Assistive Technology Resources for Children and Adults with Disabilities

Closing The Gap Solutions

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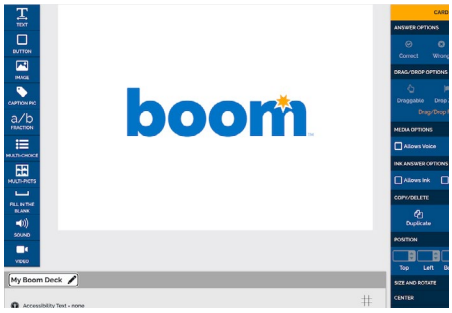

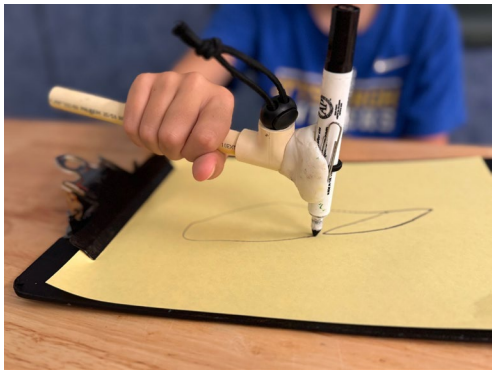

Supporting Students with CVI Through Technology: Everyday Practices with CViConnect PRO

Summary:

This article will explore practical strategies for supporting students with cortical/cerebral visual impairment (CVI) using CViConnect PRO. Readers will learn how educators are customizing instruction based on individual visual behaviors, using gaze data to inform planning, and tracking progress across routines. Real-world examples and tips for implementation will help teachers and teams better understand how to provide accessible, responsive instruction for learners with CVI in early intervention and school-based settings.

INTRODUCTION

When I first began working with children with Cortical Visual Impairment (CVI), I quickly realized that the strategies I had relied on for students with ocular visual impairments often fell short. CVI isn't about clarity of vision. It is about how the brain interprets what the eyes see. This neurological difference calls for a fundamentally different approach to support.

Today, CVI is recognized as the leading cause of pediatric visual impairment in developed countries (Chang & Borchert, 2020; Lehman et al., 2024). Yet many educators still lack the tools or training to deliver instruction that meets the unique needs of these learners. That is where CViConnect PRO has made a difference. While no tool can replace thoughtful, individualized teaching, I have seen how the right technology can unlock insight and access when used with intention.

As a teacher of the visually impaired, I've spent years searching for ways to support students with CVI that truly match how they see and learn. Like many others, I've learned that supporting these learners requires more than just modified materials. It takes tools that help us see what they see, track progress in meaningful ways, and adapt instruction in real time.

In this article, I'll share how educators are using CViConnect PRO to do just that. You'll hear from teachers in the field, see examples of what's working in real classrooms, and learn practical ways to support students with CVI using accessible technology. Whether you're just beginning to explore CVI or looking to refine your approach, my hope is that you'll leave with new strategies and renewed confidence.

WHY CVI REQUIRES A DIFFERENT INSTRUCTIONAL LENS

According to the National Eye Institute (2024), cortical visual impairment is defined as a neurodevelopmental disorder characterized by deficits of visual function and functional vision caused by neurologic damage to visual pathways and processing areas in the brain. Unlike ocular impairments, which typically affect how clearly the eyes see, CVI affects how the brain makes sense of what is seen (Roman-Lantzy, 2018).

This often means students with CVI may be able to see, but struggle to recognize objects, track movement in cluttered environments, or make meaning of visual input without significant support (Chang & Borchert, 2020). As one child's team put it, "It's not that he doesn't see the image. It's that the image doesn't always have meaning to him."

Evidence continues to reinforce the need for tailored, responsive environments for learners with CVI. Chang and Borchert (2020) explain that "careful assessment of a child's visual deficits may inform environmental modifications to promote visual functioning. Several authors recommend a simplified visual environment to minimize crowding and utilizing objects with

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color, high contrast, and motion to facilitate visual recognition."

Understanding these visual and behavioral characteristics is the first step (Roman-Lantzy, 2018). Acting on them, consistently and in collaboration with the full team, is where real change begins. In the sections ahead, I will highlight how educators are using tools like CViConnect PRO not to replace their judgment, but to sharpen it by better understanding how each student sees and responds.

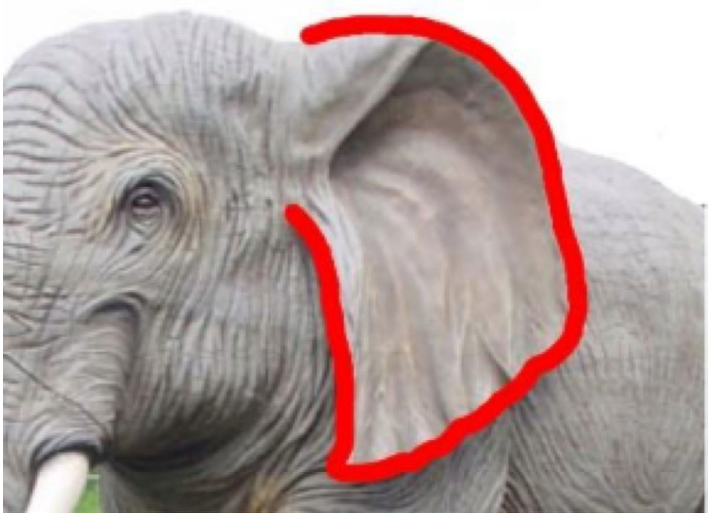
PRACTICAL IMPLEMENTATION: WHAT TEACHERS ARE DOING THAT WORKS

Supporting a student with CVI often means adapting not just what we teach, but how we present it, when we present it, and under what conditions. The educators I work with are constantly adjusting these variables, and CViConnect PRO has become one of the tools helping them do that with more clarity and purpose.

First, the team must do a functional vision evaluation consisting of a record review, parent interview, observation, and direct assessment (Roman-Lantzy, 2018). For students with CVI, vision professionals often rely on widely used tools such as the CVI Range or the Perkins CVI Protocol to guide this process. Both are designed to identify how a student with CVI uses their vision functionally and to guide appropriate accommodations and instructional strategies. Teams can use the activities provided and data collected from CViConnect PRO to help reflect on the student's level of functional vision.

After this information is gathered, the team can begin building their schedule of interventions that align the activity design to a student's known visual behaviors. For example, a teacher might create a red, high-contrast target placed consistently in the right visual field to support a learner with color and field preference. While this sounds simple, having a platform that allows for precise control of color, size, and positioning makes a difference, especially when visual complexity is a barrier. The CViConnect PRO Activity Designer allows professionals to make these adaptations as needed. Within the platform, a teacher could easily adapt this same activity to a different color or add movement for another child to meet their visual and behavioral characteristics.

What makes these adaptations effective is the ability to observe what works and adjust when it doesn't. That's where visual attention data becomes valuable. Using the iPad's front camera, CViConnect PRO estimates where and when a student appears to look at a target on the screen. This measurement helps teams reflect on visual engagement patterns without requiring specialized cameras or eye-tracking equipment. Teachers can review a session and see, in seconds, whether a student looked at a target, how long they sustained attention, and whether visual latency was a factor. With that information, teams can continue to fine-tune instructional materials.



One early childhood teacher shared, "*I had been using the same photograph of a familiar object across multiple sessions, thinking it was a good visual accommodation. But when I reviewed the look data, I realized my student never actually looked at it for more than a second or two. I swapped it for one with the background removed, and used the drawing board feature to highlight some features. We saw immediate changes, not just in the data, but in his engagement.*"

Carly Schlotterer, a TVI, reflected on the broader impact:

"*The data helped me show progress, justify visual accommodations, and even demonstrate growth during my professional evaluation. It also made classroom staff more accountable for daily visual access.*"

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That level of responsiveness shifts instructional planning from guesswork to intentional design. The system allows multiple team members, such as TVIs, classroom staff, related service providers, and families, to participate in a student's support plan by sharing data, reviewing sessions, and contributing to implementation. For many teams, especially those supporting nonverbal learners or students with multiple disabilities, having this visual feedback affirms what they are seeing. In some cases, it reveals patterns they may otherwise have missed.

Educators are also using the platform to support routines that build visual skills over time. One teacher embedded a calendar routine with highly familiar images into her daily practice. She used CViConnect PRO's session history to track whether her student began to recognize the images more quickly or showed changes in visual latency. Over several weeks, she observed stronger visual engagement and faster recognition. These were changes that hadn't been obvious through observation alone.

Lauren Stanton noted, "*CViConnect PRO assisted classroom teachers in determining placement for students' materials within their visual field preference. Based on student behaviors and visual attendance, teachers were able to choose and create better educational items in the classroom.*"

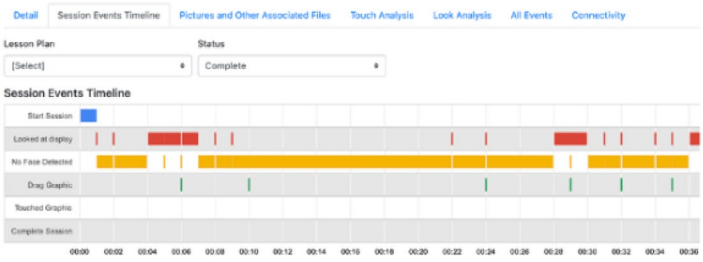
These stories reflect the kind of thoughtful, flexible instruction that many TVIs and early educators are already doing. What the tool provides is a way to make that instruction more precise, more informed, and more collaborative across teams.

BUILDING INSIGHT: HOW EDUCATORS ARE TRACKING AND ADAPTING

Once a strategy is in place, the real value comes from observing how the student responds. CViConnect PRO helps make this process more consistent, especially when tracking visual attention over time. Educators often describe how having access to session data gives them greater confidence in team discussions and IEP meetings. It is no longer just about what was observed in the moment, but what the student has demonstrated across multiple sessions.

One teacher described it this way:

"*Before using CViConnect PRO, we were relying on anecdotal notes and our impressions. Now I can show the team that the student's longest looks occurred during quiet times or when the target is purple and moving. That completely changed how we planned the day.*"



This kind of information empowers teams to adjust both instruction and the learning environment. Some educators have used the noise data to identify patterns of auditory distraction. One home visit provider realized just how much she and mom were talking during sessions and how that disrupted the child's ability to maintain gaze on the visual targets. Others have used trends in visual latency to help teams give the student enough time to locate the target. These insights are especially useful for students who are unable to communicate preferences through speech or gestures.

Findings from a federally funded OSEP Stepping Up Technology grant reinforce these experiences. The project evaluated over 2,800 instructional sessions using CViConnect PRO. Students who received instruction from trained TVIs looked at the screen more often, sustained their gaze for longer periods, and spent more overall time attending to visual information compared to students whose TVIs had not received training. Those without training showed more random screen tapping, suggesting that thoughtful implementation and professional development contribute directly to improved visual engagement (OSEP CViConnect Project Data, 2024).

For new users, getting started with this kind of visual tracking doesn't require a complicated plan. Many teachers begin

with just one activity aligned to a known visual behavior, such as adding movement, using a familiar image, or reducing the number of items within the array. Starting small and reviewing session data together allows teams to learn what works before expanding use.

A high school student using CViConnect PRO once told her team, "These activities are so calming. I find my body relaxing when I watch these." Her team now uses visual warm-ups and preview features as part of her orientation and mobility lessons.

Here are a few tips I often share with teams who are just beginning:

- Begin with what you already know elicits visual attention from the child.
- Select an activity from our library that mimics these visual characteristics.
- Repeat activities to gather consistent data.
- Sessions may need to be longer than you think to accommodate for visual latency.
- Review the data from these sessions to see if it matches your observations.
- Based on the data, change one factor at a time (ie. positioning, target, or environmental complexity). If you change more than one of these you won't know which is needed or not.
- Share session insights with the team. Use the insights to inform decisions about accommodations and routines, and begin to create an accessibility schedule for how the child will participate throughout their day.

CVI is complex, and no tool can replace professional judgment. By supporting documentation, pattern recognition, and collaboration, CViConnect PRO helps educators feel more prepared to meet the needs of students with CVI.

CONCLUSION

The work of supporting students with cortical visual impairment is deeply individualized. It requires us to recognize how vision functions differently for each learner and to adapt our instruction accordingly. Technology like CViConnect PRO does not replace that work. It supports it by making our observations more visible, our planning more intentional, and our collaboration more focused.

Across all the stories and strategies shared in this article, one theme stands out. When we listen closely to what the data tells us, and more importantly, to what the student is showing us, we begin to build an educational experience that is both accessible and empowering. These learners deserve nothing less.

Whether you are just beginning to explore CVI or already immersed in supporting this population, tools like CViConnect PRO can help guide next steps. The most important part is choosing to look more closely and respond with intention.

Note: CViConnect PRO does not use eye-gaze control technology. The system estimates visual attention using the iPad's camera and does not support navigation or device control.

RESOURCES

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RECENTLY ADDED WEBINARS

Get Low!!! Low-cost, Low-tech, DIY Assistive Technology

By Sara Lucas-Dreiss

"Get Low!" will explore DIY low-budget, low-tech assistive technology creation. Accompany presenter Sara Lucas-Dreiss as she demonstrates manipulation of high impact materials to fabricate multi-purpose, reusable supports that can easily be replicated. The utilization of the SETT Framework across educational, recreational, vocational, and home settings to determine engagement and participation obstacles and potential solutions will be examined.

Pragmatic and ethical considerations for creation and use of assistive technology, such as availability and cost of materials, basic skills needed, safety, durability, user expectations, and the autonomy & independence of individuals with complex bodies will also be discussed.

Through Sara's guidance, attendees depart equipped with not only newfound knowledge but also a profound sense of agency to effect positive change in the realm of AT accessibility.

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Shift Mindsets to Build Capacity Across Environments for AAC Implementation

By Marlene Cummings

The current landscape in education is uncovering gaps and inconsistencies in staff knowledge, academic instruction and implementation for students with complex communication needs. An increase in the number of students identified as needing AAC and easier access to more affordable technologies, coupled with greater curricular expectations, is requiring a shift in the typical mindset of how to best support these teams and the students they serve.

The need to build capacity while supporting students with complex communication needs is critical. SLP's & AAC teams must deepen and expand their knowledge base in AAC implementation. Having the knowledge in the hands of one "expert" is not sustainable. To ensure significant impact, we must embrace a capacity building model. What tools and strategies will shift the current "expert" mindset?

Examples of how multiple district level teams embraced a capacity building model will be shared. Participants will consider their current state, explore the shifts they can make and determine their next steps.

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Virtual Reality Victories for Special Populations

Summary: Practice makes possible. Floreo is an FDA-approved, evidence-based virtual reality platform that helps neurodiverse individuals build social and daily living skills in safe, real-world scenarios. The author will share early impressions and observations of VR with special needs learners, introduce the Floreo platform, and address common concerns about headset use. Stories from a speech-language pathologist, a special education teacher, and a parent will illustrate Floreo's impact across different users.

Figure 1: This image was generated using AI. It represents a child engaging in a VR lesson, while an adult monitors his progress via a tablet, providing guidance and encouragement to ensure success.

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PRACTICE MAKES PROGRESS

The first time I witnessed virtual reality's potential to reach and teach students with special needs, my heart melted. It was 2017, and Floreo, the virtual reality (VR) startup company I had joined, was launching its first pilot study. Our mission was to develop learning opportunities in VR to help autistic individuals. Toward that end, our small team had been building lessons for about a year, but we were seeking some confirmation that what we had created in VR would be safe, engaging, and useful.

For this pilot study, Floreo partnered with a self-contained, special education school in New Jersey, called Celebrate the Children, and recruited 12 students between the ages of 9 and 16, most of whom were either non-speaking or minimally verbal. We developed a 5-week study to discover if the students would tolerate wearing the headset and to explore the effects of the lessons. At the mid-study point, we were allowed to review some of the compelling video footage collected. Small gestures and responses implied big steps in engagement and cognition. One student reached out to try to touch the animated giraffe in a scene. Another student stopped her self-stimulatory behavior as soon as the googles went on. The students were engaged and happy to participate. Having worked with students of similar profiles, I felt deep appreciation for a tool that is both accessible to and empowering for these students.

That same year, Floreo developed a partnership with Children's Hospital of Philadelphia (CHOP) at their Center for Autism Research to create a different type of meaningful content. We applied for and were awarded an NIH grant to study whether practicing in virtual reality could be beneficial for autistic individuals who might someday have an unexpected encounter with a police officer. This study was conducted with more verbally fluent individuals. Once again, the feedback from participants was quite positive. With these individuals, we collected specific feedback about their experiences:

- "It was really cool and I learned how to talk to cops. I felt more confident at the end." (15-year-old male)
- "It took a little bit to finally feel comfortable, but once I was in, I felt like I was there on the street. I felt like I was interacting with someone… I felt like I was talking to a police officer..." (27-year-old male)
- "It was a positive experience. I enjoyed it once again and found it very interesting and kind of cool." (20-year-old male)
- "Pretty good and feel prepared to talk to a police officer." (12-year-old female)
- "I was a little scared of police officers at first, but then got used to it and felt good." (15-year-old male)

One of the more compelling aspects of virtual reality is that it is a medium that can be equally impactful for vastly different profiles of individuals. Since 2017, Floreo has expanded its target audience to the neurodiverse, or anyone in need of practice with social interactions and other practical skills. The ever-growing content library continues to engage children and adults who wear the headset, as well as the support teams who implement the lessons.

(Publications resulting from these two research efforts are the last two bullet points in the studies listed at the end of this article. Floreo's research page cites additional publications.)

HOW DOES FLOREO WORK?

Floreo is a virtual reality (VR) platform especially designed to support neurodiverse individuals in developing and refining a broad range of social interaction, emotional regulation, and life skills. In these immersive VR experiences, the individual wearing the VR goggles (the "Learner") is immediately transported to a relevant environment, such as a movie theater or a school cafeteria, and interacts with objects and characters. Simultaneously, another individual, such as a clinician, teacher, paraprofessional, or caregiver (referred to as the "Coach") views what the Learner is viewing in VR on a computer or a tablet. The Coach can guide the Learner to navigate the events safely and successfully. Engagement and repetition build strong connections between learning and real-life implementation.

Floreo is an easy tool to implement because it provides instructions for the Coach that update in real time. While simple to operate, Floreo is not simplistic. It can become a sophisticated and powerful tool in the hands of a skilled professional.

RITA SOLÓRZANO, MA, CCC-SLP is Director of Applied Digital Therapy at Floreo, Inc. Working as a Speech Language Pathologist since 1993, Rita has designed and delivered speech, language, literacy and social communication therapies primarily for students and clients between the ages of 2 and 22. She began working at Floreo in 2016, initially overseeing the development of VR curriculum designed to improve social and communication skills. Currently, she supports those using VR lessons to improve the skills of their students and clients.

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Video 1 shows a view of the Coach's device while a lesson is running. The video includes the author's voiceover explaining how a Coach would utilize the features of the platform. The lesson featured here is designed to practice differentiating and responding to different types of greetings: friendly, unfriendly, and neutral.

YouTube Video 1: CoachDeviceView - A demonstration and explanation of how the Coach's device works.
https://www.youtube.com/watch?v=701N3rTXnKI

The Floreo Learner device may be an all-in-one headset, or it may run on an iPhone running the Floreo app. Video 2 shows the iPhone running the app with a view of what the Learner would see. The sound (background sound and character dialogue) comes from the iPhone, but the Learner does not see any of the behind-the-scenes controls that are visible on the Coach's device.

YouTube Video 2: LearnerDeviceView - Once the phone is placed in the plastic VR goggles, the two images become merged in the Learner's view.
https://www.youtube.com/watch?v=2NeVGVKD_6c

In addition to allowing the Coach to witness what the Learner is seeing, the Coach view provides navigation and data collection buttons. If the lesson is one that uses movement, the Coach can tap a button and transport the Learner to the next location. Additionally, the Coach uses the buttons to collect data. Behind the scenes, Floreo software is keeping a record of the events, accessible to the Coach via the Floreo portal. Through the portal, the Coach can review the Learner's history and measure progress. The portal allows for note-taking and for creating custom lesson plans that appear at the top of the screen when signing in to the Learner's profile. Lastly, the portal houses an artificial intelligence tool that will create a lesson plan based on a description of lessons that are specified.

See Figure 2 and Figure 3

BENEFITS OF VR FOR SKILL ACQUISITION

With lessons constructed with input from clinicians, educators, and researchers, Floreo offers VR lessons covering a wide range of real-world scenarios. Floreo's mission is to provide learning experiences to both children and adults at any developmental level. Generally, the current content covers social interactions, communication, emotional regulation, daily living skills, and executive functioning skills. The company is actively developing new lessons and features to support the neurodiverse community.

The Learner interacts with the VR environment, but the Coach sets the pace. This is particularly useful when it comes to social interaction, since, in a social interaction, there are often so many transient signals (gestures, body language, voice tone, words) happening simultaneously that they can be difficult to interpret all in real time. When the Coach can reduce the speed of the interaction, have the VR character wait for as long as necessary while the Coach explains the events, the Learner has a greater opportunity to fully comprehend what is happening. Moreover, the Learner can repeat the exact same interaction or type of interaction as many times as needed.

The immersive nature of a VR experience often limits outside distractions, allowing the Learner to focus on the important sights and sounds inside the VR goggles.

The VR event is safe and predictable. The same cannot always be said when crossing a real street. The impulse control that may be needed when in the vicinity of a swimming pool is not an issue when the VR experience only allows the Learner to enter the virtual pool after reviewing all the rules. Floreo is able to engineer the environment to allow for early and often success.

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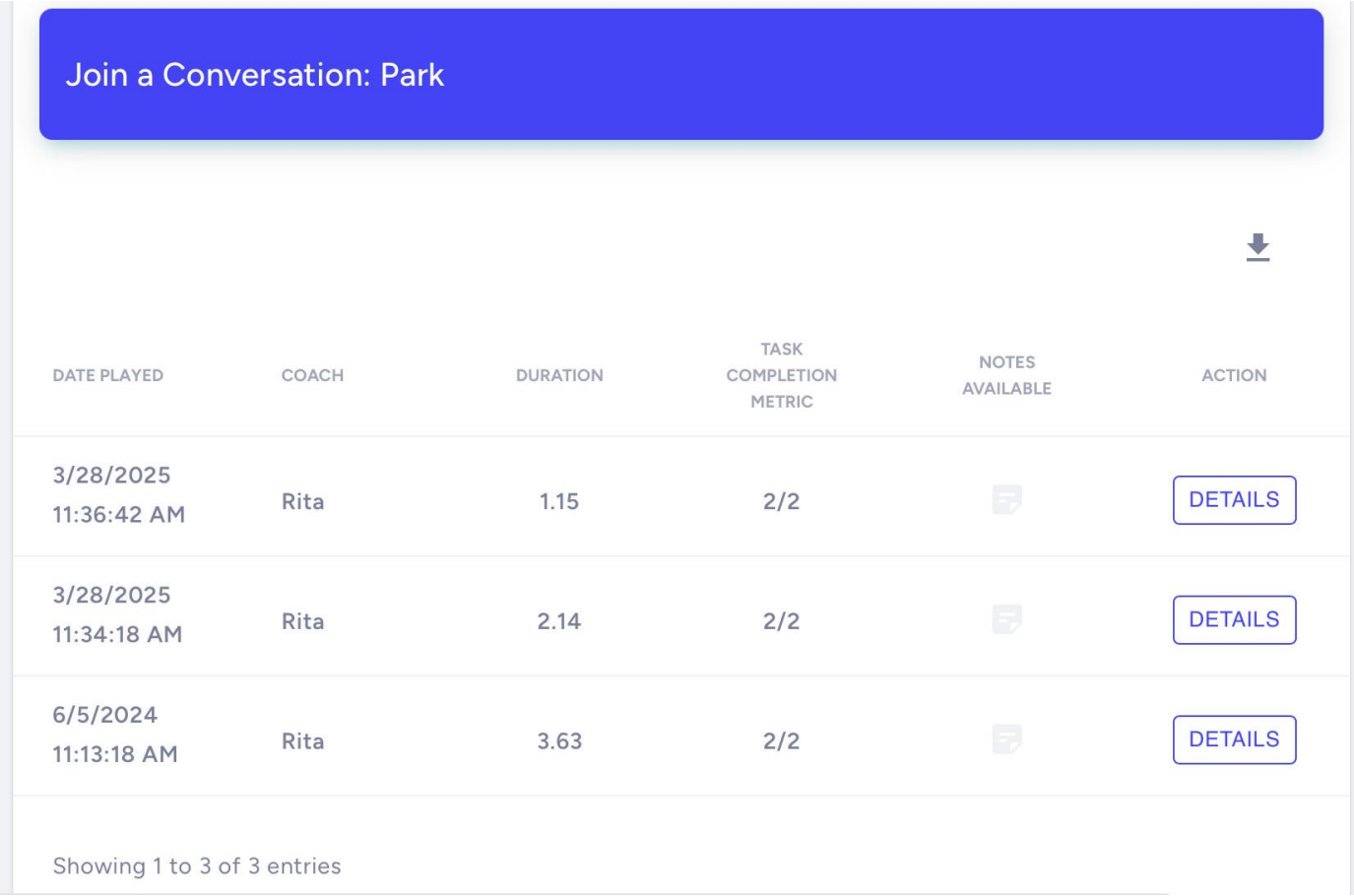

Figure 2: Sample page from the data section of the Floreo portal. This page shows some of the data for the lesson "Join a Conversation: Park"

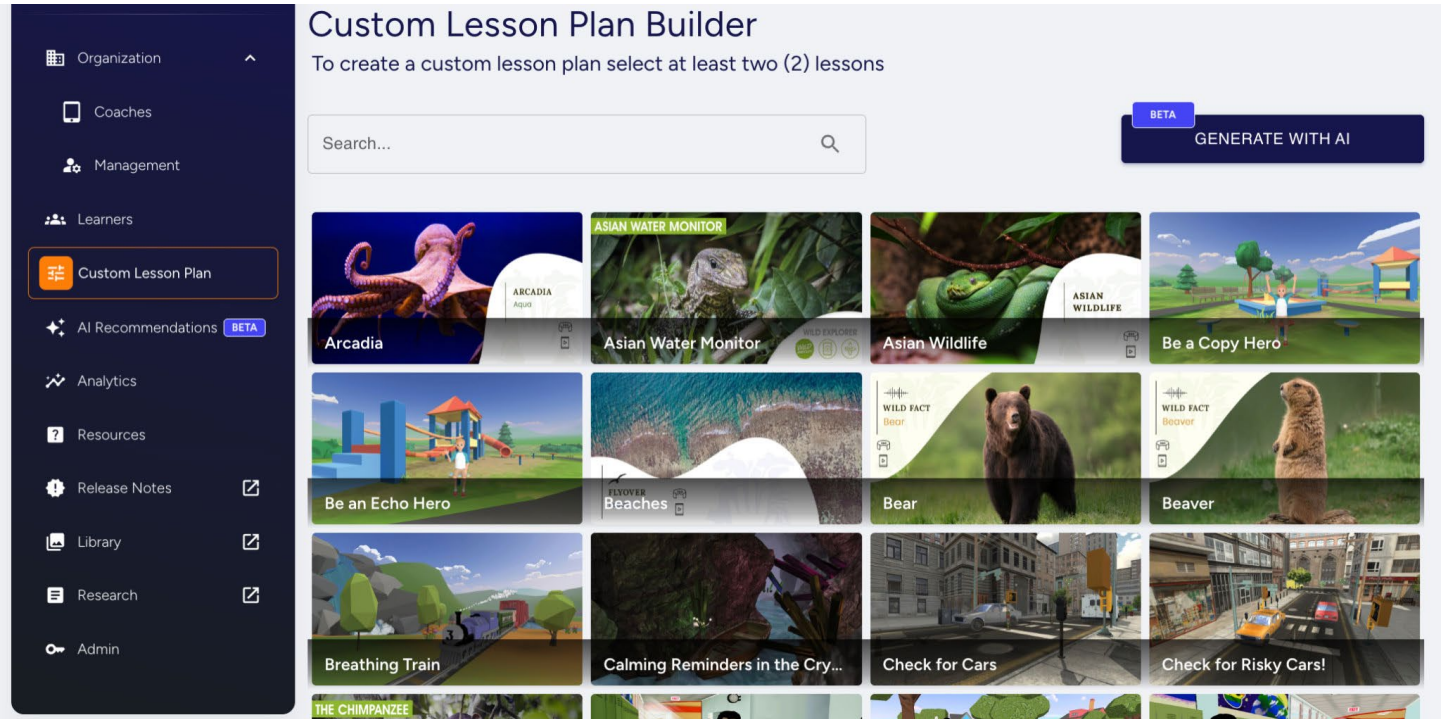

Figure 3: In the portal, the Coach can predetermine a lesson plan by selecting the lessons that are most relevant to that Learner. These lessons appear at the top of the screen when that Learner profile is selected

WILL MY LEARNER EVEN WEAR THE HEADSET?

Before trying it out, a common concern about Floreo is whether a Learner with tactile sensitivities (especially around the head and face) or one who is generally apprehensive will wear the VR headset. The overwhelming majority of Floreo customers report success with their Learners wearing the headset. The estimate is that about 80-85% of the Learners who attempt the headset will wear it. There have even been anecdotal reports that some children who reject other objects on their heads, such as hats or glasses, are interested in wearing the VR goggles once they realize there is something fun to see and do while wearing the headset.

The best advice is to start slowly using a VR experience that the Learner will enjoy and can navigate relatively independently. Floreo has a 360-degree, gaze-activated marimba/xylophone that is often a good starting point for many Learners. As the Learner looks at the keys on the marimba, a tone will play and the key will light up.

It is also important to keep the first VR experience very short (a minute or two) to ensure that the Learner is feeling well and is not experiencing any eye strain. Floreo has plenty of VR lessons that can be enjoyed and completed quickly, sometimes in under a minute. These can be good starter lessons.

In most of the Floreo lessons, the Learner stays in one location in the scene. Learners will still have the ability to look in all directions and feel immersed, but there is much less of a chance of feeling queasy if Learners are stationary. After a few sessions, people typically become acclimated to the experience and can tolerate movement. In lessons where there is movement, the Learner's view moves, although the Learner can remain stationary in the real world. Floreo is very careful that the movement in scenes such as street crossing or moving through the grocery store is not jarring. Similarly, Floreo has always been very careful about the kind of light and the colors that appear in the scenes.

The Floreo website has information on what to watch for, tips and tricks on introducing the headset, as well as visual supports that can be used to help Learners communicate about their general well-being before and after VR. Resources are here.

EQUIPMENT AND INTERNET ACCESS

To use Floreo, a Learner device, a Coach device, and a wifi signal are all needed. The wifi wirelessly connects the two devices.

Learner device options:

- iPhone 7 or more recent running iOS 15.0 or later, and any compatible Google Cardboard VR headset that fits your iPhone. This setup can be used by children as young as 5 years of age and can be used by Learners through adulthood.

OR

- a Meta Quest compatible headset. This may be used by anyone 10 years of age or older.

OR

- a PICO Business compatible headset. This may be used by anyone 10 years of age or older.

Coach device: Internet-connected device with a browser. The following browsers are compatible with Floreo: Safari, Chrome, Edge, and Firefox.

Wifi — Please note: The Coach and Learner devices do not need to be on the same wifi signal. Floreo is tele-health ready, so that a Coach could run a session from an office computer, while connected to the Learner's device at home. Then, the Coach would interact with the Learner over a teleconference call, such as Zoom, Teams, or Google Meet.

FLOREO CONTENT FROM DIFFERENT PERSPECTIVES

Due to its immersive nature, Floreo's various lessons provide many hidden learning opportunities. The content can be viewed from a variety of angles, and the application of the platform may be seen differently depending on the background of the Coach reviewing it. For example, Floreo's yoga lessons were developed as an emotional regulation lesson, and a social worker or psychologist may implement them as such. An SLP may look at these lessons and capitalize on all of the listening comprehension opportunities it offers, while an OT might use them as a motor imitation opportunity. The following are a few categories of lessons to consider:

Non-speaking individuals: The lessons related to Communicative Eye Gaze (joint attention and precursor skills related to joint attention) are accessible to these Learners, because the Learner simply shifts gaze in response to a particular event, such as a pointing gesture or the character's shift of eye gaze. Two of the imitation lessons ("Be a Copy Hero" and "Show 'Em What to Do") only require an action on the Learner's part, with the Coach determining when the action was performed adequately, tapping a button for the lesson to continue. The early gestures lessons are based on a simple play narrative. In these lessons, Learners impact their environment by demonstrating communicative gestures, such as pointing, waving come over, gesturing stop, etc. Non-speaking Learners can access many of the sensory experiences in the Emotional Regulation Skill Category, as well as engage with the street crossing lessons. Many of the other lessons can be adapted for use by non-speaking individuals. Users of AAC may be able to use the conversation-based lessons if they tip the headset up briefly, engage their personal AAC device, and then return to VR to continue the interaction.

Motor skills: As mentioned above, the Yoga lessons, the motor imitation lessons, and the communicative gestures lessons may be appropriate for learners who are working on motor targets. Additionally, there is a "Crystal Cave" lesson in the emotional regulation category in which Learners are asked to open and close their hands, lift and lower their shoulders, and then raise and lower their toes.

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Social skills: There is an extensive curriculum focused on conversational skills in the Floreo catalog, starting with greetings (differentiating between friendly, unfriendly, and neutral greetings) and progressing through small talk, chit-chat, and finally freeform conversations with an AI character. Of course, a variety of social interaction targets may be found throughout most of the lessons.

Listening comprehension: Coaches may find a number of listening comprehension opportunities throughout the lessons; however, the VR learning experiences that focus on animals and nature are a treasure trove for this skill. Floreo has also built a series of five lessons that target following directions of increasing length and complexity. The titles of these lessons all begin with the phrase, "Listen and Find".

Emotional regulation: Emotional regulation lessons range from serene, passive experiences (sitting in an aquarium, or sitting in a snowfall) all the way through guided meditation experiences in those environments. Breathing and body awareness are both emphasized in these lessons. The "Peaceful Painting" lesson encourages Learners to consider their emotional state prior to the VR experience and again following the VR experience.

Community-based skills: A critical skill for gaining independence is understanding how to navigate the community. Therefore, Floreo has developed lessons on understanding how a grocery store is organized, finding a bus stop, navigating airport security, as well as street crossing in various environments and under various conditions.

Employment readiness: Floreo partnered with the Tennessee Department of Intellectual and Developmental Disabilities (DIDD) to develop lessons on workplace readiness. These lessons take place in common work environments, such as a movie theater concession counter and a grocery store. In the movie theater, Learners are asked to manage a to-do list with one- and two-step operations, sometimes in the presence of interruptions or distractions. In the grocery store, Learners are asked to interact with one or two coworker characters to complete a job.

Safety skills: Safety skills are another critical area needed for gaining independence. Floreo's safety-based lessons include interacting with police officers, crossing the street safely, dealing with bullying behavior, safety at a swimming pool, and storing groceries.

Artificial Intelligence (AI) characters: For individuals who are 13 years old or older, Floreo has developed lessons involving conversations with an AI-driven character. These characters are able to have real-time conversations and respond to whatever the Learner says in the moment. The Coach is able to "prime" the AI character. For example, the Coach may ask the character to practice a job interview with the Learner or practice a difficult conversation with a roommate. The AI characters can also play word games, such as "20 questions". Guard rails have been put in place so that Floreo's AI characters will not deviate into inappropriate topics of conversation. Otherwise, with these characters, the sky is the limit.

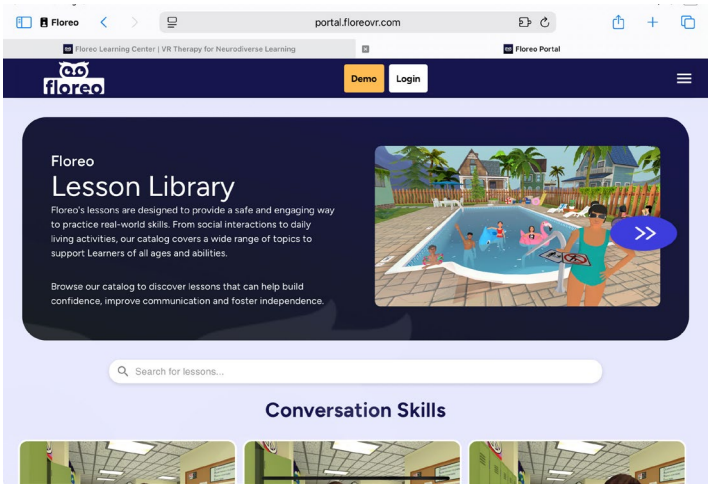

Figure 4: The full Floreo catalog with lesson descriptions may be found here.

MAKING AN IMPACT (ACCOUNTS FROM FLOREO USERS)

In December 2024, Floreo co-hosted a webinar with Multiple (https://www.multiplehub.org/). This webinar featured 3 different users of the Floreo platform. These videos provide authentic, first-hand experiences with the product.

A Speech Language Pathologist (SLP) from a private practice in Texas shared her experience using Floreo VR with her clients during the webinar. This SLP discussed how the tele-VR capabilities of Floreo allowed her to maintain an active practice during the recent pandemic and credited Floreo with making it easier for parents to continue in-person services once the restrictions were lifted. She has found Floreo practical to use with a variety of her clients. She incorporates parents into the therapy session with young children and described how Floreo is a good avenue for enhancing parent engagement with the therapy. She reported that by introducing VR to one of her clients, she was able to draw out this non-speaking 8-year-old in a way no tool or

YouTube Video: An SLP's experience using Floreo.
https://youtu.be/cczCKwJ8AMo?si=slaxcOKFoTATHO7J

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approach ever had before. This SLP heard the first vocalizations from this little girl when she was in VR and discussed how Floreo was able to provide the 8-year-old with some self-regulation at the beginning of the therapy sessions. The SLP mentioned finding the emotional regulation lessons useful for helping a stuttering client, and the grocery store lessons being useful for an older client who needed to gain daily living skills. She noted that using Floreo brings happiness to her clients and described Floreo as a "game-changer". To see the full video, click here: An SLP's experience using Floreo

In this webinar, a teacher also provided her experience using Floreo in her classroom in New York. This special education teacher and clinical supervisor leads a reduced-ratio classroom that serves autistic students, some of whom are expected to transition to a mainstream setting. Initially apprehensive (as she did not consider herself an avid user of technology), she stated that she quickly felt very comfortable using the Floreo system. She has found Floreo quite helpful for practicing social interaction skills. In particular, it provides environments that are not available in her school setting (such as a school cafeteria) that are highly relevant to students who are transitioning to a more typical school setting. She is seeing generalization of skills learned in Floreo to real events and interactions. This teacher found lessons that focus on prosocial skills in the classroom (such as raising your hand and tolerating not being selected) very helpful as well. Floreo uncovered at least one gap in her student's learning that would not have been evident without Floreo. This teacher found it very helpful to have similarly aged peers to practice conversations, rather than practicing with an adult. To view this full video, click here: A teacher's experience with Floreo

YouTube Video: A teacher's experience with Floreo.
https://youtu.be/efoaNyTAOTM?si=LPu_iaA-ssfPEruE

Finally, a parent of a 25-year-old daughter with multiple disabilities, including ASD, joined this webinar. The family lives in Alabama, and when this mother's daughter was young, they moved from a more rural area to a more urban area to have greater access to services. Over the years, this mother spent quite a bit of time and energy creating individualized materials for her daughter to support her learning. She stated that when she came across Floreo, she found the content highly applicable to her daughter and was thrilled to have it already created for her. This parent engages a person on her daughter's current support team to help implement the Floreo lessons with her daughter. Together, this mother and the support person review the library and find lessons that would be helpful for the daughter in the community, such as crossing the street and interacting with police officers. After practicing in Floreo, they have seen her daughter's ability to generalize, not only the community-based lessons, but also, in "Cloud Chronicles", a lesson that the daughter requested, designed to develop imagination and storytelling. This mother stated that her daughter began to use the system in short increments, but her tolerance for VR quickly increased. Her daughter is motivated to use the lessons and particularly enjoys the Yoga lessons in Floreo. This full video can be viewed here: A parent's experience with Floreo

YouTube Video: A parent's experience with Floreo
https://youtu.be/cTGdFj6QkSQ?si=ZoZQoWNzKpmPmjCT

Additional testimonials can be found here.

CONCLUSION

Floreo is an engaging, flexible, and efficient VR tool that can be used by a wide variety of professionals, caregivers, and individuals. Its safe, controllable, and repeatable features contribute to each lesson's effectiveness and popularity. Floreo lessons capture a Learner's attention, saving professionals and caregivers significant time and effort. It delivers a ready-made learning environment and encourages collaboration between students, professionals, and caregivers. Most importantly, it fosters a Learner's confidence and emotional well-being.

PRODUCT DESCRIPTION

Floreo is an evidence-based tool, rooted in research, and has received FDA "Breakthrough Device" designation. An ongoing randomized clinical trial is currently being conducted on Flo-

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reo in an effort to secure full FDA approval. Floreo expects that the results of this research will support FDA approval as well as the application of the conversion of the temporary CPT-3 billing code for "VR Assisted Therapy" to the more well-established CPT (Category 1) code. The current CPT-3 code for "VR Assisted Therapy" is 0770T.

Floreo is offered as a subscription service. The base subscription is $70 per Learner per month, with greater discounts available as the number of Learners increases.

For more information or to sign up for an online personalized demo, visit: https://floreovr.com/. If you have a particular question, please reach out to info@floreovr.com.

SELECTED RECENT RESEARCH ON VR IN THERAPY

Carballo-Marquez A, Ampatzoglou A, Rojas-Rincón J, Garcia-Casanovas A, Garolera M, Fernández-Capo M, Porras-Garcia B. **Improving Emotion Regulation, Internalizing Symptoms and Cognitive Functions in Adolescents at Risk of Executive Dysfunction—A Controlled Pilot VR Study.** *Applied Sciences*. 2025; 15(3):1223. https://doi.org/10.3390/app15031223

Mills J, Duffy O. **Speech and Language Therapists' Perspectives of Virtual Reality as a Clinical Tool for Autism: Cross-Sectional Survey**. *JMIR Rehabil Assist Technol*. 2025 Feb 27;12:e63235. doi: 10.2196/63235. PMID: 40014826; PMCID: PMC11884707.

Trigueiro MJ, Lopes J, Simões-Silva V, Vieira de Melo BB, Simões de Almeida R, Marques A. **Impact of VR-Based Cognitive Training on Working Memory and Inhibitory Control in IDD Young Adults.** *Healthcare (Basel)*. 2024 Aug 26;12(17):1705. doi: 10.3390/healthcare12171705. PMID: 39273729; PMCID: PMC11395001.

Smith MJ, Sherwood K, Ross B, Smith JD, DaWalt L, Bishop L, Humm L, Elkins J, Steacy C. **Virtual interview training for autistic transition age youth: A randomized controlled feasibility and effectiveness trial.** *Autism*. 2021 Aug;25(6):1536-1552. doi: 10.1177/1362361321989928. Epub 2021 Feb 10. PMID: 33567883; PMCID: PMC8324503.

Chard I, Van Zalk N, Picinali L. **Virtual reality exposure therapy for reducing social anxiety in stuttering: A randomized controlled pilot trial.** *Front Digit Health*. 2023 Feb 9;5:1061323. doi: 10.3389/fdgth.2023.1061323. PMID: 36845336; PMCID: PMC9947508.

Parish-Morris, J., Solórzano, R., Ravindran, V., Sazawal, V., Turnacioglu, S., Zitter, A., Miller, J. & McCleery, J. (2018). **Immersive Virtual Reality to Improve Police Interaction Skills in Adolescents and Adults with Autism Spectrum Disorder: Preliminary Results of a Feasibility and Safety Trial.** Proc of the 23rd Annual CyberPsychology, CyberTherapy & Social Networking Conference, Gatineau, Canada.

Ravindran V, Osgood M, Sazawal V, Solorzano R, Turnacioglu S. **Virtual Reality Support for Joint Attention Using the Floreo Joint Attention Module: Usability and Feasibility Pilot Study.** *JMIR Pediatrics and Parenting*. 2019;2(2):e14429. doi:10.2196/14429. ■

Closing The Gap 2025 CONFERENCE

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

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

43RD ANNUAL CONFERENCE

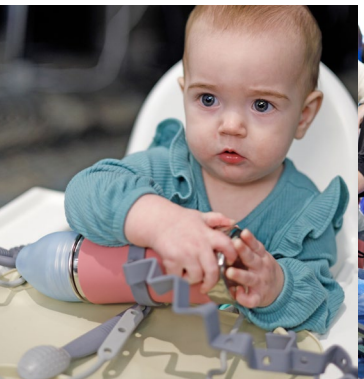
OCTOBER 21-24, 2025

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

DOUBLETREE BY HILTON HOTEL BLOOMINGTON

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

The Closing The Gap Conference is an annual assistive technology conference that presents an opportunity to deepen your assistive technology (AT) knowledge and strengthen your implementation strategies. The conference week is designed to dig deeper into critical areas that have the power, when implemented strategically, to transform your classroom, your school, your district, your practice. When you start thinking differently about how to reach ALL students, how to infuse technology into learning, how to leverage AT strategies in all areas – then we begin to transform these areas and ultimately increase achievement and independence.





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!*

In-Depth Exploration: Unique to Closing The Gap, you'll find 1-hour and 2.5-hour sessions that provide participants with a deep dive into the latest topics in the field.

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.

CONNECTIONS

Where the AT Community Comes to Network and Learn

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
- deaf and hard of hearing
- 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

The Current "State" of Special Education Is Not Sustainable ~

Period, Full Stop

Abstract: Special education teachers face significant challenges, both within their districts and in their daily work. Fewer educators are entering the field, and those already in it are leaving at historically high rates. This article explores the hurdles special educators encounter and highlights how Boom Learning is working to support them. One of the greatest struggles special educators face is accessing and implementing appropriate instructional materials. They need content that is differentiated, accessible, and supported by effective data collection tools—yet many districts provide limited support in these areas. Boom Learning, the creator of Boom Passport, addresses these challenges by equipping teachers with the tools they need. Boom Passport offers access to over 80,000 standards-based lessons spanning Pre-K through grade 22. The platform covers a wide range of subjects, including reading, writing, math, science, social studies, transition skills, and related service topics, ensuring educators have the resources to meet diverse student needs.

The issue is easy to state, easy to see, easy to speak of, but **VERY** hard to solve. The United States currently does not have enough qualified, well trained, and certified special education teachers. The funnel of new special educators entering the profession has been on the decline since the early 2000s. As suspected, all available data support these facts. Solutions however vary from school to school, district to district, and state to state. What works in one area often does not apply to another—and vice versa. Let's first examine the data and the key issues—and then explore how edtech companies like Boom Learning are working to support the special education community.

KEY FACTS:

We don't have enough special education teachers entering college programs or pursuing these studies. According to the American Association of Colleges for Teacher Education (AACTE) and Title II Higher Education Act (HEA) reports:

- The total number of college students completing special education teacher preparation programs dropped by nearly 20% between 2008 and 2020.
- In 2008, approximately 18,000–20,000 candidates completed special education prep programs. By 2020, that number had dropped to around 15,000–16,000.
- Since 2012, the number of teacher preparation programs in special education has dropped significantly, contributing to ongoing national shortages (edresearchforaction.org).
- Typically, around 17% of education students pursue special education licensure programs but many opting for dual licensure often end up in general education placements (1disabilityscoop.com).
- In California, only about one-third of new special education hires are fully certified. Approximately two out of three enter the classroom with provisional credentials, underprepared to teach (learningpolicyinstitute.org).

JOHN STANDAL, MS/CCC-SLP, ATP brings over 30 years of experience helping organizations solve complex challenges and drive meaningful outcomes within the special education space. During these years John has consulted, presented and trained nationally and internationally on topics ranging from AAC best practices to content creation and universal design for learning. John has worked for companies throughout the years including Tobii, n2y, Presence Learning and is currently the Vice President of Growth for Boom Learning.

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PROPORTION OF SPECIAL EDUCATION DEGREES

- In the early 2000s, special education degrees accounted for about 11–13% of all education-related degrees.
- By 2020, that figure had fallen to around 8–10%, according to data from the NCES Digest of Special Education. Teachers are not only not entering the profession - but they are also leaving it at a historic rate.
- Special Education Teacher turnover is roughly twice that of general education. Studies show that special educators leave the profession at nearly double the rate of general education teachers. In 2012, annual attrition was ~15% for special educators compared to much lower for general education teachers (edresearchforaction.org).
- Special education teacher attrition is high: Multiple sources, including NCES and academic studies, report that approximately 50% of special education teachers leave the profession within their first five years (educationnext.org).
- The annual departure rate is approximately 8.5%, with an additional 9.2% switching schools. One NCES report (2020–21) showed 8.5% of public school teachers left the profession entirely, while 9.2% transferred to different schools—a significant turnover burden for schools and districts (educationnext.org).

Given that fewer teachers are entering the profession - and staying in, we must ask a simple but difficult question: **"Why?"**

- **Why** don't we have enough qualified teachers in our classrooms?
- **Why** aren't more students pursuing special education programs in college or university?
- **Why** aren't we supporting and compensating special education teachers adequately, so they stay in the profession?

Once in the classroom, special education teachers face numerous hurdles and are often not adequately prepared by the time they graduate. They are underpaid, have unhealthy levels of stress, not enough in-classroom personnel support, and often their administrators are not trained well on how to support them and their students. There are currently no college classes on "how to hire and/or manage qualified paraprofessionals" or "how to get more administrative support in my classroom." Many classroom management skills are learned in the classroom during their first few years, leading to stress and a higher level of job dissatisfaction.

LET'S DISCUSS THESE HURDLES IN MORE DETAIL.

POOR PAY, STRESS, LACK OF SUPPORT

The special education industry faces a critical teacher shortage due to high stress, insufficient pay, low prestige, and inadequate preparation and support. Current data shows that at the start of the 23-24 school year, 21% of public schools reported an inability to be fully staffed in their special education department (edweek.org).

According to the Department of Education about 8 percent of teachers who work with children, who qualify for services under the Individuals with Disabilities Education Act (IDEA), are not fully certified for their job placements (ed.gov). In the 2022-2023 school year, there were approximately 531,600 special education teachers employed in the United States, according to the Bureau of Labor Statistics. These teachers work with students from preschool through high school, providing specialized instruction and support. Of these, there are ~42,000 special educators working that are not certified for their current placement in the United States.

Special education teachers must juggle case management, multi-grade and/or multi-level student/curricula issues, increasing paperwork and documentation loads, family meetings and knowledge of local, state and federal compliance laws. These added job responsibilities, lack of support and low pay lead to the "burnout" numbers and stress discussed above.

LACK OF TIME, LACK OF RESPECT

Special education teachers find themselves dealing with time constraints (limited prep time, not enough "in classroom" support/guidance) and having to learn many skills during their first few years in the classroom. They are also asked to teach with little or no formal or district-adopted instructional materials. Often, they are creating or modifying their materials on nights and weekends to meet the needs of their students. The lack of materials and lack of time put special education teachers into a vicious circle.

Besides the lack of time, special education teachers often must deal with social and perceptual stigmas that can include that they have an "easier job", lighter workloads, more classroom support and less oversight by building and/or district administrators. These perceptions are often false, and in fact, often the opposite is true. Often special education teachers find themselves with very limited time to complete their work while in their school building and find themselves working extra hours on nights and weekends. "Nearly 9 in 10 teachers said they work more than the standard 40 hours each week, compared with less than half of all working adults." (Edweek Publication).

Therefore, from a pure financial and instructional support standpoint these teachers often find themselves struggling with time management and professional isolation, and their administrators' hands are often tied due to diminishing budgets or a pure lack of supplementing additional educators or paraprofessionals. Some simple solutions to address the lack of time and lack of respect are;

Improving Lack of Time

Reduce Administrative Burden (Boom Learning is a great solution and will be discussed later in this article

- Streamline IEP paperwork with better digital tools and templates

- Consider IEP writing days built into the calendar (already implemented in some districts).

Smarter Scheduling

- Allocate protected time during the school day for case management duties.
- Ensure reasonable caseloads aligned with state and federal guidelines.
- Coordinate with general ed teachers to reduce overlapping responsibilities.

Use or acquisition of Paraprofessionals

- Assign and train paraeducators to handle routine or non-instructional tasks.
- Empower paraeducators to provide academic support under the teacher's guidance.

Technology Integration (Boom Learning is a great solution and will be discussed later in this article).

- Use apps or software to track progress and share updates with parents and staff efficiently.
- Automate data collection with tools that reduce redundancy.

Improving Lack of Professional Respect

Professional Development (PD) for All Staff (Boom Training Academy can support districts with PD as we will discuss later in this article)

- Require schoolwide PD on inclusion, equity, and the role of special educators.
- Train general ed teachers on collaborative teaching models (co-teaching, push-in support).

Cultural Change in Schools

- Recognize and celebrate special ed achievements publicly.
- Include special ed teachers in decision-making bodies, leadership teams, and committees.
- Use peer mentoring programs to build relationships between general and special ed staff.

Administrative Support (Boom Training Academy can support districts with PD)

- Train administrators to advocate for and support special ed staff explicitly.
- Encourage principals to defend teacher planning time and set norms for interdepartmental respect.

Visibility and Advocacy

- Create opportunities for special ed teachers to present at staff meetings, parent nights, or PD days.
- Encourage community engagement to raise awareness about the scope and impact of special education work.

LACK OF STANDARD-BASED MATERIALS OR CURRICULUM

Special education teachers face several challenges in finding and using appropriate content and lessons for their students, including adapting materials to different learning styles and needs, ensuring accessibility, and staying current with best practices. Educators face specific challenges that also include time constraints, limited resources (including data tools), lack of multidisciplinary support for implementation and training, and navigating complex Individual Education Plans (IEPs) and laws.

These teachers have a constant need to adapt their content to meet their students' diverse needs, addressing accessibility requirements, inclusion barriers, limited resources, evolving best practices, curriculum implementation challenges, and ongoing social and professional stigmas.

Special education teachers are constantly having to modify current content to meet the needs of the students in their classrooms. To accomplish this, they often take general education content and make modifications to these materials to help their students learn. Very often accessibility in the form of visual, auditory and motor access are not addressed, and skill and/or age-appropriate considerations are not applied either. Often the materials lack accessibility and are just not age respectful, forcing teachers to use immature content for older students. Teachers are not adhering to best practices, which again adds to their stress and can increase negative student behaviors.

It has been noted that often special education teachers are using old, outdated and uninspiring content purely because there is nothing available, and current publishers are not updating their content. Special Education Publishers have been trying to address the lack of K-12 content for students with special needs, but because these students often need their content modified or accommodations put in place many of these available solutions still fall short.

LACK OF FUNDING = "DO MORE WITH LESS MONEY"

Every State and Local Education Agency (LEA) is expected to identify more students with special needs and support them with less money. While the prevailing view is that increased funding generally improves student outcomes, schools can implement strategies to "do more with less" by focusing on targeted interventions, leveraging technology and optimizing resource allocation. These strategies aim to enhance efficiency and effectiveness within existing budgets, rather than relying solely on increased funding (www.aft.org).

- IDEA funding remains below requirement: The federal government still funds only about 15% of special education costs, far short of the 40% IDEA target, forcing states and districts to cover the rest (forbes.com).
- Rising local burden: Districts now shell out up to 25% of their general budgets on special education due to growing student numbers and costly services.
- Special education enrollment is increasing at an accelerated rate: nearly 8 million students, with upwards of 1 million new enrollees expected between 2021 and 2025 (k12dive.com).
- Per-pupil special education costs are roughly double those of general education, straining local budgets. Districts of-

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ten absorb the excess, sometimes up to 25% of total local K–12 spending (forbes.com).

The fact that there has been an increase in student identification increase while a continued decrease in funding is paradoxical. In short – do more with less. This is not a formula for success in the special education community – this is the polar opposite and sets up students and teachers for frustration and failure.

LET'S LOOK AT A SOLUTION ~ BOOM PASSPORT

BOOM LEARNING – NOT ONLY AN ACADEMIC SOLUTION BUT A TRUE EDUCATIONAL PARTNER

Mary and Eric Oemig invented Boom Cards to help students who needed extra support or were behind with some skills. Little did they know when they founded the company in 2012 that by 2025, they would have more than 1 million educators utilizing their platform and 12 million students that have interacted with Boom Cards more than 3 billion times. Boom Cards have turned out to be exceptional for all learners, especially those needing extra supports and powerful for educators and therapists.

From the start of Boom Learning through COVID, Boom Learning's focus was to support individual teachers and their classrooms through Boom Cards, and they have demonstrated amazing results with over 1.2 million teachers relying on the platform. In 2023 Mary and Eric wanted to support entire schools and school districts and thus developed Boom Passport, a collection of curated content that provides special education teachers with access to tens of thousands of standard-based, differentiated and data driven lessons and activities.

"Boom Learning truly understands the hurdles that individual teachers and school districts are struggling with right now. Our mission is to support our district partners with quality content and industry leading technology and training tools", said John Standal, Vice President of Growth.

"Start Teaching, Stop Searching" - Boom Passport was developed to support the needs of special education classroom teachers and address many of these instructional, school and/or district level issues. Boom Passport teachers can access over 80,000 standard-based lessons covering Pre-K-Transition extension activities addressing: reading, writing, math, science, social studies, transitional and related service topics. Passport also offers teachers the ability to simply modify or differentiate lessons and assign them to individual students, small groups or entire classrooms to build student agency. Boom Passport gives the educator tools to collect benchmark and ongoing student data to check/modify their instructional trajectory and/or track student growth or regression.

Often teachers find themselves recreating or searching for lessons or activities that are already available. They find themselves spending their time and money to create individualized lessons for their students. This is not an effective use of their time, and this is why Boom Learning created Boom Passport. Boom Passport includes;

- 80,000+ lessons and resources for self-contained through resource level students
- Pre-K – Transition extension activities that are age and grade-level specific
- Ability to differentiate lessons to meet students at their cognitive level
- Age respectful – age-appropriate graphics or reading levels for secondary students
- Ability to assign lessons to individual, small group or classes with data collection
- Ability to export data for IEP goals
- Device agnostic – use Boom Passport with ANY web-based device
- Print based lessons – ALL lessons can be printed off for instruction
- Classroom based licensing for $299 per teacher

Image 1: Boom Passport offers over 80,000 lessons/activities

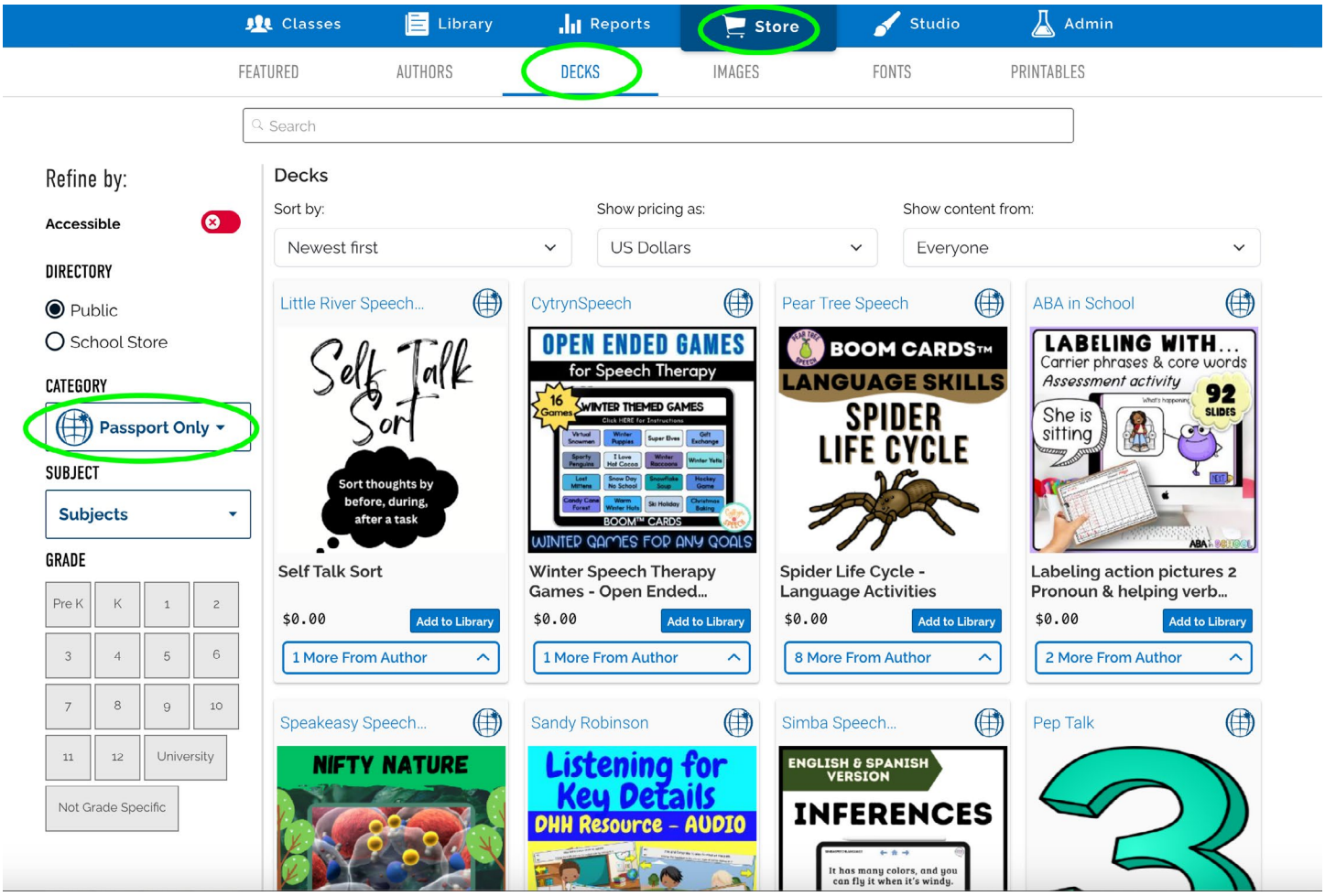

Image 2: Boom Passport Library – search and teach!

BOOM STUDIO

With Boom Passport all educators have access to Boom Studio, a creation tool that allows educators to build their own instructional content for their classroom or district needs. Boom Studio lets educators create custom, interactive materials, and then they can be filed in the school district library for other teachers to use.

- **Create your vision.** Boom Learning has been a leader in providing educators the ability to create individualized lessons and materials since its inception. Lessons can be created, and usually the only limitation is the lack of the educator's creativity. With Boom Studio an educator is free to build and modify their lessons to meet each student's individual needs.
- **Share content.** Often teachers build powerful and useful content or lessons and use them in isolation in their classrooms, but other teachers within their school or district cannot access them or are unaware of them. With the ability to "share content" any Boom Passport subscriber within that district's account can be given access to other teachers' content.
- **Personalize your instruction**. With Boom Studio a teacher can upload any image for their class or individual student to truly customize or differentiate their instruction. Very often our students need very concrete representations of their world. With the ability to upload symbols, images or graphics, an educator can customize a student's lessons to meet their specific student's objectives.
- **Learning is for ALL.** Students often need their content to be accessible to address their motor, auditory or visual needs. Making lessons (decks) accessible is easy with Boom Studio: imagine your students' needs, use the Boom Studio tools to build the content and apply the accessibility frameworks you need to meet that student needs. Educators can predetermine alt-text and then upload their own images, sounds and fonts.
- **Collaborate with colleagues!** With Studio every educator has the ability to add another colleague within the Boom Passport licenses to utilize lessons or decks they have built. This allows for a true multidisciplinary approach for educators, support and/or related services staff.

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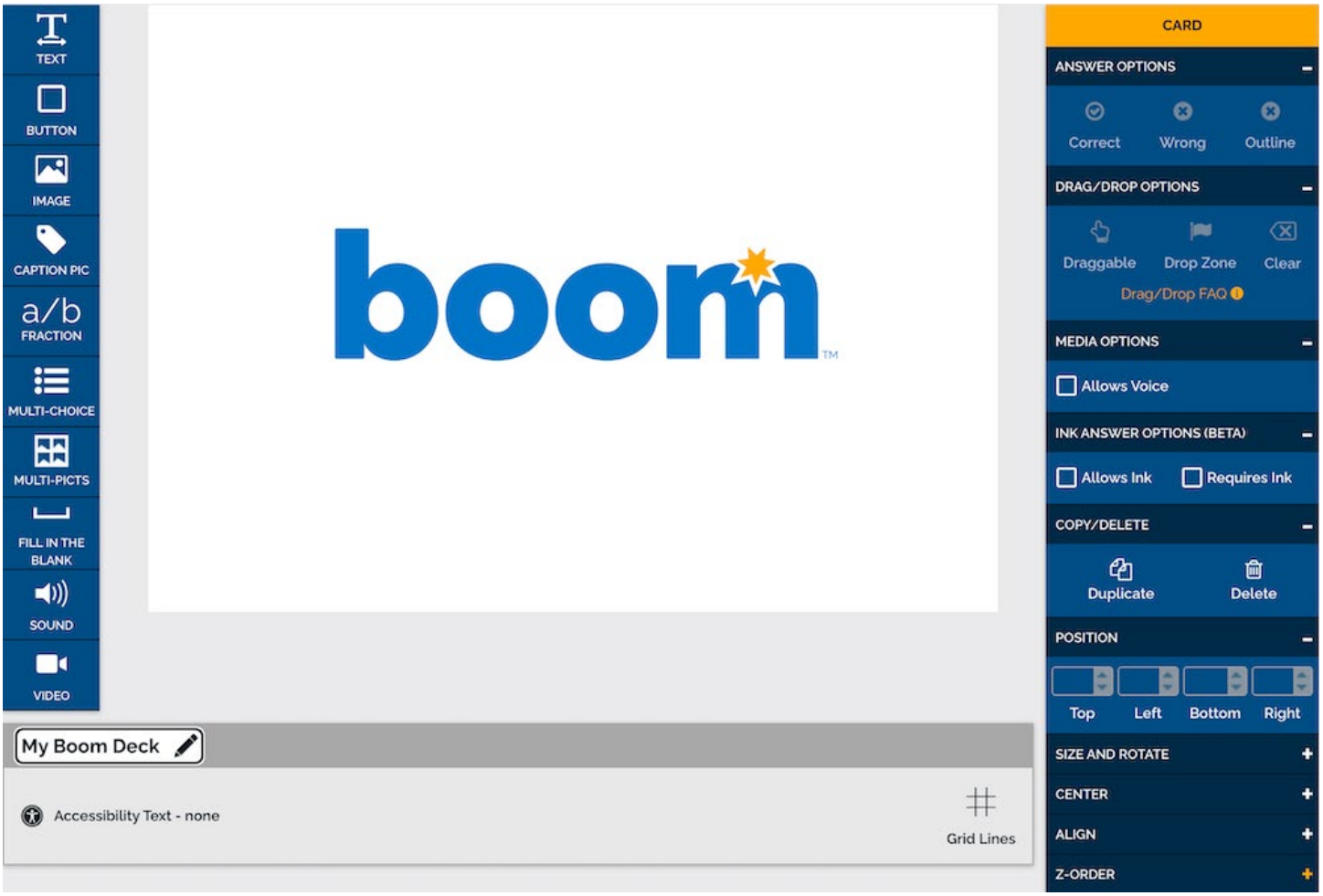

Image 3: Boom Learning's Creation Tool – Boom Studio

Image 3A: Creating with Boom Studio is easy!

DATA DRIVEN INSTRUCTION

As discussed previously, meaningful instructional data that provides educators with actionable outcomes has been an issue within the special education industry. With Boom Passport, student data can be automatically or manually input to capture student growth or regression. The data tools within Boom Passport simplify the educator's job of collecting meaningful and useable IEP data. Reports come with visualizations, and the data can be easily exported to support a multidisciplinary team's decision making and student placement. An educator can view not only longitudinal data sets but also response times and patterning to capture error patterning and response time.

An educator can see every student, group or classroom data set to see;

- at a glance who has completed a lesson
- how often a student has played a deck
- if a student's accuracy percentage improved across all plays
- if a student improved on subsequent attempts
- how quickly students answer and how they are spending their time
- how many of the cards in a deck have been mastered (gems earned

BOOM TRAINING ACADEMY (BTA)

Assimilating new materials in the classroom is often daunting, and without support from the publishers many schools or districts struggle during the first year of implementation.

The hurdles special educators have with lack of quality content are not the only hurdles they face with their daily instruction. They also deal with lack of implementation support from the district and publishing company. Districts often ask these teachers

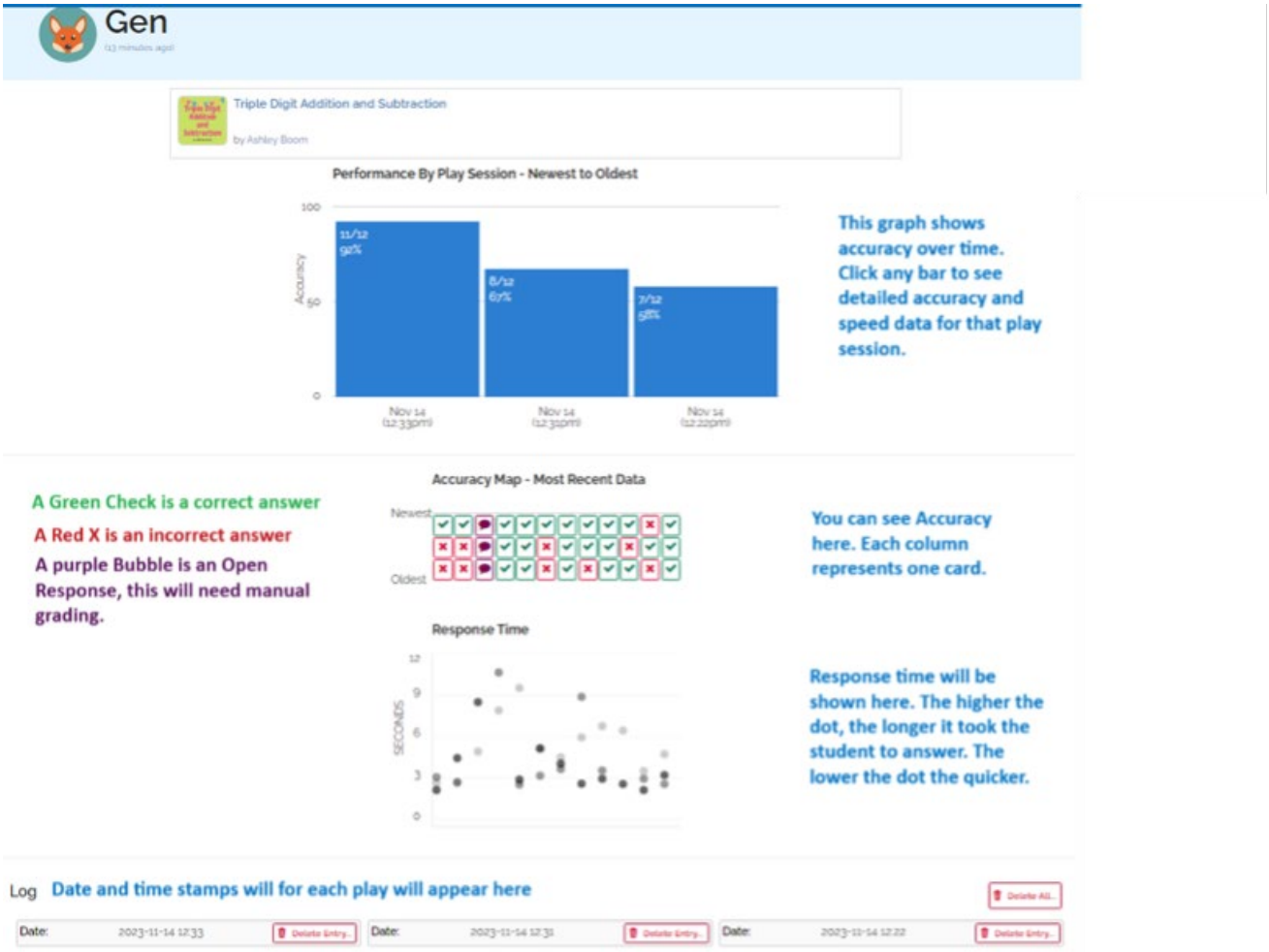

Image 4: Boom Passport allows teacher to track longitudinal data

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to explore, learn and implement these materials with little to no support. Curriculum implementation often fails without administrative guidance and support.

In a report from ED Reports and RAND (2021-2023) it was found that over 60% of US school districts reported challenges with professional development and support when implementing new materials (https://edreports.org). With this high percentage of challenge, it is not surprising to see offerings fail or just be abandon early in the adoption process.

That's why Boom Learning is in the process of developing Boom Training Academy, a comprehensive training program designed to fully support current and new teachers adopting Boom Cards and Boom Passport with online and in person training modules. Stefanie Claros, the Boom Training Academy Manager, says, "No matter where an educator or district is in the adoption process, our goal is to provide targeted, practical support. Product training is only the beginning. Our goal is to partner with educators to build confidence and consistency because true success comes from shared investment and ongoing.

BOOM LEARNING SUPPORTS COLLEGE/UNIVERSITY PROGRAMS

Waiting to address the issue that new teachers do not get enough exposure or training with quality content, Boom Learning works closely with university programs across the US. Boom Learning believes in supporting students studying to become special education teachers by offering their professors the ability to provide them free access to a Boom Cards account during their university training. This offering is designed to allow special educator candidates to learn and explore curricula designed to meet the needs of K-Transition level students and their cognitive, social and/or academic needs. To get more information about this offering, follow this link (Boom Learning University Sign Up). This free program allows professors and students to explore grade-level, differentiated and age-appropriate content offered in Boom Passport to give students exposure and instructional training.

IN SUMMARY

As stated from the start of this article, "the issue is easy to state, easy to see, easy to speak of, but **VERY** hard to solve". The solution to this academic crisis is not easy. The United States educational community is educating/training fewer special education teachers, there is an increase in identification of students with special needs, lack of federal and LEA funding, lack of educator pay, lack of quality administrative support and a lack of quality and instructional tools within the schools and classrooms. Boom Learning is attempting to support educators, administrators and related service professionals with quality content, data tools, training and implementation support, but in isolation it is an uphill climb.

In an effort to bring these deficits to light, below are possible solutions that could be (or should be) addressed and/or implemented at the Federal or LEA level, but as stated previously there is not a "one size fits all solution" to this educational crisis. Districts need to analyze where and what their hurdles are and to work on minimizing their impact to support their educators and students.

SYSTEMIC FUNDING REFORMS

Increased Federal IDEA Funding
- Fully fund the federal commitment to cover 40% of special education costs (currently closer to ~13%).

State-Level Investment Incentives
- tates must create funding formulas that adjust for rising student needs, including mental health and neurodivergent profiles.

Outcome-Based Grant Programs
- Tie funding to measurable improvements in inclusion, outcomes, and staffing retention.

Predictable, Multi-Year Funding
- Schools need predictable funding cycles for long-term planning, staffing, and programs.

TEACHER WORKFORCE DEVELOPMENT

Teacher Recruitment Incentives
- Scholarships, loan forgiveness, and housing assistance for special education teachers.

Retention Programs
- Mentorship, support staff (e.g., aides, paraprofessionals), and mental health resources for special educators.

Alternative Certification Paths
- Fast-track, high-quality licensure programs for career changers and paraprofessionals.

SERVICE DELIVERY MODERNIZATION

Multi-Tiered System of Supports (MTSS)
- Implement strong general education interventions to reduce over-identification.

Expanded Early Intervention Services
- Invest in birth-to-5 services to address learning needs early and reduce later cost-intensive placements.

Teletherapy and Hybrid Support Models
- Leverage online services to reach underserved and rural populations..

DATA & ACCOUNTABILITY SYSTEMS

Unified State-Level Data Systems
- Track student needs, identification trends, and funding gaps across districts.

Root Cause Analysis Tools
- Identify why identification is increasing: academic gaps, trauma, language barriers, etc.

Transparent Budget Reporting
- Ensure clarity on how much is spent on special education and where gaps persist.

LEGAL & EQUITY FRAMEWORKS

Reevaluate Eligibility and Classification Criteria

- Ensure culturally and linguistically fair assessments that avoid over-identifying marginalized students.

Equitable Access to General Education Curricula

- Fund supports that allow more inclusive education and reduce costly segregated placements.

Advocate for Legal Reform and Flexibility

- Update IDEA and related laws to reflect modern service models, especially for students with overlapping needs (e.g., trauma, EL status). ■

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Low-Tech, Low-Cost Do-It-Yourself Assistive Technology

Summary:

This article explores how to create low-tech, low-cost, do-it-yourself assistive technology with everyday materials and a dash of ingenuity. Readers will gain a practical framework for safe, ethical, and user-centered design, along with pragmatic tips that acknowledge the realities of time, budget, and storage space. From toolkits to legal considerations, the piece blends replicable examples with humor and empathy, proving that sometimes the best solutions come from a glue gun, PVC pipe, and a strong cup of coffee.

INTRODUCTION: WHY DIY MATTERS

In the words of Steve Ballmer, "Accessibility is all about removing barriers and providing the benefits of technology for everyone." In a world where assistive technology (AT) can be prohibitively expensive, overly complex, or stuck in district paperwork (and sometimes insurance) limbo, low-tech and do-it-yourself (DIY) approaches offer affordable, accessible, and powerful alternatives.

For many end users with disabilities, a thoughtfully crafted low-tech tool can support independence, increase access to learning, and promote inclusion, sometimes more effectively than its high-tech counterparts. A pool noodle may not have the sparkle of a $2,000 commercial device, but if it helps someone grip a writing tool, suddenly the classroom becomes a place of autonomy and creativity rather than frustration.

This article introduces a framework for thinking about low-tech, DIY assistive technology: what it is, why it matters, how to create it ethically, and what tools and materials you will need to get started. Designed for educators, families, therapists, and makers of all kinds, these ideas are replicable, affordable, and adaptable for diverse users and environments.

DIY AT also represents a philosophy. It is about believing that end users deserve access now, not after six months of paperwork or approval cycles. It is about honoring the voices of disabled people by including them in decision-making. And it is about resisting the idea that only expensive, commercialized devices can provide dignity and independence.

DEFINING THE TERMS: DIY AND LOW-TECH AT

Do-It-Yourself Assistive Technology (DIY AT) refers to non-commercially fabricated supports made from commonly available materials. These tools are designed with the end user in mind, whether the goal is communication, motor support, sensory regulation, or increased independence.

Low-tech AT requires little to no technical expertise to use or maintain. It can be as simple as a modified spoon for better grip or a high-contrast visual aid. These tools are often devised or fabricated by a maker (educator, caregiver, therapist, or even the end user themselves) to meet a specific need.

SARA LUCAS-DREISS is a National Board Certified Exceptional Needs Specialist with more than 25 years of experience in education. She serves as a curriculum, instruction, and assessment specialist and as an adaptive art teacher for Montgomery County Public Schools (MCPS) in Maryland, where she specializes in working with low occurrence disability populations. Having multiple disabilities herself, Sara is both an assistive technology (AT) user and a maker, bringing personal insight as well as professional expertise to her work. She is also a national presenter, consultant, and advocate for accessibility and equity in the arts, providing professional development across the country on low-cost assistive technology, inclusive classroom strategies, and adaptive arts instruction.

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The most important feature of DIY AT is not its cleverness, but its responsiveness. It allows for rapid trial and error, prototyping, and feedback. Commercial solutions may sit unopened in a closet because they arrived six months too late, while a DIY solution made with foam tubing and Velcro can start supporting participation in real time.

DIY AT also acknowledges that technology is not neutral. The world has too often been designed for a mythical "average user," leaving disabled people to adapt after the fact. Low-tech AT flips this script: instead of forcing the end user to adjust, it bends the environment toward the needs of the person.

WHY LOW-TECH MATTERS

There are many benefits to incorporating low-tech AT into your classroom, therapy practice, or home environment:

- **Affordability**: Low-tech tools reduce reliance on high-cost, specialized equipment. A therapy chair may cost $600, but a booster made from layered foam and shelf liner may accomplish the same task for $20.
- **Ease of Use:** Simpler tools mean fewer barriers for both users and caregivers. Families already juggling complex care schedules may not have the bandwidth to charge, calibrate, or troubleshoot.
- **Custom Fit:** Tools can be adapted to the user's preferences, environment, and existing skills. One student's switch cover might have glitter and bright colors, while another's is sleek and soft reflecting sensory and tactile preferences.
- **Repairable and Replaceable:** Most items can be fixed or rebuilt quickly and at low cost. A broken foam grip can be replaced in minutes, not months.
- **Promotes Autonomy:** When thoughtfully designed, these supports preserve dignity and foster independence. Access is not a gift; it is a right. Low-tech AT recognizes that.

Low-tech solutions offer an efficient, low-risk entry point for exploring assistive technology. They allow educators, clinicians, and families to meet end users where they are, test interventions quickly, and reduce the stigma often associated with high-tech or medicalized devices.

Equity also plays a central role. Access to commercial AT is shaped by systemic inequities: which schools get budget allocations, which families can afford adaptive equipment, and which insurance companies approve claims. Low-tech AT democratizes access by providing more accessible solutions not tied to privilege. A cardboard switch may not look like much, but if it empowers someone to turn on their toy independently, it is priceless.

CONSIDERATIONS BEFORE CREATING DIY AT

SKILL AND TRAINING

Consider the skills required for both the maker and the user. The maker must have the knowledge and training to safely fabricate the device, while the end user must have the ability to use it effectively. If it takes an engineering team, a decoder ring, and an Alohomora just to utilize, the device probably is not as user-friendly as anyone had intended or hoped for.

COST, MATERIALS, AND TOOLS

Ask yourself: are the materials and tools affordable, easy to source, and realistic for the setting? An AT solution that relies on pricey, hard-to-find parts sets everyone up for big feelings if it breaks or gets abandoned. Everyday materials often work best. Corrugated plastic, for example, holds up better than cardboard in settings where the tool might get mouthed or come into contact with liquids. PVC and Velcro are also tried and true favorites, usually beating out boutique components on cost, availability, and repairability.

LABOR AND SPEED

When you're building a tool, time really matters. Some DIY AT projects may call for materials you don't already have lying around and have to order, or even help from an outside fabricator. That's when you have to balance durability, cost, and how quickly the solution is needed. If a device takes 40 hours to put together, it probably won't solve an immediate problem. On the other hand, quick prototyping can give the end user what they need right away, even if it's more of a "good for now" fix than a forever solution. Think of it as the duct tape of assistive tech: not perfect, but sometimes exactly what saves the day.

SAFETY

Safety needs to be considered from every angle. For the maker, ask whether the fabrication process involves risks such as hot glue burns, sharp blades, or the need for protective gear like safety goggles or a respirator. For the end user, think about potential hazards such as sharp edges, choking risks, or adhesives that might be toxic or release irritating fumes. The environment also plays a role. Could the device scratch equipment, leave sticky residue, or damage the end user's personal property? Safety should never be an afterthought. A design that creates more problems than it solves is not clever at all, and no one wants their DIY AT remembered as the project that set off the smoke detector. And trust me, I have come close a few times when soldering.

DURABILITY AND RELIABILITY

A good DIY AT solution should be built to last longer than a single use. Ask yourself if the device can withstand repeated handling, or if it is likely to fall apart after one enthusiastic trial.

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An array of low-tech, art oriented communication supports are arranged on a wooden surface. Features include PCS symbols, multilingual CORE vocabulary, and high contrast imagery with the caption, "Communication supports for inclusive art.

Reliability matters just as much. Will it consistently do what it is meant to do, or will it only work on good days and cause frustration the rest of the time? A sturdy, reliable tool saves time, reduces stress, and keeps everyone from resorting to the dreaded "well, it worked last time" explanation.

EASE OF REPAIR AND COMPATIBILITY

Things break. The real question is whether they can be fixed without a meltdown and a trip to three different hardware stores. A strong DIY AT design should allow parts to be replaced quickly with simple tools or commonly available materials. Repairs should feel like tightening a bolt, not rebuilding the space shuttle. Compatibility matters too. A device that works smoothly with other assistive technology already in use is far more valuable than one that constantly fights for attention. The best DIY AT is the kind that can be patched up on a busy Tuesday afternoon and slide right back into daily use without drama.

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PORTABILITY, SIZE, AND WEIGHT

A device only works if it can actually get where it needs to go. Consider whether it can be transported easily between settings or if it turns into a full workout every time someone tries to move it. A mount that is so bulky it blocks doorways or so heavy it requires its own rolling cart will quickly frustrate the team asked to use it, and frustration often leads to abandonment. The most effective DIY AT is lightweight enough to carry, compact enough to fit into everyday spaces, and sturdy enough to survive the trip without leaving a trail of broken parts behind. If moving it feels like gearing up for a cross-country road trip, it is probably time to rethink the design.

SENSORY FEATURES

Designs are more successful when they engage the senses. Consider whether the device supports tactile, visual, or auditory needs in ways that make it appealing to use. Covering a grip with a preferred textured material can encourage someone to pick it up, while adding sound or light can spark curiosity and sustain attention. Sometimes a glow or a buzz is the difference between a device that gets ignored and one that becomes a favorite tool. These small sensory details can turn basic DIY AT into something that feels motivating and enjoyable, not just functional.

SANITIZATION AND STORAGE

A great DIY AT device should be just as easy to clean as it is to use. In shared settings, ask whether the materials can handle frequent wiping, spraying, or even the occasional dunk without falling apart. Smooth surfaces, removable covers, and washable components all make a big difference when multiple people rely on the same tool. Storage matters too. Can the device be tucked away safely without taking over a closet or cluttering every flat surface in the room? A clever design not only works well in use, it also survives cleaning and fits neatly on a shelf when it is not needed. If it requires its own storage locker, it might be time to go back to the drawing board.

A fingerlight attached to a paintbrush handle illuminates the surface as the user watercolors, with the caption "DIY adaptive light-up paintbrush supporting creative expression.

SUSTAINABILITY

Whenever possible, choose materials that are recyclable, reusable, or biodegradable. A sustainable approach not only benefits the broader environment but also helps keep costs down and reduces waste. Cardboard, corrugated plastic, and repurposed household items can often do the job just as well as pricier specialty materials, and they give a second life to things that might otherwise end up in the trash. Think, too, about what happens when a device is no longer in use. If it can be taken apart and its pieces reused to make something new, you are supporting the circle of DIY AT tool life. After all, it feels pretty good when a device helps the intended user and saves the planet at the same time.

EVERYDAY TOOLS AND MATERIALS

Think of a good maker's kit as part toolbox, part junk drawer, and part MacGyver starter pack. With the right mix of everyday supplies, a classroom, garage, or therapy office can instantly become an innovation lab.

TOOLS

Start with the basics: scissors that actually cut, pliers that do more than pinch your fingers, and screwdrivers that match the screws you own. Add in a drill for when you want to feel powerful, a sander for when things are a little rough around the edges, and a heat gun for when you want to feel like you are wielding a magic wand. Toss in a leather punch, grommet press, snap pliers, PVC cutters, and even a coroclaw (because someday you will need to cut corrugated plastic, and you will be glad you have it).

ADHESIVES & MOLDABLE PRODUCTS

Adhesives are the best friends of DIY AT. Hot glue is quick, versatile, and fixes almost anything, though it usually leaves behind those stringy souvenirs as proof. Epoxy delivers a rock-solid hold but can be brittle, so one bad drop might undo a lot of effort. Wood glue is dependable for everyday fixes, while spray glue gets the job done but has a habit of covering more than just the intended surface. Velcro earns its place by making adjustments simple and comes in a wide range of sizes, shapes, and strengths. Moldable glue starts soft like clay and cures into durable rubber that sticks to nearly anything. Thermoplastic pellets and sheets are equally handy since they can be heated, reshaped, and tried again, making them the ultimate second-chance material.

TAPES

Tapes are the quiet problem-solvers of DIY AT, ready to hold, patch, or reinforce just about anything. Clear and masking tapes cover the basics, while painter's tape is perfect for tem-

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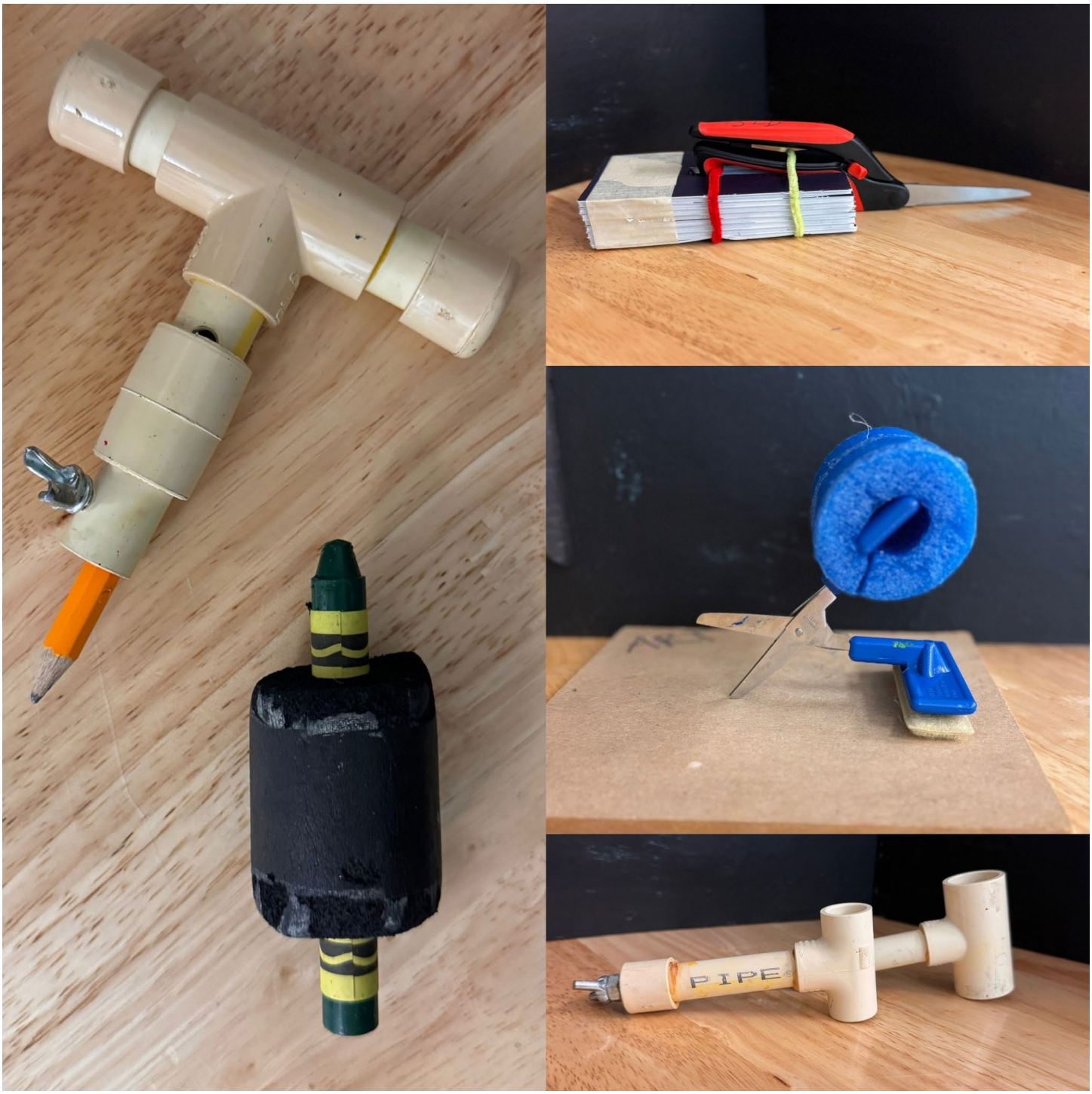
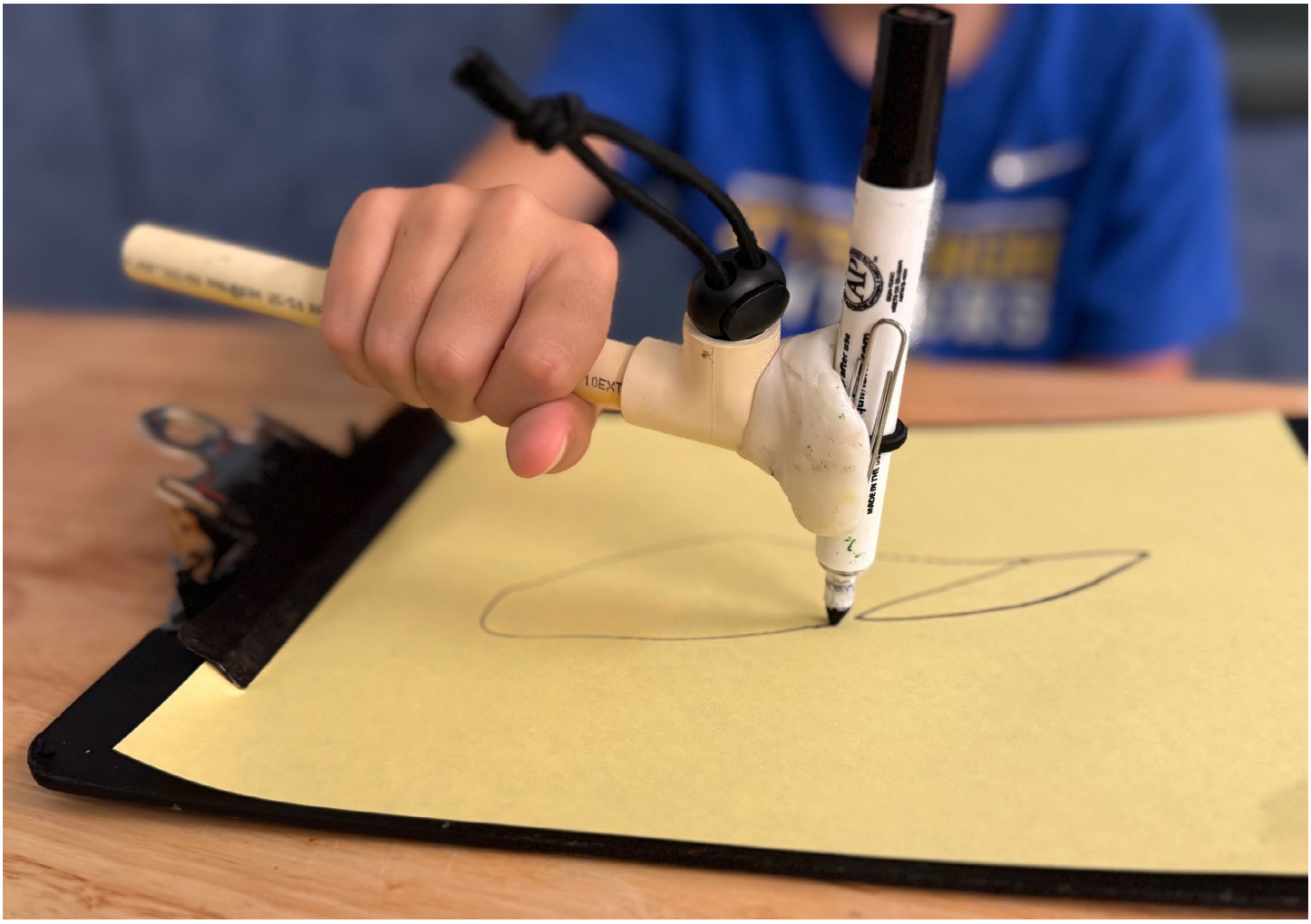
porary holds that come off cleanly. Duct and gaffer tape bring heavy-duty strength, and foam or grip tape add comfort and traction where it is needed most. Athletic and surgical tapes work well for wrapping or securing lightweight parts, while electrical tape is a go-to for quick fixes involving wires. Specialty options expand the toolkit even further: anti-slip tape for safety, carbon fiber and thermoplastic tapes for durability, self-fusing silicone tape for watertight seals, conductive copper tape for simple circuits, and repositionable or double-sided tapes when you need flexibility. With so many options, there is almost always a tape for the job, you just have to pick the right roll.



Picture collage of low-tech writing supports and adaptive scissors. Materials featured include corrugated plastic, PVC, pipe insulation, and a pool noodle , "Quick, low cost, low-tech supports for writing and cutting.



A user draws with an adaptive tool made from common materials, PVC and Thermoplastic, with the caption, "DIY tool holder providing stability and access for independent mark making."

READILY AVAILABLE MATERIALS

Everyday classroom and household supplies are DIY AT gold. Zip ties can become instant handles, holders, or restraints (for objects, not people). Cardboard is a blank slate for endless prototypes, from quick models to sturdy structures. Fabric scraps and elastic cords transform into sensory tools or custom supports with just a little creativity. Add in beads, pompoms, and bells and suddenly you are not just building AT, you are running an arts and crafts rave. Even the basics like pencils, pens, markers, paints, screws, nuts, bolts, speaker wire, or self-adhering bandage wrap can find a second life as clever adaptations. These familiar, low-cost items are often the quickest way to turn an idea into a solution, proving that sometimes the best AT starts in the junk drawer.

HOUSEHOLD & HOBBYIST ITEMS

Never overlook the mighty pool noodle. It is the duct tape of the aquatic world and a true DIY superstar, perfect for padding, positioning, or reshaping into just about anything. Shelf liner pulls double duty as a non-slip miracle, keeping items steady on desks or wheelchairs. Polymer clay can be sculpted into custom grips or adapters, while twist ties tame wires or morph into bendable tool holders. Even simple silicone molds, PVC pipes and joints, or laminating sheets can be repurposed into surprisingly durable solutions. Hobby electronics like mini switches, button lights, or stereo jacks may sound intimidating at first, but if a middle school robotics club can figure them out, so can you. With a little creativity, everyday household odds and ends quickly become the building blocks of custom AT.

ALLERGIES & SAFETY

One important reality check: not all materials are safe for every end user. Latex, for example, can cause severe allergic reactions, so it is wise to keep latex-free options in your stash. A helpful guide with safe alternatives is available from the Allergy & Asthma Network: Latex-Free Equipment Guide. Safety may not sound as fun as hot glue and pool noodles, but it keeps your brilliant ideas from turning into liability nightmares.

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BALANCING DIY INNOVATIONS WITH INTELLECTUAL PROPERTY CONCERNS

Creativity is at the heart of DIY AT, but makers need to tread carefully when borrowing ideas. Replicating or modifying existing commercial designs can cross into intellectual property (IP) infringement, which is no small matter. Infringement occurs when someone uses, sells, or distributes another person's protected work without permission, and the law takes that seriously.

Patents

A patent protects new inventions and improvements, granting the owner exclusive rights for a set period. The most common type is the utility patent, which covers over 90 percent of U.S. patents and is valid for 20 years from the filing date as long as fees are maintained.

Legal Process and Consequences

If infringement happens, the IP owner may pursue legal action. Typical steps include cease and desist letters, litigation, and settlements. Consequences can range from statutory damages (set by law) to actual damages (lost profits or market dilution), and even attorney's fees that the infringer may have to cover. In other words, this is one rabbit hole you really don't want to fall down.

Inspiration, Not Imitation

The safest path is to treat commercial products as inspiration, not blueprints. Patented designs can spark new ideas, but if your version checks all the boxes in a patent's claims, you may be in violation even if you didn't mean to be. Using different materials or processes can sometimes avoid infringement, but caution is essential. When in doubt, consult a patent professional before producing or selling items on a larger scale. In short: legality is no laughing matter, and it is always better to be safe than sorry.

GOOD HABITS FOR GREAT DIY AT

Creating DIY AT that is effective and ethical takes more than just a clever idea and a hot glue gun. A few good habits can make the difference between a tool that truly supports the end user and one that ends up forgotten in a supply closet.

- Start small: Focus on one end user, one need, and one solution. A mountain of ideas is exciting, but one tool that actually works is better than ten half-finished experiments.
- Involve others: Collaborate with families, end users, and community makers. Fresh perspectives not only improve designs but also catch problems before they become disasters.
- Document and reflect: Keep a log of what worked, what did not, and what was just plain weird. Your future self will thank you.
- Celebrate creativity: Host "maker days" that share designs, compare notes, and build capacity across the community. Involving high school students can be especially powerful, giving them hands-on experience with skills like soldering and switch adapting while sparking a habit of lifelong problem-solving.
- Revisit and revise: Needs change, and so should solutions. A good DIY AT tool grows with the user, not against them.

Sustainability also applies to the humans involved. Families and educators can feel worn out by constant trial and error. Sharing the work through lending libraries, maker spaces, or even a "pass-it-on" bin of materials spreads responsibility and amplifies the benefits. In the end, DIY AT is not just about tools, it is about building a community of problem solvers who know that sometimes the best fix comes from the recycling bin, a roll of tape, and a little shared laughter.

CONCLUSION: BUILDING A CULTURE OF INCLUSION

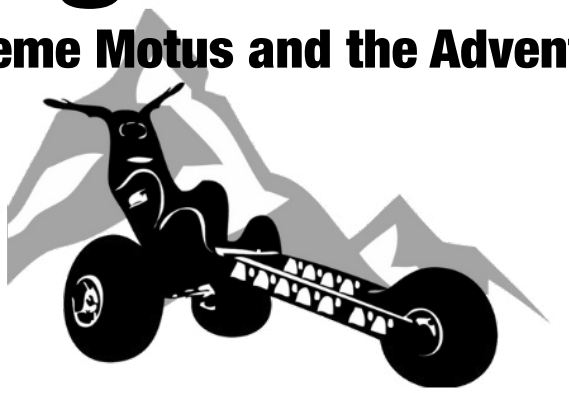
The value of low-tech AT is not in its price tag or sophistication, it is in its ability to empower. A piece of molded plastic, industrial twist tie, or repurposed beauty blender can unlock access, build confidence, and affirm identity. With a builder's mindset and a focus on dignity and autonomy, we can craft meaningful, sustainable solutions that truly change lives one DIY project at a time.

The beauty of this approach is its flexibility. Maybe you are a parent armed with nothing but a roll of duct tape, a therapist pushing a wobbly maker cart down the hall, or an end user with an idea that refuses to be ignored. DIY AT leaves the door open for everyone. And the more people who walk through that door, the more lives get better tools that work right now.

Equity, advocacy, and access are inseparable from this work. Every adapted tool pieced together from household supplies is more than just a quick fix. It is an act of resistance against exclusion, a declaration that disabled people deserve solutions today, not someday. And sometimes, that act of resistance starts with nothing more than scissors, hot glue, and the radical belief that everyone belongs. ■

Opening the Outdoors:

The Story of Extreme Motus and the Adventures of Sam & Ryan



Extreme Motus

Summary:

This article will tell the story of Extreme Motus, from its origins designing an all-terrain wheelchair to the real-life adventures of Sam and Ryan. Readers will learn what makes the chair unique, how it opens new possibilities for mobility, and how representation in media reinforces inclusion. Through case studies in adaptive disc golf, Bryce Canyon, Zion, and more, the article will highlight practical ways accessibility and adventure can truly go hand in hand.

INTRODUCTION – THE BARRIERS THAT SHOULDN'T EXIST

For many families, the outdoors is where the best memories are made—hiking trails, camping, exploring national parks, or even just a game at the local park. But for families who include a person with a mobility challenge, those opportunities often feel out of reach. Traditional wheelchairs simply aren't designed for sand, gravel, or steep trails. The result is exclusion, not because of a lack of desire, but because of equipment that wasn't built with adventure in mind.

At Extreme Motus, we believe that accessibility shouldn't stop where the sidewalk ends. That belief inspired a chair built for the toughest terrain and the deepest friendships—one that gave rise to the story of "Sam and Ryan."

This is our history, our mission, and our ongoing adventure.

THE HISTORY OF EXTREME MOTUS

Extreme Motus was founded with one clear goal: **to create an all-terrain wheelchair that makes the outdoors accessible to everyone.** Too many people were being left behind—at beaches, national parks, and playgrounds—because standard mobility equipment wasn't designed for those spaces. Our founders set out to engineer a solution that was tough, lightweight, and adaptable.

The first prototypes appeared in Utah, where rugged trails and sandy landscapes provided the perfect proving ground.

RYAN GRASSLEY, is the Chief Marketing Officer of Extreme Motus. He has worked with families worldwide to expand access to the outdoors for people with mobility challenges. He is passionate about blending storytelling, technology, and advocacy to build a more inclusive world.

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The Extreme Motus All-Terrain Wheelchair

The aluminum frames, oversized tires, and every safety feature were tested against real-world obstacles. Over time, the design evolved into a production-ready chair that could handle beaches, mountains, rivers, and everything in between.

Today, Extreme Motus wheelchairs are used not just in the United States but in Canada, Australia, Mexico, and the UK. They've rolled across beaches, desert dunes, mountain paths, and even snow-packed trails. The vision was never to build a "specialty product" for one activity, but a versatile tool that could go anywhere life takes you.

WHAT MAKES OUR ALL-TERRAIN WHEELCHAIR GREAT

The Extreme Motus all-terrain wheelchair isn't just a modification of a standard chair—it's a complete rethinking of what mobility means outdoors. Here's what sets it apart:

- **Balloon Tires for Any Surface**

Extra-wide Wheeleez® balloon tires act as natural suspension, gliding over sand, gravel, grass, and even floating in shallow water. What stops traditional wheels is just another playground for ours.

- **Lightweight Aluminum Frame**

At just 55 pounds, the frame is easy to transport and can be disassembled in seconds using quick-release pins—no tools required. Families can throw it in the trunk and be on the move without a second thought.

- **Engineered Stability**

A long wheelbase and balanced center of gravity make the chair stable on hills and uneven ground. Independent disk brakes give the operator full control during descents.

- **Customization for Every Rider**

Options include a 5-point harness, racing seat, handlebar accessories, panniers, and even extended footrests. The chair isn't one-size-fits-all—it's one-size-fits-you.

- **All-Terrain Versatility**

From beaches to red-rock deserts to snowy paths, the Extreme Motus is designed to thrive where traditional wheelchairs fail.

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The end result? Freedom. The chair doesn't just open trails; it opens possibilities.

HOW SAM AND RYAN JOINED THE JOURNEY

This is where I come into the story. My name is Ryan, and my lifelong friend is Sam. We grew up in the same Utah community—I was close with Sam's older brother Nick, and our families often crossed paths. Years later, I discovered Extreme Motus and instantly knew my friend Sam would be the perfect face of the company.

Here was a company building the very thing I knew could change his life: a way to get outdoors without limits. I reached out, created some video content, and eventually joined the company full time as Chief Marketing Officer. From there, Sam and I teamed up to tell our story—real adventures captured on video and shared online.

That partnership became "The Sam and Ryan Show," but more than that, it became a way to prove to the world what was possible. Together, we've rolled through national parks, joined adaptive sports, and shared laughter on trails most people said were "off limits."

ADVENTURES WORTH SHARING

ADAPTIVE DISC GOLF

Disc golf is often played in wide-open parks with uneven grass, dirt trails, and tree-lined fairways. For most wheelchairs, those conditions make the game impossible. But for us, it became an afternoon of competition and fun.

For this adventure, we modified Sam's Motus and mounted a clay pigeon thrower to the front of his chair. Sam would launch the disks by pulling a string with his mouth. We were pleasantly surprised by how easy all of these mods were to implement. We invented adaptive disk golf in an afternoon.

Sam and I set out on the course with the Extreme Motus wheelchair. The oversized tires rolled smoothly across the grass and dirt, letting us keep pace with other players. Every throw of the disc came with a sense of inclusion—this was no "separate" version of the sport. It was the same game, played side by side.

Other players stopped, curious about the chair, asking questions, and cheering us on. By the end, what began as a casual outing became a statement: sports don't need to be reengineered for inclusion; sometimes, the right equipment is all it takes.

YouTube Video: Adaptive Disc Golf
https://www.youtube.com/watch?v=RVL989CmfDA

BRYCE CANYON – RETURNING AFTER 33 YEARS

For many people, Bryce Canyon National Park is a bucket-list destination—a place where the towering hoodoos rise like stone cathedrals, glowing orange and red in the shifting desert light. But for Sam and his family, Bryce Canyon once symbolized something else: a door that was closing.

Sam had visited the park once before, at just five years old, carried on his father Roger's back in a hiking backpack. When they reached the end of that hike, Roger turned to his wife Christine and said, "*This is probably the last time we'll be able to visit Bryce Canyon*." At the time, it felt true. Sam was getting older, growing heavier, and the rugged trails of Bryce seemed out of reach forever.

Thirty-three years later, everything changed. With the Extreme Motus all-terrain wheelchair, Sam was no longer limited to viewing Bryce from the visitor center or paved overlook. He was able to descend into the canyon itself, navigating the famous **Wall Street and Queens Garden Loop** with his family, friends, and a little help from strangers along the way.

RACING DOWN WALL STREET

Our adventure began on the iconic Wall Street trail, a series of switchbacks that cut sharply into the canyon floor. Pushing the Motus downhill felt less like walking and more like running—the chair seemed to pull us forward, turning the descent into a rollercoaster ride.

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Bob and Mark, our friends from Road Trippin' with Bob and Mark, were there to document the experience. But as Sam and I leaned into the winding trail, laughter echoing off the canyon walls, they were left in the dust. The moment was pure joy: two friends racing through a place that, for decades, had been considered off-limits.

OBSTACLES ON THE TRAIL

Of course, the trail wasn't without challenges. At one point, the path narrowed and twisted into a sharp turn, eventually becoming a short flight of stone steps. The Motus couldn't roll through on its own. We had to lift and angle the chair, carefully maneuvering until Sam was safely back on track.

Farther down, the trail became so tight we were forced to turn back and look for an alternate route. What we found was no less daunting: a steep drop into a dry creek bed followed by a rocky climb out the other side. As I weighed the options, a group of hikers approached. Without hesitation, they offered to help.

THE POWER OF STRANGERS

This is something we've experienced often on our adventures: the kindness of strangers who want to be part of the journey. For these hikers, lending a hand wasn't just about moving a wheelchair—it was about sharing in the adventure, making sure Sam had the same chance to experience the canyon's magic as anyone else.

Together, we navigated the descent and the climb, each set of hands steadying the chair as we pushed forward. It wasn't just a problem solved; it was a reminder of how community and accessibility go hand in hand.

A MYSTICAL MOMENT

Not every memory from that day was about struggle or problem-solving. Some were simply magical. As we entered one of the narrowest parts of Wall Street, a man stood off to the side playing a pan flute. The notes echoed through the towering rock walls, creating an atmosphere that felt otherworldly. For a moment, the music and the canyon merged into something timeless, and Sam and I rolled forward in awe.

WHY THIS DAY MATTERED

For Sam, the day was more than an outdoor adventure—it was the fulfillment of a dream thought lost decades ago. For me, it was another reminder of why the Extreme Motus exists. We weren't just checking off a trail; we were rewriting a family story, showing that Bryce Canyon wasn't the "last time" after all.

And for everyone who passed us on the trail—hikers who saw the Motus in action, who lent their hands, or who simply heard our laughter echoing through the canyon—it was proof that accessibility doesn't diminish an experience. If anything, it deepens it.

YouTube Video: Bryce Canyon Adventure
https://www.youtube.com/watch?v=Z3ZUnuFjnkI

WHO WANTS AN UNDERDOG?

Not all of our Extreme Motus adventures take place on mountain trails or inside national parks. Adventures like the Bryce Canyon story can be an almost spiritual experience. Most of our adventures are about friends goofing around. Sometimes they happen in the most unexpected places—like under an abandoned train bridge in the middle of the desert. That's where we set out to attempt what might just be a world first: the underdog in an all-terrain wheelchair. Someone should probably call Guinness.

WHAT EXACTLY IS AN UNDERDOG?

If you've ever played on a swing set, you probably already know. An underdog is when you push someone so hard that instead of stopping at their back, you keep running and dive underneath as they swing up and over you. It's the boldest move on any playground—statistically the one most likely to end in injury, and in some places, it's even been banned.

For kids, though, it's a rite of passage. It's the moment when swinging becomes flying, if only for a second. And somehow, despite all our years of adventures, Sam had never gotten one.

LESSONS IN GRAVITY (AND CONSEQUENCES)

Of course, the underdog carries risks. I knew that firsthand. Back in 4th grade, I gave my friend Peter Jay an underdog so powerful he nearly landed on the roof of Brookside School. Unfortunately, he came down on the tetherball court instead. Mr. J had just finished teaching us about gravity that morning, and we thought we'd test the theory. Peter tested it a little too hard.

The playground went silent as kids looked skyward, half-believing Peter had learned to fly. He hadn't. And broke both arms when he landed. Pete had to walk around for the rest of the school year with both arms in casts that held his arms at right angles from his body. To this day, I don't know how he managed to eat lunch—or go to the bathroom—in that condition. Peter

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forgave me eventually, but he never let me give him another underdog.

That memory stuck with me, which is why, as we prepared to send Sam soaring, I felt both excited and terrified. No one should have to wait 41 years for their first underdog. But I also didn't want him to relive Pete's fate.

THE FIRST UNDERDOG

With the Extreme Motus chair rigged into a swing beneath the train bridge, we gave Sam a push. The momentum built, the ropes tightened, and suddenly it was time. I sprinted forward, ducked under the arc of the swing, and Sam shot upward, laughing with pure delight.

It worked. The world's first underdog in an all-terrain wheelchair.

POWERED BY LAUGHTER

Sam's laugh is more than just a sound—it's the fuel that powers our company. And that day, it was in full force. In fact, he laughed so hard that the chair seemed to become self-propelled for a moment, thanks to a perfectly timed fart. That's how we know an adventure has been a success: when the laughter gets so strong it takes on a life of its own.

No records were broken that day—at least not officially—but something more important happened. A 41-year wait ended. A childhood milestone was finally claimed. And once again, the Extreme Motus chair proved that joy doesn't have to stop where the pavement does.

YouTube Video: Underdog Story
https://www.youtube.com/watch?v=dy0ypwXdzAI

ZION NATIONAL PARK – INTO THE NARROWS

Zion National Park is one of Utah's crown jewels—visited by more than five million people each year, its red cliffs and sculpted canyons draw travelers from all over the world. Hikes like **Angel's Landing** and **The Narrows** are legendary, bucket-list experiences for many.

Sam and I had been dreaming of taking the Extreme Motus into Zion for years. And while Angel's Landing—with its sheer drop-offs and chains bolted into cliff walls—wasn't in the cards for us, we set our sights on something equally iconic: The Narrows.

A SHUTTLE PROBLEM SOLVED

Zion is a popular park, so private vehicles aren't allowed in most areas during peak season. Instead, a shuttle system carries visitors into the canyon. My biggest concern, honestly, wasn't the hike itself—it was the logistics of getting Sam and the chair onto a crowded shuttle bus.

The plan sounded complicated: unload the chair, fold it up, maneuver Sam into a bus seat with the help of our friend Dave, then carry the cushion and wheelchair separately while packed in with hundreds of other visitors. Just thinking about it was exhausting.

Fortunately, our friend Dave had the good sense to suggest asking a ranger about alternatives. At the visitor center, we explained our situation. The ranger nodded, jotted down a gate code, and handed it to us with a smile. "Go ahead," he said.

Minutes later, we drove straight into the canyon, parking Sam's adventure van at the Temple of Sinawava—the trailhead to The Narrows. Ours was the only private vehicle in the lot, and the adventure was about to begin.

INTO THE GATEWAY

The Narrows hike begins with the Riverside Walk, a paved path that runs along the Virgin River and snakes between towering cliffs. This portion of the trail is wheelchair accessible, and for most visitors it's the "gateway" to the canyon. For us, it was just the warm-up.

Even here, the scenery was jaw-dropping. The Virgin River shimmered beside us, canyon walls soared hundreds of feet overhead, and the air buzzed with the conversations of hikers eager to plunge into the water ahead.

And then we reached the river itself.

ROLLING THROUGH THE VIRGIN RIVER

The Narrows is less of a trail and more of a riverbed walk. Depending on the season, the water ranges from ankle-deep to chest-high, and the current can be swift in places. We had seen pictures from customers who had already used the Motus in the Narrows, so we knew it was possible—but knowing something in theory is very different from pushing your best friend into a slot canyon river.

The big balloon tires worked beautifully. In shallow water, they rolled across rocks and gravel. In deeper pools, they began to bob and float slightly, almost taking on a life of their own. Sam grinned as the chair rocked gently with the current. "It's smoother than the trail," I told him, half-surprised. He nodded in agreement.

But as with all our adventures, there were moments that test-

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ed us.

THE DEEP SECTION

At one point, the water rose to my chest. Suddenly, the fun became serious. The Extreme Motus chair does float, but it's also top-heavy, which means if I slipped on a rock and let go, Sam could tip over.

I hesitated, weighing the risks, when a group of fellow hikers approached. Once again, strangers stepped in, eager to be part of the adventure. I explained the situation, and they each took a side of the chair, steadying it as we pushed through the gently moving river together.

Moments like these happen often. People want to help. And for them, lending a hand isn't an inconvenience—it becomes a highlight of their own Zion experience. By the time we emerged on the other side, they were smiling as wide as Sam was.

WHAT PEOPLE SEE (AND DON'T SAY)

Later, when I was editing the video of our hike, I noticed something funny. In the background of nearly every shot, other hikers had stopped walking to watch us. They stared as our little band of misfits—me, Sam, Dave, and the floating Extreme Motus—rolled past them.

In the moment, I was too focused to notice. But watching later, it made me laugh. Maybe on our next adventure we should bring a flag that reads: "It's okay to ask about our all-terrain wheelchair." Because i it looks like there are a lot of questions in the background of this video.

THE SOUNDTRACK OF THE NARROWS

What makes The Narrows unforgettable isn't just the visuals—it's the sounds. The rush of water over rocks. The echo of voices bouncing off canyon walls. The occasional birdcall or rustle of leaves overhead. For a while, you forget the world outside exists.

Sam and I moved through it all together, sometimes in silence, sometimes laughing, always aware that this wasn't just another hike. It was proof. Proof that with the right equipment and a little creativity, one of the most famous hikes in America could be accessible to wheelchair users.

YouTube Video: Zion National Park Adventure
https://www.youtube.com/watch?v=95kLS-skeKs

INCLUSION MEANS GOING EVERYWHERE TOGETHER

The story of Extreme Motus is about more than a piece of equipment. It's about breaking down barriers—physical, social, and emotional—that keep people with mobility challenges from fully participating in life.

The power of the Extreme Motus chair extends beyond helping Sam to be included. It has opened up the our friendship to new outdoor possibilities. It has allowed his family to plan vacations without worrying if the destination has sidewalks.

The most beautiful locations on our world aren't paved. They are located in special protected places. Nature preserves, National and State parks. And all those places can be made accessible with the right piece of mobility equipment.

Through the history of the company, the innovation of the wheelchair, and the adventures Sam and I have shared, the message is clear: accessibility is possible. Adventure is possible. Inclusion is possible.

If you'd like to learn more or request a demo of the all-terrain wheelchair, visit ExtremeMotus.com. Together, we can keep opening the outdoors—for everyone. ■

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Integrating AI-Enhanced AAC into the IEP: Supporting Independent Authorship for Students who use AAC

Part 2 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

INTRODUCTION

Assistive technology (AT) tools and services required by a student's IEP team to help the student make progress toward and access their general education curriculum are guaranteed under IDEA. AT has a long history of myths, many dispelled in the U.S. Department of Education's Myths and Facts Surrounding Assistive Technology Devices, where the facts align with what those of us in AT have been saying for decades: these tools are about equity, not unfair advantage.

In our first article in this three-part series on AAC, Writing, and AI, we explored the fears that have accompanied every wave of new technology in education. We looked at how the arrival of AI has amplified long-standing worries about "cheating" for all students who require AT devices and services, including students who use AAC.

Consider Maria, a 9th grader who uses an eye-gaze AAC device. She can participate in class discussions by answering yes/no questions, providing keyword responses, and crafting short 2-3 word sentences using her eyegaze AAC system. With AI-supported predictive text on her device, Maria could choose from contextually relevant vocabulary leading to sentence suggestions after only a few selections, reducing the physical effort of writing and allowing her to focus on her ideas.

Consider DeShawn, a middle school student who also uses an eye-gaze AAC device, can select words efficiently with predictive text but struggles with organizing his ideas into a logical flow. With an AI planning feature on his device generates a topic outline from his brainstormed words, giving him a clear path for drafting. For the first time, DeShawn would be able to structure and complete a multi-paragraph essay independently.

In both cases, AI is not replacing the student's thinking; it is scaffolding the act of writing so their ideas can take shape on the page. The students still decide what to say, choose from suggestions, revise their work, and approve the final product. Just as spellcheck doesn't compose an essay for a student without disabilities, AI in AAC doesn't invent the message; it

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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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reduces barriers so the message can be created more effectively.

In this second article, we shift the focus to the two-fold nature of writing:

1. **Transcription:** the physical act of getting words onto the page.

2. **Process:** the cognitive work of planning, creating, revising, and refining ideas.

For students who need or use AAC, both of these areas can be labor-intensive. Physical access challenges, slow message generation, and limited vocabulary access can make transcription difficult. Limited experience with writing instruction can affect planning, organizing, editing, and word choice.

In our first article, we reframed co-authorship not as "cheating," but as a natural and necessary part of writing for all students. We noted that general education students regularly co-construct their work with peers, teachers, and digital tools (e.g., brainstorming together, using grammar checkers, seeking feedback, and refining ideas collaboratively). For students who use AAC, co-authorship often includes communication partners, teachers/therapists, and paraeducators. Often, this type of supported co-authorship can become inconsistent, overly dependent on adult input, or limited to what a support person already knows; however, here we argue that co-authorship using AI is a viable AT tool/support for students. It is essential, however, that planning and documentation in the IEP of AI-supported co-authorship is explicitly embedded into the IEP, to ensure that the student's ideas remain at the center, that their supports are consistent across settings, and that they have access to the same range of collaborative tools their peers already use.

Because the IEP is where AT decisions are formally considered, documented, and implemented, it is the team's responsibility to explore how AAC tools with AI features (e.g., such as predictive text, context-aware vocabulary, variety of syntax/sentence structures) can support both transcription and the process of writing. This article offers practical ways to document these supports in the IEP so students can access the same range of writing opportunities as their peers.

INTRODUCING THE IEP PROCESS FOR AT AND AI

The Individualized Education Program (IEP) is the legal and instructional roadmap for ensuring students with disabilities have the supports they need to access and make progress toward the general education curriculum and their IEP goals. Under IDEA, the IEP team must consider assistive technology (AT) for every student and determine whether devices or services, and here we argue including those with AI capabilities, are necessary for the student to receive a Free Appropriate Public Education (FAPE).

For students who use AAC, integrating AI features as AT into the IEP is essential for equitable access to communication and academic participation. This means the team must identify, document, and connect the student's needs to the specific AI-enhanced supports they will use, ensuring those supports are available and taught consistently across settings.

To do this effectively, AT and AI considerations should be woven throughout the IEP, including:

- **Consideration of Special Factors: Assistive Technology (AT Consideration Page)** The team must address whether the student requires AT devices or services. If the answer is "yes," this must lead to documentation in other sections of the IEP. This is the critical starting point for noting AI-powered AAC features.
- **Present Levels of Academic Achievement and Functional Performance:** Describe current abilities, access methods, and barriers; note how AI features may address these challenges.
    - **Note:** The Present Levels of Performance (PLOP) should describe the student's access and performance both without the assistive technology tool or other supports in place and with the tool/supports in place. This side-by-side context helps the IEP team understand the impact of the technology/supports on the student's participation and outcomes. Throughout this article, we offer further examples and descriptions of how to capture this in writing. Including both perspectives is essential for showing how the AT, such as AI-enhanced AAC, reduces barriers, supports skill development, and enables access to the curriculum.

Example: PLOP Written Expression and Communication

With AT supports: Maria demonstrates the ability to independently produce structured written work when provided with appropriate assistive technology supports. With access to AI-based writing tools, she can compose a paragraph that includes a topic sentence and three supporting details. When using a keyboard with word prediction features, Maria selects appropriate words from a list of five predicted options with accuracy.

Without AT supports: In the absence of technology tools, her written and expressive output is limited to responding to yes/no questions, providing single keywords, or selecting from a set of three choices presented by her communication partner. These patterns indicate that Maria's access to robust assistive technology significantly increases the complexity and independence of her written expression.

- **Annual Goals and Objectives:** Include goals that reflect learning to use AI features for transcription, writing process skills, or both.
- **Supplementary Aids and Services:** Document training and support for staff, peers, and families to ensure consistent use.
- **Accommodations:** Specify how and when the AI-enhanced AAC will be available.

When AT and AI are meaningfully integrated into these key sections, the IEP becomes a clear, actionable plan that supports the student's growth in independence, authorship, and active participation.

REFRAMING WRITING GOALS FOR STUDENTS WITH COMPLEX COMMUNICATION NEEDS

When reviewing IEPs, have you ever paused (really looked at?) at the writing goals? It is not uncommon for these goals to read like: *"Student will trace his name. Student will write the letter of the week,"* or *"Student will complete a sentence with the carrier phrase 'I like…'"* While these may reflect penmanship, spelling, or sight-word copying objectives, they do not represent true writing goals. In fact, we know tracing doesn't equate to writing.

Example of what not to do. Student tracing his name.

Authentic writing goals focus on the creation of meaning, such as: *"The student will generate a complete sentence with subject, verb, and predicate"* or *"The student will compose a paragraph including a topic sentence, three supporting details, and a conclusion."* Writing goals should foster written communication, not rote, laborious tasks like tracing, which can be taxing for students with complex motor needs and limited upper-limb endurance, and have no academic rigor.

Consider the case of a ninth-grade student using AAC with WordPower 60 via eye gaze. When I asked her mother about her daughter's writing goals, the answer was, *"We don't have any writing goals...she can't use her hands."* This highlights a critical oversight: the absence of writing goals for students who cannot produce written work through traditional means.

WRITING GOALS

The first step is to ensure that the IEP includes true writing goals that promote meaningful written expression.

Even with well-crafted written language goals, students often face significant barriers to producing authentic work. These challenges include selecting vocabulary, maintaining authorship, and ensuring access to the same expressive opportunities as peers.

In one instance, a charter school (affiliated with a public school district) was asked whether a student who uses switches and eye gaze could leverage AI to improve the efficiency of her participation. The request was escalated through multiple levels, only to be denied on the grounds that "AI is cheating."

Observation revealed that while this student participated in general education classes (e.g., math, science, social studies, and robotics), she was not provided the same general educational access and placed in a special education English class because writing tasks were deemed too labor-intensive. When I asked how she generated original written content, the staff explained they typically offered her three predetermined choices and she would select one.

From an IEP standpoint, this meant her present level of performance involved choosing among ideas provided by others. To be effective, her paraeducator would need deep content knowledge in subjects as diverse as algebra, biology, U.S. history, and literature (the current English focus being Edgar Allan Poe). This dynamic limited her to exercising choice rather than voice, an essential distinction when the goal is authentic authorship.

Under these conditions, all of her writing was effectively co-authored with her paraeducator. While co-authorship itself is not inherently problematic and certainly not "cheating", it becomes limiting when the student cannot access the breadth of vocabulary and ideas available to her peers through the internet and AI tools. General education students regularly co-construct their work with the support of these tools, and this is not seen as a violation of academic integrity.

When the English class assignment required students to write a paragraph reflecting on Poe's work, I provided an AI-generated list of six statements describing Poe's style. The student chose one, which included the term macabre. While her teacher and

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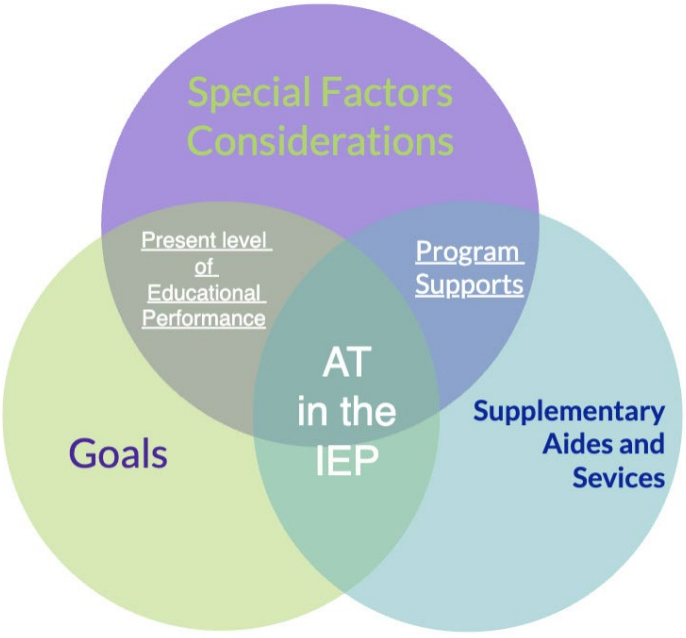
father knew the word, most paraeducators present did not. Using AI again, we generated synonyms for macabre, and the student selected one that more precisely reflected her intended meaning. This process resulted in a richer, more accurate sentence than the binary "like/dislike" prompts she typically received.

Student is thinking of different vocabulary.

Importantly, the focus was not on spelling, punctuation, or grammar, but on her ability to express three main ideas about Poe's writing, precisely as the assignment required. This was the first time her written work truly reflected her own voice, supported by tools that expanded her vocabulary beyond what was programmed into her device or known by her support staff.

What we are teaching and then measuring determines the tool we choose. If the goal is to measure spelling grade-level words, then features like word prediction are not used. If the goal is to demonstrate basic sentence construction—such as subject-verb-predicate—AI will not be used to generate that structure. However, if the goal is for the student to produce a paragraph with a topic sentence and three supporting details, then AI tools for topic generation, vocabulary expansion, or sentence organization can be used to increase rate, accuracy, and the ability to produce a fluid written paragraph. The key is matching the tool to the skill being taught and measured so that the technology scaffolds access without replacing the targeted learning outcome.

AT Consideration: Julieta requires the use of her AAC device with embedded AI writing tools to meaningfully and independently participate in written expression activities. Due to her reliance on eye gaze for access, generating written content through spelling and single-word selection is extremely fatiguing and time-consuming, making paragraph-level writing inaccessible without support. As a result, the team has often defaulted to using yes/no questions, which shifts the burden of idea generation to the paraeducator and limits JEN's responses to the adult's existing knowledge and assumptions. This approach restricts JEN's ability to express original ideas, demonstrate her understanding, and engage in authentic writing tasks. The embedded AI tools within her AAC system are essential for co-constructing text, reducing motor and cognitive fatigue, and promoting autonomy and creativity in written expression.



Graph of components of including AT/AAC in the IEP

Students in general education classrooms often complete similar assignments at home with access to Google and AI-assisted writing tools. Denying equivalent access to a student with complex access needs creates an inequity, restricting not only efficiency but the richness of thought and expression possible in her work.

PRESENT LEVEL OF PERFORMANCE: WRITTEN EXPRESSION (COMMUNICATION & AT INTEGRATION): PLOP FLUID STATEMENT

Julieta is a highly motivated and communicates using an eye gaze AAC device. While she demonstrates a strong understanding of academic content and can express ideas verbally (she cannot express herself verbally as she is non-speaking) or through supported communication, she currently experiences significant barriers in independently generating written work. Julieta's current AAC setup relies heavily on single-word selection and spelling, which is extremely fatiguing and time-intensive due to her access method. As a result, Julieta is often limited to yes/no question formats, requiring adult prompts and paraeducator-generated ideas. This restricts her ability to engage in authentic writing tasks and limits the expression of her original thoughts.

At this time, Julieta's current assistive technology (AT) supports and supplementary aids and services are not sufficient to support the development of age-appropriate written expression. She cannot independently create a paragraph of writing within a reasonable timeframe, nor can she sustain participation without high levels of adult scaffolding, which inadvertently narrows her communicative range.

Integrating the embedded AI features within her AAC device offers a research-supported path toward greater independence. These features, such as predictive text, smart phrasing, and idea-generation tools, enable Julieta to co-create written content with reduced motor demands and cognitive fatigue. According to Zabala (2005), matching technology to Julieta's unique access and communication needs is essential for promoting independence and participation. Furthermore, the National Assistive Technology Research Institute (NATRI, 2006) found that AT tools used in writing (such as prediction and text support) significantly improved written expression outcomes in students with disabilities.

Julieta's same-aged peers frequently use digital supports such as spell check, grammar correction, synonym suggestion tools, internet research, and collaborative writing platforms. The integration of AI within her AAC device functions as a parallel support, allowing Julieta access to the same level of efficiency and expressive freedom as her peers. With appropriate instruction and support, this technology has the potential to reduce barriers and foster meaningful, independent participation in writing tasks across settings.

THE FOLLOWING GOALS WERE DISCUSSED AS POSSIBILITIES FOR HER IEP:

Goal Option 1: Transcription Using AI

Annual Goal: Given access to her AAC device and an AI writing tool, Julieta will independently transcribe her ideas into written form by generating, selecting, and organizing at least three sentences with minimal support in 4 out of 5 opportunities, as measured by teacher observation and work samples.

Short-Term Objectives:

1. Julieta will use her AAC device to input prompts into an AI tool and generate relevant content on a given topic with 80% accuracy.
2. Julieta will evaluate, select, and organize AI-generated sentences into a logical sequence to form a cohesive paragraph in 80% of opportunities.
3. Julieta will use AAC and AI-based correction tools to improve spelling and vocabulary accuracy in her written responses with 80% accuracy.

Goal Option 2: Writing Process Using AI

Annual Goal: Given access to and her using AAC and AI tools, with minimal teacher prompting and support, Julieta will collaboratively develop a coherent paragraph related to her coursework, demonstrating idea generation, logical organization, revision, and improved word choice in 4 out of 5 opportunities, as measured by teacher observation and writing samples.

Short-Term Objectives:

1. Julieta will generate relevant ideas and contribute to writing structured paragraphs using AI and AAC with minimal prompting in 4 out of 5 trials
2. Julieta will revise AI-generated writing to improve clarity, organization, and word choice using AAC and AI tools with 80% accuracy.
3. The Julieta will incorporate at least one synonym per sentence in written or spoken communication using AAC and AI tools, with minimal teacher prompting and support

Goal Option 3: Writing Process Using AAC and AI

Annual Goal: Given access to an AAC device and an AI writing tool, Julieta will generate a written response to a prompt, selecting and organizing AI-generated content, with 80% accuracy in 4 out of 5 trials.

Objectives:

1. The Julieta will use their AAC device to input a writing prompt into the AI tool and generate at least six relevant sentences, in 4 out of 5 opportunities.
2. The Julieta will independently select the three most relevant or appropriate AI-generated sentences to form a coherent paragraph in 80% of trials.
3. The Julieta will organize the selected sentences into a logical sequence in 4 out of 5 opportunities.

Goal Option 4: Editing AI-Generated Content

Annual Goal: Given AI-generated text, Julieta will use their AAC device and editing tools to revise and refine content for accuracy, coherence, word choice, and grammar, demonstrating

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80% accuracy in 4 out of 5 trials.

Objectives:

1. The Julieta will evaluate AI-generated sentences for factual accuracy and relevance, correctly identifying and revising at least two inaccuracies per writing sample, in 4 out of 5 opportunities.
2. The Julieta will edit AI-generated sentences by modifying grammar, punctuation, and word choice, with 80% accuracy as measured by teacher observation and writing samples.
3. The Julieta will use an AI spelling and grammar correction tool to review and finalize a paragraph, making at least three corrections per writing sample, in 4 out of 5 opportunities.

ISSUES AND CONSIDERATIONS WHEN USING AI IN AAC FOR WRITING

We believe there is a strong case for the use of AI-enhanced AAC to support students who use AAC. These tools have the potential to remove long-standing barriers to transcription and the writing process, barriers that, left unaddressed, often limit authentic authorship and access to the general education curriculum. At the same time, we recognize that AI does not arrive without caution. Educators, families, and AAC specialists are right to raise questions about bias, authorship, accuracy, and the potential for ableism in how the technology is applied. The goal is not to ignore these concerns, but to address them head-on while ensuring that students are not left behind as their peers move forward with new tools.

PRESERVING AUTHORSHIP AND AGENCY

Early adoption must be anchored in the principle that AI is a scaffold, not a replacement for student-generated ideas. Students should remain the decision-makers: selecting, editing, and approving AI suggestions so that their voice and intent remain intact. This approach mirrors the way nondisabled peers use tools like Grammarly or Google Docs to refine their work, without surrendering ownership.

PROACTIVE EQUITY

Waiting to adopt AI features until every concern is resolved risks widening an existing equity gap. Peers are already using AI for idea generation, organization, and revision. Denying these tools to AAC users in the name of "caution" inadvertently reinforces the ableist assumption that their work must be completed without the same supports others take for granted.

ETHICAL TRANSPARENCY

Introducing AI with AAC should come with clear communication to staff, peers, and families about what the technology does, and does not, do. This helps prevent misconceptions that AI is "doing the work" for the student and reframes it as a legitimate accessibility tool under IDEA.

ACCURACY AND CRITICAL REVIEW:

AI-generated content should include the human element of the student, teachers and therapists in reviewing, fact-checking, and refining AI output. This not only protects the integrity of student work but also ensures agency and authorship.

INTENTIONAL TRAINING AND SUPPORT

AI use paired with intentional training for students, educators, paraeducators, and families can lead to success. Consistent modeling and guided practice ensure that AI features are used effectively and embedded in the student's daily communication and writing routines.

GUARDRAILS FOR PRIVACY AND BIAS

Schools must choose AI tools that protect the students' privacy and the AI-generated content is vetted for potential ableist language. Recognizing that bias, especially ableist assumptions, can be embedded in technology is a critical part of the ongoing review process.

AAC USERS PERSPECTIVES

Any discussion of AI in AAC must include the perspectives of AAC users themselves. Too often, technology decisions are made about AAC users rather than with them. Research led by AAC users has highlighted both enthusiasm for AI's potential and concerns about authorship, accuracy, and the risk of ableist assumptions being built into the tools. AAC users' perspectives remind us that AI should not replace or override the intent of the communicator. Instead, it should be developed and implemented in ways that preserve agency, honor lived experience, and respond directly to the priorities identified by people who rely on AAC every day.

Moving the conversation beyond AI's plausibility into its practical use does not mean ignoring valid concerns. By acknowledging and addressing these issues, we can implement AI-enhanced AAC in ways that promote equity, resist ableism, and prioritize student agency. The choice is not between "full speed ahead" and "never," but between cautious, informed integration now or the risk of leaving AAC users further behind.

CALL TO ACTION

Therefore, we call upon practitioners, administrators, and policymakers to take three concrete actions:

1. **From Hesitation to Action**
   It's understandable to have questions about AI in AAC, but delaying its use when it can remove barriers means missed opportunities for students. General education peers are already benefiting from AI tools. If AAC users wait for every concern to be addressed first, the gap in

access and opportunity will grow.

2. **Centering Student Voice Through the IEP**
   An IEP is most effective when it clearly connects a student's needs to specific supports, including AI-enhanced AAC. Documenting Present Levels, goals, and training ensures technology is used consistently and meaningfully. Limiting students to preselected words or yes/no responses restricts their authorship; embedding AI-enhanced AAC into the IEP allows them to expand ideas, build vocabulary, and participate fully across settings. This keeps their voice at the center of their learning. The next IEP meeting is the right time to start.

3. **Thoughtful Integration With Guardrails**
   AI in AAC must be implemented with care, training for staff, clear expectations for use, and safeguards for privacy, accuracy, and bias are essential. Moving forward doesn't mean rushing; it means building a plan that protects student agency while expanding opportunities for meaningful writing. Teachers, therapists, administrators, and families share the responsibility to ensure equitable access so every student's voice is heard and valued.

CONCLUSION

True writing instruction is about empowering students to construct and share their own ideas, not simply producing marks on a page. For students who use AAC, achieving this requires both intentional IEP goals and equitable access to the tools their peers already use. When we expand our definition of "writing" beyond handwriting and spelling, and embrace technology, including AI, as a legitimate means of authorship, we give every student the chance to develop a genuine voice.

NEXT IN OUR SERIES:

We'll explore the critical role educators play in supporting students who use AAC to ensure their voices are heard and their authorship remains their own. From fostering independence to guiding ethical and effective AI use, we'll look at practical strategies that keep student agency at the center of learning.

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

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