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contents
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Looking Backward to Design An Inclusive Future

The year is 1999. The primary way to interface with a computer is with a mouse. Some people with disabilities have trouble accessing the computer using a mouse. What's a solution for many people? Let's place a touch window over the monitor to allow the person to directly touch the screen. We call this technology touch screens.

The year is 2001. The primary way to read text is with your eyes. Some people with disabilities have trouble accessing the text using their eyes. What's a solution for many? Let's provide access to software that will read the text aloud so they can use their ears instead (or in addition to) their eyes to access the text. We call this technology text to speech as seen in Image 1.

The year is 2002. The primary way to produce text is to type letter by letter on a keyboard using a word processor. Some people with disabilities have trouble accessing the keyboard or spelling the words. What's a solution for many? Let's provide these individuals with software that provides contextually guesses at what they are trying to type and decreases the number of keystrokes necessary to produce the word. We call this technology word prediction and word completion as seen in Image 2.

The year is 2003. The primary way to produce text is still to type letter by letter on a keyboard using a word processor. Some people with disabilities have trouble accessing the keyboard. What's a solution for many? Let's provide these individ-

BACK

Read excerpt

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By Christopher R. Bugaj

ADD TO CA

School districts often struggle to develop consistent practices for meeting the assistive
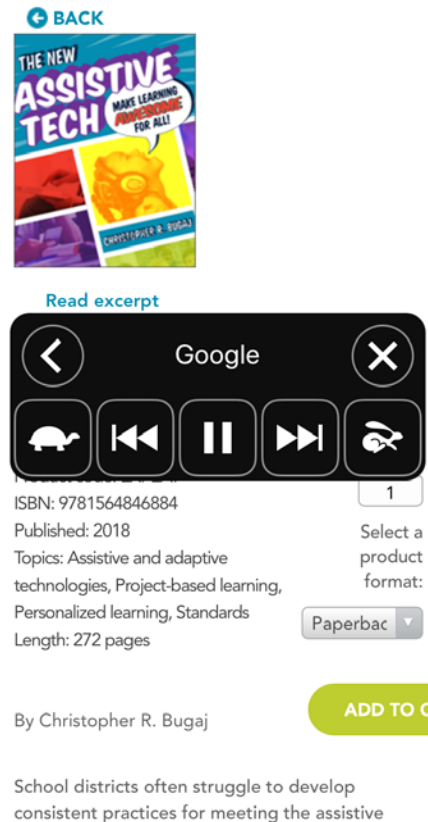
Image 1: Speak Screen Function of iOS

CHRIS BUGAJ, MA CCC-SLP is a founding member the Assistive Technology Team for Loudoun County Public Schools. Chris hosts The A.T.TIPSCAST (http://attipscast.com); a multi-award winning podcast featuring strategies to design educational experiences and co-hosts the Talking With Tech (http://www.talkingwithtech.net/) podcast featuring interviews and conversations about augmentative and alternative communication. Chris is the co-author of The Practical (and Fun) Guide to Assistive Technology in Public Schools (http://bit.ly/chewatamazon) published by the International Society on Technology in Education (ISTE) and has designed and instructed online courses for ISTE on the topics of Assistive Technology and Universal Design for Learning. Chris is also the author of ATEval2Go (http://bit.ly/ateval2go), an app for iPad that helps professionals in education perform technology assessments for students. Chris has presented over 250 live or digital sessions at local, regional, state, national and international events, including TEDx, all of which are listed at http://bit.ly/bugajpresentations. His latest book The New Assistive Tech: Making Learning Awesome For All (http://bit.ly/thenewat4all), also published by ISTE, is available for order now!
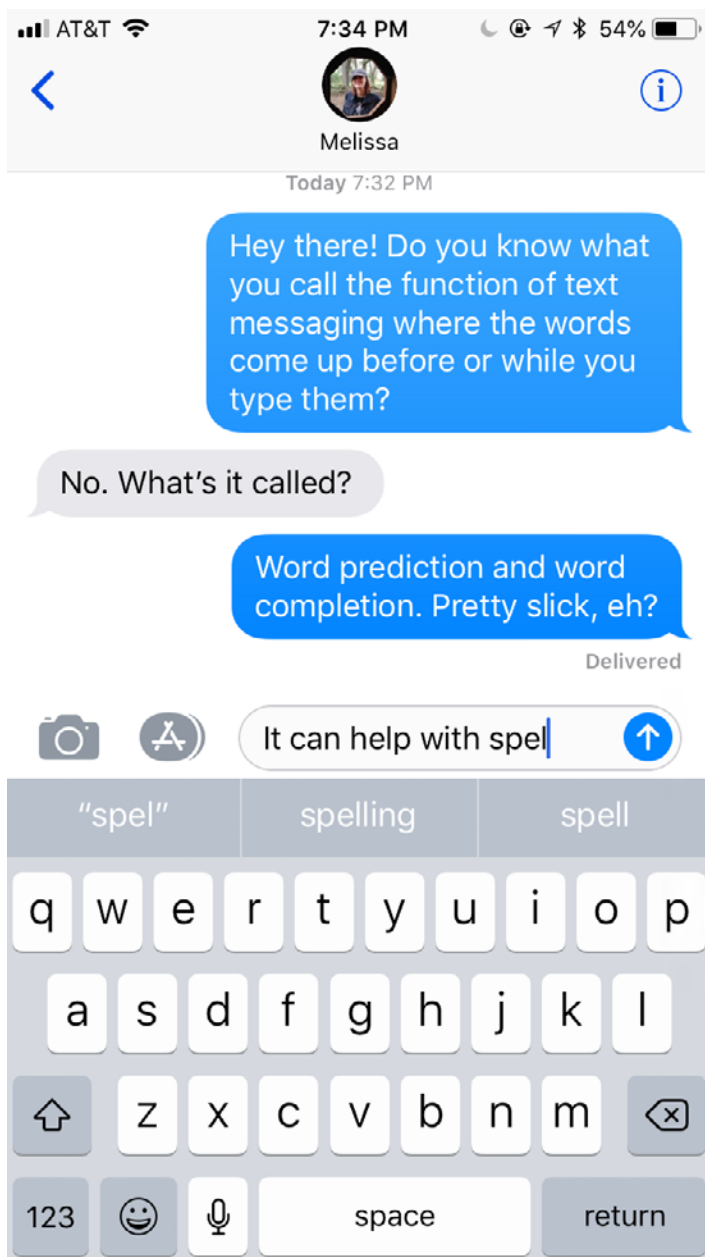
Image 2: Word completion and word prediction while text messaging

uals with software that allows them to speak what they want to type and have the text appear in the document as they speak it. We call this technology speech to text or voice dictation as seen in Image 3.

The year is 2005. The primary place most students sit is in the same style chair as most every other student at the same height. Some people with disabilities have trouble sitting in these chairs or working at the standard height. What's a solution for many? Let's provide these individuals with flexible seating, such as soft, portable inflatable pillow-like cushions that allows them to wiggle, squirm and bounce to help them focus. We call this technology vestibular or balance discs.

The year is 2008. The primary way for educators to display content to students is through boards in the front of the room. Some people with disabilities have trouble seeing the display at great distances. Let's provide these individuals with a device at their seats that simulcasts what is on the board and so they can magnify it based on their needs. We call this technology screen sharing.

The year is 2019. Touchscreen technology is the primary way people interface with computing devices. Text to speech is freely available on any computing device. Word prediction and word completion are default functionalities of text messaging and Internet search services. People talk to a variety of devices to control functions and produce text. Numerous educators have adopted flexible learning spaces where every student has a choice in where they work and on what they sit. Many school districts have invited Bring Your Own Technology and One-to-One Device initiatives where educators share content to every student no matter where they sit.

These are but a few illustrations (there are many more) of a simple, yet powerful, fact. Functionalities of technologies that were derived as solutions for a small population of people with disabilities are now used widely by the masses.

ACCOMMODATIONS AS TOOLS FOR EDUCATIONAL EXPERIENCE DESIGN

In a Multi-tiered System of Support (MTSS) model, as seen in Image 4, schools determine what interventions (including technologies) are made available to every student. These are called Tier One supports. Tier Two supports might be made available to small groups of students. Tier Three supports are made available based on the needs of the individual student and are frequently listed as accommodations in Individual Education Plans. Accommodations documented in Individualized Education Programs outline technologies, strategies and other interventions necessary to ensure that the student receives a free appropriate public education. Although it might seem like tiered supports are static remaining forever fixed in their spot, this is an illusion brought upon individual snapshots in time. When we examine a historical perspective, the trend is clear. Tier Three supports, over time, often become Tier Two or Tier One.

Armed with the knowledge of this historical trend, we can use this known pattern and apply it to the future of instructional design.

SEC. 4104 of the Every Student Succeeds Act of 2015 explicitly states that the "STATE USE OF FUNDS [for Student Support and Academic Enrichments] Funds shall be used to support "local education agencies in providing programs that increase access to personalized, rigorous learning experiences supported by technology by … providing technical assistance to local educational agencies to improve the ability of local educational agencies to use technology, consistent with the principles of universal design for learning, to support the learning needs of all students,
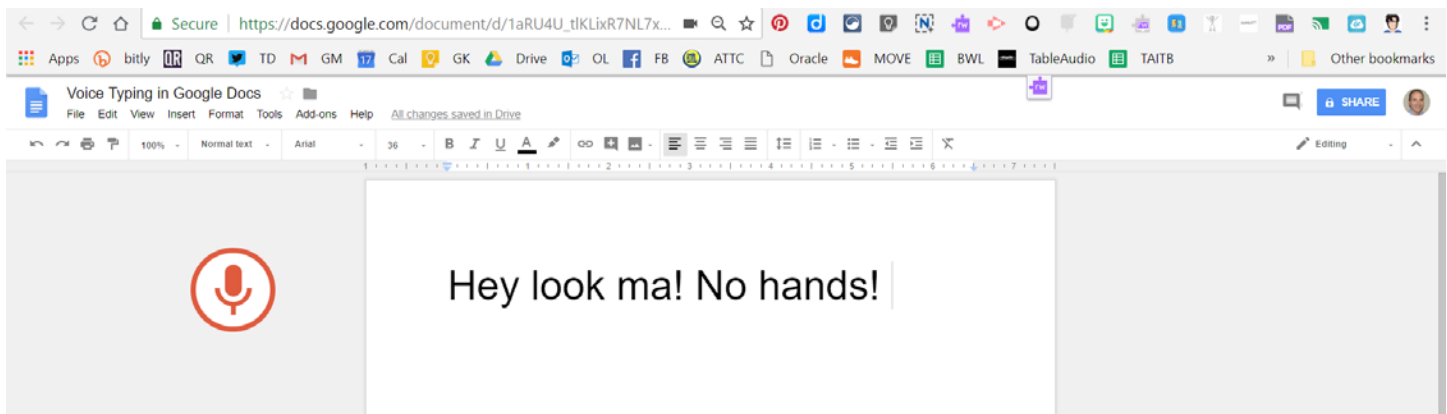
BACK TO CONTENTS

Image 3: Voice Typing in Google Docs

including children with disabilities and English learners …"

One strategy educators can use to answer this charge is to examine the most frequently used accommodations in Individualized Education Plans. Educational leaders can generate a top three, five or even 10 lists. This list could then be used to help inform decisions about the design of personalized learning experiences and the technology used to support them.

For any accommodation met through technology that appears on this list, educators could consider the viability of making the function of that technology available something that is available to all students. For instance, if text to speech appears frequently as accommodations in IEPs, then perhaps that function should be made available to everyone.

For any accommodation met through an instructional practice that appears on the list, educators could consider the viability of making that practice a parameter by which all educational experiences are designed. For example, if preferential seating appears frequently as an accommodation in IEP, then perhaps every student should be given a chance to choose the seating that she or he prefers. The process of examining the most frequently used accommodations could be repeated regularly and this information could be used as an evidence based tool to make intentional instructional design decisions.

One option for creating a list of accommodations is to anonymously extract that data from the system used to manage IEPs. It might be easy enough to pull the accommodations out into a spreadsheet, sort the information or do a search for keywords and collect the number of results. This can be particularly helpful for accommodations that are meant to provide the same or similar intents but which are worded differently. For instance, speech recognition software and speech-to-text software are likely examples of accommodations that are worded differently but which meaning presents similar intentionality.

In some cases, depending on the IEP system used, it might be the case that accommodation data cannot be exported into a spreadsheet for analysis. If this is the case, another option for creating a list of most frequently used accommodations is to
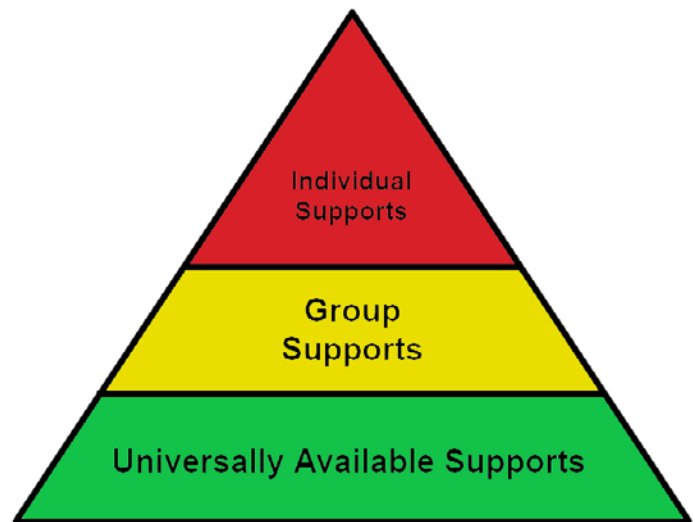
Image 4: MTSS Triangle

manually add them to a shared spreadsheet throughout the course of a year.

THE NOT-SO-HIDDEN BENEFITS OF USING ACCOMMODATIONS TO DESIGN FOR THE MASSES

Systematic examination of accommodations and intentionally using them to design instruction for the masses provides educators with a methodology for increasing inclusive practices. Beyond the legal requirements, there are additional benefits to this practice and approach.

Educators work to provide accommodations in IEPs. The time, energy and effort spent on providing an accommodation for an individual might feel like a burden or drain on resources to some. However, when accommodations are just thought of as tools used to design instruction for everyone, then they become helpful, integral and even necessary. The entire mindset around providing accommodations can change from compliance to one of usefulness. A list of accommodations can be used as a

rubric for which specific tools and strategies can be incorporated throughout the learning environments and experiences. Accommodations, when used as a resource to design instruction, become shortcuts and guides for how to construct and deliver lessons. Using accommodations in this way saves educators time, energy and effort. Educators who look at the list of accommodations and say, "Oh, why don't I just provide this to all the students?" are exhibiting a mindset primed for inclusion.

Migrating supports from Tier Three to Tier One can also be cost effective. Purchasing supports for individuals is often less cost effective per student than purchasing them for the masses. An analysis of the number and cost of tools used to implement a specific accommodation can provide a quantifiable amount. This number can be compared to the cost of providing the support universally. Time spent evaluating the need could also be a factor in this consideration. When a support is available to be tried by any student, more students can try them for longer periods of time and demonstrate evidence of need more expeditiously. No one needs to wait, qualify or demonstrate a need to access a Tier One support.

Accessing Tier One supports empowers students to take ownership of their own learning including the tools and strategies that are most effective to meeting their own needs. Further, as students discover they utilize a Tier One support, they often share that support with peers. Students with disabilities can become leaders in how to personalize the learning experience and champions for other students who are also working toward becoming masters of their own learning. Students with disabilities can become the technology and learning leaders among their peers.

Care should also be taken to realize that accommodations are only counted for those who have been identified as needing them. There could be an entire population of students who also require them but who have yet to be identified. Further, the practice of provisioning supports based on tiers is not unique to students with disabilities. Providing a support to a greater number of students could assist other minority populations of students as well.

WORDS OF WARNING

Accommodations that become Tier One supports continue to need to be listed as accommodations. Availability does not negate need. The charge of the Individualized Education Plan team is to outline what a student requires to guarantee a free appropriate public education. Because Tier One supports are variable based on location, the IEP team should be sure to document and specify needs regardless of what is available to all.

The practice of strategically and systematically making specific Tier Three supports available to all should not be confused or misinterpreted as being a claim that Tier One supports are all that is needed. There will likely always be a need for Tier Three supports. Student needs vary greatly from individual to individual. Certain students will require supports that are uniquely specialized and customized to meet the needs of the individual situation. Providing supports as a Tier One increases the access and availability to supports most students might need.

AN INTENTIONAL PLAN FOR THE FUTURE

What are currently the most frequently occurring accommodations right now? Are there certain accommodations on the rise? Will these accommodations one day also become something adopted by the masses? History says that is likely. A claim could be made that there is a rise in the number of students who have access to augmentative and alternative communication devices and supports that use symbols to assist in the representation of words. Is the use of tools like emojis, avatars, memes and gifs in text messages an indicator that the general public has begun to use alternative, picture/symbol based communication methodologies for general communication? Will this trend continue? As eye control, voice recognition and artificial intelligence technology continues to improve, will the primary way users interface with their devices become a combination of voice and eye gaze? As developers of new technologies and designers of instructional practices, we can look to innovations used by people with disabilities to inform the future.

The year is 2029. Every student, regardless of ability, is included in every environment with peers participating in educational experiences designed around personal needs. Most students have taken charge of their own learning, with educators guiding and coaching them along individual journeys of discovery. The multiple forms of technology students use supports their learning, works seamlessly whenever they need it, and is as available as the air they breathe. Students transition from tool-to-tool and place-to-place based on what works best for them to accomplish what they hope to learn. There are still students who require Tier Three supports that are highly specialized and customized to meet specific needs. This number, however, has grown increasingly smaller. Tier Two and Tier One supports have swelled and, in truth, aren't even thought of as supports to the educators who put them in place and the students who use them. Instead, these tools and strategies have just become standard operating procedure in a world that has become more accessible to everyone. Is this what the future of education looks like to you? What future do you want to see become a reality? What actions will you take to get us there as fast as possible?

This new world did not happen by accident. It was designed. The march toward inclusion was intentionally built on the technology used by those people, including students, with disabilities that came before. Together we can build a more inclusive future purposefully designed for everyone based on the historical lessons they've taught us.

ADDITIONAL RESOURCES:

Eye tracking on Hololens 2 - https://docs.microsoft.com/en-us/windows/mixed-reality/eye-tracking

Eye Control for Windows 10 - https://www.microsoft.com/en-us/garage/wall-of-fame/eye-control-windows-10/

TEDx Disability-led Innovations for the Masses - http://Bit.ly/bugajtedx

Every Student Succeeds Act of 2015 - https://www.ed.gov/essa

SUMMARY:

A trend exists in mainstream technology. Innovations that find their way to the masses often start out as tool created to assist individuals with disabilities. Educators can use this fact as a strategy to design more inclusive learning environments and experiences. The most frequently used accommodations can serve as a roadmap for educators to follow for how to design instruction to meet the variable needs of all the students. ■

UPCOMING LIVE WEBINARS

PROFESSIONAL DEVELOPMENT

CEUs are provided by the AAC Institute and are available for live webinars at no additional fee (does not include sponsored webinars unless noted). A 60-minute webinar = 0.1 CEUs. A 90-minute webinar = 0.2 CEUs

Empowering Paraprofessionals – The Key to Successful AAC Implementation

By Candice Steel, *SLP-L, ATP, Gompers Rehabilitation Centers, Phoenix, AZ.*
Thursday, August 29, 2019
3:30 pm – 5:00 pm (CDT)

Increase the chance of successful implementation of alternative communication (AAC) through systematic paraprofessional and support professional training. The goal of this session is to expand the capacity and effectiveness of support professionals from school-aged individuals through adult.

We will outline our guide to training staff in topic-focused modules. The strategies staff will learn and apply, will result in an increase in use of AAC independence in initiating use of AT and the decrease of device abandonment.

Unlock the potential of support professionals to facilitate implementation of devices and shift the power of voice and advocacy to the individual with disabilities.

Making Materials Digital

By Mark Coppin, *.Ed., ATP, ADE, is an Independent Accessibility Consultant, Prairie Assistive Technology, Fargo, ND.*
Thursday, September 19, 2019
3:30 pm – 5:00 pm (CDT)

Making classroom materials accessible for all students is extremely important. Unfortunately, not all classroom materials are accessible, in this webinar we will cover ways to make classroom materials accessible. You will learn about digital text, optical character recognition, ways to present digital text, digital study tools, math solutions and more.

We will cover solutions for Mac OS, Windows, Chrome and iPad. We will also discuss how to create and design your own digital materials such as accessible books, audio files, dictionaries, note taking and writing supports.

Rockin' in the Real World – Music for All

By Mark Coppin, *.Ed., ATP, ADE, is an Independent Accessibility Consultant, Prairie Assistive Technology, Fargo, ND.*
Tuesday, October 22, 2019
3:30 pm – 5:00 pm (CDT)

The ability for all students to express themselves through music is extremely important. If a student can't hold an instrument, play an instrument, read or write music; how can they express themselves musically? Luckily there are a lot of solutions available. This webinar will focus on some of those options.

We will look at accessible solutions such as Skoog, Skwitch, Beamz, Garageband and iPad apps. We will cover solutions from basic cause and effect music apps all the way to apps for composing and performing. Participants will learn how to unleash the inner Rock Star!

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AAC Strategies from Pre-K to Graduation Day!

Supporting Academic and Social Success School-Wide within the Park Hill School District

ELISA PARKER has been a Speech-Language Pathologist in the Early Childhood Special Education program for the Park Hill School District in Kansas City Missouri since she began her career 22 years ago. Her passion has always been working with children with Autism and facilitating Augmentative/Alternative Communication. Elisa has been the Autism Consultant for the Gerner Family Early Education Center for 8 years and the Assistive Technology Facilitator for 4 years. Elisa provides consultative services and training within her school district and various organizations in the Kansas City area. Elisa serves on the Sophie's Run board which is a non-profit organization that provides Assistive Technology to individuals in the Park Hill School District attending area.

KRISTEN PONCE is a Speech-Language Pathologist for the Gerner Family Early Education Center in the Park Hill School District in Kansas City, Missouri. She received her master's degree in Communication Sciences and Disorders from Rockhurst University in 2013. Kristen has a particular interest in working with preschoolers with autism as well as preschoolers who use AAC devices. Kristen has a passion for teaching her students to become competent and independent communicators. She has piloted several different forms of AAC groups in the preschool setting as well as pushed for increased literacy instruction for AAC learners. She is the author of the blog AAC to the Core describing her experiences working with students with complex communication needs who use AAC.

TARA WINEINGER has spent 24 years in Special Education. Tara has always been involved in assistive technology but the last 6 years it has been a full time position as the Assistive Technology Facilitator in the Park Hill School District. Prior experience includes special education teacher for grades K-12, self-contained and resource. Process Coordinator 5 years Diagnostic Coordinator 5 years. Tara has also presented at Closing the Gap and assist with moderating a Metro AT group in the Kansas City Metropolitan Area. Tara serves as Vice-President on the Sophie's Run board which is a non-profit organization that provides Assistive Technology to individuals in the Park Hill School District attending area

BACK TO CONTENTS

In 2007, the Park Hill School District began conducting formal assistive technology (AT) evaluations as part of their considerations for individual student use. This began as a request from a parent who was looking for an evaluation for their child, but was turned away by local agencies due to significant wait lists. Several Park Hill therapists were involved in this evaluation process and approached the district requesting that a formal assistive technology team be created. A team was then created consisting of an occupational therapist (OT), a speech-language pathologist (SLP), and a special education teacher as an additional duty to their normal caseload requirements. Over the years, our practices in AT have evolved and so has our team. We now employ one part-time Assistive Technology Facilitators for Early Childhood and one for K thru 12.

We have moved away from conducting such formal, in district evaluations and have begun utilizing a wider variety of device trials and considerations. These trials could include, low-tech, mid-tech and high-tech systems. As soon as a student has been identified as having a need, these trials begin. The AT Facilitator joins the student's school team to organize and offer suggestions about which types of systems to trial within the classrooms and therapy rooms by teachers and therapists. AT can be considered for any student who is struggling to make progress towards IEP goals and objectives and/or is struggling to access the general education curriculum and/or needs a different format to demonstrate knowledge. AT is not limited to students who are non-verbal or minimally verbal, but can be considered for students who have poor speech intelligibility, learning disabilities, selective mutism and fluency disorders. AT trials could not take place without an arsenal of different levels of systems and supports. Over the years, we have increased our collection of devices and now have access to a plethora of iPads and low to mid-tech options. (See image 1) With the help of a variety of vendors and the missouri AT loan program (https://at.mo.gov/), we have had more access to products allowing the teams to find the best fit for each student, the environment, for the education tasks required. Starting as young as three years old, we can begin sending district-owned devices home with families for use at home and in the community. Prior to this happening, teachers and therapists had been monitoring student progress with the devices in the classrooms. When trials at home are being considered, students are typically showing signs of independence with the device such as carrying it with them at all times and having the operational knowledge to be able to independently navigate the system. In order for the devices to go home, team members meet with the families to provide training and suggestions on how to implement in the home. This is offered individually for parents on a 1:1 basis and in a larger format for multiple families together. (See image 2)

Image 1: Switches on loan through Missouri AT program utilized in play while teaching commenting in AAC.

Image 2: Parent training occurs in large groups several times a year.

When the district began to increase the use of AT, in particular AAC, one of the largest struggles was in the area of building sustainable capacity for such a program. Building such a capacity started with defining the expectations for staff and students.

The expectations were defined as: students of all ages should have access to their AAC systems in all school environments. The goal is for each student to feel that their words matter. Honor the communication; no matter the form. Additionally, we knew that if we were to have AAC in all environments, staff in those environments would need to be trained. Training opportunities have occurred consistently since 2013 for teachers, teaching assistants and therapists. Guest speakers and device representatives are brought in at the beginning of the school year for large group professional development. Personalized and follow-up training, specific to age level and student needs, are provided by the district's AT Facilitators and SLP's who are passionate about AAC implementation. Training for regular education staff occurs during monthly early release days, and at times, as an alternative to staff meetings. Our success is due to the dedication the building principals and other administrators have placed on these trainings. Principals are and continue to be flexible in allowing teachers to attend trainings so student success can be ensured throughout the school day.

Training for specials teachers including art, music, PE and library also occur on a yearly basis. Over a five-year period, the school district prioritized the training of these art, music, PE and library teachers. Staff trainings were offered followed by in class supports for students with disabilities while attending specials classes. This is an integral piece to the success students have while in these classrooms. Teachers now know how to support the communication of their students, which has decreased behaviors and increased the learning experience and social relationships in the classrooms. Having these support staff members on board has generated such a collaborative environment in which both teachers and students are supporting each other, creating natural supports for everyone. (See image 3)

Within the school environment, instruction in AAC is based on developmental language norms, the environment and educational tasks and expectations for each individual child. At the preschool level, the focus is more play-based and promotes early communication development. (See image 4) As students move to elementary age, this focus is expanded into specific academic areas such as reading, writing and math and is also used as a tool for behavioral management. In middle school, the focus is shifted to activities of daily living by incorporating tasks such as making phone calls, placing orders, emailing daily communication notes and attending school social functions. At the high school level, the focus really becomes on employment and independent living skills. In developing these priorities by each age level, we needed to provide teachers with the appropriate tools necessary to ensure student success.

Our specialized programs are provided with one classroom iPad to be used as a backup if students forget their device or for Aided Language Stimulation. This provides the opportunity to have various AAC apps and vocabularies available for our staff to learn and use. Saltillo's TouchChat with WordPower and Chat Editor are our most widely used tools and resources. In addition to using these products as stand-alone AAC systems, we have created materials such as adapted books, posters, flip books, navigation sequence prompts and cues for modeling target vocabulary. Chat Editor has made a huge impact in our classrooms

Image 3: Using AAC during art activities.

Image 4: Visuals attached to AAC devices to support teaching and modeling of self regulation phrases.
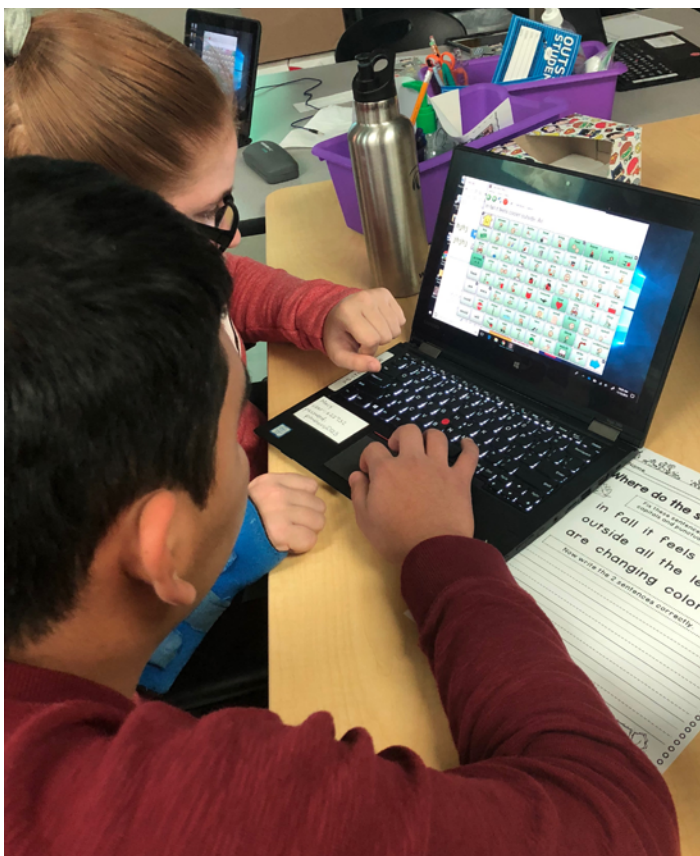
BACK TO CONTENTS

Image 5: High School students use Chat Editor to write emails to their parents everyday. Students utilize the picture icons, word prediction and copy/paste features in Chat Editor.

Image 6: Kaytlin Westbrooke (SLP) meets with Collen Manly (parent) as part of a parent AAC training.

as we are able to project different vocabularies onto our smartboards and use them as a classroom tool for all learners during group instruction. As students move through their educational years, these tools are used in general education classrooms, specials, and on student laptops. These tools are allowing our students to demonstrate their knowledge in ways they would previously not been able to. Students are able to create written products and copy and paste it into many different forms for their teachers and families. Creating emails to families has been one of our most exciting applications for students elementary through high school age. (See image 5)

In an effort to continue to build support for our students, we frequently offer a variety of types of training to our families. Family Night is an evening training that lasts about three hours and includes dinner and childcare. Parents are offered a variety of sessions to attend such as, beginning and advanced courses in AAC, and how to use AAC in the community. We also offer other relevant topics to families such as guardianship, setting up a trust, opening community-based services cases, and sensory strategies for the home. Sessions are presented by school therapists and community members. Evenings like this allow families to establish relationships with each other and build their own support networks. They also learn new ways to support their students' AAC at home. Additional opportunities that can be provided to families include; parent-teacher conferences, team meetings and individual appointments. (See image 6)

Our ultimate goal in providing these parent trainings is to empower families to take on the responsibilities and ownership of their child's communication. We help support our families in seeking outside resources to acquire their own personal, family-owned, communication systems. Due to the fact that our devices are district owned, if a family moves to another district, that system is unable to go with the child. We never want to see a child go without communication and our district is fortunate to have a nonprofit organization that helps us support families in our district in seeking their own devices. Sophie's Run at Lake Waukomis was started by a local family, Jim and Theresa Edwards, in memory of their daughter Sophie. Sophie was a student of the Park Hill School District who suffered from a variety of developmental and medical disorders including a communication delay. Sophie's family searched for a system that allowed her to be able to communicate for herself. They finally found an eye gaze system that was successful for her; however, Sophie passed away one week before her communication device was delivered. Her family founded this organization so no child would have to wait to communicate. To date, Sophie's Run has started a loan library for the school district, awarded 92 families with personal communication devices, and provided various equipment necessary for students who are visually impaired to move on to secondary education. To find out more about Sophie's Run at Lake Waukomis go to www.runsophies5k.com.

With so many students accessing AAC devices, we have had multiple student success stories over the years.

A preschool success story includes multiple students who began using AAC systems at the age of three years old. These students were invited to attend an event in a regular education

Image 7: Olive Bruders and her blue pig.

cluding reading, writing, social skills and expressive communication. With the tools and resources we have acquired, we are better able to identify a child's individual and academic strengths and use those to mold their educational pathway. In the future, for us as a district, we hope to expand AAC into more general education classrooms and across all grade levels. We also want to continue to empower our staff members to promote AAC as the norm and embed AAC theories and instruction within all areas of the general education curriculum. ∎

classroom. In this classroom, they were challenged, along with their peers, to state their names and one activity that they liked to do. Each of these students were able to independently navigate their devices and participate with their typically developing peers to answer the questions without adult support.

An elementary success story involves a student who recently acquired her very own personal device. She was on a weekend outing with her family at the local farmers market and spotted a man making balloon animals. This student was asked what she would like and she used her device to say "blue cylinder." Her mom explained that the man was making animals, so she changed her statement to say, "blue, pig, thank you." (See image 7)

One of the biggest success stories involves staff members, not students. An elementary school librarian inquired as to why some of our students with special needs were not checking out library books. After some discussion about the known importance to literacy, language development, communication and the limitations of these students, the librarian asked if she could adapt books to fit their needs. With support from the AT facilitator for the initial five books, she then developed a library of adapted books using building funds and volunteer labor. The school PTA became involved and began donating to the cause. Others followed her lead. Starting the 2019-2020 school year, we will have four elementary buildings with adapted book sections with 150 books each.

Through the growth of our AT program, our AAC program has expanded to include hundreds of students with a variety of needs. We have seen growth in all areas with our students, in-

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Harnessing the Power of Artificial Vision using OrCam MyEye

There are many challenges faced by people who are blind or visually impaired. Whether it is gaining access to print and or computer based materials, staying competitive in school/work or mobility, there are many assistive technologies that can help and to choose from. As an optometrist, who practices low vision, I try to find the right device or technology to match an individuals needs and goals. My goal is to empower and increase independence for my patients and as such I need to stay up to date on the latest in assistive technology.

Over the past decade there have been an increasing number of new assistive devices, especially wearable technology, which makes sense in today's fast paced technological world. Computer vision, which is the ability of a computer to understand what it sees, has been around for many years, but mostly in industry. With advancements in other areas and combined with artificial intelligence, a company out of Israel, OrCam Technologies, has created a device called the OrCam MyEye, which utilizes the power of computer vision.

The OrCam MyEye is a wearable assistive device that was designed from the ground up for people who are blind or visually impaired. It is a wearable smart camera that speaks the information it sees. The inspiration for OrCam MyEye is the brainchild of Professor Amnon Shashua and Ziv Aviram, who had much success in the field of computer vision with their company, Mobileye, which uses computer vision technology in automobiles

BRYAN WOLYNSKI Dr. Bryan Wolynski is in private practice in New York City where he provides low vision examinations as well as primary eye care. He also provides eye care for people with special needs at a community health center, exams for people in family homeless shelters and is starting care for people who are homebound. Dr. Wolynski consults on behalf of OrCam Technologies since 2013, providing training to patients, other professionals and facilitating clinical research. He has provided continuing education on low vision and assistive technology to eye care professionals and has spoken at conferences in the field of low vision both nationally and internationally.

helping with collision detection and safe driving practices. It is now available in many vehicles worldwide making our roads safer, reducing accidents and really saving lives. Mobileye technology is also now being incorporated for use with self-driving cars, truly amazing!

Founded in 2010, OrCam Technologies put together a team of leading engineers and design experts and really came up with a unique device and design. Over the past six years, since OrCam's pre-testing phase in 2013 and launch of their original device in 2015 and now their 2nd generation device, MyEye 2 launched in 2018, I have worked with hundreds of patients using MyEye and have become quite familiar with its functionality.

ORCAM MYEYE DESCRIPTION

The OrCam MyEye 2 is a single lightweight unit (less than one ounce), which is about the size of an index finger. With two magnets on the inside surface the device attaches magnetically to most any eyeglasses (except for thin wire frames or some wrap around frame), so there is no need for any special kind of glasses. If you don't wear glasses, it can attach to sunglasses or any frame without prescription. The device has an outer touch control pad, a 13 mega-pixel camera, 2 LED lights, a built in speaker and a mini USB port for charging. On the inside are the computer components and a rechargeable battery (lasting around 1.5 hours of continuous use). It has the capability of connecting to blue tooth speakers or headphone and is not dependent on the Internet for use. So the MyEye can be used when and anywhere I want. It however does connect to Wi-Fi for updates when connected. I have had patients using OrCam in the park, in stores and many other places where Wi-Fi may not be accessible or available.

WHAT DOES ORCAM MYEYE DO?

In practice I hear many patients complaints. The largest by far is reading text. OrCam is able to read text off of any surface (books, newspapers, mail, boxes and computer screens) through its own optical character recognition (OCR) software. My patients can read on the go, home or at work. I've had patients use MyEye 2 to read the cooking instructions on a box or just find out the nutrient contents of food products while shopping, It can instantly read anywhere you are, a menu at a restaurant or that document you get while at a work meeting. OrCam is also able to perform recognition of faces, products, bar codes, colors, money and tells me the time.

HOW DOES ORCAM MYEYE WORK?

While wearing OrCam, the camera takes a photo and speaks the information it sees. While functions can be set to automatic, for reading most people like to have control of when the device is working. To activate the OrCam camera to take a picture of the text you want to read, all that's needed is to point toward the text. This pointing gesture (pointing forward with the finger in an upward position, like gesturing the number 1, so the camera sees your nail), triggers the camera to take a picture once it sees your extended finger. If I want to read a book or any other text in front of me, I just point my finger at the text, listen for an audio feedback beep sound (indicating that the device recognized the gesture), remove my finger, at which time I will hear a camera shutter sound indicating a picture is being taken. Once the picture has been taken, OrCam will start reading. Two other ways to initiate reading include tapping on the touch pad surface or as mentioned before can be automatic. Besides the pointing gesture, other gestures include stop and tell-time. While reading I can also fast forward or rewind the text by a forward or reverse swipe motion on the touch pad. I can also pause reading with a double tap and stop with a single tap. Depending on the function I want, I can also change the settings to my preference either through an audio menu guide or through voice activation or OrCam's App.

Another reading capability is OrCam's smart OCR function through touch reading. By keeping my finger in the camera's field of view, instead of removing my finger, it knows to read about three lines above where I am pointing and will follow my finger around a page. This can be helpful with a menu or newspaper headlines and if I found that I want to read more of that section, all I need to do is remove my finger and OrCam will continue reading on, smart!

In OrCam's original design, the device was light dependent. With the release of MyEye 2, which now features 2 LED lights, lighting conditions are a thing of the past. So if I am in a dark restaurant, the LED lights will automatically flash allowing me to read the menu with ease. However, one thing to point out is that if lighting is so low that the camera cannot see the pointing gesture, you would need to use the touch pad.

Other features like facial and product recognition require that I enter the person or product in the system. This process is simple and easy to do, only requiring about 20-30 seconds. So, the next time my friends or family come into the camera's view, OrCam will tell me they are there. This has worked for patients from as far as ten feet away. OrCam can also be set to fully automatic mode and also tell you of unknown individuals recognizing their gender and if they are an adult or a child. OrCam already knows hundreds of thousands of bar codes so no need to enter it, unless it is a specialty product or unknown barcode, then you can just simply enter it. It can also recognize money notes, which is already pre-programmed. For anyone who is bilingual, OrCam MyEye can auto-detect French and Spanish (US Version Only).

WHO IS ORCAM FOR?

When I am considering a new device or technology for a patient, I go through a technology assessment. This assessment includes; functional vision status, needs, psychological aspects, cognitive ability, home/social life, abilities and cost. Here's the breakdown.

FUNCTIONAL VISION STATUS:

When I first introduced OrCam MyEye to my patients, people who were blind would say, "Oh this must be for people who are visually impaired". People who were visually impaired would say, "Oh, this must be for people who are blind". Well in fact, OrCam MyEye can be used and is for both. Much like magnification type devices need some residual vision to be used, the MyEye device does not depend on someone's vision, allowing it to be used by someone who is blind or visually impaired. One side note I like about the technology for my patients is that the MyEye can still be a useful device even if vision declines.

PATIENT NEEDS:

The OrCam MyEye is a multi-functional device. As mentioned, reading is the number one issue of many of my patients. The OrCam device not only is an exceptional reader, but it can read off of any surface and on the go. Being portable and not dependent on Internet connectivity, it can be used anywhere. This also gives privacy whether a concern to the wearer, school or employer. MyEye can be used in school, work and for personal use. It also does not save the text; sorry students, cant save the test and send it to your friends.

PSYCHOLOGICAL ASPECTS:

Depression is something that needs to be dealt with by everyone and something I pay attention to with my patients. Depression or lack of enjoyment in things can affect learning capacity and retention of information, making learning of any new technology seem daunting. So no matter what new device or technology I introduce, successful use can be hindered. Another aspect of using a device is the aspect of appearing different. I feel the MyEye device has an aesthetically appealing and pleasing design, which blends in and does not stand out more than someone else's blue tooth device. There are also no special glasses needed in order to attach the MyEye, not making you stand out or look different.

COGNITIVE ABILITY:

Since I see many low vision elderly patients this is something I need to pay attention to. However, I have found that sometimes I'm wrong and cognitive ability should not be a bias to introducing something new. I believe and some studies have shown that cognitive ability should be taken as a case-by-case basis. What's needed is a good demonstration and just see what someone is

or just in their daily lives. OrCam shows what is possible with computer artificial vision. Since the device's software can be updated through Wi-Fi, engineers at the company are continuously working on improvements and additional features for the future. Combined with machine learning and artificial intelligence OrCam MyEye2 is not only aiding people who are blind or visually impaired, but has also created a new category of assistive technology and with its reading abilities, is also being looked into for people with reading difficulties like dyslexia. For my patients, I find a good demonstration can show how MyEye can meet their needs now and in the future.

If you would like more information you can visit OrCam's website at www.orcam.com or call 1-800-713-3741. You can also reach Dr. Wolynski at bryan.wolynski@orcam.com ∎

able to accomplish.

HOME LIFE & SOCIAL LIFE:

For younger individuals who are more empowered and more social, OrCam portability works perfect for their lifestyle. However some of my elderly patients may need a good home support system, which can be important for successful use and instrumental during initial training.

ABILITIES:

OrCam MyEye can be used by anyone of any age, any type of vision loss and technological abilities. However OrCam cannot be used by people who have total hearing loss (it is able to be used by someone with a hearing aid, and have many patients that do so), someone with a head or neck tremor (as the camera needs to take a still picture) like in Parkinson's disease, someone who cannot comprehend text-to-speech or someone with unrealistic expectation, there is no dog recognition and it wont find your lost keys, at least not yet!

COST:

There are two versions of the OrCam MyEye 2. The MyEye and the MyReader. The difference between the two is that the MyEye costs $4,500, has all features and two years worth of updates, whereas the MyReader only has the reading functions, updates for one year and available at a lesser cost at $3,500. Some state rehabilitation agencies will cover the device and it is fully covered for veterans through the Veterans Administration, for those that qualify. If you have a vision plan or private medical insurance sometimes they will cover a portion of the device so you can call and check with your provider. Unfortunately as we all know, Medicare insurance does not cover any assistive technology. Hopefully one day this will change.

There are many people who are using MyEye in school, work

DISKoveries

APPLE TV for All
Accessibility Options for Special Needs

Apple TV (www.apple.com)

We have all been part of the technological changes and advances in television during the past years - the progression from network to cable TV, from VCRs to DVDs, to streaming, internet connections, HDTV, 4K and Smart TVs, etc. This article is meant to help the reader understand Smart TVs, the role of the Apple TV and the unique features it offers those with Special Needs.

The major difference between Smart TVs and not so smart ones is the internet connection. Smart TVs have a built-in ability to connect to the internet, and in order to keep up with further advances, the ability to download apps for new services as they appear. Most Smart TVs have both an Ethernet port and wireless capabilities.

If you don't have a Smart TV but do want the ability to use streaming services like Netflix, Hulu, HBO and many others on your TV, you can use a digital media interface that provides the internet connection. The most popular of these streaming devices at this time are the Apple TV, Amazon Fire, Roku Streaming Players, and Google Chromecast. Like the Smart TVs, there is a one-time cost to purchase these streaming devices.

However, in addition, you will need to subscribe individually to each of the streaming services you want (such as Netflix, Hulu, Amazon Prime, etc.) in order to use their content. This is true regardless of whether you are using a Smart TV or an interface such as Apple TV. Almost all the services have monthly subscription fees. Two of the popular free services are Crackle and YouTube.

Because of Apple's well-established reputation for built-in accessibility options, and because of some of the other options it offers, I have chosen to review the Apple TV at this time.

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BACK TO CONTENTS

Apple TV 4K and Siri Remote

APPLE TV 4K

The Apple TV 4K is a small black plastic box, measuring 3.9" wide x 3.9" deep x 1.4" high. On the back, it has connectors for the power cord (included), for an HDMI cable (to connect to the TV's HDMI port) and for an Ethernet cable (if wanted). To connect to the Internet, Apple TV can use either Wi-Fi or Ethernet. When you use an Ethernet cable, Apple TV automatically uses that connection instead of your Wi-Fi network. If you don't connect an Ethernet cable to your router/modem, Apple TV built-in wireless ability automatically connects to your wireless network. The new Apple TV 4K requires a 4K and HDR TV for 4K and HDR streaming, but can also be used with HD and UHD TVs with HDMI connections. For internet access, it requires 802.11 wireless, Ethernet network or Broadband Internet access.

On the front of the Apple TV, you will see a small, bright light when it's on. The remote, named the Siri Remote, is 4.8" h x 1.5" w x .25" deep and has a lightning connector for charging. You can use the remote by touch or with your voice (See below for additional information about Siri and Voice Search.) To use voice, press and hold the Microphone button to talk. To use Touch, swipe up, down, left or right on the top Touch surface, which you can also Press to Select, or Press and Hold for contextual menus. Other Touch functions include a slightly raised, round Menu button which you press to return to the previous menu or press and hold to return to the Home Screen. There is also a TV/Home button that you can press twice to view open apps and Press and hold to put the Apple TV to sleep. In addition, there is a volume up and volume down switch and a play/pause button. All five buttons have white icons, are slightly raised and can be distinguished by touch and/or vision.

The Apple TV provides much more than just the option to watch TV shows. Controlled by a dedicated operating system called tvOS, with current version tvOS 12.3, the Apple TV con-

nects to the App store so that you can search, download from, find games to play, shop, listen to Apple Podcasts, find information from the Internet, and stream video content. Using Home Sharing, you can also stream content from your computer's iTunes library or play content stored on other Apple devices, using AirPlay.

Once you have connected and installed the Apple TV and charged the remote, you can then adapt it for Special Needs. To set Accessibility Options, select the Setting icon from the main screen—select General--- then select Accessibility.

Apple TV Accessibility Options

APPLE TV: ACCESSIBILITY OPTIONS FOR MEDIA

Subtitles and Captioning: These are options that assist the viewer in understanding speech by providing written information. Both can be helpful for those with hearing impairments, dyslexia, English as a Second Language users, or anyone who might want assistance with listening for any reason. It is also helpful if a user is watching in an environment where sound cannot be used and earphones are not available. Although Closed Captioning and Subtitles seem similar, they are two different options. Subtitles assume that the viewer can hear and provide only the spoken words of the characters or the narrator, while Closed Captions assumes the viewer cannot hear the audio and includes descriptions of background and other noises, sounds or audio cues that help in the understanding of the scene. Whatever is heard is written below as text. For example: comments on sounds such as Music playing, Thunder, a door slams, etc. are included as well as direct speech quotes. Subtitles and Captioning can be customized to meet individual visual requirements and preferences. Users can change size, color, background and type of text.

Audio Description: This media accessibility option, when turned on, allows the user to hear in detail what is visually displayed on screen. It is designed to help those with visual impairments. The iTunes store has movies that come with audio descriptions of the visual content of each scene. For example, you might hear: "A woman enters from the right. She is wearing a long dress. She extends her arms forward as she speaks."

You are able to search iTunes to find movies available with audio description- these will contain an AD icon under the title. If you have iTunes on your computer or tablet, click this link to connect to iTunes and see the movies available with audio descriptions. https://itunes.apple.com/WebObjects/MZStore.woa/wa/viewMultiRoom?cc=us&fcId=1103547439&ls=1&app=itunes&v0=www-us-accessibility-tv-vision-audio-descriptions-available-movies

APPLE TV: ACCESSIBILITY OPTIONS FOR VISION

VoiceOver: VoiceOver is a built-in screen reader that describes exactly what's on your TV screen. To activate VoiceOver, triple-click the Menu button and let Apple TV guide you through the setup. You can also turn VoiceOver on from the Accessibility Options, set up a Shortcut or ask Siri. When setting up VoiceOver, you are able to adjust the speech speed (from very slow to very fast) and to change pitch. Apple also includes VoiceOver Practice which guides you in learning its use. For a comprehensive video tutorial on VoiceOver on the 4th Generation Apple TV, see Louis Perez excellent video at https://www.youtube.com/

Louis Perez - VoiceOver on the 4th Generation Apple TV
https://www.youtube.com/watch?v=OaclLQ84vPw

watch?v=OaclLQ84vPw

Zoom: The Zoom feature provides the user with up to 15X magnification on the Apple TV. You can turn Zoom on from the Accessibility Options area. Once turned on, you can then touch the remote three times to zoom in and out where ever you are. Double tap and slide with 2 fingers to adjust the zoom level. Tap with two fingers to enable the zoom drag mode. Then drag to move around the screen. Set maximum zoom level up to 15X.

Display Accommodations: Display Accommodations has three adjustments: Color Filters, Light Sensitivity and Reduce White Point. These are designed for those who are color blind:

Color Filters can help differentiate colors and help read on-screen text. To do this, there are four presets for the different kinds of color blindness: Grayscale, Red/Green Filter, Green/Red filter and Blue/Yellow filter. After you choose one, you can then select intensity to adjust the filter's strength. To help you read onscreen text, select the Color Tint option and then select intensity or hue to make adjustments. Once you set your filter, it applies to everything you see on Apple TV.

Light Sensitivity lets you lower or increase the overall brightness.

Reduce White Point can be used to lower or increase the intensity of bright colors.

(Since Display Accommodations aren't necessarily needed at all times, you can quickly turn them on and off with a shortcut: Go to Settings > General > Accessibility > Accessibility Shortcut

Color Filters on Apple TV

and select any features that you want a shortcut for.)

APPLE TV: ACCESSIBILITY OPTIONS: INTERFACE

These three additional options will assist the user with visual impairments:

Bold Text, Increase Contrast and Reduce Motion (Reduce Motion will limit the amount of animation used when app icons are activated.) Use shortcuts to turn these on and off as needed.

APPLE TV: ACCESSIBILITY OPTIONS FOR HEARING IMPAIRMENTS

Mono Audio: Typical stereo sound includes distinct left and right channels, so that each listening ear gets different input. If you are hard of hearing or deaf in one ear, this might result in missing words, notes or sounds while watching media with a headset or earphones. With Mono Audio Set, you can set hearing controls so that Apple TV outputs all sound through selected ear.

Balance: With this slider, you can adjust the balance of audio between left and right speakers/ears. When you move the slider to one side or the other, that headphone will be much louder than the other.

BACK TO CONTENTS

APPLE TV: ACCESSIBILITY OPTIONS SWITCH CONTROL

Apple TV's Accessibility Options for Physical and Motor Skills include Switch Control, which allows users to navigate through onscreen items, using Bluetooth-enabled switch hardware, such as Ablenet's Blue2 (www.ablenetinc.com). Items are sequentially highlighted, and with Switch Control turned on, users can connect their external switch or switches, and choose one of the following scanning options: Auto Scanning (highlighting moves automatically from one item to next after a specified time); **Manual Scanning** (using two switches, Switch #1 moves highlight from one item to next and Switch #2 selects desired option); or **Single Switch Step Scanning** (one switch moves highlight from one item to next. If no movement is taken to next item in a pre-selected time, the highlighted item is automatically activated.) You can set auto scanning time, pause from first item, and number of loops.

Platform Switching: You can also control your Apple TV directly from your iPhone, iPad or Mac, without having to set up your switches on each new device. With the latest version of iOS, the Apple TV Remote is automatically added to Control Center — so you can quickly navigate and control your Apple TV right from the Lock screen on your iOS device. Platform Switching requires all devices to be logged in to the same iCloud account and connected to the same Wi-Fi network.

Accessibility Shortcuts: Quickly turn on and off VoiceOver, Zoom, Bold Text, and more using the Accessibility Shortcut. Once the shortcut is enabled in Apple TV, you can simply triple-click the Menu button to access your preferred accessibility features.

OTHER OPTIONS FOR ACCESSIBLE USE

Voice Control: You can also use your voice for onscreen navigation. With the Siri Remote, you just press the button with the microphone icon and ask Siri to do things for you- such as Find specific movies by name or by actors or genre, ask Siri to rewind exactly 5 minutes, Open Netflix. You can use your voice to spell your user name and password, etc. You can ask Siri to display sports scores, ask for general information, like local weather or current time or stocks, to open apps, turn accessibility features on or off. You can search for movies, TV shows, or music. Siri is context-sensitive so different commands will work depending where you are in Apple TV. While watching media, you can use Siri to repeat dialog you missed. Just say "What did he say?" and Siri rewinds by a few seconds. Tell Siri to pause, play from the beginning, skip forward 90 seconds, jump back 10 minutes, turn on closed captioning. In Accessibility setting, you can enable bold, get larger text, zoom or increase contrast. If you are an Apple Music subscriber, you can ask Siri to play songs, etc. To use Voice Control, just press the round button with the Microphone icon on the Siri Remote.

Customize the Touch Surface: The top area of the Siri Remote is called the Touch Surface. When using the Touch Surface, you can control how far the cursor will move with each movement on this area. You can set Tracking to Fast to make your smaller thumb movements go farther on the screen. Or set Tracking to Slow, so your larger movements will move a smaller distance. Open Settings-->Remotes and Devices-->Touch Surface Tracking

Bluetooth Keyboard: You can also use a Bluetooth keyboard, such as the Logitech 440 Plus Keyboard and Built-in Trackpad (www.logitech.com) to navigate Apple TV with the trackpad and enter text for searching using the letter keys. To connect, set your keyboard to Pairing Mode. Open Settings --> General --> Bluetooth. The Apple TV will begin searching for nearby

Logitech 440 Plus Bluetooh Keyboard (www.logitech.com)

Touch surface

Menu

TV/Home

Siri

Volume

Play/Pause

The Siri Remote

Bluetooth devices that are in Pairing Mode and will list them on screen. Just select your keyboard and it's ready to use.

TAP Wearable Keyboard & Mouse: (www.tapwithus.com) If you use the TAP wearable keyboard, mouse and game controller with an iPad tablet, phone, or computer, you can also use it to navigate your Apple TV. TAP Wearable Keyboard is placed around your

TAP Wearable Keyboard & Mouse (www.tapwithus.com)

fingers- each finger fitting into an adjustable ring. The mouse glider is on the thumb.

There is no need to hold anything —users just tap anywhere, on anything — it is a vision-free, voice-free control of the keyboard and mouse with just the fingers of one hand on any surface. Each letter is assigned a tapping combination — and learning is with a series of tapping games downloaded from the Apple Store or from Google Play. To see TAP, visit https://www.youtube.com/watch?v=W5J5m-Hdq_Bw&feature=youtu.be or visit https://www.tapwithus.com/introducing-tap/ for a comprehensive overview.

TAP Wearable Keyboard and Mouse
https://www.youtube.com/watch?v=W5J5mHdq_Bw&feature=youtu.be

Streaming TV Controller: (www.rjcooper.com) When the Siri remote is inaccessible because of button size, many Apple TV functions can be controlled with this Bluetooth device. It is an 8" x 4" x ¾" box that has six buttons (each 1.5" round). They control the actions to move right, left, up, down, back and select. All other functions (such as pause/resume, volume, etc.) would still be done with the Siri remote. (I have not reviewed this product firsthand so email rj@rjcooper.com if you have questions about its use.)

Streaming TV Controller: (www.rjcooper.com)

WAYS TO LISTEN TO APPLE TV

Some options for enhanced listening to Apple TV include different types of Bluetooth hearing devices, such as the following, previously reviewed in DISKoveries in the Closing The Gap Solutions Magazine, 2018-10:

Ways to Listen to Apple TV (top- AirPods (www.apple.com), Logitech H800 bluetooth Headset (www.logitech.com) , Bottom: AfterShokz Trekz Air Wireless Bone Conduction Headphones (www.aftershokz.com) & Bose SoundWear Companion Speaker (www.bose.com)

BACK TO CONTENTS

Apple AirPods (Apple: www.apple.com) These cordless Bluetooth AirPods rest outside the ear canal and allow you to continue to hear outside noises, can be used with one or both ears, and have built in microphones.

Logitech H800 Bluetooth Wireless Headset (Logitech: www.logitech.com) These are wireless, over the ear headphones for those who prefer more tradional headphone listening.

AfterShokz Trekz Air Wireless Bone Conduction Headphones (AfterShokz: www.aftershokz.com) Bone conduction headphones are designed for individuals with conductive hearing loss, but are effective for all listeners. They benefit those users who cannot tolerate earphones in their ears, those with motor limitations who might not be able to handle small ear pieces and those who benefit from additional sound for attention and focus.

Bose SoundWear Companion Speaker (Bose: www.bose.com) This is a flexible and wearable neckband Bluetooth speaker that is hands free and ears free. It rests on your shoulders, and conforms to your neck. This design also provides options for those with Special Needs who might not be able to use earphones, for those with motor limitations and for others who can benefit from additional sound to help attention and focus.

For more detailed information about these items, see DISKoveries 2018-10, or visit the company websites.

I hope this brief introduction to Apple TV, tvOS12 and Accessibility Options will help you enhance your TV viewing experiences, while also bringing you greater ease of use and information about viewing options. ■

Low-Tech To High-Tech Ways to Empower Your Student to Write!

As Occupational Therapists we are frequently asked to help "fix" a student's writing. Fix is the wrong verb. By providing different types of technology tools for those who struggle with written output we offer opportunities for everyone to show their potential as a writer.

When we first begin to discuss our students, who are 3-21 years of age and have diverse challenges, we realized that we must first begin by collecting data about our student. Using the framework Student, Environment, Tasks, and Tools (SETT) and guided by the AT Decision-Making Guide, we begin with the collection of data. We first must spend time establishing rapport and building a baseline of knowledge. We must learn about their overall cognition, which includes their reading level, executive functioning skills (working memory, focus and self-regulation) genre and content knowledge and their physical capability. We also must learn about the student's family, their pets, hobbies and high interests; this information is utilized later on when introducing the technology.

We dIscovered a variety of roadblocks along the journey in supporting our students. The student's team—teachers, support staff, parents and the student themselves were included in a discussion so everyone's perception of the writing task was obtained. At times, there was a mismatch of the perceptions of expectations and the task at hand. So, we needed to find our student's potential, always assuming competence. We began by looking at the student's current performance and whether basic mechanics of writing were causing some of the challenges. These may include, but are not limited to: font, paper options, organization of writing skills and body mechanics.

In looking at font, we must consider readability for our students including the size, type and spacing of the font in which the text is written. With the many paper options available, the paper itself could be difficult to access. For example, consider if the paper is single or double spaced, if there are dotted lines in the middle that distract the student or if there is just too little space allotted for a written response.

KATHERINE SWEEN has been an OTR for 28 years. She has worked with students of all ages and disabilities in both school systems, and various organizations located in Southern Wisconsin and Northern Illinois. She has been a member of the Assistive Technology Team in School District of Janesville for 10 years as well as a member of the district's Autism Support Team. She has been a co-presenter at various conferences including; Technology Conference for Special Education, AT Across the Lifespan, WI Statewide School-Based OT/PT Conference, Wisconsin Occupational Therapy Association 2016 State Conference, and ATIA 2017,2018, and CSUN Assistive Technology Conference in California. Katherine has also co-authored Writing Composition Part I and Writing Composition Part II for the ATIM (Assistive Technology Internet Modules).

DEB KRAUSSE has been an OTR in the School District of Janesville for the past 25 years, providing a leadership role as the Instructional Manager for the past 15 years. She has worked with students from 3 through 21 throughout the district and with community agencies to help support student achievement. Deb has been an active member of the Assistive Technology Team and the Janesville Autism Support Team for the past 20 years, providing direct services, consultation and training to support student and staff development. Deb has an interest in presenting district wide, state and national trainings in the areas of Sensory Processing, Autism and Assistive Technology. Her recent endeavors include co-presenting at the Wisconsin Occupational Therapy Association Statewide Conference in 2017, AT Across the Lifespan in Florida in 2018 and CSUN Assistive Technology Conference in California in 2019..

BACK TO CONTENTS

It is important to assess the student's seating system during their expected time to write. First, we examined if the seat fit, and supported the student so that they had a 90/90/90 posture with or without physical supports beyond that, one must consider breath support for the student and if they have the required muscle strength to sit while writing without additional physical support. Looking to ensure that tone, high or low, does not impact the writing process both initially, and then as the time spent writing progressed. Determining if the students need to access switches or communication devices in order to communicate/write and if the seating system supports that need.

Sensory proprioception issues were also kept in mind. Checking that the student's sensory system is able to processes the information of where their body is in space so that they are able to generalize/adapt the function of sitting in order to use their cognition for writing is vital.

Executive function skills must be explored. As writers our students must be able to organize information, plan, learn, multi-task, remember multiple pieces of information, prioritize, pay attention and initiate the writing process. Establishing what strengths our students have, along with any supports they require in order to be successful with their executive functioning was another vital component to our initial assessment.

Also considered was the student's vision. All too frequently, students own glasses but do not have them. Investigating if the students are color blind, have nystagmus, require large print, colored overlays or even audio text for assist with processing text at their highest comprehension level were kept in mind when gathering information.

As we collected baseline data, we began with handwriting and keyboard samples if possible, which included near point copying, copying from a board, creative writing and dictation. An alternative keyboard was considered to offer support if the student was already familiar with that option. Photographs or videos were utilized to help assess the student's access for work completion. We also obtained classroom work samples in order to compare classroom work versus one-on-one work completion. Standardized and informal assessments were utilized if needed, to look specifically at visual motor, visual perception, fine motor, motor coordination and motor planning (praxis) skills.

Once a specific writing task was determined as a starting point for the team and all of the evidence gathered, we then began the task of determining which technology supports would be trialed. When implementing technology we always presented "low tech" items first. For example, if hand grasp was an issue shortened pencils, pencil grips or slant boards might be offered. Difficulty with grading pressure while writing might result in a trial of mechanical pencils or pens. If the team found that the paper might be the potential issue alternative paper was offered to trial; paper with bold lines, raised line (which offers tactile feedback) paper that highlights the base of the line, writing templates or larger spacing between lines. Colored overlays could assist with improving print clarity/print stability. Likewise, if working on a device, such as a laptop, the background color or font color could be altered.

Students who require sensory supports with seating might benefit from balance chairs, standing desks or ball chairs. Book stands could be used while the students were laying on their stomach propped on elbows. A clipboard could provide a stable base of support while sitting in a glider rocker, a couch, a beanbag, or walking about the room. We found that although research supports the 90/90/90 principle, when working with students who have significant sensory needs we must endeavor to be resourceful. In this manner we are able to support their sensory system while still having the students be active engaged writers.

Students whose executive skills required support were introduced to visual step by step checklists, video modeling, highlighting of important steps, graphic organizers and/or interactive tutorials embedded into their written work. Specific skills were taught for naming projects and organizing files on their computer.

Creativity became a defining feature with our process to ensure students are able to write. We quickly realized that although these supports previously mentioned worked well with students working towards Common Core Standards those working towards Alternative Standards/Essential Elements required flexible thinking. We introduced visuals in a different manner so that the students were using curriculum pictures paired with words, their Pragmatic Organizational Dynamic Display (P.O.D.D.) book or eye gaze with visuals on a high contrast boards to indicate their written responses. Single switch, proximity and sequence switches were programmed with vocabulary and became part of the writing process. A combination of a variety of switches in a variety of locations,head/hand/chin/knee/foot, produced success. We found that everyone was an author! Students who were previously not engaged and required direct adult support became attentive, required only intermittent adult support and were able to share opinions, facts and their sense of humor.

The next level of supports include software and extensions. Co-Writer is used as a Universal Design for Learning (UDL) tool in our district. Word prediction software and extensions, such as Co-Writer, were reintroduced and explicit instruction offered to students who are limited by their ability to correctly form the letter, to correctly identify a letter on a keyboard or by those students who have a limited phonemic awareness. Students who struggle, now were able to hear the letter they typed and, for those who struggle with letter formation, were able to independently recognize that they typed the incorrect letter. Students are able to create their own topic word bank and hear the predicted word bank choices prior to self-selecting them. Many people have access to word prediction in their everyday life through their smartphone. Providing students access to this in-

creased their length of sentences, their overall length of writing, and the complexity of their vocabulary.

Offering software/extensions that enabled the student to have text read aloud provided our students with the ability to hear information at their comprehension level, which seldom was at their independent reading level. Once the students had access to material at their comprehension level and of interest to them they, in turn, exhibited significantly improved enthusiasm with their writing. When accessing Snap and Read, which our district utilizes as a UDL tool, the text is able to be translated to multiple languages. The material the students are reading can be pulled into an outline from a variety of formats. This is incredibly helpful for students who struggle at organization of the content material and their thoughts regarding the reading information. Inspiration and Kidspiration are two options to consider for graphic organizers. These programs allow students to create graphic organizers including webs, concept maps and even Venn diagrams using picture symbols along with words. Through the use of both formats (verbal and non-verbal) our student were able to reduce their cognitive load and thus, retain and recall more information.

First Author software was offered to students who were challenged with increased learning difficulties. This program provides specific lessons that are working towards standards based or, alternative based standards in writing. The students have access to multiple choices, or they can create their own topics. After choosing a topic they begin writing with the support of built-in accommodations like word banks and picture prompts which are generated automatically. This was instrumental in improving the written output of not only students with learning difficulties, but those with physical disabilities.

Clicker 7 software is a program that can assist the students with organizing their ideas to help them prepare for writing. The students are able to use their own voice to record notes and also practice their sentence prior to typing it out. In this manner, the teaching staff are able to hear if the sentence has the correct format and provide additional support or instruction with sentence structure through alternative grids. These different types of grids are dependent on the support that the students need. The grids are able to be formatted so that the students must select one word/phrase/picture from the first grid before they are able to move onto the second grid, the third grid and so on to compose a complete sentence including punctuation. The students are also able to see and hear pictures symbols paired with words, single words, or even entire phrases. Students can hear their writing read back to them with a child's voice.

In our district as Occupational Therapists, we worked in collaboration with our teaching staff during reading and writing instruction. Curriculum that provided specific scripted lessons, which was able to differentiate and provide alternate methods to write, was offered to students who were working toward alternative standards. This curriculum prepares the students for alternate assessments, along with collecting data. Unique Curriculum provides alternative formats of graphic organizers and journaling. The students may access a series of curriculum pictures paired with words to answer a journal question/create a graphic organizer on a Smart Board, a tablet or via paper. It was important when using the paper pencil method that we empower our student to be as independent as possible along with providing instruction on how to complete the activity. Step-by-step visual checklists were used. The students understood that the first thing on a paper was their name and if they were not able to print their name, they became independent in locating, correctly orientating (for correct letter directionality and location on the paper) and stamping their name with a name stamp. Journal sentences could be pre-printed with the student only self selecting the ending, or the sentences were printed for them while the student watched. The adult took great care to verbalize every letter, along with capitalizations and spaces between words. The students were always responsible for ending punctuation.

For our students who continued to struggle with writing or who had already experienced so little success with writing, we looked to voice to text through the Google Docs, Co-Writer or iPad applications. Dependent on the quality of the students speech this tool could provide a startling success and reframe the student's own perspective of themselves. When using voice to text, we were diligent with instruction of complete sentence and paragraph formation along with punctuation. The students were also taught how to use other technology tools to listen to the text as it was read outloud back to them. This was so they could identify if the words transcribed were accurate and if the sentence was complete.

Our district continues to increase access to technology through one-to-one technology options and the option to bring your own device. Even with the increase in accessibility, it is important to make sure our students have the right technology for their needs. Therefore, our district has a variety of options available to our staff to try with our students. Chromebooks, Thinkpads and iPads are the common tools that our schools use, varying on the grade level being taught. With Chromebooks, we have a variety of different extensions that can be added to support student access. Several have been discussed in the paragraphs above, which include word prediction programs, voice-to-text, word banks and google drive access for easy sharing to name a few. Thinkpads and iPads offer touch screen access with wireless keyboard or mice support. We use a variety of modified keyboards to help support student access, which may include larger or smaller key sets, color coded letters, or wireless. We also use our student's Augmentative Communication devices to serve as their writing tool. As long as our students can get their ideas down through communication, we also try to access it for academics. If a student does not have an Augmentative Communication device, but still needs an augmentative communica-

tion mode of instruction, our district utilized the PODD system. The PODD system is a book that contains words and symbols through a systemic sequence and categorization system to support communication between people with complex communication needs. With the use of this system, students are able to get their needs and ideas represented in a way that supports writing.

For some of our students that have limited access to writing, we provided them with iPads and app access, which include apps like Explain Everything or Book Creator, which allow students to tell a story through a sequence of pictures, collages and/or words. Clicker Connect is an app that allows for students to access words, phrases and/or pictures to help build sentences and paragraphs with structured support as designed. We have used QR codes to help students log in to computers, as well as access to instructional tools.

In utilizing a student's iPad, one of the features most overlooked when writing is the camera. Through the use of the camera a student could create a pictorial graphic organizer. The students can be taught to take picture of the steps in a science experiment, items they see on a field trip, or even curriculum visuals (pictures in books or pictures of the specific items in their P.O.D.D. book). In this manner, we are supporting their working memory so that when it comes time to write about an experiment, an experience, share an opinion or state facts the students can reference their pictures.

Clicker Connect is another application which, like the Clicker 7 software offers different levels of supports for students so they can be independent writers. Our students are able to have access to premade sentence grids that can offer pictorial supports paired with words, parts of sentences (phrases) or single words to build sentences with. The difference is iPad application vs. software.

QR code readers are another way to offer alternative forms of writing. The students can either supplement their writing projects or the QR code can be a "stand alone" form of writing. For example, a middle school student we worked with had to complete a project on pyramids. He did type out some factual information to be placed next to his pyramid model but then placed a QR code that had a school appropriate video on pyramids linked to the code. Another method of using QR codes would be for the students to scan the code and receive a step by step video model of how to use their technology. This has received positive feedback not only from the students, but also the staff that are in the classrooms. In this manner everyone has access to how to use the technology.

Snap Type is an application that allows the student or teaching staff to quickly take a picture of a worksheet and then, instead of using a pencil the student is able to type, with the word prediction that comes with the iPad's keyboard, or use voice-to-text to complete the worksheet. Just airdrop, e-mail or save the completed worksheet. It is easy and quick for your students to use and learn.

GoWorksheet Maker is another application that modifies worksheets. In this app, the teacher must take a picture and then modify the worksheet before sending, via a whole range of options including broadcasting, to the students. This application is different than Snap Type because it allows the teacher more modification options. Some of them are creating text-to-speech, so the students are able to hear the story, question, and answers read to them out loud. It also allows modifications so that the teacher can create multiple choice answers, drag and drop answers, word banks, image answers and links to videos. Students continue to have the option to type their answers and use voice to text also. This application is used in our district with success as our students, who require additional support for reading and writing, can sit in their classroom with headphones/earbuds and still be completing the same worksheet as their peers.

Popplet is an application that we use for creating graphic organizers. For those students who struggle with organization and working memory this app allows them to insert words, upload images and even create their own drawings. The students are able see the ideas connected, via the app's graphics and can change colors, bold important words and underline. For our students who become anxious at the thought of composing a written paragraph it provides the visual security they need.

The final application that is used frequently in our district for students working towards the alternate standards/essential elements is Explain Everything. We instruct our students, via a visual schedule or video model, how to launch the app, open a new project and then take a selfie as their signature. They then first use the camera feature to take pictures paired with words from their curriculum, or their communication device (P.O.D.D. books or an AAC device). After students indicate they are finished with their composition, they are to complete the final step of writing; they are asked to type. This may look like random rows of letter typing at first, but when we give meaning to their letters then the students begin to understand phonics or whole sight words. (This was from the First Author Curriculum.) We give meaning by underlining a letter/group of letters and stating, "it looks like you are writing___, this is how I spell ___" and then type that word(s) stating each letter out loud. By just using this application on a three times per week basis we were able to show consistent progress with all of the students. For example, one non-verbal student on the Autism spectrum moved from typing three or four rows of what appeared to be random letters to independently answering a specific "where" question. He did this by self-selecting a visual of the post office (from his P.O.D.D. book), which is always paired with the word underneath (post office) and then independently typing "fedx." Amazing! In our classrooms we have a question written in large bold font for all to see, "Who here is an Author?" The answer is "EVERYONE."

Once we determined the technology and tools our students could access, we provided instruction and trial periods while data

was collected. We may begin with keyboard instruction when appropriate, but for some, it was visual instructions for login access and steps to open or begin the program. For our beginning students or students with more limited access, we modified how to sign in, while our more advanced students were taught how to name their work, save their information, and file it, along with emailing and/or sharing their work for teacher access.

We expanded writing considerations to encourage student participation by introducing high interest areas to their writing repertoire. We also supported their learning styles by using first, next, then boards, sequence boards, journals and pen pals that facilitated writing skills within the classroom and on a personal level.

In order to gain the greatest success with our student's writing skills, we needed to empower not only our students, but our staff members. We provided training to our teachers and support staff on the technology and tools needed per individual students. This included visual supports and sequencing for student and staff access. We made sure to check back often with staff and students to help modify, provide additional training and suggest adaptations based on the assignments or tasks required. We also worked with our students to make sure they were comfortable advocating for their technology and/or tools when working on classroom assignments or tasks. Our final empowerment technique was to make sure that our students and staff had a back up plan. We know that technology fails, gets taken away, or modifications are not made in time. When this happens, teachers need to have access to other options so that students can continue to complete assignments and increase their confidence with writing skills.

Finally, we realized that although our job description stated Occupational Therapists, we were salespeople. We needed to sell the technology to the team members. The teachers needed to be reassured that it wasn't "cheating" if their student used technology. The student's frequently required introduction of the technology in a non-academic setting, where we could utilize information previously learned about their family, their pets, their hobbies and their high interests. Other methods to facilitate student engagement in writing were mad libs, pen-pals or even entries to contests (with parental and school district approval). Parents required reassurance that it would take time, it would take patience and we might need a "do over" if the first tool used didn't work.

In conclusion, even though there may be barriers for our students to overcome there are many tools and strategies that we are able to provide. We must strive to remember the answer to the question posed in our classrooms, "Who here is an author?" EVERYONE! Our job and goal is to support and empower our students so they can show us their true potential.

RESOURCES:
Assessing Student's Needs through Assistive Technology

A publication through the Wisconsin Assistive Technology Initiative
http://www.wati.org/free-publications/assessing-students-needs-for-assistive-technology/

Assistive Technology Decision Making Guide
A publication through the Wisconsin Assistive Technology Initiative
http://www.wati.org/free-publications/assistive-technology-consideration-to-assessment/

Book Creator
Free
https://bookcreator.com/

Clicker Connect for Ipad
Crick Software
$32.99 per individual license
https://www.cricksoft.com/us/clicker/ipad/clicker-connect

Clicker 7 for Windows or Mac
Crick Software
$495 per computer license
https://www.cricksoft.com/us/clicker

Co-Writer
Don Johnston Inc
$4.99 per month individually or
$0.50-2.00 per student annually
https://learningtools.donjohnston.com/product/cowriter/

Explain Everything
$6.99 per month for individual plans
$11.99 per user, per month for team plans
https://explaineverything.com/

First Author
Don Johnston Inc
$699 per classroom
https://learningtools.donjohnston.com/product/first-author/

Google Docs
https://www.google.com/docs/about/

GoWorksheet Maker
$39.99 per Ipad
https://itunes.apple.com/us/app/goworksheet-maker/id1074020582

BACK TO CONTENTS

Inspiration
Inspiration Software
$39.95 per computer license
http://www.inspiration.com/

Kidspiration
Inspiration Software
$39.95 per computer license
http://www.inspiration.com/Kidspiration

Pragmatic Organizational Dynamic Display (PODD)
$270.00 per CD-ROM

Popplet
$4.99 per Ipad
http://popplet.com/

QR Codes
Free
www.qr-code-generator.com

SETT Framework
Publication by the Wisconsin Assistive Technology Initiative
Free
http://www.wati.org/

Snap and Read
Don Johnston Inc
$4.99 per month individually or
$0.50-2.00 per student annually
https://learningtools.donjohnston.com/product/snap-read/

Snap Type
Free
http://www.snaptypeapp.com/

Unique Learning System
$528.10 per license
https://www.n2y.com/unique-learning-system/

Word Bank
Don Johnston Inc
$3.99 per month individually or
$0.50-2.00 per student annually
https://learningtools.donjohnston.com/product/word-bank/ ■

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WHO SHOULD ATTEND?

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✔ OCCUPATIONAL THERAPISTS
✔ AT CONSULTANTS
✔ TECHNOLOGY SPECIALIST
✔ AUTISM SPECIALIST

✔ SPECIAL EDUCATORS
✔ SPECIAL EDUCATION DIRECTORS
✔ ADMINISTRATORS
✔ PHYSICAL THERAPIST
✔ UNIVERSITY INSTRUCTORS

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Come and learn, first-hand, about the best AT products, practices and strategies used by teachers, therapists, clinicians, parents and end users alike.
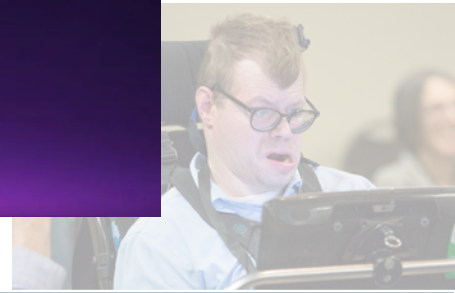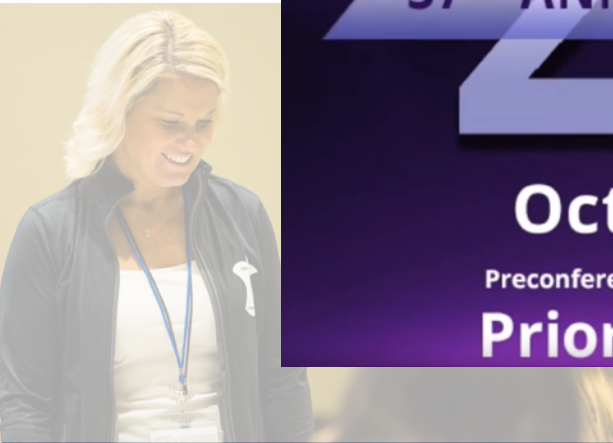
2019

37TH ANNUAL CLOSING THE GAP

October 2-4, 2019

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Prior Lake, Minnesota

Registration detail, including, group, student and parent discounts... CLICK HERE!!

How to Get Hands-On with Professional Development!

As AAC facilitators for a special education cooperative, one of our primary job responsibilities is ensuring teams who work with students with complex communication needs have access to relevant professional development opportunities. We have employed multiple formats when it comes to providing facilitated learning opportunities for our teams. We have offered the typical training in which participants sit and listen to a lecture, supplied materials with a brief, in-the-moment training and provided staff with resources for learning at their own pace. However, we found that our teams struggled to put into practice intervention strategies discussed during these types of trainings and demonstrated little change in practice and development of skills. We could see the learning opportunities offered were not providing the level of support needed to affect change in practice, so we went back to the drawing board. When we were looking to develop more effective professional development activities, we did what any speech-language pathologist would do - we went to the research! We wanted to ensure that any training we spent time developing and that staff used time participating in would encompass evidence-based strategies to support adult learning. We did not want to waste anyone's time with ineffective professional development!

Through our research we found that critical features of evidence-based professional development include explicit explanation and illustration of the content, knowledge, and practices to be acquired. Furthermore, according to Dunst (2015), participants should have "opportunities to be actively involved in as many of the in-service training activities as possible as opposed to passively sitting through lectures in workshops" (p. 213). This explained why many of the traditional style trainings provided were not having the impact we were hoping for; there was not enough opportunity to be actively involved, and there was way too much passive sitting! Furthermore, looking at adult learning theory principles, we see that adults learn best when they can immediately use the content taught and prefer learning that is problem-centered rather than just content-centered (Carlson McCall, Padron, & Andrews, 2018). We assumed providing materials to staff for use in the classroom would be an effective

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MAGGIE JUDSON, M.S., CCC-SLP has over a decade of experience as a school-based speech-language pathologist serving students with complex communication needs. For the past two years, she has worked as the AAC Specialist for the Belleville Area Special Services Cooperative in southern Illinois. In her work as an AAC facilitator, Maggie provides consultations, evaluations, and direct therapy to students aged 3 to 21, and implements professional development activities for school teams. She earned her M.S from Southern Illinois University Edwardsville with an emphasis in AAC and has continued postgraduate course work in special education and assistive technology. Maggie can be reached at maggie.judson@bassc-sped.org or on Instagram @basscAAC

BACK TO CONTENTS

approach, but without the intensive training piece on how to implement the materials, it was not a problem-centered approach to learning. It was lacking that connection of how the materials could be immediately utilized to support students. This explained why just giving materials, without a complete explanation and demonstration, was missing the mark for effective professional development.

We paired this information with our observations and feedback gathered through a needs assessment to determine what components and supports staff was hoping to see included in a professional development offering. One of the main points we kept hearing throughout this process was professionals expressing how frustrated they were with attending workshops and getting excellent information, but then coming back to work and not having the time or resources to implement what they learned. Haven't we all been there? You spend the day away from work at a great training and leave feeling excited to implement the ideas and strategies. You go back to work the next day with all the handouts and information, ready to follow up. But now you are behind with your caseload because you were gone the day before. You do not have the time to research and prep new resources, which leads you to not feeling confident in implementing those new strategies because you do not have access to the resources you saw at the training. So you hold off on implementing the interventions. But once you do finally get planning time to follow up, you run into another problem. You do not have access to all the needed materials to create the resources. Your school doesn't have color printing. You are only allowed a small allotment of lamination for the year, and you have already used it up. You can get velcro, but only if you buy it with your own money. These are the barriers some educators face. And it can have a significant impact on the carry-over of strategies learned at a professional development training to the classroom or therapy room.

Taking this information and keeping in mind what the literature tells us about adult learners, we developed a professional development initiative to tackle these barriers by combining learning with resource development. We wanted professionals to leave our trainings with ready-to-implement materials to create conditions in their day-to-day practice that promotes the use of evidence-based interventions, bypassing barriers and obstacles. This is in line with recommendations stated in The Assistive Technology Trainer's Handbook. According to Reed, Kaplan, and Bowser (2009), "to increase the likelihood that your participants will implement what you trained them to do … provide the tools they need to implement back in their own setting" (p. 92). Our solution was a make-and-take training series that combines clear explanation, illustration, and active learning with hands-on material making to encourage increased AAC strategy, visual support, literacy and assistive technology use in the classroom. This MATerial (make and take) training initiative was designed to provide evidence-based strategies for teachers

Image 1

and related service personnel to increase student learning in the school setting by providing hands-on time for making materials that relate to the information provided during the training. In the 'save-the-dates' and 'RSVP' forms, we say, "come for the information, leave with the materials!" (See IMAGE 1) That is how we view this professional development initiative - a way to provide evidence-based content easily digestible through the creation of relevant, applicable resources that can immediately be put to use to support students.

We structure this training program as a four-part series spread out over a school year. According to Darling-Hammond, Hyler, and Gardner (2018), professional development that is spread out over time, as opposed to a one-time training, is more effective at creating change in practice. While participants can pick and choose which topics to attend, we present the training as a series and share the benefits of attending over time. The topics we selected to address were based on needs assessments and through informal discussion and observation with staff. From this, we identified the topics of visual supports, communication development and emergent literacy as are our top areas of need. These topics are very much interrelated and feed into one another in terms of supporting students with complex commu-

nication needs. Viewing the MATerials as a training program, as opposed to stand-alone sessions, provides participants with a more complete understanding of best practices and with more materials to implement communication and literacy instruction in their classrooms and therapy rooms.

HERE IS A MORE DETAILED LOOK AT THE CONTENT OF THE TRAININGS:

Visual Supports: For the topic of visual supports, we discuss evidence-based strategies such as environmental engineering, token boards and working for cards as they relate to visual boundaries, visual cues and visual schedules. A sampling of the materials created during this session includes classroom descriptive labels, visual behavior cards, a first/then board, token board, activity sequence strips, and choice boards. We watch videos of different scenarios and engage in simulated practice of using the visual support materials to assist students in a variety of situations.

Communication Development: During the communication MATerial, we discuss core vocabulary, fringe vocabulary, aided language stimulation, and access to AAC systems. Participants make a manual communication board, alphabet board, fringe vocabulary supports, aided language input visuals/resources and core word instructional materials. We then use these resources to practice implementing the strategy of aided language stimulation, and we generate ideas for targeting core words during routine, classroom activities.

We present the area of emergent literacy in two separate sessions, emergent reading and emergent writing.

Emergent Reading: For emergent reading, we share information around the importance of reading opportunities for students with complex communication needs, the various ways to adapt a book to meet the needs of a student, shared reading strategies and utilizing visuals to support reading comprehension. Materials created include a manual communication board, alphabet board, adapted book, companion comprehension worksheet, shared reading resources, and a shared reading choice board. In this MATerial, participants bring personal books to adapt to the specific needs of their students based on the information presented. We use these books and the other materials created to practice asking a variety of questions during a shared reading interaction.

Emergent Writing: During the writing MATerial training, we discuss emergent writing stages, the importance of providing writing opportunities to all students, alternative pencils and shared writing and independent writing instruction. Participants of this session create a manual communication board, an alphabet board, an alternative pencil flip book, a writing companion with various writing and vocabulary supports and a squishy (sensory) book. We spend time getting hands-on with shared writing instruction through the process of predictable chart writing.

To ascertain if this professional development initiative was hitting the mark in terms of increasing knowledge for participants and ultimately impacting the communication skills of students, we collected feedback information in a variety of ways. Pre- and post-surveys were provided to obtain information regarding the comfort level and frequency with using visual supports, manual communication boards, shared reading opportunities, and emergent writing instruction in the classroom. Participants reported an overall increase in familiarity and comfort in these key areas. Moreover, all participants self-reported through post-surveys that the training series increased their working knowledge of AAC, improved their AAC instructional practices, and ultimately had a positive impact on the communication skills of their students.

Additionally, we have been able to gauge effectiveness during consultations with participants in their settings, as we have observed staff utilizing the resources created at the training with their students. We have also received emails from participants sharing they went to work the day after the training and immediately used the materials with their caseload. Furthermore, information gathered through a post-survey indicated that all participants had used or were planning to use the materials made at the training with their students. This information is important because it points to the fact that the participants are implementing the strategies and skills shared at the training. According to Reed et al. (2009), "In order to apply information gained in a hands-on training, participants need to begin to use their new skills within a few days of learning them" (p. 92). Exactly why we developed the MATerial initiative!

Through the use of anonymous feedback forms, participants shared comments that highlight this point as well.

"It's all such good information and so important, but so time-consuming as well, it's hard to go back to school and find the time to make these items. I love that we walk away with all the materials."

"I love having all of the materials ready to go! The advice given on how to use the visuals is crucial."

"It's so hard to find time to make materials, but these sessions make it fun and so easy with everything ready to go!"

"The biggest takeaway was having the materials to take home and to know how to use them!

Each MATerial training follows a similar format organized to answer what, who, when, where, why and how questions around the training topic. For example, the reading MATerial aims to answer the wh- questions of selecting appropriate books, adapting books, shared reading strategies, and supporting reading comprehension for students with complex communication needs. After each information lecture, a make-and-take session occurs. Participants have all the needed resources available, such as scissors, hole punches, velcro and binder rings, to create a fully prepped material based on the topic. We then use those materials to practice and get hands-on with the content. Par-
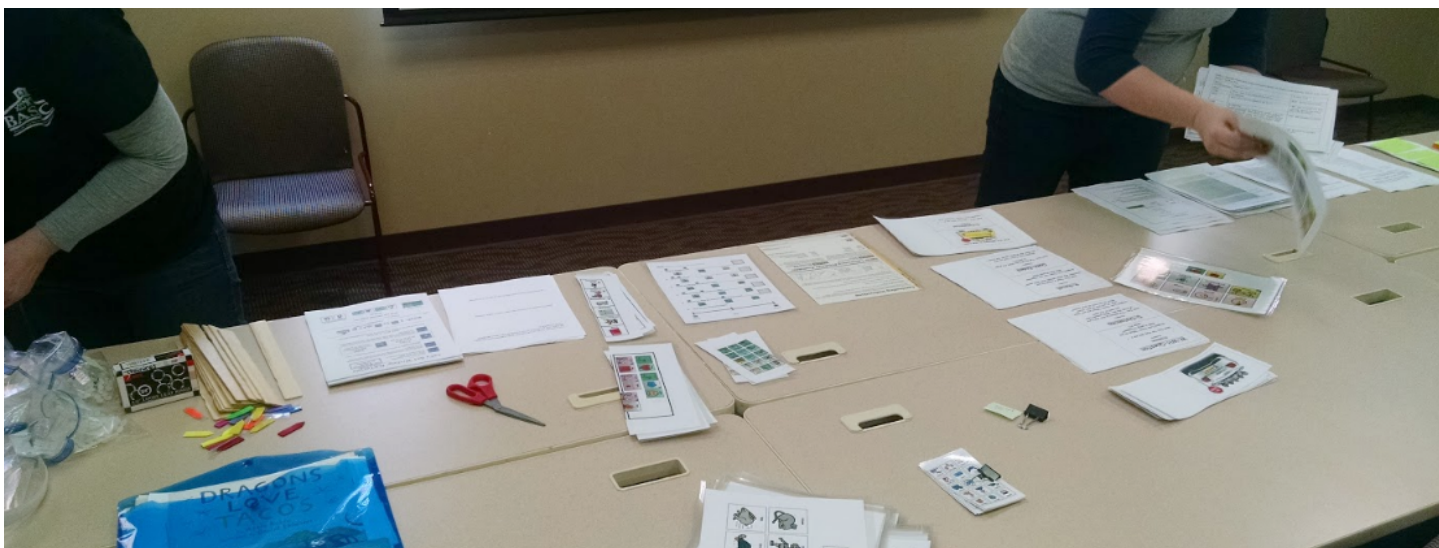
Image 2

ticipants have stated time and again how much they enjoy this type of structure during the training. As one participant wrote on a feedback form, "I enjoyed the real-life examples as well as the frequent breaks from the instruction to work on the make-and-takes." Having time between instruction and lecturing to participate actively, practice new strategies, and frankly, have a break from sitting and listening, helps to keep engagement and concentration up throughout the day!

Furthermore, participants often attend these sessions in teams and take advantage of the time during material making to discuss the presented content amongst their workgroups. This allows for teams to brainstorm how they can apply the information back in their setting in more specific, concrete ways based on the individual needs of their students. We see that a lot of good conversation and brainstorming occurs during this time!

Another important component of the MATerial trainings is the fun factor! We strive to keep the atmosphere relaxed, comfortable and entertaining. Personally, we enjoy attending sessions that incorporate these elements and feel we are more engaged and attentive at those workshops, so we strive to bring that into a MATerial. We play music during the make-and-take portions, we serve snacks and candy, we share funny memes, there are laughs when we describe our real-life examples (and failures!) and there are giveaways! Now, we are not sure if fun is necessarily evidence-based, but for us, it is a crucial way to get everyone relaxed, comfortable and engaged! Which is what we are striving for, because we are asking participants to get outside their comfort zone to learn about and implement strategies that may be new to them. Doing anything new is hard at first and usually makes us feel uncomfortable. We want participants to feel at ease, ready to try something new and to be willing to get comfortable with being uncomfortable. Keeping things fun helps us achieve this goal!

During a make-and-take training, another significant component is making the materials. We spend a considerable amount of time before the training deciding what materials to include, creating the materials and prepping the materials so participants can assemble them during the workshop in a structured, systematic way. We provide materials in three different symbol sets - Minspeak symbols, SymbolStix symbols and PCS symbols. We chose these as most of our staff utilize one of these symbol sets in their classroom to support students with complex communication needs. Participants indicate which symbol set they prefer when registering for the training. Our team then preps the pre-assembled components of the materials, along with other training resources, such as the slide deck, references and resource handouts, in a folder so that everything is organized and easy to find during the training. Creating and pre-prepping the materials is a substantial time commitment. We work in a team to help spread out the workload and follow a checklist to keep us organized as we prep for the training. (See IMAGE 2)

During the session, we found it works best to have a variety of instructions available detailing how to assemble the materials. We have pictures of the materials pre-assembly and post-assembly as a reference. We have fully created materials available for participants to see how the finished products look. We also create the materials together with the participants in real time so we can demonstrate how to assemble the materials. (See IMAGE 3) To increase the level of support offered during this portion of the training, we also include step-by-step written directions to further assist in the material making process. We have found that having a variety of written, visual and auditory supports help participants feel confident as they create the materials.

Participants of the MATerial trainings leave with a variety of materials created around a single symbol set. However, in reality, we know that many professionals utilize a variety of symbol sets in the classroom to address the communication needs of
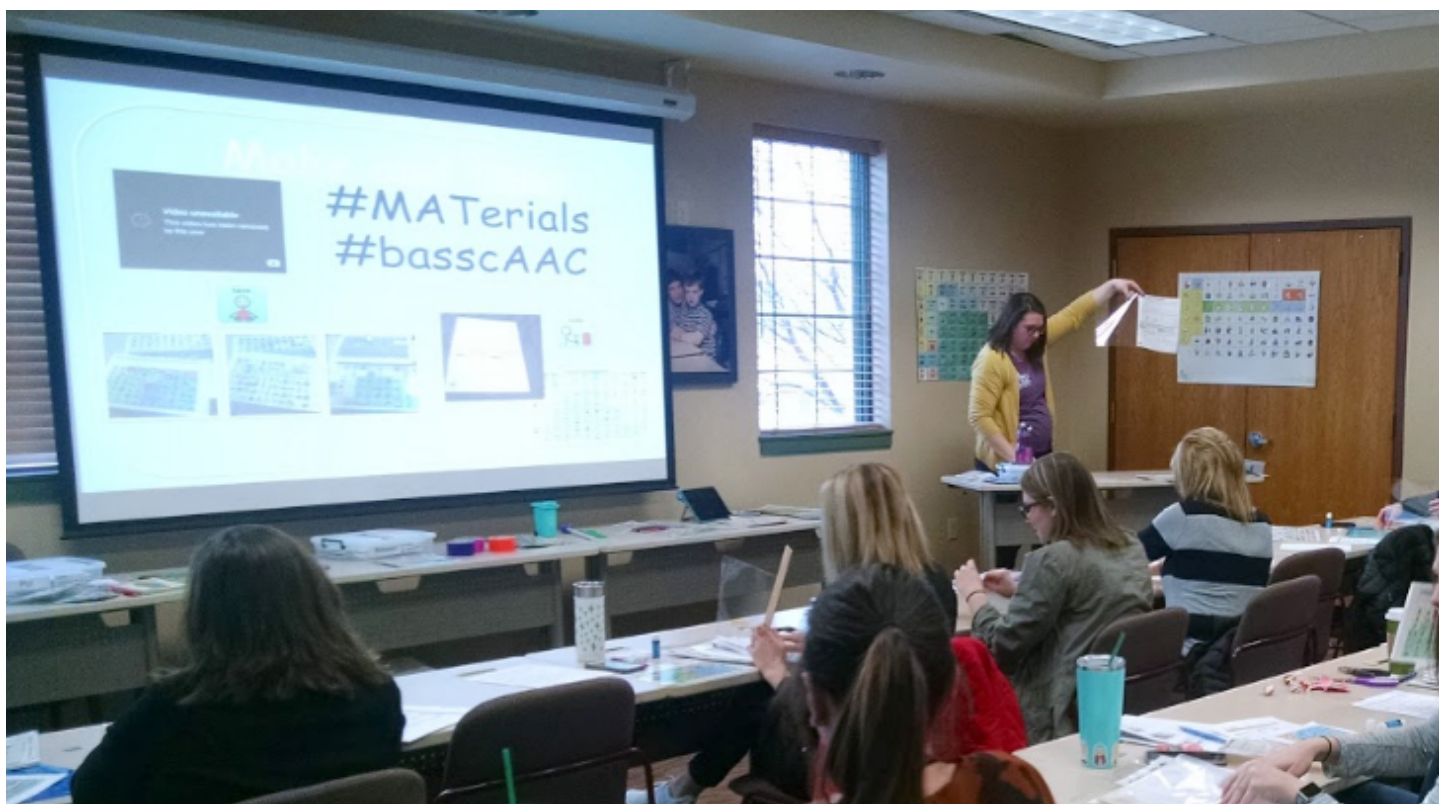
BACK TO CONTENTS

Image 3

their students. Due to this, we send out a google drive link after a training so participants can have access to all the materials in the other symbol sets. By doing this, participants have the ability to apply the information shared at the training with their knowledge of how to create the materials to ensure all of their students have access to the appropriate supports. As one participant shared through a post-survey, "I am enjoying using the materials and being able to look back to make new ones."

Having read how we structure our MATerial training series and the benefits it has provided to our staff and students, take some time to consider if this type of professional development could be of benefit to your teams. One way to do that is by utilizing a professional development planning guide, such as the Quality Indicators of Assistive Technology (QIAT) Assistive Technology Guiding Document (bit.ly/2QU0Nmh) and Planner (bit.ly/2K4Oovk). Systematically reviewing the areas of need for your staff and district through planning guides supports the creation of an effective plan for professional development. If after reviewing these documents you feel a MATerial training initiative could be a valuable support, there are a variety of ways to implement such a program. We decided to create the trainings from scratch so to tailor it to the specific needs of our staff. We started with doing research, reading articles, watching webinars, and attending other high-quality professional development to ensure we were presenting up-to-date best practices. From there, we decided which materials to include and then designed and created them.

However, that is just one way to create a make-and-take training. There is a plethora of high quality, free webinars and training resources available around the topics of AAC, communication, and literacy that could be utilized to structure a professional development offering. Some of the resources we find ourselves frequently referencing are the Project Core webinars (bit.ly/31dYQFY), the POWER AAC modules (bit.ly/2K1EWIV), Literacy for All webinars (bit.ly/2yk7CX6), and the Angelman Foundation Communication Training Series webinars (bit.ly/31jPFEa). Utilizing one or more of these resources and pairing them with materials to make-and-take is another way to structure a MATerial training.

Furthermore, there are resource materials available for download that could easily be paired with a presentation to incorporate the material component for this type of training. For example, ConnectAbility's Visual Engine website has a variety of free visual support resources, such as picture cards and templates for schedules, choice boards and first/then cards, which could be used during the make-and-take portion of a visual supports MATerial (bit.ly/2tKysnr). Saltillo has manual communication boards with alphabet and fringe word supports for download from their website (bit.ly/2EW0mTu), and the AAC Language Lab has a variety of manual communication boards available (bit.ly/2WifqAQ) that could pair well with a MATerial training around the topics of AAC and communication development. The Dynamic Learning Maps website has a variety of alternative pencils available to download that could address the material making

component of a writing MATerial training (bit.ly/2Mz7fjS). They also have a list of books, organized by grade level, created on the Tar Heel Reader website that could be utilized during a reading MATerial training (bit.ly/2MO4UC7). These are just a few ideas of places you can look to for evidence-based resources that may be a good fit for a make-and-take portion of a MATerial training.

When it comes to providing any professional development training, there is the question of cost. Throw in the mix a whole packet of materials and this point becomes even more relevant. In order to pay for the MATerials, we employ a variety of strategies. We charge a small fee to help cover the price of materials and the provided continuing professional development units. In order for this amount to offset the cost of the materials, we do a great deal of budget shopping. Dollar stores, stores with teacher discounts, free shipping and sales are our jam! Our goal is to supply as many materials as possible on a tight budget to provide participants the maximum benefit for their time and money. Also, our special education cooperative has a professional development budget which we utilize to help defray costs for our staff members.

Overall, our MATerial training series has had good participation, positive feedback, and requests to continue. As one participant shared, "This was one of the most helpful workshops I have ever attended." With feedback like that, we are excited to further develop and present our MATerial trainings this school year! We have found that providing the opportunity during a professional development training to leave with information, plus a whole set of materials ready to go the next day, prepares participants to put into action the content discussed at the training.

We like to end each MATerial training by saying, "It is usually at this point in the day when the presenter will say, what can you do in the next week to implement something from this session? But, we will not be saying that today! This was a make-and-take, you have the next steps in your hands ready to go first thing tomorrow morning!" Now, not only does this get a laugh, but it drives home the idea that participants leave the MATerial with fewer barriers to overcome due to having materials in their hands ready to go. They can feel prepared and empowered to put into practice the strategies and interventions discussed at the training. Which, of course, is the whole point of professional development!

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Assistive Technology Professional Development and Training Planner. The QIAT Leadership Team (2014), https://qiat.org/docs/resources/PD_planning_Document.pdf

Project Core modules: http://www.project-core.com/professional-development-modules/

POWER:AAC modules on PaTTAN: https://www.pattan.net/assistive-technology/at-for-communication/power-aac/

Literacy for All webinars: http://literacyforallab.ca/videos/ & http://literacyforallab.ca/past-webinars/

Angelman Foundation Communication Training Series webinars: https://www.angelman.org/resources-education/communication-training-series/schedule-recordings/

ConnectAbility's Visual Engine: https://connectability.ca/visuals-engine/

Saltillo, manual communication boards: https://saltillo.com/chatcorner/content/29

AAC Language Lab: https://aaclanguagelab.com/resources?category=teaching-and-therapy-material

Dynamic Learning Maps, alternative pencils: http://www.dlmpd.com/instructional-resources/

Dynamic Learning Maps, list of books: https://www.dlmpd.com/exemplar-text-supports/

Tar Heel Reader: https://tarheelreader.org ∎

product spotlight

OTTER – IS WHERE CONVERSATIONS LIVE

Otter is where conversations live

Generate rich notes for meetings, interviews, lectures, and other important voice conversations with Otter, your AI-powered assistant.

Collaborate Smarter With Otter 2.0

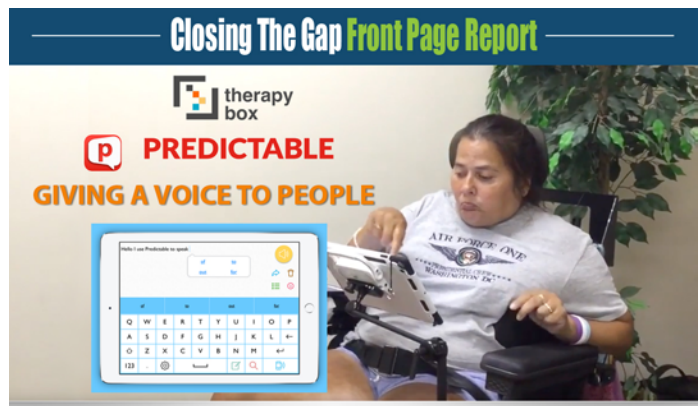Record and review in real time. Search, play, edit, organize, and share your conversations from any device.

Otter is Wicked Smart

Magically generate sharable smart notes that sync audio, text, and images.

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Predictable by Therapy Box – Giving A Voice to People

WHO'S IT FOR?

Predictable is designed for people who are literate but have lost the ability to speak possibly due to cerebral palsy, motor neurone disease, laryngectomy, stroke, apraxia or brain injury.

WHAT DO THEY DO?

Start typing on Predictable and it will predict what you want to say and read out the sentence for you – it gives a voice to people who don't have one. Predictable is a multi-award winning app and the market leader in its category. It's also available in 10 different languages!

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BACK TO CONTENTS

Special iApps – Award-Winning Educational Apps

SPECIAL IAPPS

Proven to encourage many areas of a child's development, they are supporting children with their education worldwide.

ABOUT SPECIAL IAPPS

Special iApps is a non-profit social enterprise founded by Beverley and Colin Dean in 2011 after they couldn't find the apps needed to teach their youngest son William, who has Down syndrome and Autism. They found that most apps had too much going on in the background, weren't configurable or easily personalised, and didn't cater for William's needs.

Since then, they have developed a range of award-winning educational apps that are being used around the world in over 26 languages to support children with their education and development both at home, in school and by speech and language specialists.

They have worked closely with parents, teachers, and education and healthcare professionals to develop the activities within each of their apps in order for them to have a beneficial impact.

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COMMUNICATION DEVELOPMENT "IN THE MESS OF DAILY LIFE"

It's the only AAC app with simple, practical guidance for parents and educators, helping you extend AAC beyond therapy and into homes and classrooms.lking with a genuine clinician who cares about your well-being.

FEATURES:

• Grows with your child

A graded, consistent and research based vocabulary that's fast and efficient

• The "everywhere, every time" App

Convert it to a book, so your child can use it even without an iPad!

• Fastest, easiest to personalize

It takes mere seconds to add new words from your child's life into Avaz.

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Compass Chair – Made For Your Classroom

NEW AND IMPROVED.

It's the perfect inclusion chair. With its supportive seat, sturdy armrests and stable frame the new Compass Chair offers mildly involved students the support they need to feel secure and comfortable. At the same time its simple and elegant construction lets it blend easily into any classroom environment.

THE BENEFITS:

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• Seat and back have a non-slip texture for added security
• Two inches of height adjustment
• 5 sizes accommodate users of all ages
• Calming blue color and minimalist design blends in with other classroom chairs
• Provides support and sensory boundariese

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Lingraphica is Your Partner for the Journey

They are the leading provider of AAC Devices, Language Apps, and Online Therapy Software

AAC DEVICES

Lingraphica's communication devices are Medicare-reimbursable and covered by many private insurance plans. Designed by clinicians and backed by research, Lingraphica's AAC devices are packed with more than 9,000 words and phrases making it easy for your clients to communicate their wants and needs. Learn more about their free, no-obligation device trial.

WHAT DOES LINGRAPHICA DO?

They provide solutions for those with communication difficulties and disorders due to aphasia, brain injury, and disease. From speech generation to speech recovery, our solutions bring hope to those who need it.

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BACK TO CONTENTS

Voicea – Smarter Meetings. Faster Follow-Up.

Voicea is a voice collaboration platform powered by an Enterprise Voice Assistant named EVA. EVA is an AI that takes commands, performs actions and captures highlights in meetings to share them and create actionable recaps. With EVA on conference lines, on calls, or in-person, you can focus on the conversation knowing EVA will capture and share whatever you highlight. Turn talk into action with Voicea.

EVA TAKES YOUR COMMANDS

Voicea enables you to have your own AI in meetings to capture key takeaways and turn talk into action. EVA takes Voice Commands to create reminders, tasks, answer questions and provide meeting recaps. For example, say "Okay EVA, remind me to send the presentation to Tom, Thursday at 4pm" and watch EVA go into your calendar to create a reminder. Voicea is the leader in developing a voice assistant solely for use at work, customized to your needs for increased productivity and better team collaboration.

MIO – Physical Therapy for the 21 Century

MIO combines the simplicity of an iOS app with wearable sensors to give accurate range of motion measurements, real-time exercise feedback, and 3D movement tracking.

WHAT IS MIO?

MIO is a complete PT solution that automatically measures ROM, analyzes body movements, and provides built-in games/exercises to improve patient rehabilitation and decrease recovery times.

MIO SENSORS

Stick or strap the sensors to virutally any major body part. Every movement of that body part and continuous ROM of the joint will be tracked/recorded!

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