Assistive Technology Resources for Children and Adults with Disabilities

Closing The Gap

Solutions

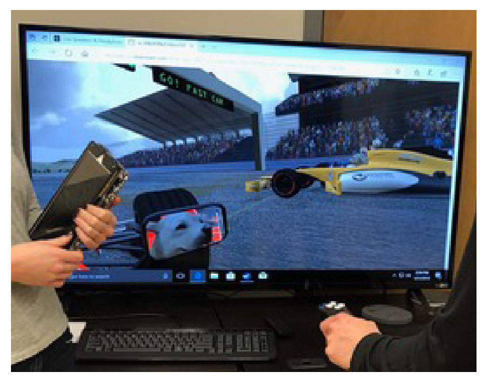
June / July, 2019
Volume 38 - Number 2

www.closingthegap.com

contents

volume 38 | number 2

June / July, 2019



STAFF

Megan Turek .... PRESIDENT

Marc Hagen .... VICE PRESIDENT MANAGING EDITOR

Becky Hagen .... MEMBERSHIP MANAGER REGISTRATION MANAGER

Mary Jo Barry .... DIRECTOR OF SALES & MARKETING

Callie Boelter .... SALES & MARKETING

INDIVIDUAL SOLUTIONS MEMBERSHIP

Standard Membership
1-yr. $140; 2-yr. $210; Parent $85
Premium Membership
1-yr. $440; 2-yr. $648; Parent $274

GROUP SOLUTIONS MEMBERSHIP

Standard and Premium Group options available.

SUPPLEMENTAL COLLEGE CURRICULUM – ELECTRONIC TEXTBOOK

Instructors receive a complimentary one-year premium membership.
Student Membership
1-yr. $85 Standard;
1-yr. $274 Premium
Visit www.closingthegap.com/membership for complete details and pricing.

PUBLICATION INFORMATION

Closing The Gap (ISSN: 0886-1935) is published bi monthly in February, April, June, August, October and December.

CONTACT INFORMATION

Please address all correspondence to Closing The Gap, P.O. Box 68, Henderson, MN 56044. Telephone 507-248-3294; Fax 507-248-3810. Email <info@closingthegap.com>; Website <www.closingthegap.com>.

EDITOR'S NOTE

The information provided by Closing The Gap, Inc. in no way serves as an endorsement or guarantee by Closing The Gap, Inc.

@ATClosingTheGap

www.facebook.com/ATClosingTheGap

www.instagram.com/atclosingthegap

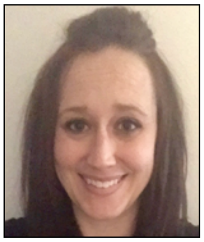
Considerations in Customizing a Core Language System for Persons using Auditory Scanning

Finding appropriate and efficient generative language solutions has been historically difficult for persons with complex communication needs who use auditory scanning. As a field, we are constantly improving the language programs available for persons using alternative access; however, I find careful customization is needed for any out-of-the box language system that I recommend. Along with Heather Duvall, Cassie Sementelli, and Michele Bishop, I helped in customizing and designing a language system for Douglas; a person with complex communication needs using two-step auditory scanning. We created this language system before the advent of Core Scanner™ by Prentke Romich Company (PRC) and I continue to recommend this language system to people I work with, today, as well as use the principles used to create it when customizing other language systems to better meet the needs of persons using auditory scanning.

Douglas needed a language system that allowed him to generate novel thoughts and expressions. It was not enough to simply change the access method of an out-of-the box language program and use it with Douglas. The language systems available at the time (such as, but not limited to, Unity®, Word Power™ and Gateway©) were not appropriate to use in this manner, because they were designed having a person using direct selection in mind. A variety of factors change when considering the needs of a person using auditory scanning, including: the visual and auditory information gleaned and needed by a user to navigate through a language system, auditory prompts, motor planning, language organization, frequency of word use, grid real estate and morphological and syntactic complexity considerations (Sementelli et al., 2012, October). For Douglas, we started with a version of MinTalk, by Gail Van Tatenhove, and transformed it into an auditory scanning language program, capitalizing on frequency of word use, information gained from auditory prompts paired with visual information gained from multi-meaning picture symbols, and the conceptual framework of how MinSpeak® programs (like Unity®) were organized to organize Douglas' system (Sementelli et al., 2012, October).

VISUAL AND AUDITORY INFORMATION/PROMPTS

Douglas needed his language system to capitalize on motor planning and take advantage of auditory prompts to give pertinent information on his location within the language system. When you think about a direct selector (without vision impairment) using a language system they, are able to gain visual information from the picture symbol as well as the location of a word within the grid of the language system, arguably simultaneously. How do we give that same information to someone accessing a system using switches, any type of auditory scanning, with unreliable vision and motor planning difficulties? You offer the same visual information (changing visual aspects, as appropriate – i.e., high contrast symbols) while capitalizing on the auditory information of the scan. You build this information carefully within the system, in order to allow the user to build motor patterns based on the information they hear. We tried to make the auditory prompt information of Douglas' system relevant, through carefully arranging the language program. His language system was set up to scan row/column, with row prompts being a color. The color



ALICIA ALVERSON is a speech and language pathologist (SLP), working at Providence Children's Development Institute, in Portland, OR. She specializes in augmentative and alternative communication (AAC), working with children and young adults in pediatric outpatient clinic and pediatric skilled nursing facility settings. She has also worked in the schools in specialized classroom settings, working with students using AAC. Prior to working as an SLP, Alicia worked as a caregiver for a person with complex communication needs, where she gained mentorship and experience in creating generative language systems for auditory scanners and served as an advocate in the person's school to train educators in how to use and incorporate a generative language communication device into a general education setting..

BACK TO CONTENTS

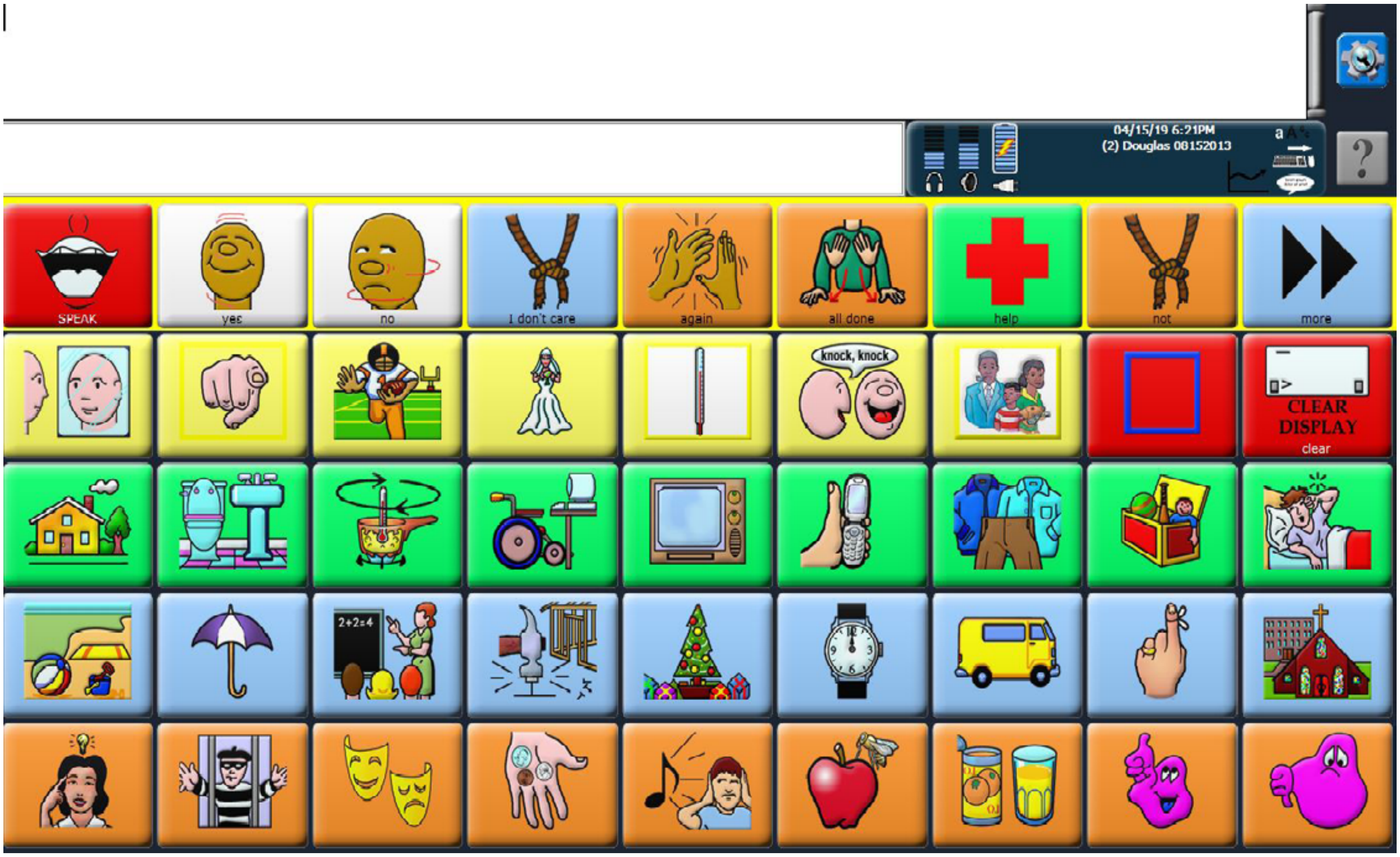


Figure 1. Main Screen

really is quite arbitrary, however, we were able to group like visual and auditory information to make the name of the color relevant. For example, 'yellow row' indicated words or picture symbols referring to people. See Figures 1 and 2.

A learner could certainly memorize locations of all the words within their device without them being arranged as we did, however, this becomes much like memorizing a route to the nearby coffee shop without being able to use an sensory information. Memorizing three blocks forward and two blocks right gets you to the coffee shop works, until the walker forgets or loses track of where in their motor pattern they are (perhaps because of a misstep due to body incoordination or developing, but not mastered scanning automaticity). There is no useful information in understanding the context of where that person is in relation to a whole system, and therefore their entire learning process is based only on rote memory, instead of also understanding context. Much more comprehensive and contextual is understanding that the coffee shop is three blocks in front of my house and I turn right at the green house, with the willow tree. If my motor pattern is interrupted, I still have relevant contextual information that will get me to the coffee shop.

We wanted Douglas to be able to understand the context of where he was within his language system, so he did not need to know every location and motor pattern of every word in his language system in order to use it to find words he had not yet been shown, modeled or practiced. He could understand how patterns got him to words and where he may look for new words, much like a person using direct selection understands they when they are looking in the Unity® icon of a rainbow, they see the colors of the rainbow and are given a hint that that is where colors might live; and that we often pair colors with art, so words about art may live there as well. This information allows the user to make informed guesses on where a word they have not used before is. This was especially important for Douglas, as he was at risk for his motor execution going awry, due to the complexity of his body.

We accommodated for the visual and auditory needs in Douglas' system with auditory row and column (icon) prompts. Row prompts were a somewhat arbitrary color (button/symbol background of icons in said row) that described the color of the given row with like information contained in the row. The patterns are two-fold, as information on the main screen could not be sorted in the same ways. Throughout the system (with the exception of customized fringe vocabulary pages), the rows were sorted "activity" or "quick row," "yellow row," "green row," "blue row," "orange row," with the colors representing parts of speech or word functions (See Figures 1 and 2). Yellow = people words. Green = action words. Blue = phrases. Orange = describing words; and the activity rows containing fringe vocabulary (mostly nouns).

BACK TO CONTENTS

The main screen was sorted as similarly as we could with some secondary context conventions. Yellow remained the people row. Green became icon pictures and names of things we generally do or use inside. Blue became icon pictures and names of things we generally do or use outside. Orange became icon pictures and names of things we do with our body. By having similar naming conventions on the main screen as the second sequence screen, Douglas was able to create motor plans by understanding that the row colors always stayed consistent. Additionally this information was reinforced in low-tech ways of using his picture symbols, talking about words as being a "yellow word", or "green word", and so on.

An additional piece of information was the prompt names of the icon symbols bridging to the sequence screen. They generally described the icon symbol chosen. For example, the picture of a toy box and toys was "play". We worked with Douglas on creating mental images of each auditory prompt using the visual information we (and Douglas at times was) were able to gather from the icon. Because we customized his system based off of MinSpeak® symbols, it was important for Douglas to learn the concept of multi-meaning symbols in order to navigate through his language system and make informed guesses on where vocabulary lived, that he hadn't used or learned the location. So, while still taking advantage of motor planning, Douglas did not have to rely solely on motor patterns to navigate through his language system.

MOTOR PLANNING, LANGUAGE ORGANIZATION AND REAL ESTATE

While we did not want Douglas to rely on automaticity of motor patterns in order to navigate through his device; it was very important that he had access to consistent motor patterns, so he could develop motor automaticity. This was accomplished by the way icon symbols were sorted.

Starting with the first row on the main and sequence pages, these are always where fringe vocabulary or quick words live (see Figures 1 and 2). As with other MinSpeak® programs, this is where the language system became highly customizable to Douglas and his experience with vocabulary. An important question that may be forming is: why would you put fringe vocabulary (the least used vocabulary when implementing a core language system) in the row with the least amount of hits to access? There are a few reasons. To start, activity rows (a concept of MinSpeak® systems) were part of the program that we customized off of and lived in the first row. The activity rows lend themselves well to fringe vocabulary; and in a system made for a direct selection there is not a motor consideration for a first row versus a second row. However, we did not leave this here simply because that is what we had to work with; it lent itself well to natural motor planning. Due to the location of the activity rows, we were able to provide natural and quick access to "quick words" on the main screen. Also, the way the scan pattern is programmed in PRC devices, it would take a

Figure 2. Sequence Screen of "your hand"

BACK TO CONTENTS

double hit to get into the first row, on the second sequence. For Douglas, his select switch was the switch in his scanning array that he used least often; therefore, it was not as natural of a motor sequence (although learnable). So, it was not necessarily detrimental to give up this conceivably easier to access row for fringe vocabulary, and it was possibly advantageous.

Moving down the rows, they were then sorted by types of words/parts of speech. This pattern remained consistent throughout the device. Much like when finding the main verb in a MinSpeak® based program at the Action Man location, verbs are always found in the green or third row of Douglas' language system (see Figure 2). This pattern carries through for all word types – nouns, pronouns/people words, actions, phrases and adjectives/describing words. Giving these consistent patterns allows for automaticity to happen in motor planning, increasing efficiency of expression. (Van Tatenhove, n.d.).

Related to motor planning is real estate (or the value of the location of single button) of the language system. In direct selection systems real estate is not as important of a factor as one button is not necessarily easier to access than another; albeit direct selection can have its own set of access difficulties depending on the user. Real estate was critical when arranging Douglas' language system. Scanning already has efficiency working against it, therefore we needed to consider where and how we were going to lay out language in conjunction with frequency of word use. For Douglas' system we used frequency of word use and fine-tuned our arrangement with word importance to Douglas. For example, "eat" and "drink" are frequently used core words. Eating and drinking is not a big part of Douglas' life. While he certainly still has things to say with these words, it did not warrant them being more easily accessible than other, more relatable words.

When thinking about real estate in a language system designed for scanning, we did not determine linearly, but by number of switch hits (moving and selecting) it would take Douglas to get to a single word. These hit numbers will differ for single- and two-switch scanners, but relationally will give the same information, when also considering the auditory information and wait time single-switch scanners will still have. For example, in Douglas' language system, "touch" (see Figures 1 and 2) is a two-hit sequence in MinSpeak® terms, but takes seven switch hits (five moves and two selects) to navigate to. You will see that the number of selections, remains consistent with the Unity® and MinSpeak® hit patterns, two selects is the same as a two-hit sequence. Instead of counting hits for each word, we looked at the grid of icons as a (partial) pyramid, tilted on its base, with dimensionality added as Douglas progressed into sequential screens. The first button in the first row takes the least amount of switch hits (two) to access. The second button in the first row and the first button in the second row take the next, least amount of switch hits (three) to access. The third button in first row, second button in the second row, and first button in the third row take the next least amount of switch hits (four) to access; and so on. While the system could not be organized on a purely one-to-one ratio with frequency of word use to least amount of hits, due to the already established motor pattern "categories" (yellow, green, blue, orange row, etc.); the real estate pyramid guided us in where to place our multi-meaning icons within their motor pattern "category." The "eat" and "drink" examples I mentioned earlier come in to play here. "Eat" and "drink" and the vocabulary within their icon symbol were mostly related to eating and drinking; and because we decided this set of vocabulary was not essential to have near the top of the pyramid, quicker to access, we moved them towards the base, giving other more highly sought after words better real estate. Additionally, because they were towards the base of the pyramid, they had less language content inside of them, versus icons closer to the top, were filled with more language. See Figure 3.

Lastly, we did add (mostly core) phrases into Douglas' language system. Important to note, is that the phrases we chose were likely word combinations and could be combined with other core words, still maintaining the generative natures of Douglas' language system. They were not necessarily a singular unit. We wanted to offer Douglas the same efficiency tool that Unity® offers with pronoun/verb combinations (i.e., "I want", "you need", "we like", etc.). Due to the high frequency of uses for the words in these combinations, it made sense to combine them into a single motor pattern instead of always having to use two motor patterns. We offered these phrases both in statement and question phrases, in a similar location pattern to Unity®. The statement phrases live in the pronoun icon with which they are associated. The question phrases live in the icon symbol of the verb with which they are associated. Since these phrases did not take up all of our fourth row (or blue row) real estate within the language system, we were able to create other phrases that we determined would be ideal for Douglas to say efficiently, adding a social and pragmatic language component within the language system, such as "pay attention," or "not cool."

MORPHOLOGICAL AND SYNTACTICAL CONSIDERATIONS

Another important consideration for Douglas' language system was understanding that when it took at minimum two hits to say any single word and up to 20+ switch hits (for a two-step scanner) to say to a single word (in a core language based system), we needed to take into consideration our desire for Douglas to use correct syntax and how this affected his efficiency. Was it important for us that Douglas used correct syntax or more important for him to be able to get his expressions across more efficiently with one, two or three words that were not necessarily grammatically "correct" nor in the syntactically correct word order, but had meaningful context and were novel, generative and autonomous? We went for novel, generative and autonomous. It is not to say that his language system could not grow and become more grammatically complex as he grew in his automaticity, but we knew that quick access to rich content words was crucial for him to be generative in his language use and overcome ineffi-

BACK TO CONTENTS

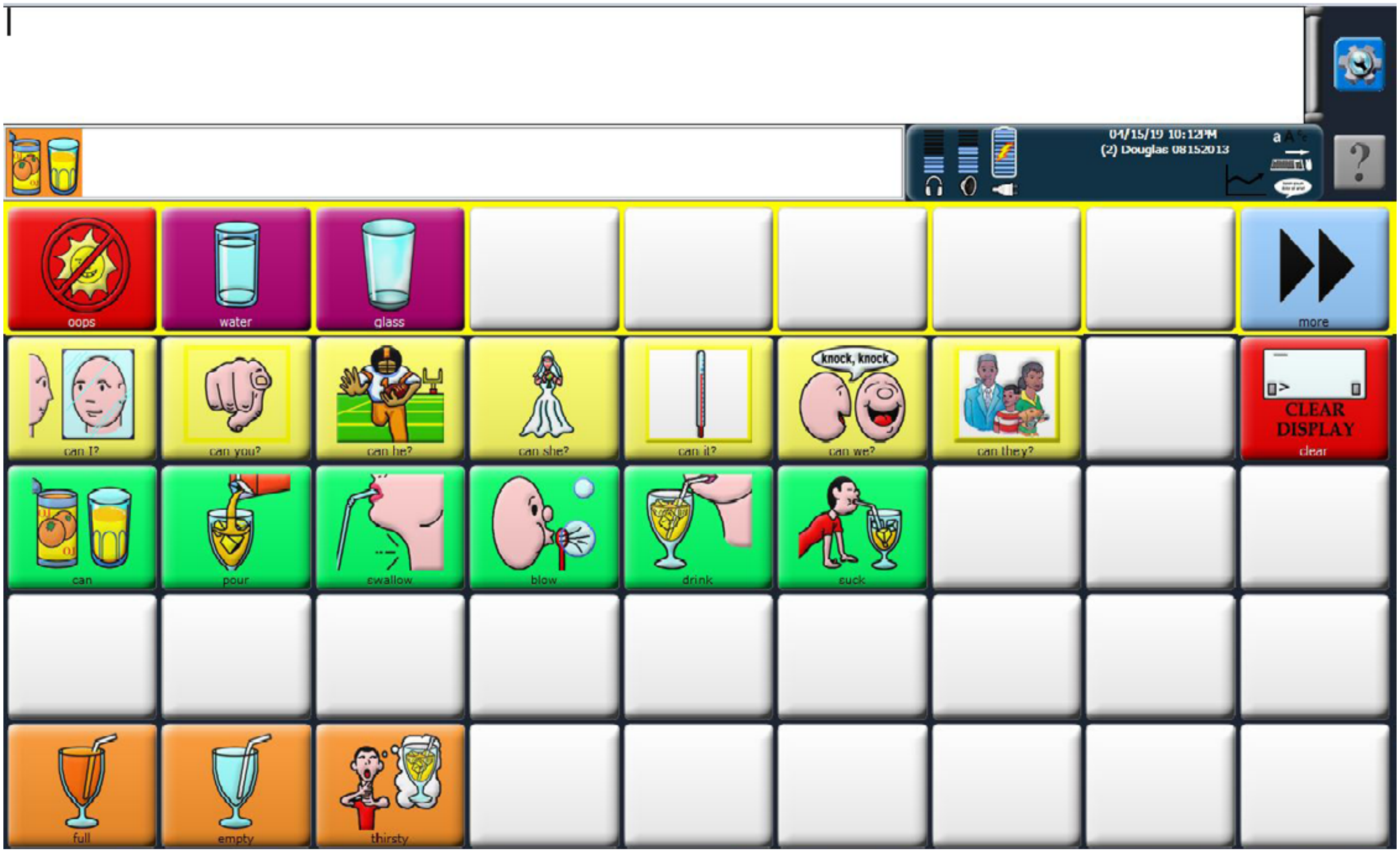


Figure 3. Sequence Screen, "Drink"

ciency barriers. It is also not to say that we completely negated morphology and syntax in our teachings. We continued to use correct grammar when we spoke and provided accurate spoken language models. Additionally, I am also not suggesting that one must give up morphology and syntax for generative language, but simply that we needed to weigh it against the efficiency cost.

We decided to forgo having various verb tenses, superlatives, and plural nouns readily available in Douglas' language system, as it would have increased the amount of hits required for him to say a single word or taken up valuable real-estate. We instead went with the base forms of all words with the acceptance that his expressions may not always look pretty, but certainly still got his point across. When combined with partner assisted auditory scanning, we have been able to clarify and communicate with Douglas when his messages may have multiple meanings depending on context, or work with him to add additional words for more specific meaning and understanding. We did not completely take away the option to conjugate verbs, create superlatives, or plurals, but moved these function buttons into a page that was not competing for prime real estate. The system we created for Douglas, with further customization, could also have morphological features in a similar way that CoreScanner™ has added them to their most complex user area.

Douglas' language system provides an example of another way that creating and arranging language systems could be successful. We are growing as a field in the products we are putting out for auditory scanners, however, I would argue a single one still is not ideal for all users. When I am working with auditory scanners I continue to take the characteristics of Douglas' language system in mind to more adequately fit the auditory and motor planning needs of persons using auditory scanning. I continue to use Douglas' system as an option for other users. Just like choosing between Unity®, LAMP™, Word Power™, Snap+Core, or other language systems on the market, I continue to make the same feature matching decisions when considering Douglas' system, an out-of-the box system and/or customizing them.

REFERENCES

Sementelli, C., Bishop, M., Duvall, H., & Alverson, A. (2012, October). Give Me a C(L)UE: Reworking our Beliefs about What Individuals who Use Auditory Scanning Need in a Communication and Language Set. Presented at 30th Annual Closing the Gap Conference, Minneapolis, MN.

Van Tatenhove, G. (n.d.). Core Vocabulary with Generative-Independent Communicators in Inclusive Classrooms. Retrieved from http://www.vantatenhove.com/files/handouts ■

UPCOMING LIVE WEBINARS

PROFFESIONAL 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!

REGISTER NOW!

https://www.closingthegap.com/product-category/upcoming-webinars/

log in today, members have exclusive access to:

Closing The Gap *Solutions*

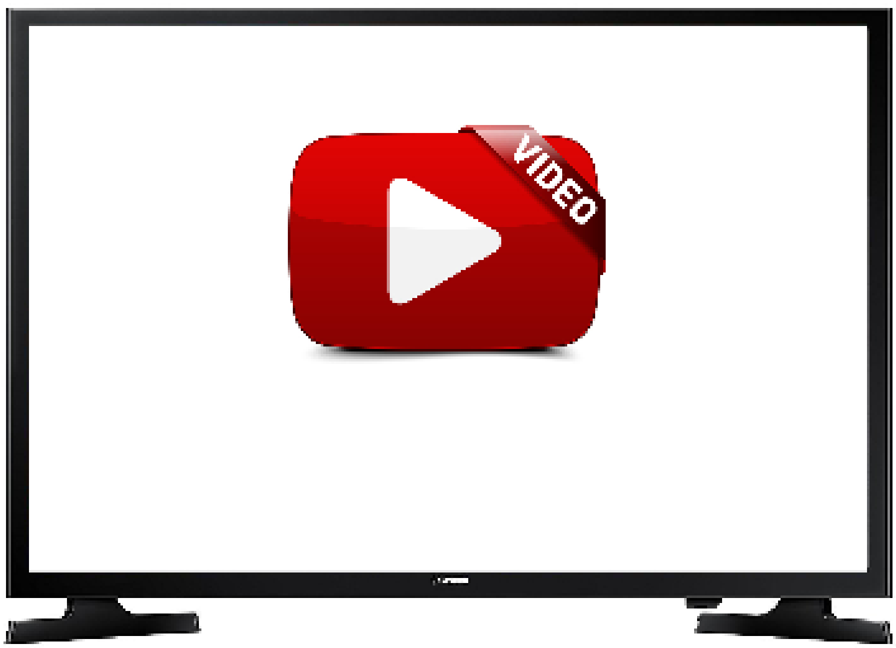
Engaging and Interactive!

ARCHIVED WEBINARS

Over 100 archived webinars already included, plus more added regularly!

Partner Skills Tips and Strategies for Supporting your Students that Use Core Boards and Devices

BY KELLY KEY



Recorded: May 7, 2018

LOG IN TODAY!

Do you need to document your learning? Members simply view an archived webinar and, upon completion, can request a certificate of contact hours. *It is really just that simple.*

www.closingthegap.com/webinars/archived-webinars/

Caught Modeling Core

You've gone to the training, taken the webinar and are all geared up to go back to work armed with what you have learned and want to implement. However, not everyone back home is as excited as you are. Now what do you do? How do we, as professionals, close the gap between what we know and how to put it into practice? How do we close the gap between our students and staff?

I attended the Assistive Technology Industry Association (ATIA) conference for the first time in January 2017. ATIA is a three-day conference and one of the world's most extensive assistive technology conferences showcasing international excellence in the field. This conference goes beyond Augmentative and Alternative Communication (AAC) into a whole realm of Assistive Technology and how multi-disciplinary professionals, parents and teachers can use these products to best serve those in need. The conference was a memorable educational experience, to say the least. If you have not had the chance to attend ATIA (like I hadn't before this trip), I definitely recommend at least looking into it.

I went to some notable breakout sessions. I was able to hear speakers genuinely talk about their passion for Assistive Technology. My colleague, Colleen, was in her Clinical Fellowship year and was just as excited as I was to be first time attendees. One of the more memorable sessions we both attended was Hard "Core": There's More (Than Stop and Go) to Explore presented by Aldrich, Dubovsky and Katzen. In their session, these women spoke about Core Vocabulary and used an analogy that really made an impact on us. In their analogy, Aldrich, Dubovsky and Katzen stated that an ice cream sundae is like our language, our language as a whole. The main ingredient of the ice cream sundae is the ice cream, in which they compared to Core Vocabulary, whereas the toppings are comparable to Fringe Vocabulary because these are additional and specific to each individual. I also heard the following quote by Jane Kortsen for the first time: "The average 18 month old has been exposed to 4,380 hours of oral language at the rate of eight hours a day from birth. A child who has a communication system and receives speech language therapy two times per week for 20 to 30 minute sessions will reach this same amount of language exposure in 84 years". This quote rocked us back on our heels, especially knowing that as speech-language pathologists, we were the ones providing that 20-30 minutes of speech therapy twice a week. After hearing this, we definitely realized that we had some work ahead of us!

After leaving our first ATIA conference, Colleen and I were feeling both inspired and bewildered. We had already started a Core Vocabulary initiative within our Autism program; however, it was slow moving and realistically, not what we had anticipated and hoped for, up until that point. We knew that something needed to change and we would be the ones to implement that

JESSICA GERTH is a Speech Language Pathologist who works with children on the Autism Spectrum to help them communicate effectively and engage in the world around them. Jessica believes that just because someone is non-verbal, does not mean that they have nothing to say. She has worked for the Belleville Area Special Services Co-op for 12 years, 10 solely within the Autism Program. Jessica holds a Master's degree in Speech Language Pathology from Southern Illinois University-Edwardsville.

COLLEEN KRASICH is a Speech-Language Pathologist who currently works with elementary school children, in a rural part of the Midwest. She completed her CF year working with children on the Autism Spectrum, at Belleville Area Special Services Cooperative (BASSC), where she met Jessica Gerth and implemented the "Caught Modeling Core" program. Colleen graduated with honors from Western Illinois University, where she holds a Master's degree in Speech-Language Pathology and Spanish Language/Literature.

BACK TO CONTENTS

change. Our workplace consistently struggled with staff turnover and staff participation, so we knew there had to be something that enticed the teachers and staff.

Having worked in the field of Autism, in a school-based setting for ten plus years, I knew positive reinforcement was going to garner the best results. This discussion led to a memory from my childhood of a program that was implemented throughout grade school entitled "Caught Being Good". When a student was caught having a preferred behavior, a ticket was given to that individual student. These same tickets would then be saved up and used to purchase items, such as: stickers, folders or pencils from the "school store". The program I participated in during my elementary education was a Positive Behavior Intervention and Support (PBIS), which was a program used to achieve important behavior changes. Simply put, PBIS is a general term that refers to positive behavioral interventions and systems used to achieve important behavior changes. Therefore, it rewarded good behavior to encourage others to have good behavior as well. These two ideas gave rise to the PBIS initiative "Caught Modeling Core". Our PBIS program was a bit different than the one used throughout my education because it was designed for the school staff, rather than for students, whom most PBIS are utilized.

Colleen and I sat down with our administrator, who was previously a speech-language pathologist (SLP), and laid out the framework for structuring the initiative. Since it was after the ATIA conference, we knew we were running short on time before the end of the school year, so we wanted to implement a quick three-month initiative to track the use and modeling of Core Vocabulary across different activities and settings in our school. I know that there has been multiple conversations within the AAC world about how to classify and what to call this concept. Do we continue to classify it as modeling or do we call it Aided Language Input? For our "Caught Modeling Core" initiative we called it modeling (to simplify the terminology for our staff) and defined it as, "pointing to an icon on a core board or activating a button on an AAC device, while saying the word". This definition did not require the student to respond, rather it was just the adult showing the student. We printed this definition on a small, pocket-sized laminated card and provided it to each one of our teachers and staff members.

We confirmed that our administrator as well as our fellow support staff, which included: Occupational Therapists, Certified Occupational Therapy Assistants, and a Music Therapist, would all be assisting us SLPs, to watch and keep track of the teachers and staff who are modeling Core Vocabulary to their students. We informed our administrator of our plans for having staff incentives and that these incentive costs would be covered by myself and Colleen. We outlined the duration of the "Caught Modeling Core" initiative, explaining that we would hold this initiative from March until mid-May, even though we knew spring break would come in the middle of this. From our experience, we know that the teachers in our school rarely get to eat lunch outside of their classrooms or without students, so we wanted to have a meaningful incentive for our winners. We decided on the following prizes: (1) a restaurant gift card for the individual who modeled the most and (2) lunch that was provided by Colleen and myself, for the classroom that cumulatively modeled the most. Not only was lunch going to be provided, but Colleen and I were to trade places and let the teachers and the classroom staff enjoy lunch in the workroom, while we sat with their students for that period. We also knew there would be staff hesitations, so we planned to combat those with extra trainings and core vocabulary meetings.

To introduce our "Caught Modeling Core" initiative to the staff, we had the teachers and staff fill out a survey that included questions regarding their knowledge, familiarity and level of comfort in regards to Core Vocabulary and modeling. In the survey, we also asked them how many activities throughout the day that they were currently modeling core vocabulary to their students. We told the staff that this survey was their invitation to an ice cream social. Once the survey was completed, the teachers and staff were able to turn it in to receive their ice cream. Our related service staff was generous enough to serve the ice cream to the staff, since they were going to help us keep track during our program. While the teachers and staff were eating their ice cream sundaes, Colleen and I explained the "Caught Modeling Core" initiative and the reasoning behind it. We explained the definitions of Core Vocabulary versus Fringe Vocabulary by using the ice cream sundae analogy that Aldrich, Dubovsky and Katzen used. Research tells us that Core Vocabulary makes up

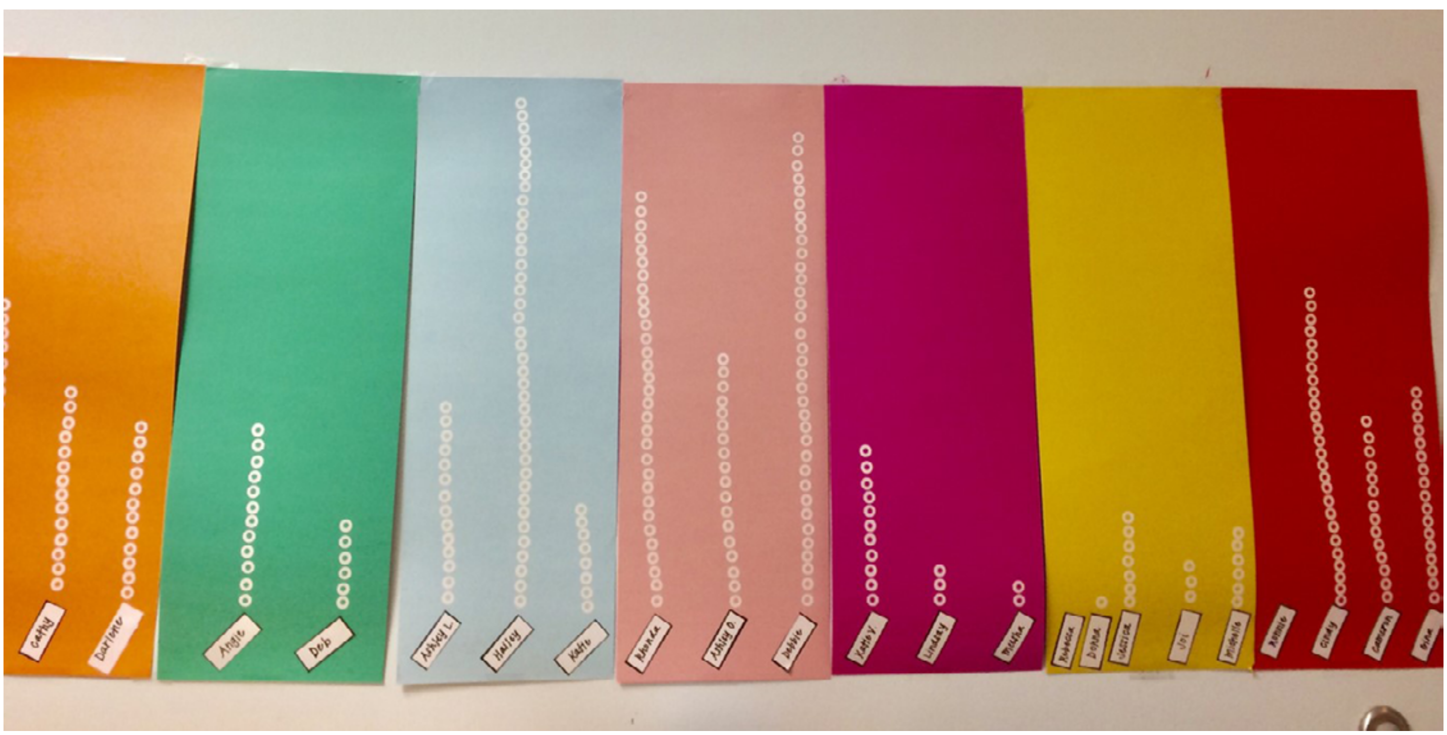
A fun group lesson

Another fun group lesson

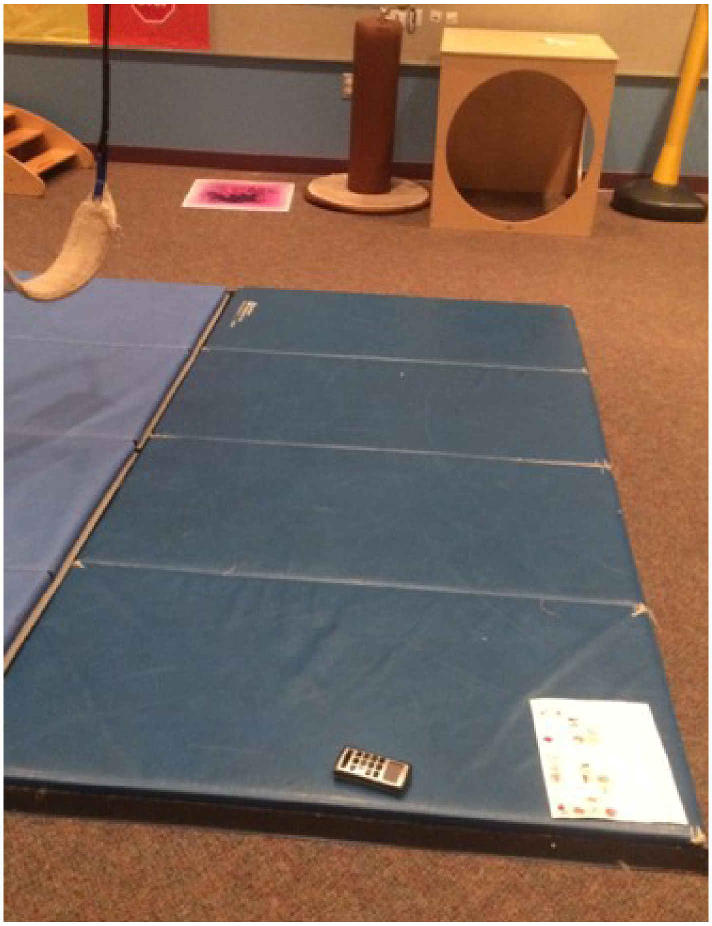
approximately 80% of our language, just like ice cream makes up approximately 80% of your sundae. While the remaining 20% of our ice cream sundaes would be the toppings that are specific to each individual. This remaining 20% in terms of our language is called Fringe Vocabulary, which is the specific, contextual, non-generic vocabulary words used while we speak. These are made up of mostly nouns, but without them, we would have nothing to talk about. During our ice cream social, we also read Jane Korsten's 84 years quote to the teachers and staff and explained their role in this. We explained the importance of them modeling and using this approach with their students, since they are with their students more than we are during the day. After this, we laid out the logistics and framework for our "Caught Modeling Core" initiative and wished them luck.

As expected, a few hesitations came out of this initial introduction from our teachers and staff. One specific hesitation was that the teachers never get out of the classroom; therefore, the modeling would not be seen as frequently. Thus, the teachers and staff wanted to model Core Vocabulary to their students, but wanted to make sure they were given credit where credit was due. We explained that our administrator, as well as other related service staff, would be more of a presence within the classrooms to assist with this concern. Colleen and I added more environmental labeling throughout the school building, such as picture icons on light switches, providing and planting core boards in the bathrooms, cafeterias, hallways, and outside on the playground. We also made mobile "to-go" core boards which were printed, laminated and put on lanyards, so they were easily accessible. We teamed up with our Occupational Therapists and Certified Occupational Therapy Assistants to make sure Core Vocabulary was intertwined to the Zones of Regulation that they were using on a daily basis.

The environmental labeling was to help promote the fact that communication happens everywhere and our students should not be limited to certain rooms in which they can communicate. Another hesitation came from one of the classrooms in which the majority of the students were verbal. The hesitation was the fact that, "there was not a need to model since our students are verbal". This hesitation made us aware of the need for more training. We explained with that classroom specifically, that using Core Vocabulary static boards to expand upon what their



Visual Tracking



Environmental labeling

students verbally say, would encourage longer utterances from their students. Throughout the initiative, we always combated these hesitations with positivity and encouragement, as well as trainings, when needed.

Colleen and I held staff trainings, sometimes alongside our AAC consultant, for our teachers and staff on ways to include Core Vocabulary into their classrooms. One training in particular that was beneficial was when Colleen and I brought in random toys from an overflowing speech therapy closet, empty plastic shoe boxes, and printed Core Vocabulary icons. You might be thinking okay, so they organized their materials? Wrong! We had our teachers pair up, grab a couple toys and then we gave them Core Vocabulary words to use. The teachers had to figure out different ways to use the toys they had, combined with their specific Core Vocabulary words to address multiple communicative functions. This brought on a fun, collaborative approach to teaching Core Vocabulary, rather than lecturing. The staff were involved and hands on, which is known as "hands on" or "experiential learning", which research shows to be beneficial. Experiential learning is the process of learning through experience, and is more specifically defined as "learning through reflection on doing" according to psychologist David Kolb. Our teachers and staff agreed with this when they explained that these trainings were helpful. Our main goal for these trainings was to explain and demonstrate the fact that Core Vocabulary should be a part of EVERYTHING – not an additional task for teachers to implement, thus focusing on embedding Core Vocabulary into their already planned academic activities.

Even with the hesitations, when all was said and done, our teachers and staff did show improvement with modeling Core Vocabulary for the students. A post-survey was given (which included the same questions as the pre-survey) and it showed an increase across all areas that we looked into (e.g., familiarity with Core Vocabulary, settings in which Core Vocabulary is used, activities in which Core Vocabulary is used). Our winners were very pleased with their prizes and we were very pleased to see the modeling continue once the competition was complete. Our ultimate goal was to understand how we could be more effective and intentional when implementing Core Vocabulary in our environment, while simultaneously inspiring the staff to want to be better communication partners for their students and in hopes, model Core Vocabulary in more settings and throughout more academic activities. The by-product of this initiative was the sheer amount of modeling in which our students were exposed. "Caught Modeling Core" ultimately increased the communicative use of Core Vocabulary with both our non-verbal and verbal students, brought classrooms together and on the same page regarding the importance of communicating with our students, increased understanding and comfort level of using Core Vocabulary, and increased the number of activities in which Core Vocabulary was used throughout the school day.

As with any sort of new program being put into place, there

BACK TO CONTENTS

is going to be room for improvement and ways to make things more effective and efficient moving forward. Knowing this, there are things that we would change. We would make sure Core Vocabulary trainings were provided to our teachers and staff (specifically new hires) at the beginning of the school year especially because of our high turnover rate. We would make the "Caught Modeling Core" initiative more collaborative and cooperative rather than competitive. We would have a Core Vocabulary word of the week designated, which would help in taking some of the stress off the teachers when trying to decide which core word to target, and we would make sure Core Vocabulary words are expanding beyond the basic few words, such as "stop, go, eat, drink, yes, no, more".

One thing that has been implemented, that was not done during our "Caught Modeling Core" initiative is providing one-to-one trainings to the teachers and staff regarding modeling. In these trainings, the SLP is using Senner and Baud (2012) S'mores Model in order to demonstrate modeling effectively. Senner and Baud break modeling into different components: (S) slow rate, (Mo) model in which you point and participate in self and parallel talk, (R) respect and reflect, (R) repeat, (E) expand, and (S) stop, pausing and allowing the child to respond. We have received great feedback since using this training method for the teachers and staff and we believe this will help our teachers and staff have a better understanding of how to use Core Vocabulary and modeling with our students.

Overall, we are extremely pleased with how "Caught Modeling Core" turned out; however, I think our administrator summed it up the best when she said, "The Caught Modeling Core program created a fun, engaging and slightly competitive way to encourage staff to further expand the use of core words in the classroom. The activities and trainings were brief, fun, low stress and encouraged participation by all staff. There was an increase in modeling of core words in all of our classrooms as well as throughout the school building". ■

BACK TO CONTENTS

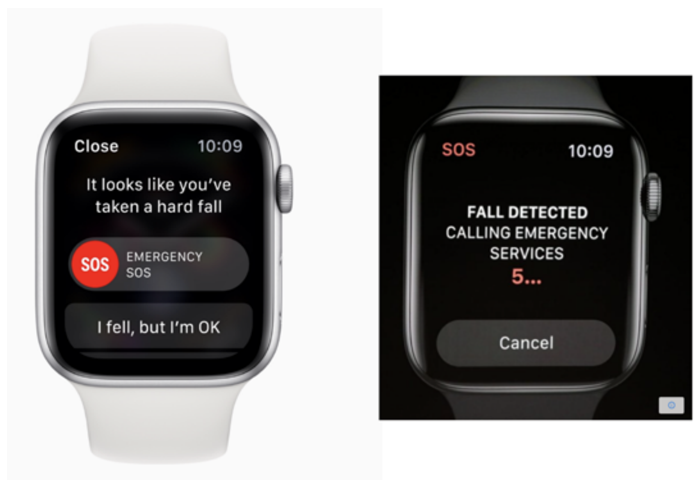
BACK TO CONTENTS

DISKoveries

THE APPLE WATCH AND SPECIAL NEEDS HEALTH AND SAFETY: PART 2

Apple Watch Series 4 (www.apple.com)

The Apple Watch was designed and declared a tool for health and fitness right from its beginning. Apple Watch Series 1, 2 and 3 have an optical heart sensor and are able to monitor heart rate and send high heart rate notifications, low heart rate notifications, and irregular rhythm notifications. In addition, Apple Watch, Series 3 (2017) has a built in altimeter that measures how many flights of steps were climbed and kept track of those results in a very comprehensive activity app. (For a complete review of the Health and Safety features of Series 3 and earlier for Special Needs, see DISKoveries in the October/November 2018 issue of Closing the Gap Solutions). Apple Watch Series 4 (the latest and current watch) launched in October 2018 with even more of these health and safety features, as a result of both the hardware and software updates. It has an electrical heart sensor and ECG (electrocardiogram) capabilities, along with a next generation accelerometer and gyroscope for Fall Detection. This article will focus on these two new cutting-edge features, Fall Detection and ECG Capabilities, along with some additional information about other new changes and improvements. (https://www.apple.com/watch/)



Fall Detection

FALL DETECTION

Apple groups falls into a three-part classification that includes Falls, Trips and Slips. Because of the more advanced accelerom-

JOAN TANENHAUS, Joan Tanenhaus, M.A., CCC, Speech-Language Pathologist/ Assistive Technology Specialist, is Founder and Executive Director of Technology for Language and Learning, Inc., a non-profit organization dedicated to advancing the use of computers and technology with children and adults with Special Needs. (e-mail: ForTLL@aol.com)

eter and the newly introduced gyroscope, the Series 4 watch is now able to detect these hard falls and be able to distinguish between them and the many other different body/arm movements such as clapping, banging on a drum, using a hammer, etc. that the user presents. The result is a watch and app that work together to detect hard falls.

When a hard fall happens to a user who is wearing the Apple Watch 4, the watch will wait a full minute. If it does not detect any movement in that minute, it will offer the wearer multi-sensory stimulation and the opportunity to respond. With haptic feedback, it taps the user's wrist, emits an auditory alarm and visually displays a message that says: "Looks like you have taken a hard fall." The auditory alert is loud enough for someone nearby to hear it. There is then a 15 second opportunity to click a box that says: "I fell, but I'm okay." or to dismiss the alert by pressing the Digital Crown. If there is no response to that message in the given time, the watch will then call 911 and send text messages to family and others previously designated by the user as emergency contacts. (If Location Services is off, it will temporarily turn it on.) This message will notify the recipients that the user has fallen, give their current location and if location changes, will send an update about 20 minutes later. (All falls, whether or not reported to 911, are automatically recorded in the Health app, which keeps an ongoing record of falls for future reference.)

Video demonstrating Fall Detection in more detail
https://www.youtube.com/watch?v=G7xI2dUPN3A

For Fall Detection to work in this way, the user must have set it up previously. The directions for setting up Fall Detection can be found at https://www.imore.com/how-set-and-use-fall-detection-apple-watch-series-4. For emergency calling to work, you must have either the cellular model of the Apple Watch or be near your paired iPhone or Wi-Fi service.

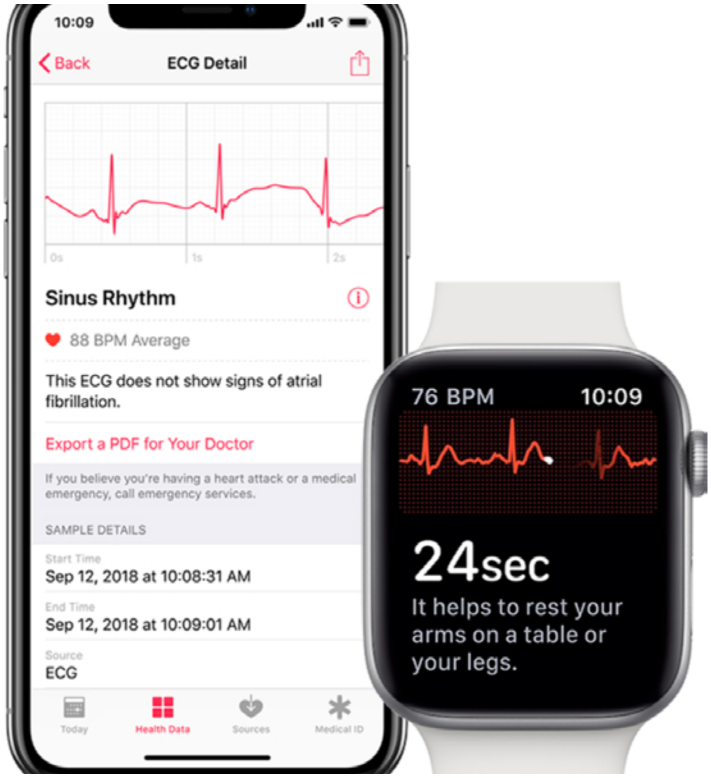
Fall Detection is an outstanding option for those with Special Needs and for those older users who are at a greater risk for falling. Major causes of falls also include safety hazards in the home, muscle weakness, postural hypotension (blood pressure that drops too much when rising from a sitting or reclining position) and problems with gait and balance. Poor balance can also be a side effect of some common medications, including anti-seizure drugs, hypertensive (high blood pressure) drugs, antihistamines, antidepressants, anti-anxiety drugs and many others. For a comprehensive article on preventing falls by Jane Brody, well-known Personal Health Consultant and NY Times columnist, see: https://www.nytimes.com/2019/02/25/well/live/falls-can-kill-you-heres-how-to-minimize-the-risk.html

The Emergency SOS option used by Fall Detection can also be used manually. (This feature has been available in previous versions of the Apple Watch.) Users press and hold the side button on the watch and the Emergency SOS slider appears. The watch calls emergency services (911) and also sends your emergency contacts a text with your current location and for a period of time after, it updates when your location changes. Also in an emergency, Apple Watch users can just say "Hey Siri, Call (say name or 911) and Siri will place a call, hands free. User can then speak directly to 911 or family for help.

ECG/EKG CAPABILITIES

ECG Results

An electrocardiogram (ECG or EKG), usually conducted in a hospital, clinic or a doctor's office, records the electrical signals of the heart in order to identify or monitor heart difficulties. The usual ECG/EKG is called a 12 lead test, because it gets its information from 12 different sensors on 12 different locations. The result is a graph that reveals a pattern of activity. These electrocardiograms can only record an abnormal heart rhythm if it occurs during the actual test. According to Apple, the Apple Watch Series 4 is the "first direct-to-consumer products that enables customers to take an electrocardiogram right from their wrist, capturing heart rhythm in a moment when they experience symptoms like a rapid or skipped heart beat and helping to provide critical data to physicians". Another feature of the watch (Series 1 or later) is that it also checks heart rhythms in the background, and if it detects an irregular heart pattern on five rhythm checks over a minimum of 65 minutes, it will send a notification to the user. Both features have FDA approval.



ECG Detail

The Apple Watch Series 4 has sensors on the back and on the Digital Crown that work together with watchOS 5.1.2 to take an ECG similar to a single-lead graph. Apple describes the process: "To take an ECG recording at any time or following an irregular rhythm notification, users launch the new ECG app on Apple Watch Series 4 and hold their finger on the Digital Crown. As the user touches the Digital Crown, the circuit is completed and electrical signals across their heart are measured. After 30 seconds, the heart rhythm is classified as either AFib, sinus rhythm or inconclusive. All recordings, their associated classifications and any noted symptoms are stored securely in the Health app on iPhone. Users can share a PDF of the results with physicians". This new technology, for the first time, gives people the opportunity to capture important information about their heart, as it is happening.

For more information on the ECG app and how to set it up: https://support.apple.com/en-us/HT208955

For more information on the irregular rhythm notification: https://support.apple.com/en-us/HT208931

For more information for medical professionals and providers https://www.apple.com/healthcare/apple-watch/

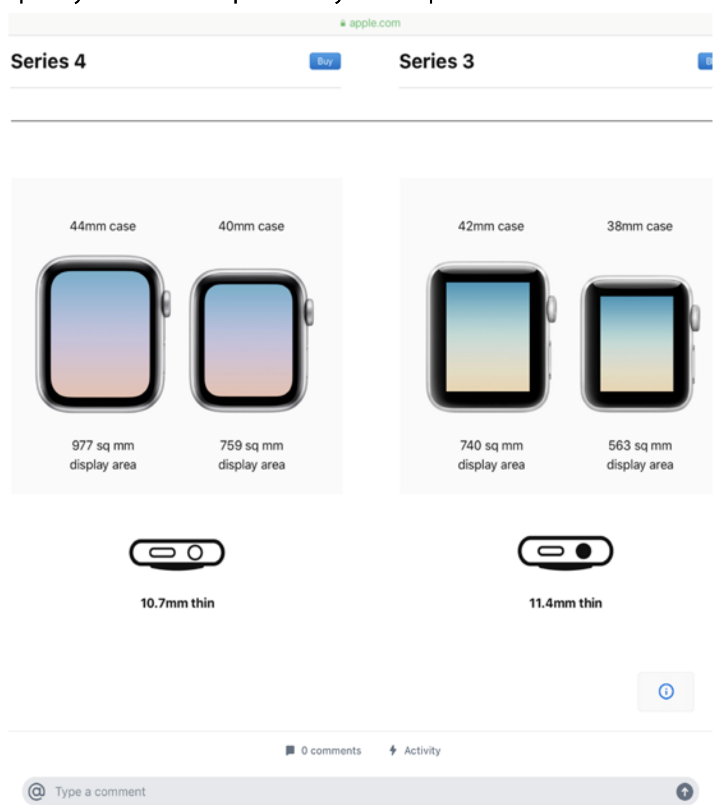
OTHER CHANGES AND IMPROVEMENTS

Size and Resolution

Size: The 40mm Apple Series 4 watch has a 40mm case and 759 sq. mm display area. Series 4 is 10.7 mm thin. This compares to the older 38mm Apple Series 3 watch which is a 38mm case, a 563 sq. mm display area, and is 11.4 mm thin. The 44mm Apple Series 4 watch now has a 44mm case and 977 sq. mm display area. Series 4 is 10.7 mm thin. This compares to the older 42mm Apple Series 3 which is a 42 mm case, a 740 sq. mm display area, and is 11.4 mm thin.

Screen Resolution: The 40 mm Apple Series 4 watch has a screen resolution of 324 x 394 pixels. The older 38mm Apple Series 3 has a screen resolution of 272 x 340 pixels. The 44 mm Apple Series 4 watch has a screen resolution of 368 x 448 pixels. The older 42 mm watch has a screen resolution of 312 x 390 pixels.

The graphic below clearly shows the impact of the additional display area on the Series 4 watch, which is accomplished by both the increased size of the watch and the decreased bezel size and rounding of the corners. Display quality is further improved by the improved screen resolution.



Apple Watch Series 3 & Series 4 Display Comparison

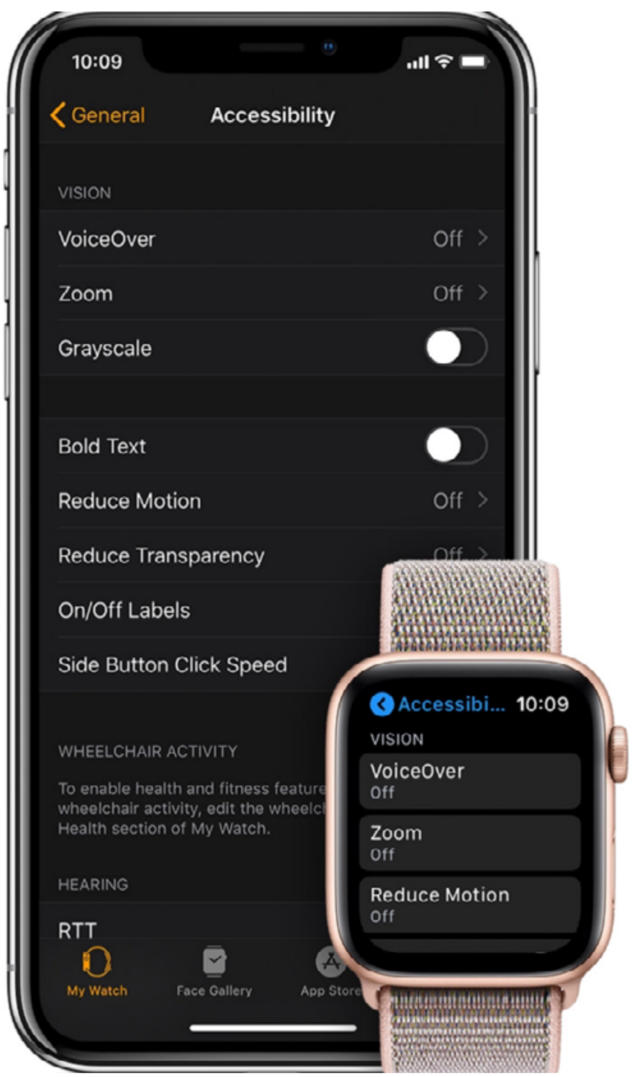
Speed & Performance: The Apple Watch Series 4 has a 64-bit dual-core S4 processor, which Apple says in two times faster than the Dual-Core S3 processor in the Apple Watch Series 3. It is responsible for the apps ability to launch and perform faster.

Digital Crown: In Series 4, the newly designed Digital Crown provides haptic feedback when you use it to scroll up or down a list. You can feel it click from one item to the next.

Connectivity: Apple reports that the new W3 wireless chip in Series 4 replaces the W2 wireless chip in Series 3 and together with the new design of the Series 4 antennae, there is improved quality in both incoming and outgoing phone calls.

Sound: Series 4 has a new speaker which is much louder than Series 3. In addition, the microphone is now on the opposite side of the watch in order to reduce echoes on phone calls.

Accessibility: The Apple Watch and watchOS 5.2, of course, continue to have all the Accessibility features of previous watches. For detailed information about Zoom, Bold Text, Brightness & Text Size, VoiceOver, Mono Audio, Options for Listening, and much more, see DISKoveries in the October/November 2018 issue of Closing the Gap Solutions)



Apple Watch Accessibility

GoTalk WOW (Attainment Company: www.attainmentcompany.com)y

GOTALK WOW (ATTAINMENT COMPANY: WWW.ATTAINMENTCOMPANY.COM)

This AAC app, created specifically for the Apple Watch, can be used with any Apple Watch with iOS 4.3 and up. It comes with 15 pre-set messages, and can easily be programmed with your own messages, using text-to-speech or recorded audio, and using your own pictures, emojiis or pictures from the built-in library. Unlimited messages can be backed up, automatically or manually.

Settings allow you to set the Volume to a comfortable level, adjust Scroll Resistance (the amount the Digital Crown needs to be turned to advance through your message), turn on Scroll Debounce (prevents scrolling to another message for up to 5 seconds), turn on Tap Debounce (prevents activating an additional message for up to 5 seconds), adjust Text to Speech Rate,

BACK TO CONTENTS

GoTalk Wow Video
https://www.youtube.com/watch?v=4HgNo92ds9A

and turn on Vertical Swipe (use finger instead of Digital Crown to swipe up and down through messages),

While wearing the watch, you can access GoTalk Wow from Settings or you can customize the Extra-Large Watch Face to show the time and a GoTalk Wow icon which can then be tapped to open the app. For noisy setting, you can increase the volume by pairing the Watch to a Bluetooth speaker. Excellent Technical Support, via phone and email, is available from Attainment weekdays from 9 am-5 pm (CST). A quick, easy and motivating way to communicate!

LOGITECH POWERED FOR IPHONE (WWW.LOGITECH.COM)

Logitech Powered for iPhone Wireless Charger (Logitech: https://www.logitech.com/en-us/product/powered-iphone-wireless-charging?crid=1537) For the iPhone 8 and higher, this wireless charger allows the phone to be charged and used at the same time. The phone can be charged in either landscape or portrait position, with it resting in a good angle for watching, writing or using apps. The U-shaped cradle makes it easy to place the phone correctly each time- just drop inside the cradle. If you have Face Recognition capabilities, you can unlock and access with a glance. A rubberized surfaces eliminates the risk of phone falling during alert vibrations. There is an indicator light which goes off when charging is complete.

Logitech Powered for iPhone: (www.logitech.com)

Logitech Powered Wireless Charging Stand Video
https://www.youtube.com/watch?v=QZycLcGmq2w

BACK TO CONTENTS

PLUGBUG DUO (TWELVE SOUTH: WWW.TWELVESOUTH.COM)

Apple Watch users have to charge not only the watch but the iPhone, and often a MacBook too. PlugBug Duo is the perfect accessory- you can charge three devices from just one outlet. In addition, it includes 5 international adapters so, if you travel, you can use in over 150 countries. PlugBug Duo is a 2.1A (12W) charger. If only one device is being charged via USB, you use the top port for the fastest charge. If two devices are being charged simultaneously, the power will be equally split between the two USB ports. PlugBugWorld, with a single USB connection and 5 international adapters, is also available.

These new features, hardware capabilities and software updates of the Apple Watch Series 4 combine to produce an outstanding and unique device that has the potential to enhance the lives of individuals with Special Needs. For further information and insight into its power and potential, talk with your physician, visit the Apple website (www.apple.com) or visit your local Apple store. ■

PlugBugDuo (Twelve South: www.twelvesouth.com)

Assistive Technology in Special Education, Rehabilitation and Everyday Living

37th ANNUAL CONFERENCE

Closing The Gap

OCTOBER 2-4, 2019

Preconference Workshops
Monday and Tuesday,
September 30 - October 1, 2019

PRIOR LAKE, MINNESOTA

SAVE THE DATE Plan To Attend!

Mystic Lake Center

The Mystic Lake Center is the newest addition to Mystic Lake Casino Hotel – the only full-service resort in the Minneapolis/Saint Paul area. With the addition of 180 hotel rooms in a stunning new tower, this brand new Mystic Lake Center joins Mystic Lake Casino Hotel to form the second-largest hotel in the Minneapolis/Saint Paul area.

Guests will experience luxury, modern amenities and sweeping west-facing golf course views as one of the first guests in the new Promenade Tower — adjacent to the new Mystic Lake Center and everything Mystic Lake has to offer. It's all just steps away from restaurants, bars and nonstop entertainment. Learn more.

Mysitc Lake Center
2400 Mystic Lake Blvd.
Prior Lake, MN 55372

PLAN NOW TO JOIN US IN 2019!

Join us for the 37th Annual Closing The Gap Conference and return home with knowledge and tools to implement all that is gained!
Through shared best practices and research, networking, training, hands-on opportunities and an expansive exhibit hall, conference participants will find information, strategies and products that prove beneficial and, oftentimes, unsurpassed for use in their work and in their lives.

WHO SHOULD ATTEND?

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

- ✔ SPEECH LANGUAGE PATHOLOGISTS
- ✔ OCCUPATIONAL THERAPISTS
- ✔ AT CONSULTANTS
- ✔ TECHNOLOGY SPECIALIST
- ✔ AUTISM SPECIALIST
- ✔ SPECIAL EDUCATORS
- ✔ SPECIAL EDUCATION DIRECTORS
- ✔ ADMINISTRATORS
- ✔ PHYSICAL THERAPIST
- ✔ UNIVERSITY INSTRUCTORS

This year's conference will build on a tradition of providing a comprehensive examination of the most current uses of technology by persons with disabilities and the professionals who work with them.

Topics will cover a broad spectrum of technology as it is being applied to all disabilities and age groups in education, rehabilitation, vocation, and independent living.

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

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

Take NOTES:
Supporting Emergent Writers Who Use AAC

The need for intentional literacy instruction for people using AAC has become a frequent topic of conversation among teachers, therapists, parents and researchers. When we think of literacy, we often first think of reading. However, research shows that intentional writing experiences are critical as intervention strategies to help those with complex communication needs become better communicators, readers and writers (Sturm, Janet "Writing in AAC." The ASHA Leader, September 2003).

How do you begin teaching writing with your students who struggle not only with communication but with fine motor skills as well? First, we need to think not about writing as a fine motor activity, but as a composition activity. Handwriting is important to learn, but not at the exclusion of the concept of writing: The act of combining words to tell a story, commenting on a picture, or sharing ideas. For many emergent AAC communicators, written composition is either watered-down to marking on paper or not taught at all. Just as we can't confuse not being able to speak as having nothing to say, not being able to form letters with a pencil doesn't mean there are no ideas to share through writing.

Help students write for real purposes and a genuine audience. Teach your students to think of themselves as writers. A simple way to remember how to do this is to take **NOTES:** Notice, Opportunity, Talk, Engage, Share

They tell budding authors to write what they know. The familiarity of a known subject is comfortable and perceived as easier to talk about-so NOTICE your students' interests. Take photos of favorite activities, people, art projects and hobbies, etc. and begin a collection of photo writing prompts. Ask family and classroom staff to take pictures on an iPad or tablet to build a collection. Is your student into the latest movie or video game? Use Google images to find photos of favorite characters to write about as well. Part of the activity is the act of collecting these photos for writing prompts. Taking photos and talking about them is age-respectful for everyone. There are a lot of communication opportunities built-into just taking or finding photos. It's a fantastic way to practice verbs (look, get, take, move, save, delete), prepositions (on, in, out, over, about, for), determiners (there, this, these, that), adjectives (good, bad, happy, funny, goofy). Then, find a way to organize these photos: Use folders in the Photos app in tablets/smart phones, social media sites like Pinterest or Instagram or Google Keep. Say goodbye to the same old writing prompt for everyone: mix it up and give your students using AAC familiar and personally-relevant prompts to select from for writing.

Once you have several photos, provide daily OPPORTUNITY to write. Expressing ourselves through word is as much about the process as it is the finished product. A great way to begin with an emergent learner is to model writing. Either an adult or peer with adult direction can go through the process of looking at their personal photos-commenting aloud about each as they consider their options. "I like this scene from my backyard, here's a cute picture of my dog-today I'll write about my dog, Beau". By talking through our process we can help build our nonverbal student's "inner voice". We can develop this by using "think-aloud" strategies. According to the website Reading Rockets (www.readingrockets.org), think-alouds have been described as "eavesdropping on someone's thinking." This technique is widely used in early elementary education as the teacher verbally describes things she is doing as she reads to show students what to do to improve comprehension. Using this "think-aloud" approach to model illustrates to students how readers get meaning from text.

BETH WAITE-LAFEVER Beth is speech-language pathologist with over 30 years of experience in the field of AAC. She has the RESNA ATP credential and LAMP certification from The Center for AAC and Autism. Beth has worked in outpatient rehab, private practice, and public school. Through her private practice, she has provided evaluations/therapy, trainings, and presentations at the state, national and international level. She is the co-creator of The Indiana AAC Summit, the only conference in Indiana dedicated to the practice of AAC. Currently she provides monthly online trainings for PRC as a contracted employee and is a speech/language pathologist and AT Coach for MSD Martinsville, a public school system in Martinsville, Indiana.

During the OPPORTUNITY phase, it's important to use the "think-aloud" strategy to show the emerging writer the process you are going through as you write. Then we simply talk about the picture and model words on a communication device. Basic list poems do not have to rhyme; they are just lists of words that may or may not be connected. It's a great way to work on various parts of speech; such as, verbs, adjectives and interjections. I flip through photos on my iPad to find my choice. In order to make the poems visually appealing, I upload them to free graphic design apps/websites, as simple as DoodleBuddy, Pic Collage, Canva or Adobe Spark Post with lots of options for font, color and size. After I create my poem I read it and then tell the student "now it's your turn." Make sure that the model is not the same as the student's photo-we want to model the process but not the exact words.

Now it is time for the student to write. After he selects his photo, ask him to TALK about the picture. There are no wrong answers here. We are teaching the concept of writing words and helping our AAC learner see himself as a writer. I usually tell my student we need at least five words to make a poem. I make sure my poem also has at least five words. Then, together we look at the student's photo. First, I merely say: "tell me what you want to write about your picture." I pull up the photo in a graphic design website/app and type whatever the student says. Depending on the communication system, you can connect the dedicated device to a computer and let the student type into a document and move the text into a graphic design program. Or, you can use the voice typing feature in Google Docs to transcribe the speech output from a speech generating device.

It's important not to rush the AAC writer. If they are not providing much output, rather than telling him exact words to write, you can give a verbal description of the photo. For example, looking at a student's family dinner photo you could say "looks like you guys had fun at dinner. I see your mom smiling and there is a dessert on the table. I wonder if you were celebrating a birthday or special event". At this time, write whatever the AAC learner says with his device-even if the words don't appear to make a connection. Verbally comment on the words as you write them and let him see you do this: You said "awesome in name funny face". I wrote that right here. What else do you want to write about this picture?

Part of the writing process is reflecting and revising. If my writer is disinterested, or has difficulty coming up with words during an activity, we will put away the photo and bring it out another day. Once the writer has stopped saying words, or you may have to prompt him "Today's writing only needs five words, so we are done with that part", then it's time to ENGAGE.

After composing the text, it's time to ENGAGE. At this point, the photo prompt is in a graphics program/app and we have added words. Now a lot of choices can be made with the style of the visual aspects of the words; such as font style, text size and color, location on the page, text highlighting or text box color. We can use words like "top/bottom", "big/small" and "different". Making the words visually appealing draws the reader in to the poem and provides more communication opportunities. Once the student is satisfied with the product, read the poem aloud. Depending on the individual's skill level, he may not be able to recall the words on his system to read the poem exactly and that is OK. You can even take turns reciting the poem by reading all the words but one and asking the student to just read his assigned word.

After this step, we are ready to SHARE. In order to experience being a true writer, our work must be read and appreciated by an audience. Keep in mind that it's also totally fine for some writings to be private, so always get permission to share the writing. Print out copies of the poems and distribute among friends/family, post on social media, text or email to others and let the writer review his work often to see what he's written for modeling and to monitor growth.

Here are some of my authors and how the NOTES strategy has helped them develop writing skills.

James is an inquisitive 11 year-old with Down Syndrome. He loves building with Legos and has made some complicated structures. He speaks in two to four word phrases with very poor intelligibility and is learning to use LAMP Words For Life with direct selection to supplement verbalizations. James has significant behavior challenges. He can be difficult to motivate and often prefers to search YouTube for videos than attempt to complete academic-related tasks. When he doesn't want to participate, he often puts his head down, sits on the floor, or resorts to physical aggression. In order to build on his interest but still reduce distractions of live video, James was guided through a process of curating favorite images on Google. We also took photos of some of his block creations. We used NOTES to go through this process with him.

NOTICE:

James was interested in his photo of the restaurant he made from Legos - he returned to this photo many times. When asked if he wanted to write about this, he shook his head "yes".

OPPORTUNITY:

I provided modeling of the writing process by talking through my thought process. "Here is my photo. It is a picture of a sunset. I like it. I can write words to describe it. Look Pretty Pink Amazing Sky Love". As I spoke out loud, I found the words on my version of his speech-generating device to model the language, then wrote them into the textbox of Adobe Spark and created my photo.

TALK:

We talked about his photo. James pointed to it and used several unintelligible verbalizations. I opened Adobe Spark Post on my iPad, uploaded his photo and opened the edit text window.

BACK TO CONTENTS

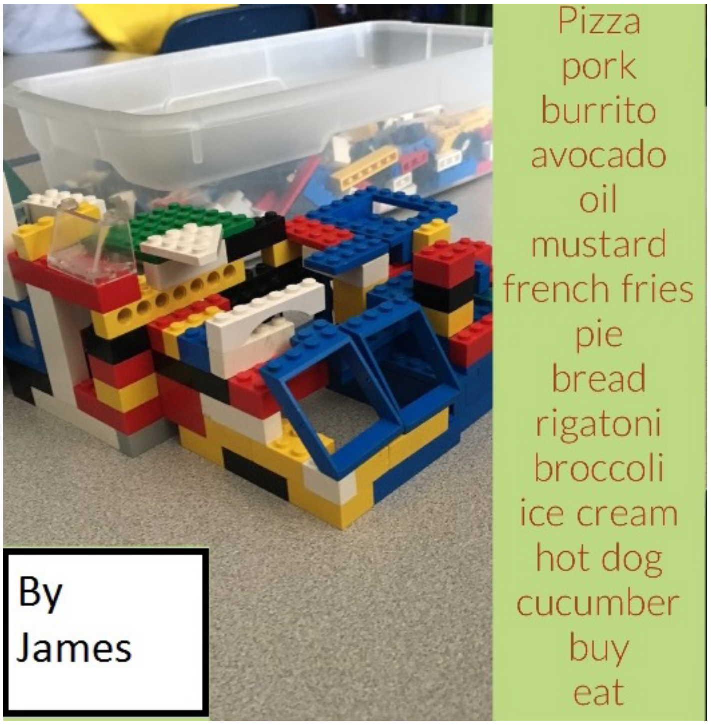


Image 1

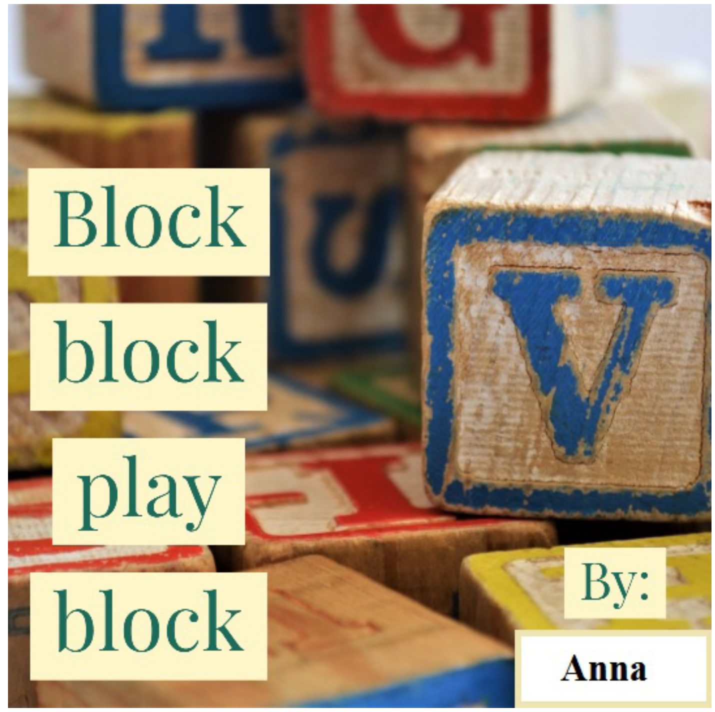


Image 2

Through our discussion, James began to recall words on his speech generating device and watched as I wrote what he said. Words continued to poor from his fingers, as he kept recalling words and watching me type them in the iPad. This was the first time I'd seen James get excited about any type of writing. He paused after several words. When asked if he was finished, he shook his head "no" and added three more words.

ENGAGE:

During the Engage phase, we talk about the visual elements of the picture and text. James used his words to say "big" and "down" to show where he wanted his name to be placed. He also said "green" to tell what color he wanted the background for the text of his writing.

SHARE:

It is important that our writers see their words published and appreciated by an audience. This is what makes writing purposeful and authentic. James, who often refused any activity that looked academic, could not wait to get to the printer and then hand-deliver this to his teacher! SEE IMAGE 1

Writing has been another way that one of my beginning communicators has learned to express herself. Anna, an eight year-old girl with Down Syndrome loves music, blocks and puzzles. Her speech is improving, but at this time she uses approximately just five verbal words that are intelligible to familiar people. She has been using an Accent 800 with LAMP Words For Life for a year with direct selection, and is combining two words to make comments, ask questions, and make requests. To begin the writing process, it was important to take NOTES; Notice her interest. Anna loves looking through photos of favorite items and activities on the Internet. She used her speech generating device to say "block" and we searched through various pictures of different types of blocks on the iPad. After she made her selection, we went through the additional phases of NOTES to elicit her words and participation in creating the visual. Anna's words for this picture were "Block, block, play block". She was also excited to get her printed copy of her poem and eager to return to her class to share it. SEE IMAGE 2

Clare is a 17 year old girl with a funny sense of humor. SEE IMAGE 3

She enjoys reading, horseback riding, creating art projects and jewelry. During the past couple of years, she has added writing to this list and it has become one of her most frequently requested activities. Employing the NOTES strategy, Clare has begun to write poems using her Accent 1400 speech generating device with Unity language through eye gaze. Recalling single words, as well as up to four word phrases, Clare primarily uses her speech generating device to comment, make requests and answer questions. Clare has Rett Syndrome, resulting in minimal control of her upper and lower extremities and apraxia. She uses a wheelchair with a tray for seating/positioning and has both a table top mount and a wheelchair mount for her Accent 1400. Her family and school staff take lots of photos of her favorite people, places and activities. Using these as writing prompts, we scroll through the photo library on her iPad looking for her choice for writing. Clare offers a long blink for "yes" when she sees what she wants. Then the words begin flowing. Here she

Image 3

writes about riding her horse, Rascal. SEE IMAGE 4

During the 2018-19 school year, Clare has written many poems using the NOTES strategy. Her words are beautiful and typically have a direct connection to the subject. She often amazes us with her insight. SEE IMAGE 5

During the school year, we have incorporated the PrAACtical AAC Year of Core Words (https://praacticalaac.org) throughout our district. This has served to introduce words in different categories (adjectives, determiners, adverbs) that we may not have considered. We see these words reflected in her poems as well as her daily conversation. Clare's writing is shared with her family and friends. During a recent meeting to discuss her goals, some of her writings were shared with the team. Because writing is personal, we ask Clare's permission before sharing her writing. A new goal was added to her Individual Education Plan so that we can improve her language through writing: When provided with a self-selected photo, Clare will write a list poem of five to seven words consisting of at least three different word forms (nouns, verbs, adjectives, prepositions, etc.) using her SGD in 3/5 opportunities across three data collection days. Some days she has less control of her eyes and as a result more difficulty selecting words on her Accent. On these days, we talk about the writing process and the concept of editing and revising- assuring her that it's OK to put away her writing and return to it another day.

Another fun way to encourage interaction is to incorporate apps with selfies. Using Hair Salon Me, from Toca Boca, we uploaded Clare's photo and she was able to give herself various hairstyles and hair colors. This led to another writing prompt for Clare to describe - SEE IMAGE 6.

By inserting the photo in Adobe Spark Post, Clare then directed us which font, background color and sizes to use for her words. JibJab, a free app for making e-cards that allows you to upload photos and find holiday-related backgrounds, is also a favorite. This app lets you add multiple faces, so it's always exciting to see who Clare chooses to be in her pictures and what she will say about them.

Using Adobe Spark Video, we've made short videos including her poems, and have contemplated opening an Instagram ac-

Image 4

Image 5

Image 6

count for her to publish her work on social media. The look on her face when she hears her words read aloud by others tells it all: Clare is thrilled to be a writer!

All of these students have used their speech generating devices to experience emergent writing. We've seen growth in vocabulary, word type and frequency of use in regard to authentic communication. For some, we saw reduced behaviors. All our students expanded their leisure activities by discovering a new hobby. Those who read the poems have a newfound appreciation for these young authors, as well as insight into their understanding and views. Students who were not able to write in the traditional sense used words from their speech generating devices to express their ideas and make a creation for others to enjoy as well. This changed the perception others held of students with significant disabilities as well as helped our students to see themselves as "writers". Helping our AAC communicators experience the writing process is much less intimidating and more successful if you take NOTES: Notice Opportunity Talk Engage Share.

Ready to learn more about teaching writing to students who use AAC? Join us at CTG on October 1st, 8:00 - 4:00 for "Scribbling to Learn: Moving Students with Significant Disabilities from Emergent to Conventional Writers #CTG19 https://www.closingthegap.com/preconf-workshop/pc-14/

RESOUCES:

Adobe Spark Post and Video https://spark.adobe.com/home/

Bertram, Mary-Louise, Musselwhite, Caroline, (March 24, 2016) Journaling with AAC and the Alphabet (Webinar) Angelman Communication Training Series, Angelman Foundation

Hanser, Gretchen, "Emergent Literacy For Children with Disabilities (December 2015) AOTA.org https://www.aota.org/~/media/Corporate/Files/Practice/Children/emergent-literacy-for-children-with-disabilities.pdf

PrAACtical AAC (www.praacticalaac.org)

Sturm, Janet "Writing in AAC." The ASHA Leader (September 2003). ■

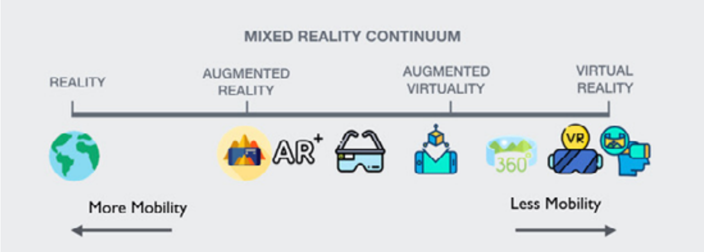
Getting started with Virtual Reality as Assistive Technology

New technologies such as Immersive learning tools like augmented reality and virtual reality have many potential applications as assistive technologies to support the needs of individuals with disabilities. Like many new technologies though, early adoption and use is tending towards video gaming and entertainment applications with some educational uses beginning to get established. Unfortunately, the accessibility features and potential assistive technology applications of these tools are still in a very early phase of development.

At the Assistive Technology Research and Development Lab at Washington State University our primary goal is exploring the capabilities of these new technologies and matching them to the needs of individuals with disabilities. We believe that the best way to support early adoption of these innovative technologies is to get them into schools, hospitals, communities, and homes while working to educate our community of stakeholders about what is available on these platforms to support the needs of people with disabilities.

BRIEF BACKGROUND ON AR AND VR

There are a multitude of terms in the immersive learning field but the primary ones are augmented reality (AR) and virtual reality (VR). In the fields of computer science and engineering these terms are well established and defined in the mixed reality taxonomy (Milgram & Kishino, 1994) which is shown in Figure 1 below. Starting at the left side is actual reality which hopefully all of us can recognize most of the time. AR is a live view of the physical world with some digital information overlaid on top of it. Augmented virtuality is a term rarely used now and is generally considered high quality AR with 3D objects. Finally, VR is on the right side of the taxonomy and is defined as a fully artificial digital environment in which a user navigates in order to complete tasks or gain experiences.



Mixed Reality Continuum

These terms can get confusing and are often misused or conflated with other technologies. For example some previous

DR. DON MCMAHON is an Assistant Professor of Special Education Technology at Washington State University in Pullman, WA. His research interests include, Augmented Reality, Virtual Reality, Wearable devices, Universal Design for Learning, Assistive Technology, and Instructional technology. At WSU Don McMahon coordinates the Assistive Technology Research and Development Lab. He recently was one of the authors of a handbook on using mobile devices in secondary classroom settings. In addition he is one of the Cofounders of the WSU ROAR postsecondary education program for students with intellectual and developmental disabilities at Washington State University. Don was a special education teacher for 7 years and then became an instructional Co-teaching coach for general education and special education teachers. Don graduated from the Special Education Ph.D. program at the University of Tennessee, Knoxville. Don is also a national presenter providing professional development sessions for both general educators and special educators on using technology to support diverse groups of learners.

BACK TO CONTENTS

assistive technology and special education technology work has used the terms like virtual worlds (like the computer games played on computer screen or tv) interchangeably with virtual reality. One of the primary things that separates VR with these virtual world games is that the user views these experiences with a head mounted display which provides a 360 degree experience in the virtual environment. Understanding what is and is not VR is an important first step in advancing more ways to use VR as an assistive technology. In comparison, AR as an assistive technology is probably in a more mature state of development than VR. The 2016 cultural phenomenon of Pokemon Go at least helped to grow the popular understanding of what AR is. VR has not hit that type of widespread adoption yet. AR research in special education and assistive technology is also more common currently than VR examples. Luckily as a field of AT professionals there are many ways we can advance VR adoption outside of waiting for the VR tools designed with accessibility at the forefront and waiting for a larger body of research to provide lessons on the best practices.

CAPABILITIES AND LIMITATIONS OF VR

So as we explore what VR can bring as an AT resource, understanding how it is used is an important consideration of its capabilities and limitations. VR like any potential tool used as an assistive technology is not universally going to be an ideal tool for all individuals. This will improve as more developers design for accessibility from the start but many current VR offerings are limited in their accessibility. There are some important efforts to improve accessibility in VR. For example, the University of Melbourne provides a great resource very detailed examination of VR accessibility challenges and opportunities across many different types of disability needs (https://unimelb.edu.au/accessibility/guides/vr-old). The best way to learn about VR capabilities and limitations is to start trying it out.

Once you try it you immediately appreciate that VR is a very visually focused medium. While head mounted displays and VR experiences also include sounds and sometimes haptic feedback from the controllers, being able to see is still a very central assumption being made by most developers. So VR in its current form is not likely to be an ideal resource for individuals with vision impairments. Even users with glasses may find using VR head mounted displays a challenge to use comfortably.

Another limitation is that VR experiences such as games, videos, and educational simulations each vary by their design features for using and navigating the experiences. Just as there are millions of mobile apps there are currently thousands of VR games and experiences which can all vary in terms of accessibility. Some VR experiences are very text heavy in their instructions and interfaces which could be a barrier for users who need assistance in reading. Common screen reading tools and accessibility features generally will not work in these 360 degree VR environments. Some provide on screen text instructions but no options for audio prompts.

VR by its nature is generally a stationary activity. When we teach people about AR and VR one of our favorite examples is that you can't cross the street in VR. While using AR apps (i.e. Pokemon Go, AR Navigation apps) most of us are able to safely move around our communities and find what we are looking for in the physical environment around us. VR's head mounted displays showing completely virtual environments make physically moving any distance potentially dangerous. That does not mean users can't stand or even in some cases move around a small area in what is generally called room scale VR. But even in most room scale VR experience a participant uses a fairly small area of no more than 10 by 10 feet. A great example of this is Google Tilt Brush which is a creative drawing and painting app that uses one controller as the "brush" and one controller as an interactive palette of colors and tools. Because VR is primarily a stationary activity that also means that for individuals with mobility challenges, for example using a wheelchair, it can still be very accessible. Some VR systems games require one hand held controller while more advanced ones use two controllers. A user with more limited mobility, for example a patient in a bed, would be better serviced by a system with one controller to select and interact in VR. For example, the Oculus Go uses a single controller and the games and experiences in this system tend to require less movement.

360 DEGREE VIDEO

One of the easiest ways to get started using a VR headset is to use it to watch existing 360 degree videos. These videos are taken with a special camera that captures video in a 360 circle that can be watched in the VR headset. Unlike a traditional video the user can choose what to pay attention to in these immersive videos. For example in a 360 video swimming under the ocean, one person might focus on a sea turtle swimming by and another might choose to focus on a nearby clown fish. Some popular 360 degree video apps in VR are VEER (Free), National Geographic VR (Free), and Discovery VR (Free). But the largest collection of 360 video is also the world's largest collection of video Youtube on the Youtube VR app on which you can also upload your own immersive 360 videos.

Creating your own 360 degree videos to make immersive video models is one of the most promising assistive technology applications of VR. Video modeling is an evidence based practice with decades of research that we can easily extend to this new platform of VR. The 360 cameras are available for as little as \$200 to \$500 and very easy to operate. Some use a single lens to create a flat standard video while other cameras use two lens to create 3D video. In our experiments we prefer systems that create 3D video for the VR video models. We also suggest putting the 360 camera on a stand or selfie stick to help keep the image steady because your video will be what the user experiences and too much turning and shaking can be very disorienting. We

VR as Assistive Technology: WSU Assistive Technology Research & Development Lab
https://www.youtube.com/watch?v=HvamGtYg_mw

learned this lesson by partnering with the WSU ARMY ROTC who mounted the camera on a cadet's helmet during a field exercise that involved many obstacles, running, and jumping. We now use this video as an example of how to make people motion sick. Beyond that limitation of slowing down and keeping the camera steady, 360 video is easy to learn to produce. Just like traditional video modeling has been applied to a wide range of skills, VR video modeling also has an incredible potential to address skills. Imagine a student who struggles with changes to routine and new transitions, for example learning to ride a school bus home. We can record the new experience, in this case the new bus ride experience start to finish with all of its sights and sounds so our learner can practice that experience in advance. The student's teachers can see if there are major distractors or other problems that could be reduced or eliminated before the student has to attempt the transition in real life. The 360 video models could be applied to individual needs for AT to address functional skills, academic needs, or employment related activities using similar best practices to traditional video modeling.

VR PLATFORMS

After we understand the capabilities and limitations of VR broadly we need to choose some VR platforms to get started discovering the assistive technology of VR. The easiest way to get started using VR involves your smartphone's screen which is placed in cardboard or plastic headsets ($5-10) to create smartphone based VR experiences. Students and educators can get started using these VR experiences by searching their mobile devices app stores such as Google Play or Apple's App Store for the search term "virtual reality". Some of the currently popular VR applications using smartphones and headsets are education focused experiences such as Google Expeditions and Nearpod which take users through interactive presentations and allow teachers to create their own interactive immersive presentations as well.

In addition to smartphone based VR there are several dedicated VR platforms which have their own unique features, controllers, and collections of VR applications. The primary VR hardware platforms are made by HTC (HTC Vive, Vive Focus Plus), Facebook's Oculus (Oculus Rift, Oculus Go), Samsung (Gear VR), and Sony (Playstation VR). Some of these require a dedicated computer in addition to the VR head mounted display (Oculus Rift, HTC VIVE) while others are stand alone VR headsets (Oculus Go). Each system has its own collection of VR games, experiences, and applications. All of these systems provide free apps to play and control 360 video.

VR EXERCISE GAMING

One of our first projects in the WSU ATR&D Lab was to explore the use of VR exercise gaming (exergaming) to increase the physical activity of individuals with intellectual and developmental disabilities (IDD) (McMahon, Barrio, McMahon, Tutt, & Firestone, 2019). We chose to examine physical activity because we felt that exergaming in VR could help address concerns about reduced physical activity for students as they transition from their K-12 schools. The study examined the exercise duration and intensity for a group of students with IDD when using a VR exercising system called Virzoom (Virzoom.com). The Virzoom exercise games are controlled using an exercise bike with sensors that communicate to the VR games how fast the user is peddling the bike. From the users experience in the VR game they are sitting in race car, riding a horse, or kayaking, and the faster they peddle the faster they go in the VR game. The participants in the VR experience greatly increased their duration and intensity of physical activity while playing the exergaming system. A picture of the system is shown in Figure 2 below.

There are also many VR exergaming apps that don't require an exercise bike or additional equipment. Holoball is a VR racketball like game played in standing room VR using the controllers to serve, redirect, and whack as hard as you can a ball on court. It makes a great single player or competitive exergame to get the participants moving and exercising. The most popular VR exergame is probably Beatsaber in which participants use the controllers to hit the beat with lightsaber drumsticks while listening to a range of popular songs. Playing one song seems easy but after 20 minutes most people are starting to feel the Beatsaber burn.

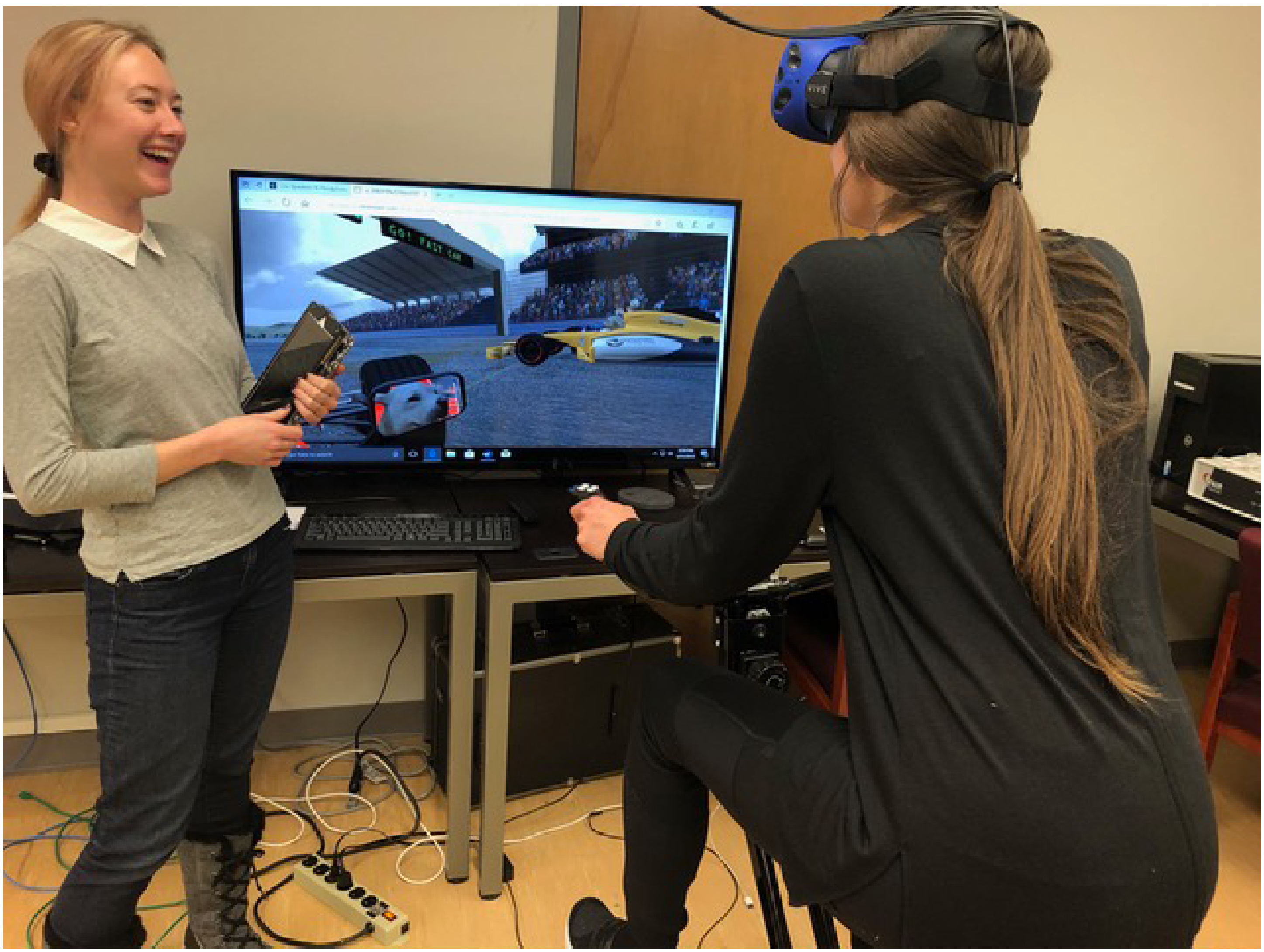


Figure 2: VR Exergaming session in the WSU ATR&D Lab.

BACK TO CONTENTS

MINDFULNESS VR APPS

There are several VR apps focused on relaxation and mindfulness which can be used to support behavior regulation. Guided Meditation VR (Free) takes the user to beautiful simulated VR environments such as a beach, forest under the aurora borealis, or outer space and guides the user through a calming deep breathing mindfulness script. FlowVR ($3.99) uses high resolution 360 degree video of nature scenes (waterfalls, oceans, mountains), gentle music, and guided meditation prompts to support relaxation and mindfulness. For individuals who may need a break to regroup emotionally these VR mindfulness apps can provide an easy to implement self regulation tool using VR.

VR EDUCATION

The capability of VR experiences to put the user into a completely artificial environment means that there is incredible potential to use VR for education. Currently, VR education focused apps are not quite as common as VR games but there are still many high quality VR educational apps. Google Earth VR (Free) brings the power of the Google Earth desktop app to VR so the user can virtually visit and explore anywhere on Earth. Google Earth in VR is easy to navigate and learn and includes detailed 3D models of most buildings in big cities and all the available street level imagery. Using the street level imagery a learner can virtually visit all around the world. Lifeliqe VR Museum (Free) allows users to interact with a range of topics from how volcanoes work, parts of a plant cell, and exploring outer space. Medical Holodeck (Free) is an interactive human anatomy viewer with tools for teaching and assessing user knowledge. These are just a few of the available educational VR experiences that could provide immersive learning opportunities that are hands on (virtual hands on anyways), interactive, and learner directed. For students that are struggling to master content from a textbook or lecture these VR experiences are new resources to help educators meet their students needs.

VR SOCIAL

It may seem counterintuitive to think of VR as a social activity but there are many social applications and games that can provide structured practice for improving social skills. We are not recommending this as the only social skills instruction of course, but the capabilities of VR may provide some novel tools to your social skills instruction. For example the VR app AltspaceVR (Free) allows the user to meet up with friends in a room as a cartoonish avatar but the movements and voices are all real people. A student working on employment skills could practice answering interview questions from their teacher or job coach in this VR space. A practice interview in a simulated environment may be less socially stressful than initially practicing face to face in real life where issues like making eye contact could be barrier to success. There are many multiplayer games that are available in VR that can be played with friends from anywhere in the world with internet access. A user with limited transportation could meet up with friend in Oculus Rooms (free) for a chat and some board games like chess, checkers, and many others or get together a group of friends for a fun game of Settlers of Catan in VR ($9.99). Based on individual needs some users may prefer playing complex games with many small pieces in VR which reduces the need for fine motor activities such as reaching across the board and placing small objects.

VR ENTERTAINMENT

Access to entertainment is another interesting capability on VR headsets. In addition to games like the ones mentioned above popular streaming video services like Netflix and Hulu are available on many VR platforms. Some like the Oculus Go even let you and a friend watch the same movie or show together from anywhere with internet access. Using these VR video apps a user can make the screen as large or small as they want based on their needs. The nature of wearing a head mounted VR display also means that the user does not see the world around them while watching their favorite show unlike when they watch Netflix or Hulu on a mobile device. Representatives from our lab recently met with the administration of a local hospital to examine the potential benefits of offering VR headset as another patient care option to relax and entertain during long treatments that can be distressing such as infusion based treatments. Rather than seeing needles, tubes, and monitors and a small mobile tablet screen patients could explore simulated environments, play games in virtual environments, or just watch their favorite episode of Star Trek on a virtual screen as large as a movie theater screen.

FUTURE DIRECTIONS OF VR AS AT

Hopefully this brief overview of the current capabilities of VR demonstrates some of its potential as an assistive technology. The next generations of these platforms will provide additional applications and design features that will enhance accessibility in VR for a larger group of users. Several platforms are working including eye tracking to allow users to select and navigate experiences on the VR head mounted display. Major platforms in VR are also working to incorporate brain computer interfaces that could use biofeedback to allow the user to select and control their VR experiences with less dependence on controllers. These additions could dramatically increase future accessibility by incorporating eye tracking and other technologies to increase the options for access. Eye tracking tools could allow a user with mobility challenges that limit their use of hand held controllers to still enjoy and experience interactive VR games and simulations.

ADVANCING VR AS AT

Advancing VR as a resource for individuals with disabilities is an exciting opportunity that will benefit from more people exploring and informally trying to see what works for them. That doesn't mean there isn't outstanding research work being done currently to advance VR as assistive technology. Dr. Sarah Howorth at the University of Maine is working on using 360 degree video modeling to support social skills development for students with autism. According to Dr. Howorth:

Students with disabilities such as autism and intellectual disability benefit from practicing new skills in real world situations. Often it is difficult to replicate real world situations in a safe environment, or the environment may be too risky from a social or a safety perspective. 360 degree video modeling allows these individuals to immerse themselves in an environment to practice a skill. Social skills can be rehearsed, and vocational skills practiced in a way that allows for skill rehearsal in an environment that replicates the real world environment without real world risks. Once the individual becomes fluent in the skill, real world rehearsal may begin.

Dr. David Cihak at the University of Tennessee is working on advancing VR interactive simulations for virtual job training for students and adults with Intellectual and developmental disabilities. According to Dr. Cihak "The advantage of VR simulations for job training is that we can provide multiple job environments and situations in a structured and safe setting. We can see what the learner is paying attention to in the situation and provide prompts and feedback based on the learners needs." The goal of these simulations would be to provide a robust job training and point of view experiential practice to precoach critical job skills.

In additional VR research projects the ATR&D Lab at WSU works to advance VR in education by partnering with classes in the teacher education programs to provide hands on experiences using VR and other immersive tools that preservice teachers then implement into their assignments. These introductory VR experiences have become student favorites as shown in student evaluations, lesson plans that include VR tools to support Universal Design for Learning, and student research projects using VR.

To reach current educators we also work to provide ongoing professional development. The ATR&D LAB sponsored its third full day preconference workshop at the Division of Autism and Developmental Disabilities conference on using Current and Emerging technology to support students with disabilities. These sessions start the day covering many traditional AT topics such as text to speech, accessibility tools, accessible instructional materials and build up to wearable and immersive learning tools such as VR. Our favorite and the audience's favorite part of the day is the hands on afternoon session where we set up multiple stations of virtual reality experiences for the audience to try. In each station we provide many examples of how to use VR to support students with disabilities. In addition to our examples, every time our audience comes up with new ways to use VR to address needs that they are trying to meet in their classrooms. We need more of those great ideas and we need to share them with each other.

The best way to advance the adoption of new assistive technology platforms such as VR is to get them to individuals with disabilities, special educators, related service providers, parents, families, and other stakeholders. AT is a diverse field touching on many different needs and contexts some of which VR can support. Our users' strengths and needs are unique to each individual and VR tools are one additional means of supporting the people we serve. A process of discovery and innovation is needed to advance VR as an assistive technology. The more VR devices and experiences we all try the faster we will build the knowledge base around this topic. Working with all of our community of stakeholders, we can explore how to apply these new VR tools to empower and include individuals with disabilities.

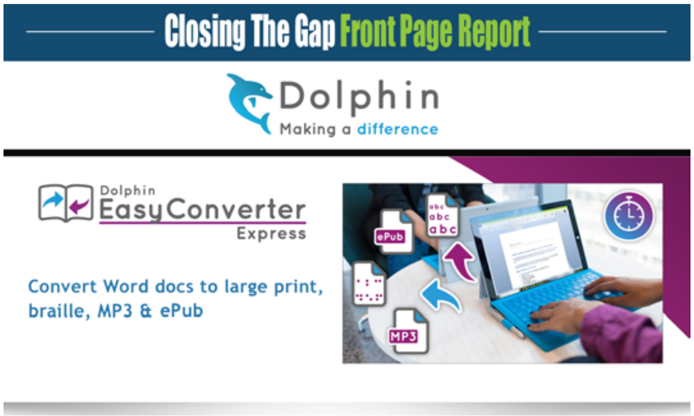
REFERENCES

McMahon, D.D, Barrio, B. L., McMahon, A. K., Tutt, K., & Firestone, J., (2019) Virtual reality exercise bike intervention for high school students with intellectual/developmental disability. Journal of Special Education Technology. 34, 2,

Milgram, P., & Kishino, F. (1994). A taxonomy of mixed reality visual displays. IEICE Transactions on Information Systems, E77-D(12), 1321–1329. Retrieved from http://web.cs.wpi.edu/~gogo/hive/papers/Milgram_IEICE_1994.pdf ■

product spotlight

DOLPHIN – EASYCONVERTER EXPRESS – CONVERT WORD DOCS TO LARGE PRINT, BRAILLE, MP3 & EPUB



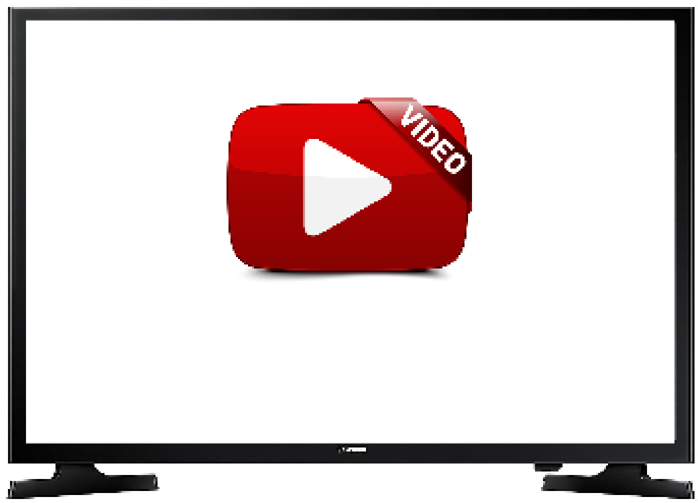
Convert Word docs to large print, braille, MP3 & ePub!

EasyConverter Express enables school districts, companies, non-profits and government agencies, to instantly provide accessible formats of the information that is critical to the core mission of their environment! Whether you're the author of a document in MS Word or you're the recipient of that document, you can quickly convert it into the four most widely embraced accessible formats with the click of a button—Braille, MP3, Large Print and ePub.

LEARN MORE

Be My Eyes – Bringing Sight to Blind and Low-Vision People

Be My Eyes is a global community that connects people who are blind or have low vision with sighted volunteers or company representatives. On the app, volunteers assist blind and low-vision users through a live video connection and work together to tackle challenges and handle a wide range of tasks. With the Specialized Help feature, blind and low-vision users can connect with company representatives for accessibile customer support. The app harnesses the power of generosity, technology and human connection to help blind and low-vision people lead more independent lives. Be My Eyes is accessible in more than 150 countries worldwide and in over 180 languages. The app is free and available for both iOS and Android.



LEARN MORE

Ginger – Make No Mistake! The World's Best Grammar Checker

WRITE WITH COMPLETE CONFIDENCE

Ginger makes sure everything you write is mistake-free on Gmail, Facebook, Twitter, LinkedIn, MS-Office and everywhere you write.

CORRECT YOUR TEXT AS YOU TYPE

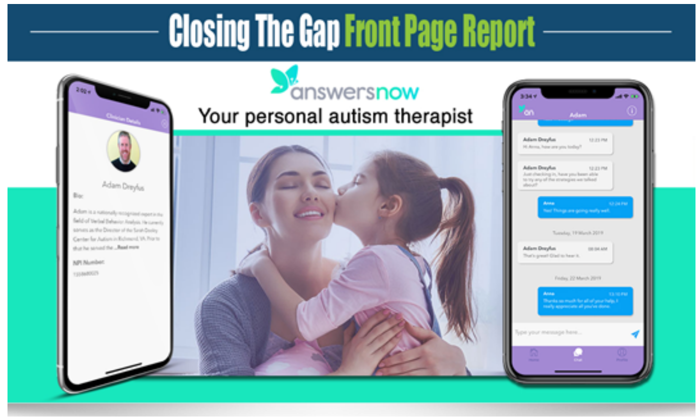
Ginger corrects all types of grammatical mistakes including punctuation, sentence structure and style. Everything from misused words to subject-verb agreement to contextual spelling.

IMPROVE YOUR WRITING SKILLS

Whether you're writing for business, sending an email, completing school assignment or posting an important status update – Ginger will be there to make sure your text is clear and is of the highest caliber.

LEARN MORE

AnswersNow – Message Your Personal Autism Expert Today



THEIR MISSION

Their team of clinicians has had thousands of conversations with parents just like you who have expressed frustrations around the lack of specific support aimed at the parent and they set out to do something about it. They started AnswersNow to bring confidence, convenience and clarity to parents of children on the autism spectrum.

WHAT THEY DO

Raising a child with autism can be tough, so we provide parents all across the country with daily access to a personalized clinician via a mobile device. In addition, they give parents access to resources and specific guidance to help them through their day-to-day lives.

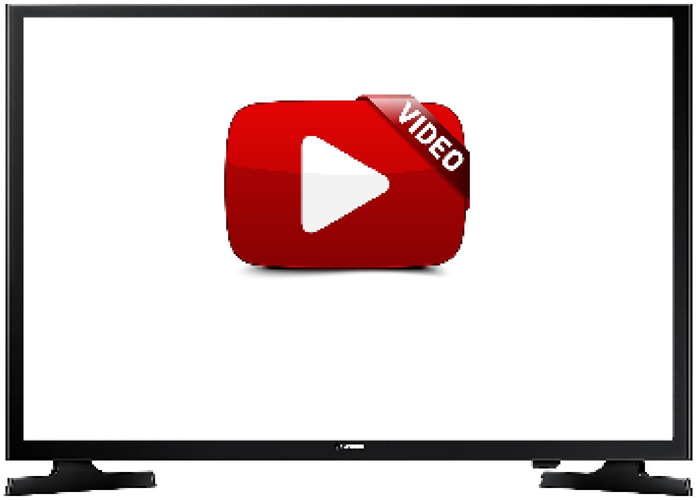
THEIR TRUSTED TEAM OF PROFESSIONALS

The AnswersNow team consists of professional clinicians with years of experience with helping parents of children diagnosed with autism. They are all required to have a masters degree and board certification in behavior analysis.

They realize each child develops at their own rate and that it takes time to understand each individual. Their expertise is in finding a method that works for you and your child, that fosters concrete progress, and that strengthens the relationship between you and your child.

The mobile app consists of real people, no bots or programs. Therefore, you know you're talking with a genuine clinician who cares about your well-being.

BACK TO CONTENTS



LEARN MORE

Speech Sounds Visualized – Helping People Understand and Be Understood

What if we could see speech in action? What if we could create a set of images that would be like having a mirror to see inside the mouth? Would these images help people who struggle with speech pronunciation to learn more readily and quickly? These were the questions Keri Jones and her team thought about when they set out to create their App, Speech Sounds Visualizedr

They've gathered x-rays showing speech sound movements and created visually stunning videos to help educate people about how English speech sounds are formed. The videos are further enhanced by written instructions to accompany each sound in the English language. Recording capability has been built into the App, so that users can record themselves practicing at the sound-in-isolation level, word level, and even sentence level.

Apps have become very accessible for people worldwide, which is why Keri and her team felt it was the perfect platform to debut Speech Sounds Visualized. It was created for primarily for older children and adults and can be especially helpful for individuals struggling with the very complex R sound. Speech Sounds Visualized is only available for iPad and iPhone at this time, though the team is hard at work considering ways to make this program even more accessible!

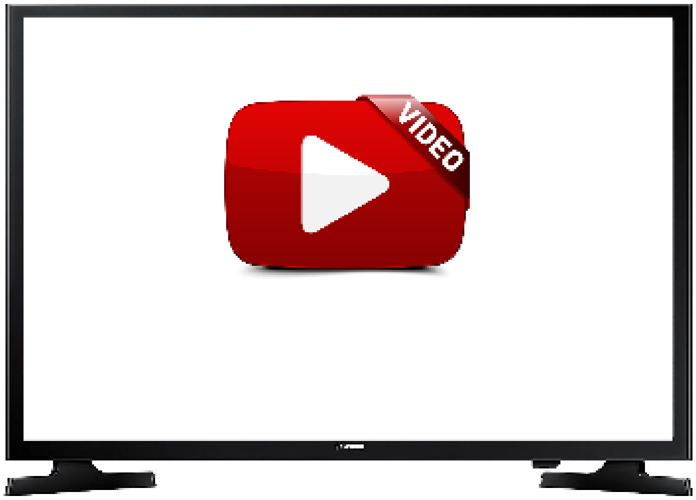
LEARN MORE

Marbotic – Deluxe Learning Kit, Learn to Read & Discover Maths

Marbotic is the company that brought us Smart Letters and Smart Numbers , sets of 26 high quality wooden upper case letters and 10 numbers that work together with a group of excellent, free literacy apps and with the iPad2 and later. The front of each letter has a metal handle that makes it easy to grasp and press. The back of each has here small rubber-like "feet", all in varied spots that identify them as particular letters or numbers when they are placed on the screen. A full review of Smart Letters and Smart Numbers and all the Marbotic apps appeared in DISKoveries by Joan Tanenhaus in the April/May 2017, the June/July 2018 and now April/May 2019 issues of Closing the Gap Solutions magazine.

DELUXE LEARNING KIT – LEARN TO READ & DISCOVER MATHS

Hi Major Tom! Are you ready to take off and explore the wonderful galaxy of reading and counting? Put your astronaut's helmet on, get your Deluxe Learning Kit, don't forget your iPad, and let's go for a fantastic learning journey!



LEARN MORE

Lego Introducing LEGO Braille Brick

FIntroducing LEGO® Braille Bricks – a fun and playful way to learn Braille

LEGO® Braille Bricks is a playful tool to teach Braille to blind and visually impaired children. The toolkit comprises of adjusted LEGO bricks that correspond to Braille. Each colourful brick has a printed letter or symbol allowing the sighted and blind to interact and play on equal terms.

LEGO® Braille Bricks is developed by the LEGO Foundation, LEGO Group and partners from the blind community.

A pedagogical concept that builds on learning through play principles ensures an optimal teaching and learning experience. The aim is to inspire blind and visually impaired children to learn Braille and as such support them in achieving their goals and dreams in life.

LEARNING THROUGH PLAY

A principle that empowers children to become creative, engaged, lifelong learners. By unlocking the power of play, children can develop the broad set of skills they need to thrive and succeed in the 21st century.

LIFE SKILLS

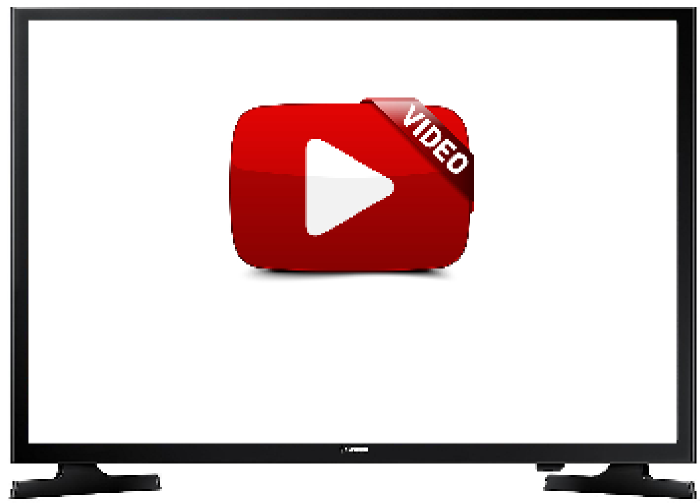
Learning Braille is said to be crucial for blind and visually impaired children as it allows them to develop a variety of essential life skills ensuring they experience intellectual freedom, independence and equal access to education and work.

INCLUSIVE LEARNING

The concept presents a groundbreaking and inclusive opportunity to teach blind, visually impaired and sighted children alongside each other by offering a fun and playful way to engage, interact and learn together.

FUN & FULFILLMENT

Opening up the joy of learning and social interaction through playful games and innovative teaching methods paving the way for improved confidence, creativity, problem-solving and communication needed to support life goals.



LEARN MORE

CLOSING THE GAP SOLUTIONS - SO MUCH MORE THAN A MAGAZINE!

MAGAZINE
650+ Articles

100+ Archived Webinars
Available On Demand

Resource Directory
2,000 Products

MEMBERSHIP OPTIONS AND BENEFITS

Individual Standard Membership:

- Six Issues Closing The Gap Solutions E-magazine
- 100+ Archived Webinars On-Demand
- 150+ Contact Hours
- The Acclaimed Resource Directory – A Guide to Over 2,000 AT Products

Individual Premium Membership:

- **Standard benefits plus....**
- Seat in ALL Upcoming Live Webinars
- CEUs Included. Each 90-minute live webinar includes 0.2 CEUs

INDIVIDUAL STANDARD MEMBERSHIPS		
1-YEAR STANDARD	2-YEAR STANDARD	PARENT MEMBERSHIP
$ 140 annually	$ 210 biennially	$ 85 annually

INDIVIDUAL PREMIUM MEMBERSHIPS		
1-YEAR STANDARD	2-YEAR STANDARD	PARENT MEMBERSHIP
$ 440 annually	$ 648 biennially	$ 274 anuually

GROUP MEMBERSHIP

Build District-Level Capacity

Support ALL educators with the training, tools and resources they need to successfully implement new and emerging technologies into existing programs, while simultaneously meeting education requirements.

NUMBER OF USERS	STANDARD MEMBERSHIPS	NUMBER OF USERS	PREMIUM MEMBERSHIPS
5-USER GROUP	$ 630 annually	5-USER GROUP	$ 2,100 annually
10-USER GROUP	$ 1190 annually	10-USER GROUP	$ 4,200 annually
25-USER GROUP	$ 2,800 annually	25-USER GROUP	$ 10,525 annually
35-USER GROUP	$ 3,850 annually	35-USER GROUP	$ 14,735 annually
50-USER GROUP	$ 5,250 annually	50-USER GROUP	$ 21,050 annually

SUPPLEMENTAL COLLEGE CURRICULUM – ELECTRONIC TEXTBOOK

Solutions, as an electronic textbook, is a very effective and cost efficient state-of-the-art training tool for undergraduate and graduate university students in the disciplines of special education and rehabilitation.

1-YEAR, STANDARD STUDENT MEMBERSHIP	1-YEAR, PREMIUM STUDENT MEMBERSHIP
$ 85 annually	$ 274 annually