods of writing. Composing with AAC, AI tools, or predictive text is no less legitimate than writing with a pencil or typing on a keyboard. Just as we accept spelling support for students with dyslexia or speech-to-text tools for those with fine motor challenges, we must understand and embrace the use of AI even those included in AAC systems not as a shortcut, but as a necessary scaffold that enables equitable participation in the writing process. When thoughtfully integrated into instruction, they can promote independence rather than diminish it or have an over reliance of a student's co-constructed support by a staff member.

WORKING TOWARD INCLUSIVE WRITING INSTRUCTION

To support equitable access to writing for students who use AAC, we need to rethink what counts as "help" and recognize that writing is often a co-authored process, for all students. AAC users may rely on partners to help generate language or navigate a device, or now, increasingly, use AI tools to support idea generation, vocabulary, and sentence structure. This isn't cheating, it's access. Their non-disabled peers also get support when they brainstorm with friends, use grammar checkers, ask for teacher feedback, or revise with the help of a rubric. These supports are part of good writing instruction. For students who use AAC, AI-enhanced co-authorship is simply a necessary scaffold to make participation in writing possible.

Implementing the use of an AT tool such as AI can reduce cognitive and motor load, prompt metacognitive reflection, and, critically, offer content-area information to support students in making informed choices as they write. This aligns with the Universal Design for Learning (UDL) principle of providing multiple means of representation and expression, helping students access and engage with rigorous content in diverse ways (CAST, 2024).

Fears of authorship from both AAC users, teachers and parents are valid concerns. However, we are not suggesting AI replace the writer, AI-enhanced co-authorship allows students to focus on idea development, sentence construction, and authorship, what writing instruction is truly about. Ultimately, the goal is not to reduce expectations, but to reimagine support structures so that every student can participate in authentic writing experiences. When used with intentionality, AI becomes not a shortcut, but a scaffold for equity, allowing students to engage in the writing process with agency.

CONCLUSION

Writing goes beyond transcription—whether through handwriting, typing, or dictation. It is the creation of meaning, a form of communication, and a vital avenue for academic participation and self-expression. Every student—regardless of their access needs—has the right to actively participate in learning how to construct written expression, as affirmed by the Communication Bill of Rights. The integration of artificial intelligence (AI) in education has reignited debates about academic integrity and authorship particularly for students with disabilities who need or use augmentative and alternative communication (AAC). While tools such as ChatGPT and AI-supported AAC systems are often labeled as "cheating," this perspective overlooks a long history of resistance to educational innovation for students with disabilities. When the first reaction to a new tool is "No," educators must pause and ask: Why not? If the objection is rooted in fear, unfamiliarity, or nostalgia for "how we've always done it," then it may be time to challenge those assumptions. For students who use AAC, especially those who encounter barriers to their learning, AI may be the bridge to meaningful, co-constructed writing. That's not cheating, that's access.

We will continue this conversation in the next issue where we will dive deeper into the idea of co-authorship and how AI as an

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AT can be integrated in the IEP for those that need or use AAC.

Note: ChatGPT and Grammarly were used by the authors to edit this content.

REFERENCES

CAST (2024). Universal Design for Learning Guidelines version 3.0. Retrieved from https://udlguidelines.cast.org

Graham, S., & Perin, D. (2007). Writing next: Effective strategies to improve writing of adolescents in middle and high schools. Alliance for Excellent Education.

Individuals with Disabilities Education Act, 20 U.S.C. § 1400 (2004)

Jimenez, B., Courtade, G., & Fosbinder, J. (2024). *Leveraging Artificial Intelligence to Enhance Implementation of Research-Based Practices for Teaching Students with Moderate to Severe Intellectual Disability.*

Khan, S. (2024). *Brave New Words: How AI Will Revolutionize Education (and Why That's a Good Thing*). Thorndike Press.

Light, J., & McNaughton, D. (2012). *Supporting the communication, language, and literacy development of children with complex communication needs: State of the science and future research priorities. Assistive Technology, 24*(1), 34–44.

National Council of Teachers of English (NCTE). (2004). NCTE Beliefs about the Teaching of Writing. Retrieved from https://cdn.ncte.org

Sennott, S. C., Akagi, L., Lee, M., & Rhodes, A. (2019). AAC and Artificial Intelligence (AI). Topics in Language Disorders, 39(4), 389–403. https://doi.org/10.1097/TLD.0000000000000197

U.S. Department of Education. (2024, January). *Myths and Facts Surrounding Assistive Technology Devices.* https://sites.ed.gov/idea/files/Myths-and-Facts-Surrounding-Assistive-Technology-Devices-01-22-2024.pdf

Zabala, J. S. (2005). *Using the SETT Framework to Level the Learning Field for Students with Disabilities.* Retrieved from https://www.joyzabala.com ■

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