

Communication **Matters**



NOVEMBER 2020 VOLUME 34 NUMBER 3

THE JOURNAL OF COMMUNICATION MATTERS / ISAAC (UK)

**Eye-Gaze Access, Literacy Instruction, Aphasia, Device Data Protection, BBC
micro:bit, Spinal Cord Injury, Multi-Sensory Impairment, Insights from AAC Users,
Tele-AAC, In Praise of Imprecision**





Communication with a little help from Google

Google Assistant is now available in Snap Core First. Discover the benefits of this integration and get a little help from Google wherever you go. No smart speaker required*.

- Check the weather forecast
- Discover nearby restaurants with wheelchair access
- Find the closest next bus home
- Play music and turn up the volume
- Get answers from Google
- Turn on the lights or control the temperature

There are so many ways to use Google Assistant - how will you use it?

Want to know more?

For more information, please visit tobiidynavox.co.uk or contact us at 0114 481 0011 or sales.uk@tobiidynavox.com.

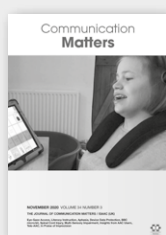
*Some functions, such as playing music, will need a compatible speaker.



COMMUNICATION MATTERS JOURNAL

VOLUME 34 NUMBER 3

November 2020



This is Emily who used her Accent 1400 to join in with virtual assemblies every week during lockdown. She certainly made her presence known! #MyAACinLockdown

COMMUNICATION MATTERS JOURNAL
ISSN 0969-9554

Communication Matters / ISAAC (UK)
3rd Floor, University House,
University of Leeds,
Leeds, LS2 9JT
Tel: 0113 343 1533
Email: admin@communicationmatters.org.uk
Website: www.communicationmatters.org.uk
Registered Charity No. 327500
Company Registered in England & Wales No. 01965474

Editor
Emily Campbell and Karen Merchant
Email: admin@communicationmatters.org.uk

Design & Production
Karin Wall & Emily Campbell

Advertising and Overseas Subscriptions
Tel: 0113 343 1533
Email: admin@communicationmatters.org.uk

Copy submission
Preferred text format: Microsoft Word
Preferred graphics/photo formats: JPEG, TIFF
Copy deadline: contact editor
The Communication Matters Journal is the official publication of Communication Matters / ISAAC (UK), and is an ISAAC affiliated publication.

The journal provides a forum for discussion, and views expressed in any section of this publication are the views of the writer(s) exclusively; publication in this journal does not constitute endorsement by Communication Matters / ISAAC (UK) or ISAAC of those views expressed. This is no way affected by the right of the Editors to edit all copy published. Publication of advertisements in this journal is not an endorsement of the advertiser nor of the products and services advertised. Communication Matters reserves the right to reject or cancel without notice any advertisement. Copyright for all published material is held by Communication Matters / ISAAC (UK) unless otherwise stated.

Contents

-
- 2 Chair's Report**
Helen Whittle
 - 3 Communication Matters AAC User Focus Group**
Andrea Sharples
 - 4 An 'It Takes a Village' Journey: Multiagency Working, Building Foundations for Successful Provision of Voice Output Communication with Eye-Gaze Access**
Andrea Bell, Friedl Jansen van Vuuren
 - 7 Comprehensive Literacy Instruction for Emergent Learners: Translating Theory into Practice**
Karen Erickson, Maureen Donnelly
 - 10 Aphasia and AAC - Encouraging Social Engagement Following Aphasia**
Emily Gabrielle
 - 11 Who Owns What I have Said When I Die?**
Hannah Griffiths, Helen Baines
 - 13 Using the BBC micro:bit as AAC – Three Solutions**
Matthew Oppenheim
 - 16 Applying Assistive Technology in Computing, and its Association with Quality of Life for People with Spinal Cord Injury: A Systematic Review**
Valéria Baldassin
 - 19 A Creative Approach to Total Communication for One Young Man with Multi-Sensory Impairment (MSI)**
Olly Robinson, Beccy Timbers
 - 22 Powerful Insights from AAC Users that Challenge How we Practice AAC**
Amanda Hartmann, Erin Sheldon, Willemijn Wetzels
 - 25 Tele-AAC: A Summary of the Literature on Parent, Professional and AAC Users' Perspectives**
Kate Duggan
 - 27 In Praise of Imprecision**
Dr. George Turner

Chair's Report

HELEN WHITTLE

Welcome to the November issue of the Communication Matters Journal.

As I am writing this, we are halfway through The CM Sessions. I know many of you have been enjoying this range of academic talks and social events, and the opportunity to hear from our commercial members, with a "flavour of" the International Conference usually held at the University of Leeds in September each year. We have been delighted with the feedback from delegates so far and we are looking forward to the finale, which includes a "Sign Out Loud" concert in aid of Communication Matters – a big thank you to "Sign Out Loud" for this amazing fundraising opportunity. We would like to thank all of the contributors who have given their time for free, and the "Meet in Leeds" team who have helped to ensure the smooth running of all the virtual events that have been part of The CM Sessions. Thank you to everyone who bought a ticket; we hope you enjoyed the sessions and I would encourage you to fill out the feedback form to help us with the planning of future events, if you haven't done so already.

Following my letter to all members and friends in July 2020, we were delighted to receive some very generous donations from our members for which we are very grateful. A number of members have set themselves some challenges to raise money for Communication Matters, whilst raising awareness of the value of AAC. A special thanks to Jamie Preece (and his excellent support team) and Tomás and Sinéad, and to everyone who sponsored them. You can read more about what they did at: www.justgiving.com/fundraising/jamies500mileswithoutavoice and www.justgiving.com/fundraising/Barker-CM-Challenge.

The CM 3.4 Challenge fundraiser to celebrate what should have been our 34th Annual Communication Matters Conference will now take place in March 2021. Please start thinking of challenges that have a 3 and a 4 in them to help support this campaign. This could be running 34 miles, doing 3 or 4 star jumps each day during March or baking 34 shortbread biscuits to share with neighbours. We would love to hear about your challenges and see your photos. Find out more about this challenge at: <https://communicationmatters.org.uk/about-us/donate-fundraise/cm-fundraising-pack/>.

The AAC User focus group is now established, and monthly meetings are taking place remotely to discuss the running of CM and its activities (read more on page 3). So, if you are an AAC user and feel you would like to take part then please contact Laith Ritchie on laith@attherapy.co.uk and you will be sent details about how to join in.

The Communication Matters Mentoring Project is still ongoing via distance learning, and we can offer a

wide range of fully-funded learning and development opportunities for AAC users. We have created a new flowchart that we hope clarifies the various options and how we can work with AAC users aged 14+ to adult, either as individual learners, or through a local school, college or Speech and Language Therapy service; you can find this at: <https://communicationmatters.org.uk/what-we-do/projects/mentoring-project/>. Please feel free to call or email Verity Elliott (project lead), as we can tailor our offer to meet individual and local requirements. Email: verity@creativityinpractice.co.uk.

The Board of Trustees is continuing to meet remotely. As we are still waiting to hear from many of the grant-giving trusts we applied to during lockdown, the Trustees have made the decision to once again make this journal available on a digital platform. We have had some very positive feedback from members about this move, which we are delighted to hear. Whilst this more environmentally friendly option is one we have considered for some time, all of these money-saving measures are helping to ensure we keep the costs of running the organisation to a minimum.

The Communication Matters Annual Meeting of Associate Members is normally held on the Sunday of our Annual Conference each September at the University of Leeds. However, due to the COVID-19 pandemic, as you know we had to cancel this event, and therefore the Board also made the decision to cancel the Annual Meeting of Associate Members. Furthermore, due to the pandemic, all current Trustees have agreed to stay on the Board for an additional year for continuity during this uncertain period. I am so grateful that they have all felt able to do

STOP PRESS

Just as we were about to finish the journal, we heard from the National Lottery Community Fund that we have been successful with our application for 6 months' running costs. This is fantastic news, and we are very grateful to the Government's Coronavirus Community Support Fund for this much-needed core funding. We are not out of the woods yet, but this will help a great deal.



In partnership with
**THE NATIONAL LOTTERY
COMMUNITY FUND**

this to ensure the smooth running of Communication Matters at this time.

We continue to be on the steering group for the Communication Access UK initiative. Whilst during lockdown there have had to be some changes to this work, we are pleased to be involved with the virtual launch of the symbol and online training for businesses that will take place on the 12th November 2020. Search social media for #CommunicationAccess to follow the launch.

We were thrilled that our Aviva Community Fund project hit its target of £2500 and then surpassed this to raise £2840 before its closing date on 7th October. A huge thank you to everyone who donated and thank you for your kind messages of support!

Finally, I and the Board of Trustees would like to thank all of you for your support during the past few months; with your backing, we can continue to support our members into 2021.

Are you an AAC user or a family member of someone who uses AAC with a story to share? Are you a professional working with children or adults who use AAC and would like to write about your experiences or research?

We are looking for your help! If you are interested in writing an article for our journal, please get in touch by emailing admin@communicationmatters.org.uk with your idea.

If you need some inspiration, you can find back copies of our journals on our website at <https://communicationmatters.org.uk/research/journals/>.

We look forward to hearing from you!

Communication Matters AAC User Focus Group

ANDREA SHARPLES, CM TRUSTEE

The Communication Matters (CM) AAC User Focus Group has been meeting regularly to provide CM with feedback on current CM activities.

October has been a busy month, not only as AAC Awareness month, but also the month of The CM Sessions. The group felt that it was particularly important to bring the feel of the conference that usually takes place in September at the University of Leeds to these sessions. High on the list of priorities for the group was how to bring the social side of the conference to the CM sessions.

The group discussed many ideas for social activities that could work for a remote conference. It was decided that each week in October, to match the CM Sessions, a different social activity would take place. A quiz, Bingo and DJ were all organised by the focus group. These sessions were well attended, a really enjoyable part of the

CM Sessions, and have really brought the fun and social opportunities that the CM conference does so well.

Some members of the group also recorded presentations for the formal, presentation element of the CM Sessions.

The group has been so busy, we decided to postpone the Talkathon until 2021. We will be in touch in the New Year with details on how to get involved.

The group will continue to meet on Zoom to make sure AAC users are at the heart of CM. Future dates will be advertised on the CM Friday Announcements, so if you are an AAC user and would like to give CM your opinions, please join us if you can!

If you are interested in joining future meetings, please email Andrea Sharples (CM Trustee) andrea@attherapy.co.uk, or Laith Ritchie (AT Mentor) on laith@attherapy.co.uk.

An 'It Takes a Village' Journey: Multiagency Working, Building Foundations for Successful Provision of Voice Output Communication with Eye-Gaze Access

ANDREA BELL

Paediatric Occupational Therapist, Kent and Medway Communication and Assistive Technology Service (KM CAT)

FRIEDL JANSEN VAN VUUREN

Speech and Language Therapist, Kent and Medway Communication and Assistive Technology Service (KM CAT)

Email: andrea.bell1@nhs.net

As a service, our ultimate aim is to provide technology to enable service users to communicate and access/demonstrate learning. Since eye-gaze technology for communication has become more widely available, the KM CAT Service has considered this as an option in multidisciplinary assessments with service users who have complex physical access needs. We would like to share with you one example of a journey we took towards the ultimate destination: successful provision of a communication device with eye-gaze as the access method - all of the 'village' working together to build foundation skills and the objective 'satellite view' provided by heatmaps and audio recordings.

Where did we Start our Journey?

We attended a CM study day in London in 2013, where Katie Price (Great Ormond Street Hospital (GOSH)) presented on the research they were doing with children with Cerebral Palsy, using eye-pointing for communication. We then identified children on our caseload for whom we had already provided Voice Output Communication Aids (VOCAs) with eye-gaze access. Using the parameters identified by GOSH, we reflected on those and what had made them successful.

We presented our findings at CM Conference in 2015 by extending this list to include other factors, such as the absolute importance of positioning, consistent support, personality and temperament

and attention/memory (Vanvuuren et al 2015). We represented our thinking in what became known as the AAC Eye-Gaze Doughnut, as shown in Figure 1 below:

Returning from CM Conference in 2015, we noticed that more and more schools were purchasing eye-gaze technology, and we saw an opportunity to support this. Schools were mainly purchasing for leisure, but sometimes to develop as an access method for voice output communication. We invited a member of Senior Management and the Communication Lead from the special schools in our area for a day's training - Focus on Eye-Gaze Training (now one of our e-learning modules).

We have many schools and individuals in our area that have access to leisure activities, using eye-gaze as an access method - schools have supported this process through the purchase of equipment. We have been able to provide support to schools interested in developing the use of this access method for communication. Through this training, schools were then better informed as to the building blocks that lead to Children & Young People (CYP) successfully using eye-gaze as an access method to support communication. These building blocks have been well described by many in the field, including Stokes TS, Roden P (2017). When CYP were then referred into the KM CAT service, the CYP had completed the foundation work required before meeting specialised services' criteria

for provision. This then allowed our service to successfully support CYP through assessment and provision processes.

Back to the Village...

As part of this piece of work and our learning, we reflected on a particular young person whom we will call Z. At the time, Z was 13 years 9 months old, and had 4-limb Cerebral Palsy. She was educated in a special school - a school which had participated in our training, as described above. From attending the training, the staff supporting Z had realised that they needed to consider positioning, and so they connected the eye-gaze camera to a desktop computer on a height-adjustable table. Following the training, the staff also had a better understanding of the foundation skills they could develop, using the technology that they had access to, for example following our recommendations of which software/games to use to develop specific physical and visual access skills (Sargent, J. et al (2013) and AAC Eye-Gaze Doughnut). Alongside this, KM CAT made recommendations for school staff and family to further develop Z's use of symbols for communication, and to develop a range of language functions e.g. describing, commenting and answering questions. We also supported staff to teach symbols in real-life contexts instead of constantly 'testing', for example, 'show me blue' versus 'what colour are we painting the sky?'. Jointly working with the local community OT, we

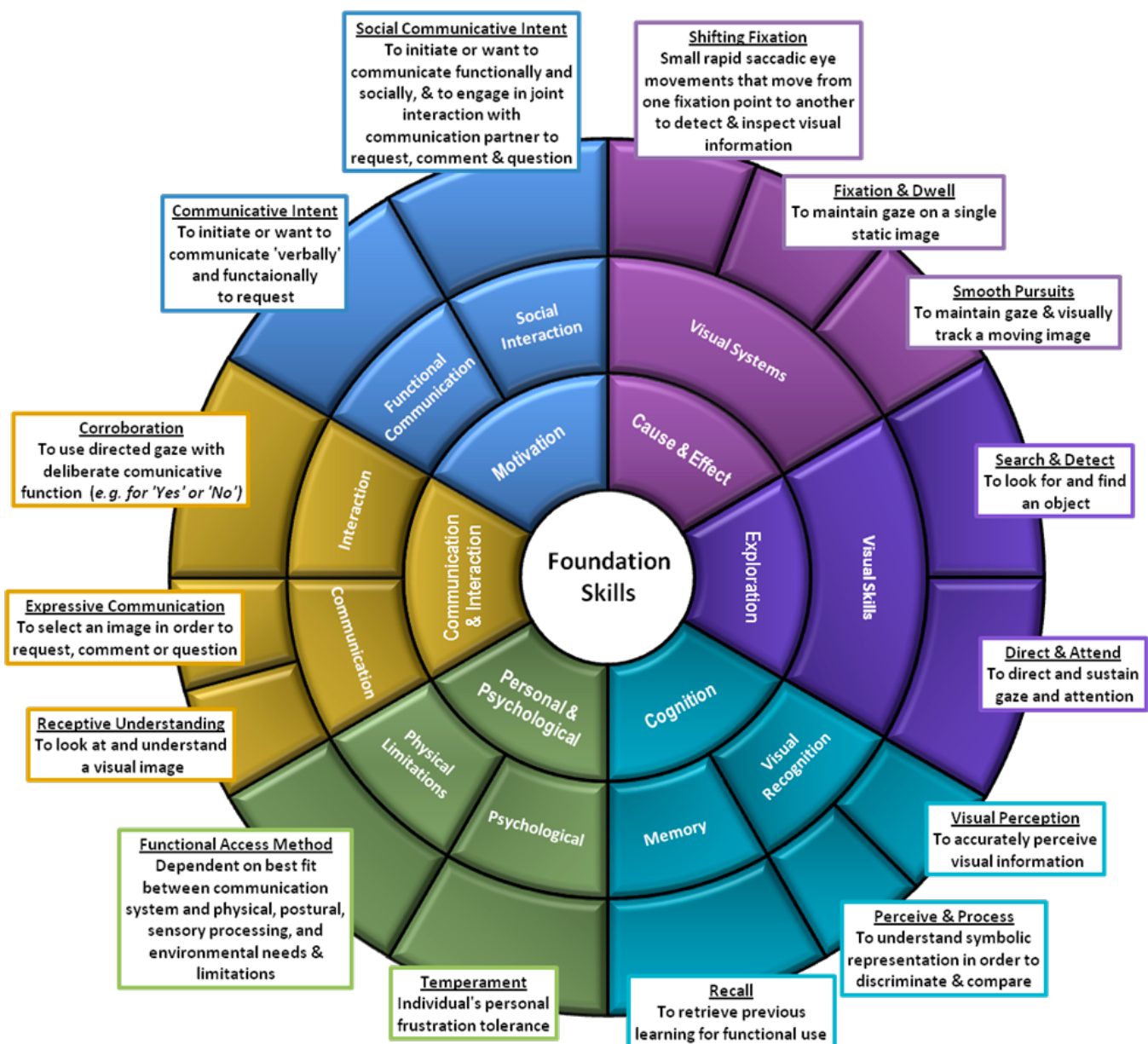


Figure 1 - The AAC Eye-Gaze Doughnut

were additionally supporting the exploration of using switches as a suitable access method, and Z trialled a Stealth i2i headrest with 2 switches to access online subscription games with low cognitive demands.

18 months on, Z's school approached us with the request to trial a VOCA using eye-gaze as the access method. By this stage it had been established that switches were not a viable access method to explore further, with Z finding it difficult to maintain the head position and develop the control required to access the switches effectively. As part of the work prior to any assessment loan, we completed a visual screening assessment. Through this we established that when comfortable and

well-positioned in her seating system, Z had the potential to access a 12" screen.

KM CAT put a loan in place - a device with square screen, which was most similar to what she had been using in class (classroom computer screen) with Symbol Talker B + core vocabulary.

With this loan, specific guidelines were given for those working with Z, to ensure the appropriate evidence was gathered to secure further appropriate provision. The objectives compiled for this loan period were as follows:

- To determine whether Z had the motivational intent to visually move from one focus point to another on the screen, in order to detect and inspect

visual information by looking at pictures that correlate to the auditory cue given by the communication partners.

- To determine whether Z had the motivational intent to navigate between pages/categories to start using (with help & prompt) symbols to comment and give her opinion on games and activities.
- To further develop Z's physical and visual abilities to most accurately access the whole of the screen.

We provided daily observation forms for school staff to complete, as shown in Figure 2 on the previous page (adapted from T. Moreno 2015/PrAACtical AAC).

GIVE ME FIVE Daily Observation Form		NV = Non-verbal (facial expression, movements, vocalization, eye-pointing, gesture) SP = spoken utterance VOCA = spoken utterance via VOCA S = Symbol M = Makaton signed <u>Underline if prompt needed</u> (verbal or physical e.g pointing to cell)		
Name: Joe Bloggs		Date: 16/10/16		
Time	1 Activity/Context	2 Partner	3 What happened	4 Message (What did they mean?)
09.35	Morning routine - talking about weekend	TA	<u>Helped navigate to Joe's news page.</u> Joe selected pre-programmed message.	I went to McDonalds with my brother and sister (VOCA)
11:30	Device in Cafeteria. Lunch room discussion	Tablemates and lunch monitor	Joe started to move towards door and vocalised.	I want to go outside (NV)
2:15	Art class circle time	Teacher/TA	Asked to critique another child's work. Joe provided with 6 symbols on an etran frame.	I like it. (S) Cool (S)
2.20	Playing parachute games in sports hall	TA	Class make parachute go over their heads and Joe laughs.	More (M)
3.00	Getting ready for home time	TA	Holding up water bottle and Joe asked whether it stays at school or goes home. Eye pointed towards bag to take home.	It goes home (NV)

Adapted from T. Moreno, 2015/PrAACtical AAC

Figure 2 – Give Me Five Daily Observation Form

The Satellite View

Along with the written information provided by school, heatmap evidence was gathered through the use of eye-tracking software recordings. These heatmaps included the recording of verbal prompts that were given to Z when encouraging her to use the eye-gaze device, as well as overall background noise levels. Because the heatmap only lights up when activated through eye-gaze (not when the adult is modelling with direct access or mouse input), this gave additional evidence as to how much modelling or prompting was required within a session.

With this information, it was then possible to objectively determine factors influencing Z's success with eye-gaze use, such as:

- whether she was accessing all areas of the screen
- her response time to verbal prompts or questions

- how her attention/concentration levels were influenced by external factors such as background noise.

We additionally had the evidence of how frequently the device was used and for how long, thereby indicating Z's tolerance and stamina. With the confirmation from the eye-tracking software recordings, we went back to the AAC Eye-Gaze Doughnut to evidence examples of foundation skills.

Following on from the evidence we had gathered through the assessment and loan period, we were then able to provide Z with her own communication device, through NHS England funding. Through this, Z is now reportedly communicating in a wide range of situations and settings, including giving her opinion when recently house-hunting with her parents.

References

KM CAT eye gaze e-learning part 1-3 <https://elearning.theeducationpeople.org/elearning/Course/Detail?CourseId=67>

(You have to create an account, but it is free. The training needs to be launched in Google Chrome. Please wait for it to fully download before starting)

PrAACtical AAC website <https://practicalaac.org/toolbox/>

Sargent, J., Clarke, M., Price, K., Griffiths, T. and Swettenham, J. (2013) Eye-pointing in children with severe cerebral palsy: What are we looking at? *International Journal of Language and Communication Disorders*, 48, pp. 477-485

Stokes, TS., Roden, P. (2017) Establishing the key components of an eye gaze assessment for a child with a severe neurodisability using nominal group technique. *Edorium Journal of Disability and Rehabilitation*, 3, pp. 62-68. doi:10.5348/D05-2017-32-OA-8

Van Vuuren, F., Bailey, D., Tumber, N and Miles, R. (2015) Eye Gaze Technology for Voice Output Communication: Some case studies. Presentation at National AAC Conference.

Comprehensive Literacy Instruction for Emergent Learners: Translating Theory into Practice

KAREN ERICKSON, PH.D

Director, Center for Literacy and Disability Studies, University of North Carolina - Chapel Hill

MAUREEN DONNELLY, M.ED

Curriculum Manager, Tobii Dynavox

Email: Maureen.Donnelly@tobiidynavox.com

Students who use AAC have struggled to achieve conventional literacy for decades. This fact is worrisome, since they require conventional reading and writing skills for independent function, vocational success, and even social relationships (Kamil, 2003). This paper introduces emergent literacy as it relates to individuals who use AAC; it clarifies the connection between language and literacy, and it introduces a framework for implementing daily early literacy instruction. Finally, it offers a description of one application that allows adults to provide the kind of daily, comprehensive, evidence-based instruction that leads to growth.

Research from the last three decades indicates that comprehensive instruction can produce significant gains for students with the most significant disabilities (Allor, Mathes, Roberts, Cheatham, & Champlin, 2010; Erickson et al., 2009). Nonetheless, many students who use AAC remain at the earliest learning levels. Among the many barriers that learners face, a lack of access to engaging, age-appropriate materials (Hatch & Erickson, 2019) and ongoing adherence to mastery models and readiness approaches (Browder, Wood, Thompson & Ribuffo, 2014) are particularly challenging. When students and the adults who work to teach them do not have access to appropriate materials, motivation and interest are difficult to achieve. When instruction adheres to mastery and readiness, students are forced to learn a set of pre-determined

skills in a predetermined order (Katims, 2000). This view fails to recognize the mutually reinforcing and transactional relationship between language and literacy development (Koppenhaver, Kalman & Yoder, 1991; Snowling, 2005), the fact that we cannot predict which language and literacy targets will be easiest for an individual student, and our need to address both literacy and language learning in an integrated, comprehensive way (Pressley & Allington, 2014). Perhaps

most importantly, this view ensures that many students who use AAC remain at the earliest stages of literacy learning and use.

In 2017, Erickson and Koppenhaver created a framework that defines the most effective, evidence-based literacy instructional routines for beginners. This framework (see Figure 1) helps adults make decisions regarding what is most important to address in literacy

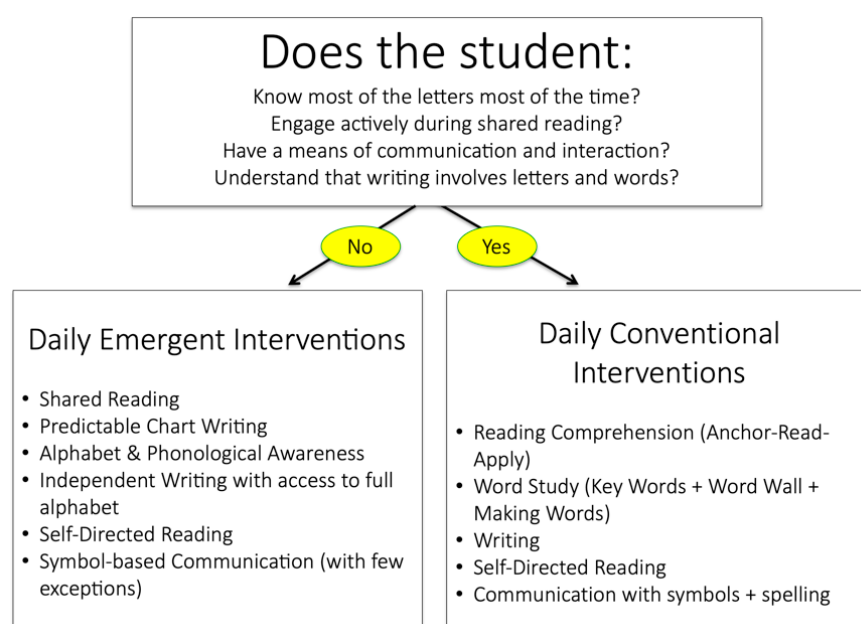


Figure 1. Comprehensive Emergent and Conventional Literacy Plans Based on Student Knowledge and Skills

instruction, based on four simple questions. It is easy to use, does not require vast training in literacy instruction, and nor does it demand that teachers or therapists have extensive knowledge of individual students.

See Figure 1 on previous page.

The four questions in the framework address student knowledge and skills in literacy. When the answer is “no” to any one of the four questions, we should continue to support emergent literacy learning using at least the five routines named in the framework. This will help students learn to actively engage with more knowledgeable others, while interacting using materials that support emergent literacy learning (Clay, 2005). Providing these experiences until all four questions are confidently answered “YES” will ensure student success with conventional literacy instruction.

Emergent Literacy Instructional Routines

Five daily instructional routines support learners at the emergent level. These include shared reading, independent book explorations, shared writing, independent writing, symbol-supported communication, and alphabetical and phonological learning. Below is a description of each.

Shared Reading: Shared reading is an interactive reading experience whereby adults (parents, teachers, SLTs, etc.) encourage meaningful page-by-page interaction with a text. Shared reading has many benefits, but its primary purpose is to engage student interest. This practice begins when an adult makes open-ended comments about a text, and then waits for students to respond. For example, an adult might say, “I see a butterfly” and then wait for the student to make a comment or interact in some other way. Open-ended comments enable students to connect their life experiences and background knowledge with the shared reading experience. When students don’t initiate or interact on their own, adults can solicit their participation by explicitly inviting their interaction. Regardless, it’s important to pause and provide the wait-time many students require to plan. It is also important for adults to attribute meaning to all student communication efforts and then expand or build on them. While adults may initially drive shared reading, the goal is to encourage the student to lead these interactions.

Independent Reading: Independent reading provides students with an opportunity to select and navigate books independently as a means toward increasing their understanding of books—what they are, how they work, and why we read them. What is true for learning to read is true for all learning curves: we all must have independent time accessing and exploring materials, and applying emerging skills and understanding. Accessible technologies (e-books, eye-gaze software, etc.) play a critical role in providing many students with truly independent time with books. During independent reading, students have opportunities to refine assumptions, challenge new understanding, and assimilate operational knowledge of what books are and how they work.

Predictable Chart Writing: Predictable chart writing, also known as shared writing, is a multi-step activity that offers a way for all students to discern both the forms and functions of print. Predictable chart writing is a group activity during which an adult introduces a simple sentence stem that is primarily composed of core vocabulary. The adult then ‘speaks’ this stem while also writing it on paper or a screen for the whole group to see. As she does so, she simultaneously solicits students to complete the sentence stem. This process continues until everyone has had at least one turn to share an idea. When the chart is complete, the adult directs students’ attention to elements of print (pointing out student names, capital letters, punctuation, etc.). Once the group has had the chance to revisit the chart multiple times for multiple, meaningful purposes, students are invited to demonstrate their concept of word by breaking up individual sentences (composed on strips) into words. Students can either cut the sentence strips themselves or direct the adults to cut them. Adults then provide informative feedback and help students use mistakes as opportunities for learning. Once sentence strips have been broken up into individual words, each student re-assembles the words into a sentence. In the next step, groups of students, each assigned an individual word, work together to build the sentence. Finally, adults compile the sentences in a student-generated book with each student’s idea represented on a page. The book is meant to be available so that all students can access it during shared or independent reading.

Alphabetical and Phonological Learning includes a range of repeated but varied activities that support students in developing knowledge of the alphabetic code. Specifically, students identify letters of the alphabet (in their names, books, environmental print, etc.) and relate them to the sounds they represent. Students also work to develop an understanding of the sounds in spoken language including a recognition of rhyme, syllables, and the individual sounds in words. Teachers support student learning both explicitly and implicitly, within the context of engaging student interest as well as a sense of agency in seeking out letters, matching them to their sounds, and beginning to understand their role in words and connected text. The goal of alphabetical and phonological awareness activities is to help students develop a conceptual understanding of how letters and sounds form words. Examples of these activities include alphabet boards, tongue twisters, name games, pointing out environmental print, and letter searches. Once again, assistive technologies play a key role in providing access to these instructional routines. It’s critical that alphabetical and phonological learning is supported across all literacy and language domains so that students have opportunities to generalize new knowledge across contexts. It’s also important that exploration and discovery are at the heart of these instructional activities, since this is consistent with evidence-based early learning instruction.

Symbol-Supported Communication: Symbol-supported communication is an integral part of all the above instructional routines and experiences for students who require AAC. There are several critical reasons for this, including, but not limited to, the need to respond, to demonstrate thoughts, feelings, and ideas, and the need for explicit opportunities to connect print to language. Especially for students at the emergent level, symbols provide even the earliest beginners with access to the meaning of a broader range of words than print alone can. Core vocabulary provides a bank of words that are frequent, flexible, and functional across contexts and partners. As such, they are often an easy and contextual starting place for adults to model or show how one might find, use, and ultimately read these critically important words.

A Comprehensive Solution: Reading Avenue

A comprehensive approach that introduces these five routines daily, whilst also balancing the continuous interplay of instruction, exploration, practice, and assessment, is the de facto approach that drives literacy and language outcomes for AAC users who are emergent readers and writers. While the Emergent-Conventional framework takes us far in delineating what comprehensive instruction might look like, challenges remain. Developing rigorous, accessible curricula requires research, technological know-how, and implementation savvy - which is to say, time. While there are many comprehensive programs on the market, few are fully accessible, and even fewer target the interests and needs of students beyond early childhood. The clinical team at TobiiDynavox endeavored to address all of this by creating Reading Avenue, an accessible, comprehensive literacy program delivered through Boardmaker Online. This program provides up to three years of instruction and assessment, includes a library of 120 primer and pre-primer books that introduce the science and social studies concepts and vocabulary that build background knowledge, and supports comprehension throughout the school day. Scripted daily lesson plans ensure that parents, teachers, and clinicians incorporate all five routines, with a heavy emphasis on both exploration and independent practice. With three

avenues of differentiation and built-in, dynamic, symbol-based communication supports, Reading Avenue is supportive of AAC users who span the range of beginning skills across a wide range of grade levels. Finally, Reading Avenue provides automatic opportunities to collect data, so that adults can easily tailor instruction to ensure literacy growth for all students who use AAC.

References

- Allor, J. H., Mathes, P. G., Roberts, J. K., Cheatham, J. P., & Champlin, T. M. (2010). Comprehensive reading instruction for students with intellectual disabilities: Findings from the first three years of a longitudinal study. *Psychology in the Schools*, 47(5), 445-466.
- Browder, D. M., Wood, L., Thompson, J., & Ribuffo, C. (2014). Evidence-based practices for students with severe disabilities (Document No. IC-3). Retrieved from University of Florida, Collaboration for Effective Educator, Development, Accountability, and Reform Center
- Clay, M. M. (2005). *Literacy Lessons Designed for Individuals: Why? When? And How?* Heinemann Educational Books.
- Erickson, K., Hanser, G., Hatch, P., & Sanders, E. (2009). Research-based practices for creating access to the general curriculum in reading and literacy for students with significant intellectual disabilities. *Monograph prepared for the Council for Chief State School Officers (CCSSO) Assessing Special Education Students (ASES) State Collaborative on Assessment and Student Standards (SCASS)*.
- Erickson, K. A., & Koppenhaver, D. A. (1995). Developing a literacy program for children with severe disabilities. *The Reading Teacher*, 48(8), 676-684.
- Katims, D. S. (2000). *The Quest for Literacy: Curriculum and Instructional Procedures for Teaching Reading and Writing to Students with Mental Retardation and Developmental Disabilities*. MRDD Prism Series. The Council for Exceptional Children, 1920 Association Dr., Reston, VA 20191-1589.
- Hatch, P., & Erickson, K. (2018). Teacher experience, text access, and adolescents with significant disabilities. *Assistive Technology Outcomes and Benefits*, 12, 56-72. <http://www.atia.org/atob>
- Kamil, M. L. (2003). *Adolescents and literacy: Reading for the 21st century*. Washington, DC: Alliance for Excellent Education.
- Katims, D. S. (2000). Literacy instruction for people with mental retardation: Historical highlights and contemporary analysis. *Education and training in mental retardation and Developmental Disabilities*, 3-15.
- Koppenhaver, D. A., Coleman, P. P., Kalman, S. L., & Yoder, D. E. (1991). The implications of emergent literacy research for children with developmental disabilities. *American Journal of Speech-Language Pathology*, 1(1), 38-44.
- Pressley, M., & Allington, R. L. (2014). *Reading instruction that works: The case for balanced teaching*.
- Snowling, M. J. (2005). Literacy outcomes for children with oral language impairments: Developmental interactions between language skills and learning to read. In H. W. Catts & A. G. Kamhi (Eds.), *The connections between language and reading disabilities* (pp. 55-75). Mahwah, NJ: Erlbaum. New York, NY: Guilford Press.

Sign up to Communication Matters E-News

Receive **Communication Matters News** by email and join our **AAC Forum** to share your views and experiences on important AAC topics or read about other people's by emailing admin@communicationmatters.org.uk at any time.

Have you got a birthday coming up and would like to raise donations for CM? It's easy to set up!

If you have Facebook go to <https://www.facebook.com/fundraisers/> or you can donate via our JustGiving or Virgin Money Giving pages.

Donate your birthday to #SaveCM

Aphasia and AAC - Encouraging Social Engagement Following Aphasia

EMILY GABRIELLE

AAC Education & Resources Consultant, Liberator Ltd

Email: emily@liberator.co.uk

What is Aphasia?

People with aphasia often have trouble with the 4 main ways people understand and use language.

These are: reading, listening, speaking and typing (or writing) (NHS UK). There are numerous causes of aphasia, including head injury, brain tumour, neurosurgery, neurological diseases, drug misuse and dementia, however stroke is the most common cause (RCSLT).

The effects of aphasia can be wide-reaching and can impact on an individual's abilities to complete everyday activities, such as telephone calls, watching TV or listening to the radio. They can impact on an individual's roles and positions within groups as they perhaps struggle with fulfilling social roles, and as their role within their family is perceived to have changed. Participation in wider society can also be affected, including the ability to access both employment and previously-enjoyed recreational activities. Finally, psychosocial impacts can include grief and a sense of disconnection (RCSLT).

Stroke

Stroke is the most common cause of aphasia. Every year there are more than 100,000 strokes in the UK, which is a stroke approximately every 5 minutes. Around 1 in 6 men and 1 in 5 women will have a stroke in their life. There are over 1.2 million stroke survivors in the UK. Around a third of stroke survivors experience some level of aphasia and between 30-40% of those affected will

remain severely affected in the long term (State of the Nation: Stroke statistics).

The emotional impact of stroke can be significant too. In a 2015 Stroke Association survey of over 1000 stroke survivors, 1 in 5 reported the emotional impact of stroke was hard to deal with, about a quarter (26%) reported negative changes in their family relationships since the stroke, less than half (42%) reported a negative change in their relationship with their spouse/partner and a third of stroke survivors experienced depression after having a stroke (State of the Nation: Stroke statistics).

Finally, the financial impact of stroke is often not considered but is significant. Around 1 in 6 stroke survivors experience a loss of income after stroke and one report estimates the average cost of stroke to a family in the UK is £22,377, with people of working age who have had a stroke being two to three times more likely to be unemployed 8 years after their stroke (State of the Nation: Stroke statistics).

The impact of communication impairment following aphasia can affect emotional, social and financial aspects of an individual's life. The combined effects of these can then lead to isolation which can have negative impacts on an individual's health and well-being.

With this in mind, it is important to ensure that an individual has the support needed to re-engage in life following a diagnosis of aphasia.

The Life Participant Approach to Aphasia

The Life Participant Approach to Aphasia (LPAA), developed by Chapey et al., (2000), focuses on working with what skills an aphasic client has and developing the skills of the communication partner to encourage re-engagement in life. It encourages those living with aphasia to live their life to the best of their abilities.

Communication Journey: Aphasia

Originally created by a Canadian group of Speech-Language Pathologists working in a rehabilitation hospital, "Communication Journey: Aphasia" is an AAC template with a collection of useful, customisable, aphasia-friendly pages. It is available on multiple devices, including dedicated 'chat' devices and iPads, through the TouchChat app.

It is easily adaptable and can allow photos to be used in place of icons – even specific photos which are meaningful for an individual.

The vocabulary layout and its intended implementation were inspired by the values expressed in The Life Participant Approach to Aphasia (LPAA).

The developers looked at the AAC Aphasia categories by Garrett and Lasker (2005), and felt that clients who use this vocabulary file will most likely be Contextual Choice Communicators, Transitional Communicators, or Stored Message Communicators. These clients tend to have a more severe presentation of aphasia, often with limited abilities to communicate independently.

The pages in “Communication Journey: Aphasia” were created to facilitate participation in daily activities and to promote social links. Because of this, some pages benefit from the involvement of both the person with aphasia and the communication partner, who provides supported communication techniques. “Communication Journey: Aphasia” utilises various support tools, including physical supports such as symbols, pictures, maps, schedules, clocks, written supports and visual scene displays.

How do we use Communication Journey: Aphasia?

The vocabulary template should not be viewed as a ‘grab and go’ vocabulary. To be successfully implemented, firstly there needs to be a period of assessment of the client’s needs, interests and abilities, including consideration of what the important categories are for the client, what grid size they can successfully use

and what operational skills are present (such as navigation, clearing messages etc). Once appropriate pages have been chosen, the vocabulary needs to be customised to reflect the individual’s personal circumstances, preferences and interests. Finally, a period of support following introduction of the vocabulary is essential for both the individual and communication partner, in order to provide support to develop operational skills, become familiar with customisation and acquire general skills needed to use the vocabulary successfully.

Things to Consider

Communication Journey: Aphasia offers customisable vocabulary which can suit a range of client needs. It is driven by values focused on enhancing engagement in life and participation, irrespective of impairment level. It should be used alongside other established communication strategies. Remember the importance

of supporting skills development in the early days, and ensure you set small goals for social participation to encourage re-engagement.

References

- Chapey, R., Duchan, J. F., Elman, R. J., Garcia, L. J., Kagan, A., Lyon, J. G., & Simmons Mackie, N. (2000). Life Participation Approach to Aphasia: A Statement of Values for the Future. *The ASHA Leader*, 5(3), 4-6. doi: 10.1044/leader.FTR.05032000.4.
- Garrett, K. & Lasker, J. (2005). AAC Aphasia Categories of Communicators Checklist.
- RCSLT (Royal College of Speech and Language Therapists) (2009) RCSLT Resource Manual For Commissioning And Planning Services For SLCN - Aphasia
- Stroke Association (2018) State of the Nation: Stroke statistics – February 2018 https://www.stroke.org.uk/sites/default/files/state_of_the_nation_2018.pdf
- www.nhs.uk/conditions/aphasia/
- www.liberator.co.uk

Who Owns What I have Said When I Die?

HANNAH GRIFFITHS

Clinical Scientist, Service Manager, Chailey Communication Aid Service, Chailey Clinical Services, Sussex Community NHS Foundation Trust

HELEN BAINES

Speech & Language Therapist, Chailey Communication Aid Service, Chailey Clinical Services, Sussex Community NHS Foundation Trust

Email: hannah.griffiths1@nhs.net

Background

This presentation was given at the Communication Matters Conference, as a case at Chailey Communication Aid Service (CCAS) had highlighted some areas of Information Governance that hadn’t previously been considered by our team, and it was felt a wider discussion was needed regarding the storing of messages on devices.

CCAS is one of the NHSE-funded Specialist Communication Aid Services, and we provided a gentleman with a deteriorating condition a communication aid under the

NHSE criteria. This gentleman used his device (a tablet with Grid 3 & Fast Talker) regularly to communicate with those around him. It also became apparent that he had used his device to organise his affairs, using the message function within this software. When he passed away, his family asked if they could keep some messages as they were important with respect to sorting out what was to happen with some of his assets.

Where Did we Stand?

As many will be aware, Fast Talker has a function through which all words and

phrases that are spoken can be saved, as part of a chat history. This is great for increasing the speed of communication for some, particularly if access is more difficult. However, it also means that all conversations are ‘recorded’.

Naturally, CCAS wanted to help the family, however our Information Governance (IG) training kicked in and we consulted our Trust’s IG team for guidance.

What Does the Law Say?

Our IG team hadn’t been asked this question before and initially looked to the law. Health records can be requested in

specific situations, providing the correct paperwork has been completed and any relevant identification is provided.

- You can request your own records:
 - A person, parent of a child or someone with appropriate lasting power of attorney can ask for these in writing
- Requests for the records of a deceased person:
 - Ordinarily requested by the executor of the Will or someone who has a claim against the estate
- Other requests:
 - Solicitor
 - Police
 - Court Order/Coroner

The family's request didn't fit into this guidance, as the saved messages were not considered to be part of a health record. Therefore other considerations needed to be made. CCAS had not been given any authorisation by our client to provide this information to his family. Therefore, by providing these messages we could breach the duty of confidence.

As the messages are not medical records, if CCAS were to provide them to the family, it would essentially be done as a Freedom of Information Request. This would be equivalent to making them public documents, which would not be deemed appropriate under GDPR.

Technically, as no one in the CCAS team observed the messages being written, there was no guarantee that the gentleman wrote the messages himself, or if he did, that he wrote them of his own free will and was not coerced into writing them.

For the above reasons, it was decided that the family would need to apply for a court order if they wanted copies of

the messages. It was also agreed that Information Governance (IG) would keep a transcript of the messages for six months in order for the family to complete the process. If CCAS/IG had not heard from the family by the end of this period, the transcripts would be securely disposed of.

Going Forward

This case study highlights the fact that a conversation needs to be had with AAC users, both with regards to what is saved on their devices, and what needs to be put in place if messages are to be used for legal matters; or if messages, notes or other written information is to be passed onto others following their death.

The following options were considered at the time of writing the presentation:

- Gain prior consent for what can be passed on after death. This brings up a number of potential difficulties:
 - Approaching this sensitive subject with those with a progressive condition at the point of providing the device may be difficult, and the AAC user may not want to think about this at the time.
 - How do we know that we have passed all messages onto the correct person? It is not practical for services to be expected to give certain messages to certain people. The possibility of giving messages to the wrong person in error is high, and the time needed to do this is too great for already-busy services.
 - However, if consent for certain types of text to be passed on could be workable (for example, in CCAS we have some AAC users using the 'notes' section in their vocabulary package to write their memoirs) it would be possible to have a consent form saying that we can pass on anything in the 'notes'

section to next of kin or other named person.

- How do we know the AAC user was the author of the message, or wasn't coerced into writing it?
- Explain to AAC users the following issues:
 - If they are using high-tech AAC systems to have conversations relating to important decisions, such as who will inherit assets, the conversations need to be witnessed. They should take legal advice on this, and the witness needs to be skilled in determining whether messages are written under coercion.
 - The pros and cons of using chat history function in their vocabulary package. Namely that, whilst it can speed up conversations, they are being 'recorded' and that if they want a truly private conversation then they need to switch this function off.
- Ideally for equity across the UK, perhaps it is more feasible for NHSE-funded AAC services to work together to gain consensus on how to deal with these requests, so that:
 - All Caldicott Guardians are happy with the proposals
 - AAC users can leave messages/information to whomever they want
 - It is practical

At the time of writing this article, the first meeting of NHSE-funded specialist AAC and Environmental Control (EC) Services and suppliers of AAC and EC devices has been held. One of the outcomes of the meeting was for a guidance document to be produced. A means of sharing this document to as wide an audience as possible is being looked into.



CM Merchandise

Wristbands • Car Stickers •
Fridge Magnets • ALL £1 EACH
CM Enamel Badges • £2 EACH

100% of all sales to Communication Matters

*Please contact us on
admin@communicationmatters.org.uk
to place an order*

Registered charity no. 327500
Company registered in England & Wales no. 01965474

Using the BBC micro:bit as AAC – Three Solutions

MATTHEW OPPENHEIM

Researcher, InfoLab21, Lancaster University

Email: matt.oppenheim@gmail.com

Introduction

This paper builds on the projects presented at the Communication Matters Conferences for 2018 and 2019. The BBC micro:bit [BBC] is a small educational device, provided to schools for students to learn how to program. Figure 1 shows a BBC micro:bit on a home-made wrist holder. The features of this device make it a suitable platform for creating real-world AAC access solutions. Three devices have been created and trialled using the BBC micro:bit so far. One is in daily use, a second is trialled and ready for deployment and a third is being assessed. This paper explores what makes the BBC micro:bit suitable for use as an AAC aid and briefly covers the freely-available tools there are for developing with it. The three solutions presented can be easily and cheaply replicated. Instructions and the software needed to build these solutions can be found on the project website [GitHub website].

Solutions

Give Me a Minute

Details of this project are already published in Communication Matters [Oppenheim, 2019]. A BBC micro:bit is used to visually indicate when communication software is being used. When text is added to or removed from the communication software interface, a rotating pattern displays on the BBC micro:bit. This indicates that the AAC user is actively using the communication software, which enables a more natural interaction and encourages good

communication practice, giving adequate time for composition and respecting personal space.

One system is currently in daily use. A second device was tested with another AAC user, however this candidate is not in the right 'head space' to use an additional AAC device. There are plans to trial this system with other AAC users. The idea is straightforward to implement. All required software and instructions on how to install it can be downloaded from the project website.

This project uses a number of the features of the BBC micro:bit. The LED display is obviously used. The board's small size makes it light and easy to mount on the back of a communication device. The ease of programming the device makes it practical for the system to be set up by following the instructions posted on the project website and downloading the required code from the project GitHub site [GitHub]. The implementation has been successfully replicated by someone not connected with the project using the online instructions and code repository.



Figure 1: BBC micro:bit and AAA battery pack on a home-made wrist holder.

Feedback is welcome from anybody who would like to implement this system. The total cost to replicate this system is around £12 – the price of a BBC micro:bit.

Hand Shake

The system detects when there is arm motion above an adjustable threshold of acceleration. This enables a shake motion to act as a switch. This was designed to enable a student at Beaumont, who could make intentional hand movements but not reliably to the same place, to have switch access to his AAC.

One BBC micro:bit is worn on the wrist. The BBC micro:bit has an accelerometer, which is used to detect acceleration above an adjustable threshold. This threshold can be remotely adjusted. When a hand or arm movement above the threshold is detected, a signal is sent to an AAC device using the BBC micro:bit's radio. The project was tested at Beaumont College. The student who the system was designed for was able to improve his co-ordination, so that he no longer needed this system. The system is ready to deploy when the next suitable candidate is identified.

The features of the BBC micro:bit which make it suitable for this project include the onboard accelerometer and the excellent board-to-board radio. BBC micro:bits can communicate without having to be paired, as is necessary with e.g. Bluetooth.

Hand Wave

A student at Beaumont has limited hand movement. This project uses a flex sensor attached to a BBC micro:bit to detect the student's hand motion. Figure 2 shows how the flex sensor can be mounted using a wrist support to detect a sideways motion of the hand. A shorter flex sensor could be used to detect a finger being bent by placing the flex sensor under a suitable finger bandage, such as Tubigrip. The flex sensors are rated to one million bends. One idea suggested by a Clinical Engineer is to use the flex sensor, suitably protected, as a switch for a client who can only move his tongue.

The features of the BBC micro:bit that were leveraged for this project include: the analog input to the board, that it is battery powered (so there is no danger of shock through the flex sensor), and the board-to-board radio.

For this project, some extra components and some simple soldering and wiring is necessary. The total cost for the components of the system is around £70.



Figure 2: Flex sensor held in position to detect a sideways hand motion.

What Makes the BBC micro:bit Suitable for Use as AAC Technology?

The BBC micro:bit was developed to help get 11-12 year olds from 'nothing to something' with programming. This resulted in a device that is designed to be safe and easy to work with, compared with alternative platforms.

The BBC micro:bit has a number of built-in features that are useful for AAC projects. These include a reliable and easy-to-use board-to-board radio, battery power as well as the ability to be powered through a USB port, analog inputs and LEDs. Other systems that were considered, such as the Arduino, do not have all of these features on a single board. This leads to a system having to be created from several boards, which is both more expensive and creates an obstacle to the solutions being replicated elsewhere. Keeping everything on a single board enables the ideas to be replicated on-site elsewhere, rather than a device having to be built or manufactured.

The development environments needed to program BBC micro:bits are available for free online. There is an active online community with a repository of solutions for any of the common issues which may be encountered using and programming the board.

Safety

The BBC micro:bit is designed for use with 11-12 year olds, with safety as part of the design criteria. The device is battery powered, has no exposed pins and the board corners are rounded. Lithium batteries are not used.

Reliability

Once the board is programmed, the program will automatically start when the board is powered. The program is stored on a chip on the board; there are no memory cards to lose. The BBC micro:bit is relatively simple when compared with e.g. camera-based technology such as the Microsoft Kinect. Keeping a design simple increases reliability.

Robust

There are no moving parts on the board. All the components are soldered down. The entire board weighs around 8g, excluding batteries, so it can be dropped with a low risk of damage.

Replicability

BBC micro:bits cost about £12 each and are readily available. Over 1.5 million have already been shipped. Instructions and the software needed for these projects can be downloaded from the project website. The software needed to load the projects' code is available for free online.

Development

A number of technologies were trialled, including the Microsoft Kinect and Leap Motion. These two technologies can be considered as vision-based technologies. Though initially promising, both were found to be unsuitable for the projects presented in this paper.

The Microsoft Kinect was successfully used to track head motion, to enable head gestures to control switchable software [Oppenheim, 2016]. However, the Microsoft Kinect would not reliably track the candidates' hand motions. One reason is that the communication devices that are mounted on the candidates' wheelchairs can obstruct the Microsoft Kinect from having a good enough view of the body to be able to consistently track hand and arm positions. The second reason is that the software does not appear to cope with the movement characteristics of our target user group.

The Leap Motion is a USB-powered device that tracks hand and finger positions. This is shown being tested in Figure 3.

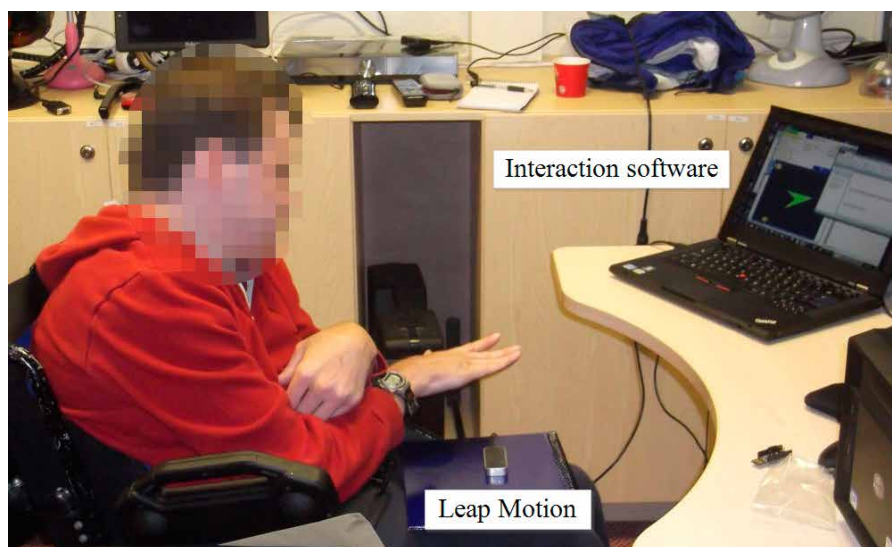


Figure 3: Testing the Leap Motion at Beaumont College.

The volume of space in which the Leap Motion responds to gesture was found to be too limited to be of practical use for our candidates.

Devices that are physically attached to the participants were trialled next. These were called 'contact technologies'. Several home-made devices were trialled successfully. When the BBC micro:bit became widely available, this was seen to have all of the necessary components to

implement the ideas with instead. Figure 4 shows two generations of home-made prototypes and the BBC micro:bit built for the Hand Shake project. The prototypes wire together several modules, including an accelerometer module to detect the hand motion, a radio module to enable the device to signal the communication device, a battery management module and a microcontroller module. As all of these components are included on a compact single board with the BBC micro:bit,

porting the idea to this hardware means that there is minimal construction needed to implement the project in the 'real world'.

Conclusions

The BBC micro:bit has a number of features that make it a practical device for implementing AAC aids in the 'real world'. Ideas that are developed for this device can be replicated cheaply by other people wanting to implement the projects. As the BBC micro:bit is widely deployed in schools, the devices and the software to program them will remain easily available for the foreseeable future.

References

- BBC (2018). BBC micro:bit.
<https://www.microbit.org/>
- GitHub website <https://github.com/hardwaremonkey/BBC-micro-bit>.
- Oppenheim, M. & McIntyre, F. HandShake (2019) "Give Me a Minute – Visual indication of message creation", *Communication Matters*, pp35-36
- Oppenheim, M. (2016) "Headbanger: controlling switchable software with head gesture", *Journal of Assistive Technologies*, vol 10, issue 1, pp2-10
- Project website: seismicmatt.com

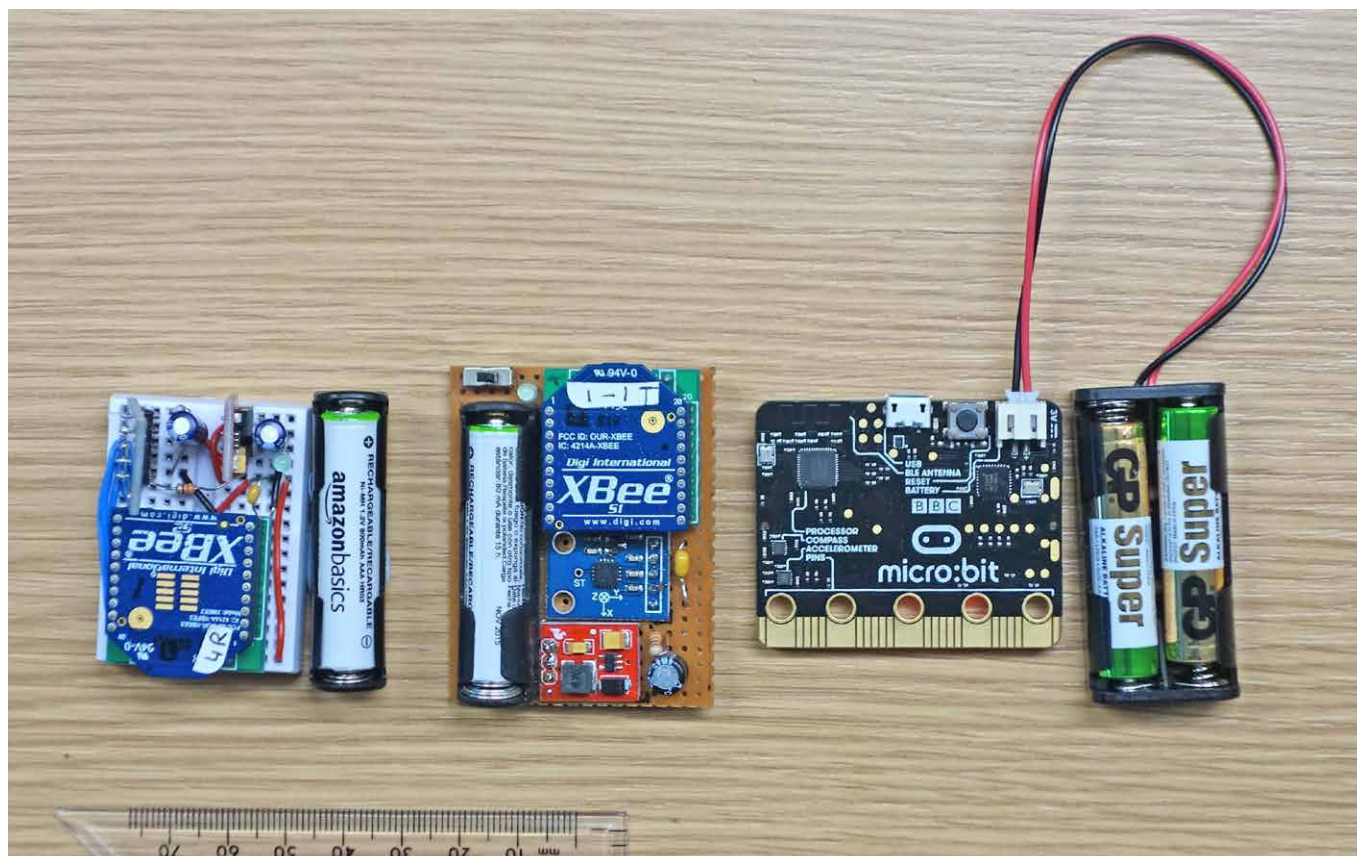


Figure 4: Left to right: First and second generation prototypes for hand motion detection; BBC micro:bit.

Applying Assistive Technology in Computing, and its Association with Quality of Life for People with Spinal Cord Injury: A Systematic Review

VALÉRIA BALDASSIN

Physical Therapist, SARAH Network of Rehabilitation Hospitals

Email: valbaldassin@gmail.com

Introduction

According to the severity of the motor and functional impairments secondary to spinal cord injury (SCI), assistive technology devices for computer access may represent, especially for the tetraplegic individual, one of the few possibilities for access to information, social networks, work and leisure activities^{1,2,3}, and give them greater autonomy^{2,4}.

Assistive technology devices for computer access include specific interfaces, such as voice command software, modified mice and typing sticks, among others. Faced with the trend of humanized approaches in order to promote a higher quality of life for patients, the introduction of assistive technology by rehabilitation teams seems to be useful, since studies and evidence-based practice have demonstrated their effectiveness in contributing positively to the life of people with tetraplegia, compensating impairment to promote well-being by allowing for unlimited activities and unrestricted participation^{2,5}.

The study aimed to identify and organize evidences (outcomes) about quality of life influenced by assistive technology related to computers, for people with traumatic and non-traumatic SCI.

Methods

This review followed a rationale to include studies that addressed the use of assistive technology for computers (intervention) to improve quality of life

(outcome) of post-spinal cord injury (SCI) people (participants), considering the hypothesis that assistive technology for computers could improve quality of life (user and non-user comparison)⁶.

Literature searches were carried out in the PubMed, PEDro, LILACS, PsycINFO and SCIELO. An electronic search strategy comprising a comprehensive list of key search terms relating to SCI (e.g. 'spinal cord injuries', 'tetraplegia' and 'quadriplegia'), assistive technology (e.g. 'self-help device' and 'computer system') and quality of life was developed for each database. The search date (March, 31th 2017) formed the only temporal cut off.

The main inclusion criteria were applied during the electronic search strategy designed to find an adult sample (i.e. age ≥ 18 years) diagnosed with a traumatic or non-traumatic SCI, and including as outcome quality of life measurements, assessed as a primary or secondary outcome via a validated quality of life scale.

According to available guidelines for reporting systematic reviews⁶, a data extraction sheet was formulated (Tables 1 and 2 overleaf).

Results

Of the 79 retrieved articles, 10 articles were considered for inclusion in the final review.

Among the quantitative studies, only two compared the quality of life level between users and non-users of electronic aids to daily living^{9,10}, including devices for

computer access. Despite the methodological limitations, both have found a positive correlation between assistive technology and quality of life in individuals with tetraplegia.

None of the studies obtained a level of evidence above 3, according to the Oxford Centre for Evidence-based Medicine.

Discussion

Only four studies discriminated the types of devices used by participants^{2,5,11,12}, with emphasis on voice command features², mouse or keyboard alternatives^{2,5}, remote controls to access computer¹² and low-tech options^{2,5}. For many participants, the use of assistive devices was strongly linked to their participation experiences, promoting participation in those activities that held personal meaning and importance.

Despite the positive effects of assistive technology on the quality of life of people with SCI, it is still necessary to develop new computer access devices to target the needs of people with SCI^{5,13}. The information and evidence presented by the studies are not enough, considering the practical guides that could help in the training of professionals and developing new services using computer access technology, since many potential barriers exist to widespread use of this technology, including performance limitations, lack of access or financial resources, and the need for further education of the SCI population and clinicians.

Conclusion

People with SCI recognize that assistive technology for computer access improves their quality of life or, at least, could improve it when compared with non-users.

References

1. Scherer MJ, Cushman LA. Predicting satisfaction with assistive technology for a sample of adults with new spinal cord injuries. *Psychol Rep.* 2000;981-987.
2. Folan A, Barclay L, Cooper C, Robinson M. Exploring the experience of clients with tetraplegia utilizing assistive technology for computer access. *Disabil Rehabil Assist Technol.* 2013;10(1):46-52. doi:10.3109/17483107.2013.836686
3. Cooper R, Cooper R. Quality-of-life technology for people with spinal cord injuries. *Phys Med Rehabil Clin N Am.* 2010;21(1):1-13. doi:10.1016/j.pmr.2009.07.004
4. Andrade L, Araújo E, Andrade K, Soares D, Cianca T. Role of nursing in physical rehabilitation. *Rev Bras Enferm.* 2010;63(6):1056-1060.
5. McKinley W, Tewksbury M, Sitter P, Reed J, Floyd S. Assistive technology and computer adaptations for individuals with spinal cord injury. *NeuroRehabilitation.* 2004;19(2):141-146.
6. Liberati A, Altman DG, Tetzlaff J, et al. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. *J Clin Epidemiol.* 2009;62(10):e1-34. doi:10.1016/j.jclinepi.2009.06.006
7. OCEBM Levels of Evidence Working Group. The Oxford 2011 levels of evidence. Oxford Centre for Evidence-Based Medicine. <http://www.cebm.net/ocebm-levels-of-evidence/>. Published 2011. Accessed April 26, 2017.
8. Des Jarlais D, Lyles C, Crepaz N. Improving the Reporting Quality of Nonrandomized Evaluations of Behavioral and Public Health Interventions: The TREND Statement. *Am J Public Health.* 2004;94(3):361-366. doi:10.1111/j.1360-0443.2004.00785.x
9. Rigby P, Ryan SE, Campbell KA. Electronic aids to daily living and quality of life for persons with tetraplegia. *Disabil Rehabil Assist Technol.* 2011;6(3):260-267. doi:10.3109/17483107.2010.522678
10. Rigby P, Ryan S, Joos S, Cooper B, Jutai J, Steggle E. Impact of electronic aids to daily living on the lives of persons with cervical spinal cord injuries. *Assist Technol.* 2005;17(2):89-97.
11. Ripat JD, Woodgate RL. The role of assistive technology in self-perceived participation. *Int J Rehabil Res.* 2012;35(2):170-177. <http://dx.doi.org/10.1097/MRR.0b013e3283531806>
12. Verdonck M, Chard G, Nolan M. Electronic aids to daily living: be able to do what you want. *Disabil Rehabil Assist Technol.* 2011;6(3):268-281. doi:10.3109/17483107.2010.525291
13. Craig A, Tran Y, McIsaac P, Boord P. The efficacy and benefits of environmental control systems for the severely disabled. *Med Sci Monit.* 2005;11(1):RA32-9. <http://www.ncbi.nlm.nih.gov/pubmed/15614204>.
14. Scherer MJ, Cushman LA. Measuring subjective quality of life following spinal cord injury : a validation study of the assistive technology device predisposition assessment. 2001;(November):387-393.
15. Collinger J, Boninger M, Bruns T, Kenneth C, Wang W, Weber D. Functional Priorities, Assistive Technology, and Brain-Computer Interfaces after Spinal Cord Injury. *J Rehabil Res Dev.* 2013;50(2):145-160. <https://www.ncbi.nlm.nih.gov/pubmed/23760996>.

Table 1: Extracted data from the selected references using quantitative study designs

References	Study Design	Total Sample (N)	Groups (n)	Approach	Outcome	Instrument for Data Collection	Variable	Results	Conclusions	Level of Evidence*
Rigby <i>et al</i> ⁹ (2011)	Cross-sectional quantitative	Traumatic tetraplegia (N=36)	AT users (n=15) and AT non-users (n=21)	To correlate the degree of QoL satisfaction with the use of EADL	Satisfaction with the QoL	QOLP-PD	Ratings of satisfaction with quality of life	Non-users (mean-SD): (3.39-0.65) users: 4.03-0.58) p<0.01†	AT users experienced greater satisfaction with their QoL than the AT non-users	4C
Rigby <i>et al</i> ¹⁰ (2005)	Cross-sectional quantitative	Traumatic tetraplegia, Guillain Barré Syndrome (N=32)	AT users (n=16) and AT non-users (n=16)	To compare psychosocial impact measures and functional abilities between users and non-users of EADL	Functional abilities and psychosocial well-being	SMAF, LOMEC, PIADS	User perceptions of how AT affects quality of life	There were no significant differences between both groups for each of the subscales psychosocial impact of AT	AT had a positive impact on perceptions of competency, adaptability and self-esteem	4C
Scherer M ¹⁴ (2001)	Cross-sectional quantitative	Traumatic and non-traumatic SCI (N=20)	Paraplegia (n=13) and tetraplegia (n=7)	To assess the validity of a subset of items of the ATD PA as a measure of QoL for persons with new SCI	Assessment of the internal reliability of the QoL subset of the ATD PA	ATD PA, SWLS and BSI	The internal consistency analysis of the QoL subset of items (ATD PA sections B and C)	The QoL subset total score and SWLS total score correlated very highly (0.89, p< 0.01‡)	The ATD PA's QoL subset seemed to be a valid measure to identify subjective QoL and predispositions to AT use early in rehabilitation	3B

Reference number; N – Total sample size; n – Size by group; * Level of evidence according to Oxford Centre for level of evidence-based Medicine; AT – Assistive Technology; QoL – Quality of Life; EADL – Electronic aids to daily living; QOLP-PD – Quality of Life Profile-Physical Disabilities; †Referring to the t-test for comparison between groups; SMAF – Function al Autonomy Measuring Scale; LOMEC – Lincoln Outcome Measures for Environmental Controls; PIADS – Psychosocial Impact of Assistive Devices Scale; ATD PA – Assistive Technology Device Predisposition Assessment; SWLS – Satisfaction with Life Scale; BSI – Brief Symptom Inventory; ‡ Bivariate relationships among the variables were assessed using Spearman correlations. Alpha was set at the 0.01 level

Table 2: Extracted data from the selected references using qualitative, quali-quantitative, descriptive, and review study designs

References	Study Design	Total Sample (N)	Groups (n)	Approach	Outcome	Instrument for Data Collection	Variable	Results	Conclusions	Level of Evidence*
Collinger <i>et al</i> ¹⁵ (2013)	Cross-sectional qualitative-quantitative	Traumatic SCI (N=57)	Paraplegia (n=36) and Tetraplegia (n=21)	To assess knowledge of the BCI and their interference in QoL for veterans with SCI	Usability of the BCI	Frequency distribution between participants who indicated or did not indicate that they would use BCI	% of the total by group	Paraplegia (81% would use) Tetraplegia (86% would use)	BCI was associated with restoring motor functions	4C
Folan <i>et al</i> ² (2013)	Thematic Analysis	Traumatic tetraplegia (N=7)	In-patients (n=4) and out-patients (n=3)	To understand the experiences of people with tetraplegia about AT for computer access	Usability of computers and AT from the perspective of the user	Semi-structured interviews	Demographics, experience meaning and reality of the participants	Three main themes emerged as a result of the data analysis process: getting back into life, assisting in adjusting to injury and learning new skills	The ability for computer use resulted in greater sense of self-efficacy and better QoL	4C
Ripat <i>et al</i> ¹¹ (2012)	Grounded Theory	Tetraplegia (N=19)	Traumatic (n=15), congenital (n=4)	To understand the factors related to self-perception and participation of AT users	Self-perception related to participation and AT use	Interviews, photograph and focus group	Demographics, the role that AT plays in terms of self-perceived participation	AT was considered a mean to participation	The use of AT was highly linked to the participation experiences	4C
Verdonck <i>et al</i> ¹² (2011)	Phenomenology	Traumatic tetraplegia (N=15)	Non-users (n=7) and users of AT (n=8)	To explore the experiences and the deeper meaning of living with EADL	Knowledge about the phenomenon of living with EADL	Focus group	Autonomy, QoL, time alone, relationship and security	Participants perceived improvements in both anticipated and actual lived experiences with EADL	Autonomy, time alone and changed relationships have been linked to enhanced QoL	4C
Cooper <i>et al</i> ³ (2010)	Descriptive	Not applicable	Not applicable	To describe AT resources for computer access, and their possible use and benefits	Not applicable	Not applicable	Computer access	Not applicable	Computer access technology is crucial for participation and to increase communication	5D
Craig <i>et al</i> ¹³ (2005)	Narrative review	Not applicable	Not applicable	To evaluate the effectiveness of AT for environment control and its benefits in improving QoL	Not applicable	Not applicable	Technical and clinical aspects of ECS control	The efficacy of ECS systems rarely has been scientifically established	Computer access technology is crucial for participation and to increase communication	3A
McKinley <i>et al</i> ⁵ (2004)	Narrative review and case reports	Traumatic tetraplegia (N=3)	Not applicable	To discuss the use of AT resources for computers, the access to paid work and QoL	Not applicable	Not applicable	Not applicable	Not applicable	There is need for more scientific evidence on the subject	4C

Reference number; N – Total sample size; n – Size by group; * Level of evidence according to Oxford Centre for level of evidence-based Medicine; AT – Assistive technology; BCI – Brain computer interfaces; QoL – Quality of life; EADL – Electronic aids to daily living; ECS – Environmental control system

A Creative Approach to Total Communication for One Young Man with Multi-Sensory Impairment (MSI)

OLLY ROBINSON

Speech and Language Therapist, Seashell Trust

Email: Olly.Robinson@seashelltrust.org.uk

BECCY TIMBERS

Speech and Language Therapist, Seashell Trust

Email: Beccy.timbers@seashelltrust.org.uk

The Seashell Trust is a school, college, residential and outreach service for children and young people with complex needs. As a group of Speech and Language Therapists working at Seashell Trust, we are familiar with a large range of different Augmentative and Alternative Communication (AAC) systems. However, due to the needs of the students we often have to be creative with the approaches that we use. This case study focuses on one young man with Multi-Sensory Impairment (MSI) and the variety of different approaches that we took to support his expressive communication.

Multi-Sensory Impairment

The National Sensory Impairment Partnership (NatSIP) defines Multi-Sensory Impairment as “where a child or young person has combined vision and hearing impairments, which may include a functional loss in one or both of these senses”. (NatSIP, 2017). Children with multi-sensory impairment may have some residual hearing and/or vision or have no residual hearing or vision. In our experience, they also often have difficulties with sensory processing as well as having other impairments (Rowland and Schweigert, 2001). Children with MSI can have difficulty learning symbolic communication because they may not see or hear language happening around them, so they are unable to imitate language or achieve incidental learning (Bruce, 2005).

MSI and AAC

There is very limited research on using AAC with students with Multi-Sensory Impairments. Objects of Reference and tactile signing are often used in practice. Objects of Reference (ORs) are objects which represent a person, object, place or event (Ockelford, 1994), and can be as simple or as complex as is appropriate for that person. They are often used as an introduction to symbolic communication. However, these can be challenging to implement and the evidence for their effectiveness is limited (Goldbart and Canton, 2010).

Tactile signing is any way of using sign language that can be felt rather than seen by the person with MSI. There are a number of different types of tactile sign. On-body sign systems such as Canaan Barrie or Tassels involve making the sign on the person's body, and these are often used with people with limited motor movement. Hand-under-hand signing involves using a standard sign language such as British Sign Language, but the signer has their hands underneath the hands of the person with multi-sensory impairment and signs the BSL signs in this position. This allows the person with MSI to feel the movement of the hands, whilst still being able to remove their hands if they no longer want to “listen”. Less formal tactile sign language can also be used which is based on the persons' responses to activities they have participated in. There is a

growing body of research around this way of developing idiosyncratic sign language in collaboration with the person with MSI (Bloeming-Wolbrink et al, 2018).

Within our practice we have also explored other AAC solutions for people with MSI. Single-message Voice Output Communication Aids (VOCAs) are often used with people with intellectual disabilities, and there is some evidence for their effectiveness in developing communication (Sigafoos, Didden, Schlosser, Green, O'Reilly & Lancioni (2008)). The Language Acquisition through Motor Planning (LAMP) approach has traditionally been used as a way of teaching high-tech AAC use with people with Autism.

“The LAMP approach involves five basic components: (1) Readiness to Learn, (2) Shared Engagement, (3) Consistent Motor Patterns, (4) Auditory Signals, and (5) Natural Consequences.” (Potts and Saterfield, 2013).

Children can learn language through repeating a motor pattern to acquire the thing they want each time. Therefore, they do not need to rely on the recognition of symbols or 2D images. For this reason, we have had some success in our setting, using LAMP principles with single-message VOCAS. A board of static VOCAS can be used to request different items; these can have tactile markers and a single message, so that those who have limited or no functional vision can locate the correct

VOCA. These principles can then be used to develop the skills of the learner with MSI to access a high-tech communication aid through touching a screen with a grid.

Alternatively, auditory scanning and switches can be used if there is residual hearing and some understanding of single words. This system requires the learner with MSI to listen to a voice reading out options. They then indicate the one that they want in some way, for example, a movement, a vocalisation or a press of a switch (Blackstone, 1998).

We often try a number of the strategies mentioned above with our young people with MSI, depending on their skills and needs.

Participant

When we started working with him, Ferris was a 16-year-old young man with Multi-Sensory Impairment who had just moved to our residential service and started in the sixth form at our school. Ferris has no residual vision and a moderate hearing impairment in both ears. He wears hearing aids, but only ever one at a time. He arrived with some understanding of British Sign Language signs, which were signed to him hand-under-hand. The only sign he used expressively was the sign “please” which he used to request/agree/acknowledge his communication partner. He had a small number of Objects of Reference which were used to tell him what was happening. Ferris is very interested in people and likes to know who is in the room with him. However, he takes a long time to develop relationships with people. He is very adventurous and likes climbing, going on outings, and loves music.

Strategies Used

Initially, Speech and Language Therapy focused on the strategies Ferris could already use, expanding the number of signs he understood and used and the number of ORs he had (Figure 1).

Ferris appeared to have a significant discrepancy between his understanding and expression, so the Therapist began to use single message Voice Output Communication Aids (VOCAs) with him. Each VOCA represented a motivating activity to do with music (e.g. clapping, drumming, stamping etc.). A number of VOCAs were set up on a board using a LAMP approach. As the location was the same each time, Ferris learnt what would happen when he pressed the VOCA by



Figure 1

remembering the location for each outcome. This was successful and highly motivating for Ferris. However, the board was quite large, and it was difficult to have available in a number of different settings. Vocabulary was also limited to the number of VOCAs that would fit on the board.

A scan and select switch was trialled with a computer program, so that Ferris could listen to the music options by pressing one switch and select the option he wanted by pressing the other switch. Again, this was motivating to Ferris but was difficult to set up and could only be done in his classroom. If Ferris struggled to transition or couldn't wait, then the activity was not completed. Something more portable was needed. A Nova Chat 5 was trialled – initially this was with two switches taped to a trolley, but this was still not portable enough so they are now attached to a lap tray (Figure 2).

Ferris chooses a category by using the blue button to scan and the green button to select and then listens to the choices within that category in the same way (Figure 3).

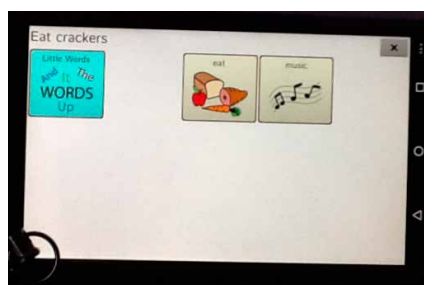


Figure 2

Ferris demonstrated his intentionality with the communication aid by:

- Requiring a lower level of/less frequent prompting in order to select the switch
- Speeding up as he remembered where something was
- Requesting the same thing several times but then next time we met, requesting something different
- As he was eating, he chose music, then as soon as he had finished his mouthful, he chose food, and repeated this pattern.

Ferris is using his hearing to listen to the options, but also starting to learn the motor pattern for a particular item. We have now expanded his vocabulary to include core words, motivating activities and drinks. We are trying to get the use of the aid embedded into his day, rather than just being used for ‘choose time’. We are teaching Ferris to request his communication aid by signing, or exchanging an Object of Reference for it.

Ferris was still having difficulty making a choice between two ORs. We thought that this may be because two ORs were also presented to tell him what was happening “now and next”. We started using ORs in a wallet in a folder for his schedule, and then making choices from the back of

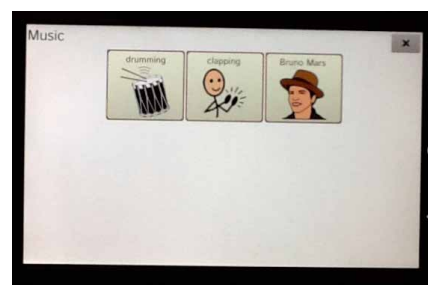


Figure 3



Figure 4

the folder. We introduced making choices with a Picture Exchange Communication System (PECS) approach, physically prompting Ferris to choose a motivating OR. He picked this up really quickly, and was then able to make choices between his ORs when they were presented in this way (Figure 4).

Conclusions

Ferris was having difficulty expressing himself, despite showing single word understanding of tactile sign, spoken word and Objects of Reference. He has expanded his ability to express himself through a number of different systems – Objects of Reference, a small number of signs and the high-tech communication aid. Ferris has been motivated to engage in each step of the process and is starting to have some control over his surroundings. There have been some challenges along the way:

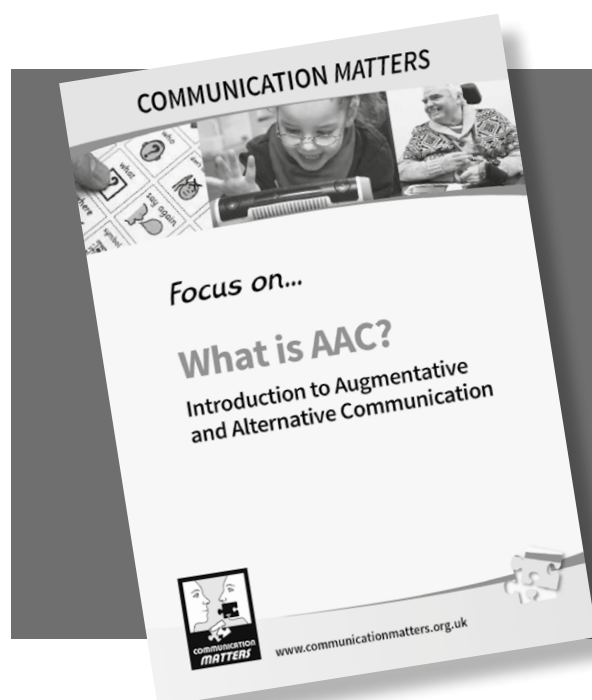
- Ferris has just moved to college and has moved his residential house, so although it is on the same site this means a transition and a new staff team

- The high-tech communication aid is a novel system for staff and it is difficult to ensure that all staff feel confident enough with the aid to use it throughout the day
- Currently, Ferris will continue to request things until he is counted down to another activity because he is so motivated by the communication aid
- The technology is not always reliable, and this can be off-putting for Ferris and staff
- Objects of Reference are Ferris's low-tech way of expressing himself, but these can be cumbersome and difficult for staff to manage

Staff training, both through formal training and modelling of strategies, is a significant tool to overcome these barriers and we continue to find other ways of overcoming any challenges. It is also essential that Ferris continues to have a total communication approach, both to support his understanding and his ability to express himself.

References

- Blackstone S. 1998 Augmentative Communication News, Clinical News: Auditory Scanning. Volume 11, Numbers 4 and 5
- Bloeming-Wolbrink, K.A., Janssen, M.J., Ruijsenaars, W.A. and Riksen-Walraven, J.M., 2018. Effects of an Intervention Program on Interaction and Bodily Emotional Traces in Adults with Congenital Deafblindness and an Intellectual Disability. *Journal of Deafblind Studies on Communication*, 4(1).
- Bruce, S.M., 2005. The impact of congenital deafblindness on the struggle to symbolism. *International Journal of Disability, Development and Education*, 52(3), pp.233-251.
- Goldbart, J. and Caton, S., 2010. Communication and people with the most complex needs: What works and why this is essential.
- Lee, Y., Jeong, S.W. and Kim, L.S., 2013. AAC intervention using a VOCA for deaf children with multiple disabilities who received cochlear implantation. *International journal of paediatric otorhinolaryngology*, 77(12), pp.2008-2013.
- Mar, H. and Sall, N., 1994. Programmatic approach to use of technology in communication instruction for children with dual sensory impairments. *Augmentative and Alternative Communication*, 10(3), pp.138-150.
- NatSIP Website – Children and young people with multi-sensory impairment: The Facts (July 2017) [Accessed 2019]
- NatSIP Website – Children and young people with multi-sensory impairment: The Facts (July 2017) [Accessed 2019]
- Meredith Potts, C.C.C.S.L.P. and Satterfield, B., 2013. Studies in AAC and Autism: The Impact of LAMP as a Therapy Intervention.
- Rowland, C. and Schweigert, P., 2001. Assessment and instruction of hands-on problem-solving and object interaction skills in children who are deafblind. *British Journal of Visual Impairment*, 19(2), pp.57-68.
- Sigafoos, J., Didden, R., Schlosser, R., Green, V.A., O'Reily, M.F. & Lancioni, G. (2008) **A Review of Intervention Studies on Teaching AAC to Individuals who are Deaf and Blind.** *Journal of Developmental and Physical Disabilities*, 20 pp71-99



'What is AAC?' Focus On leaflet

Please contact us on
admin@communicationmatters.org.uk
to place an order.

CM is very happy to distribute these
leaflets to spread awareness of AAC
free of charge, but donations
are always welcome!

Powerful Insights from AAC Users that Challenge How we Practice AAC

AMANDA HARTMANN

Speech Pathologist, AssistiveWare

ERIN SHELDON

Education Specialist, AssistiveWare

WILLEMIJN WETZELS

Speech and Language Therapist, AssistiveWare

Email: w.wetzels@assistiveware.com



Amanda Hartmann



Erin Sheldon



Willemijn Wetzels

It is easy to find AAC resources telling us about symbol-based AAC and the importance of modelling. These resources are typically written to support parents, teachers and Speech Pathologists who are teaching children to use AAC.

But when we try to dig a bit deeper, and search for implementation materials written to better support text-based AAC users, or even better, written for AAC users themselves, we don't find many resources.

That's why we, at AssistiveWare, in the spring of 2018 decided to contribute to addressing this gap. The project was led by Erin Sheldon (Education Specialist, Ontario, Canada) and Amanda Hartmann (Speech Pathologist, Queensland, Australia). We interviewed three dozen adult AAC users. We included people who were born with their communication disability as well as those who acquired one later in life. The AAC users were generous with their time. Their insights can inform the work of anyone who supports AAC. We are deeply grateful to these AAC users for their participation in our project.

The Project

We started by conducting a literature review on AAC use and adults. We identified common challenges for any person who needs to use AAC (Beukelman & Mirenda, 2012). We explored how AAC users can fully participate in research (e.g., Rackensburger et al, 2005). We focused on the questions that researchers

hadn't already asked. This is when we started interviewing AAC users.

Traditional interviews (face-to-face) create challenges for many AAC users, so we chose to use "asynchronous" forms of conversation. This meant most interviews happened over days or weeks, rather than hours or minutes. AAC users participate more when the technology is familiar. So, we conducted focus group interviews in private Facebook groups. Every few days, we posted new questions that invited conversation.

Assumptions Blown Up

We received many unexpected answers. The insights from the conversations challenged many of the things we thought we knew.

We learned that:

- Many text-based AAC users also use symbols regularly.
- Most of these users started using typing without first communicating with symbols. Typing versus using symbols works best for different reasons at different times.



- Very few users had received evidence-based AAC support. This was true no matter what kind of diagnosis caused the speech issue. Fewer than 10% had been referred to a Speech-Language Pathologist or AAC specialist to evaluate their need for AAC.
- Using AAC does not mean people feel understood. Many users explained that they regularly felt unheard, despite being fluent AAC users.

Key Insights

In almost all of the conversations, the following key insights were reflected:

The biggest challenge AAC users consistently face is the behaviour of speaking people.

Even with a completely optimised AAC system and environment, starting and maintaining a regular conversation can be challenging for an AAC user. Not only because of speed and timing, but also because of the limitations of communication device technology. In order to support AAC users to become valued contributors to conversations and discussions, we need to change our own behaviour. A good communication partner takes the time to find out an AAC user's preferences regarding being supported.

AAC is universal - speech is only for some.

We all use AAC (Zisk & Dalton, 2019). Social media, texting, emails, and more are alternatives to speech that have

grown to be a big part of our society. We can't live without them. All these media are forms of AAC. It's just an alternative to speech that happens across different times and spaces. These alternatives are inclusive and accessible for almost anyone. We need to plan how to support our clients to access literacy and social media (Shane et al, 2012).

We need to consider alternative access for all AAC users.

Just because you can type does not mean you can always use it to communicate. For example, some AAC users have moments of meltdown or freezing where they cannot use their AAC. Strategies like Partner Assisted Scanning and tools like eye-gaze might be very helpful.

The AAC user should be central to all decision-making.

The person using the AAC should be involved in all decisions about AAC. This includes selecting the digital voice or changing the words that are available. AAC users themselves should decide if they want to use AAC, at what time, to whom, where and when. They should be asked to direct how they are supported or prompted. We (speaking people) need to ask more and stop assuming and guessing.

Privacy is crucial.

All words we use are private. You might use different words in a conversation with your parents than with your friends. Using AAC creates new privacy risks. The words we want available to use might be private or sensitive. Perhaps we only use some words on particular occasions with certain people. Messages can often be viewed in the history. We should all ask for consent before looking in someone's AAC. This includes asking before we check a person's message history.

AAC is more than an app or a single system.

AAC systems are not just used for communication. Many AAC users use their system in creative ways. Some use folders and messages as visual supports. They might design symbol displays as visual schedules to help plan and organize tasks and days. Some users in our project defined their AAC very broadly. We asked people to describe what they used for AAC. Many used texting and instant messaging. Many used sign language and wrote messages on paper. Some used badges or buttons with messages on them. One even thought of their t-shirt slogans as a form of AAC.

How to be a Respectful Communication Partner

It's time to take a closer look at our own behaviour when communicating with an AAC user. AAC users need to be supported in different ways, which are specific and personal to them. So what makes us good and respectful communication partners?

Respect the effort of using AAC.

AAC does not come as fast and fluently as speech. Using it requires far more conscious effort than speech. Each individual word has to be generated. For some AAC users, the motor coordination to select or compose a single word is a massive effort. Good communication partners respect this effort.

Be patient and wait.

AAC takes more time - a lot more time. Good communication partners are patient listeners. They wait as long as necessary because they value what the person has to say.

Help manage noise.

AAC affects how we experience noise. Most AAC systems that generate speech have a limited range of volume. In addition, many AAC users told us they are extra sensitive to background noise. Some struggle to process speech in loud environments. Good communication partners help manage noise. This might include taking a conversation into a different room. It might mean moving a conversation from real-time to having it by email, instant message, or on social media.

Help manage physical space.

AAC changes how we experience physical space. Bright sunlight can make it difficult to view the device screen. The table or desk might need to be larger, to hold the usual laptop or meal, plus an AAC device. The AAC user may require extra room to type or select icons. Good communication partners try to find the spaces that are the most accessible to the AAC user.

Watch the person, not the device.

AAC changes the timing of messages and how messages are delivered. Facial expressions and messages on AAC are not likely to be simultaneous. Good communication partners learn how important it is to watch the AAC user's face while the messages are written and played.

Pay attention to the message and multi-modal cues.

AAC can be easily misunderstood. With speech, we easily convey sarcasm, questions, humour, and irritation. Digital voices cannot use tone of voice to convey

different meaning. Good communication partners are attentive and observant. Rather than jumping to conclusions about what a person means to say, they look for different cues. They actively consider different meanings, and ask clarifying questions if needed.

Do not dominate the conversation.

Conversation is an exchange between two or more people. It is constructed together. It is not an interrogation, with one person asking questions while the other person responds. It is not a monologue, where one person just observes and listens. Speaking people usually have the advantage in conversations with AAC users. It is easy for a speaking person to dominate a conversation, such as swiftly changing subjects while the AAC user is still generating a message. Good communication partners actively try to level the playing field.

Respect an AAC user's voice.

Using AAC is deeply personal, in the same way that our voices are deeply personal. Our voices are a reflection of our identity. Shaping our voice is a key part of how we express our identity. The design of an AAC device is often impersonal. It is a machine. Some AAC users may be reluctant to adopt the AAC device as an extension of their own voice. They may need to spend a lot of time ensuring that the voice and the words truly reflect them as a person. Good communication partners learn how the AAC user feels about their voice and respects those feelings and limitations.

Just ask.

We all have good intentions when we try to support an AAC user. That doesn't mean our assistance is actually helpful or appropriate. Don't assume you know what support a person needs. If you want to know what support an AAC user appreciates, just ask.

Accept that communication is on the AAC user's terms.

AAC can be powerful but it can also be imperfect. Good communication partners do not impose their own feelings about how the AAC user "should" feel about their technology. They do not insist the person use their AAC, or not use it. Instead, good communication partners are so interested in what the AAC user has to say that they accept all communication, however it is expressed and however long it takes to convey.

New AAC Resources

A wealth of information was gathered from

the project. This was turned into a series of new resources on the AssistiveWare website. Most were reviewed and edited by the AAC users themselves.

I would like to invite you to take another look at the Learn AAC section of our website (<https://www.assistiveware.com/learn-aac>). Most of the new articles have ideas and concepts that can be applied to all AAC users. The section called "AAC for Everyone" includes new information that applies to **all** people who cannot rely on speech. You will learn to personalize how you support someone to communicate. You will be encouraged to support all forms of communication.

I hope these articles make us think about the ways we support all AAC users. AssistiveWare values the insights we gained through our project. The most important thing we can do is ask more questions, then really listen to the answers. Let's hope that new insights can continue to change the practice of AAC - for the better.

Thank you.

References

Beukelman, D. & Mirenda, P. (2012). *Augmentative and Alternative Communication: Supporting Children and Adults with Complex Communication Needs*, Brookes: Baltimore.

Rackensperger, T., Krezman, C., McNaughton, D., Williams, M., & D'Silva, K. (2005) "When I First Got It, I Wanted to Throw It Off a Cliff": The Challenges and Benefits of Learning AAC Technologies as Described by Adults who use AAC, *Augmentative and Alternative Communication*, 21:3, 165-186, DOI: 10.1080/07434610500140360

Shane, H., Blackstone, S., Vanderheiden, G., Williams, M., DeRuyter, F. (2012) Using AAC Technology to Access the World, *Assistive Technology*, 24:1, 3-13, DOI: 10.1080/10400435.2011.648716

Zisk, A. & Dalton, E. (2019). *Augmentative and Alternative Communication for Speaking Autistic Adults: Overview and Recommendations*. *Autism in Adulthood*. 1. 10.1089/aut.2018.0007.

Join CM in 2021 and make a difference



Members of CM are joining an active community and can:

- get a reduced rate to attend the CM International AAC Conference, Study Days & AAC Information Days
- receive three copies of this Journal
- be part of an online AAC forum where ideas and advice are freely exchanged
- receive E-News from Communication Matters delivered via email
- get access to the latest information on a wide range of AAC issues
- become an international member – receive copies of ISAAC e-news bulletins and reduced rate subscription to their journals, newsletters and Biennial Conference

...and much more!

**Please consider renewing your membership in January 2021.
Your support is never more needed.**

AAC users and family members can apply for a free membership in their first year of joining, so please let anyone else know who you think might be interested.

Tele-AAC: A Summary of the Literature on Parent, Professional and AAC Users' Perspectives

KATE DUGGAN

Head of Clinical Services, Seashell Trust

Email: kate.duggan@seashelltrust.org.uk

What is Tele-AAC?

Tele-AAC is defined by Anderson et al (2012 p. 80) as a 'unique cross-disciplinary clinical service delivery model that requires expertise in both telepractice and Augmentative and Alternative Communication (AAC) systems'. The American Speech Language and Hearing Association (ASHA, 2019) defines telepractice as the 'application of telecommunications technology to the delivery of Speech Language Pathology and Audiology professional services at a distance by linking clinician to client or clinician to clinician for assessment, intervention, and/or consultation.'

Hall and Johnson (2014) describe a range of approaches used within tele-AAC. These include assessment or therapy delivered to a client remotely using video technology. Alternatively, coaching, supervision or training can be delivered to communication partners to increase their skills in promoting effective AAC use. Coaching would typically be offered in real time, with the communication partner being coached by an expert clinician such as a Speech and Language Therapist (SaLT) during a live therapy session while they were directly supporting the AAC user. Supervision or training can also be offered in this way, or can involve 'asynchronous' support, whereby video footage of the AAC user is shared with the communication partner to aid their skill development.

Different technology can be utilised to promote interactions between client and clinician using tele-AAC (Hall and

Boisvert, 2014). Screen-sharing can be used so that the AAC user and the clinician can see one another's screens, and the clinician can text or model use of symbols to guide and coach the AAC user. For individuals using symbol-based systems, screen-sharing of the AAC user's device and the clinician's identical device can be supported using mounted cameras. This allows the clinician to model and coach the AAC user on the use of their vocabulary package. Finally, the clinician could take control of the AAC user's screen via remote link-up, to allow them to model on the AAC user's actual device screen. This requires the AAC user to be able to connect to the internet on their device. AAC users in Lopresti et al's (2015) study highlighted that AAC devices or tablets often didn't support screen-sharing and therefore required someone to attempt to capture screen on camera, which was perceived as an additional challenge to successful delivery of services.

What is the Impact for AAC Users?

Skill Development

Various studies highlight evidence of tele-AAC prompting skill development which is comparable to in-person support. A range of measures are used to capture this. Hall et al (2014a) consider the use of morphological features during prompted and unprompted targets by the AAC user following receipt of support via tele-AAC. Hall et al (2014b) completed a case study of a child using a Speech Generating Device (SGD) who was supported over an eight-week period, with the first four

weeks of delivery being in person and the later weeks via tele-AAC. Progress, measured through the child's use of grammatical morphemes, was comparable in both conditions. Subsequent evaluation of skill development where the initial intervention phase was delivered through telepractice may be beneficial, in light of Lopresti et al's (2015) findings that clinicians experienced difficulty in delivering effective support in the early stages of AAC implementation when delivering services via tele-AAC.

In Dimian et al's (2018) study, tele-AAC was used to deliver a Functional Communication Training approach to two children with developmental delay and Autism Spectrum Conditions (ASC). Assessment, communication-partner training and intervention using forward-chaining were delivered remotely. Clinicians evaluated the children's use of AAC across three contexts to make requests in place of behaviours of concern. Effective use of AAC to replace the behaviours of concern was demonstrated in each context.

Access

Evidence in the literature indicates that tele-AAC is not necessarily an effective way of accessing services for all AAC users. Barriers to accessing services via tele-AAC, including communication difficulties and cognitive impairment, have been highlighted by Curtis (2014). These difficulties could cause challenges in understanding instructions relating to setting up a video call. A lack of spoken communication skills could pose

a barrier to troubleshooting if the AAC user's device was not working. Limited mobility could also lead to difficulties with an AAC user positioning themselves to ensure they can be clearly viewed by the clinician. Specific challenges of access methods, including eye-gaze, were also highlighted in the study. However, Curtis (2014) did conclude the study by stating that, 'barriers can be overcome, and tele-practice is not only practical and effective, but often a preferred means of service delivery for persons with complex communication needs'. It should also be taken into account that the nature of some AAC users' disabilities could also cause challenges in attending appointments outside of their home environments.

Efficiency

Lopresi et al (2015) considered AAC users' levels of satisfaction with services they received via tele-AAC. 66 AAC users and 38 assistive technology users involved in the study were allocated to either receive services in person or via tele-AAC. Broadly, the AAC users receiving services via tele-AAC reported an equally high level of satisfaction to participants who received services in person. The benefits of not having to travel to appointments and remain in their comfortable home environment were reported by AAC users, along with access to a wider pool of specialists. The opportunity for other key stakeholders such as close friends and family to participate in sessions was also seen as a benefit. Reduced stress levels associated with attending appointments were also reported. However, concern was expressed relating to the quality of the audio and visual during sessions and the inconsistency in the technology working effectively. This could cause delays and interruptions to sessions, and led to participants expressing concern that the clinician would not be able to see symbols or hear voice output with sufficient clarity to enable them to make accurate judgements on their skills.

What are the Perspectives of Family Members?

Anderson et al (2014) considered the outcomes of an online training and support programme for four under-served families in Australia, of children with new SGDs along with online supervision. Parents felt that accessing services in this way was a positive experience. They reported challenges associated with the limitations of the technology, and also felt

there was increased pressure on them to lead on practising use of the SGD at home compared to receiving support in person in a clinic setting. Despite this, they did cite benefits, including convenient and flexible access to services.

What are the Perspectives of Clinicians?

Despite clear benefits for AAC users and family members, clinicians in Lopresti et al's (2015) study highlighted a number of challenges when delivering services via tele-AAC. They highlighted the lack of professional standards or efficacy data on this service delivery model, and reported concern around cost effectiveness, given the high initial costs of purchasing the required equipment. Clinicians found it difficult at the start of the AAC assessment process when they were trialling a range of software, as this required a high level of flexibility and adjustment. Having to describe to the communication partner how to make these adjustments was significantly more time consuming than the clinician being able to complete this themselves when delivering services in person. However, they did express that once software had been identified, later sessions were more successful and acknowledged the time efficiency savings that this model could offer. Clinicians described the added challenge of having to multitask, diverting their attention between the client, their communication partner and the technology, e.g. needing to change the view or window size while maintaining interactions with the client. They did however express that being able to observe the client in their typical physical and social contexts offered additional benefits compared to services delivered in a clinic.

What is the Impact for Services?

Lopresti et al (2015) found that increased attendance rates at appointments was promoted through offering services remotely. Due to efficiency savings, services had increased capacity to offer additional follow-up sessions and training to key communication partners who would not usually be able to attend sessions. The added benefit of being able to record sessions for quality assurance and evaluation purposes was highlighted. The impact of this from a data processing perspective and General Data Protection Regulation (GDPR) was not discussed. Services were able to deploy staff with the required areas of specialism to

clients across a broader geographic area, resulting in clients benefiting from the specialist support they required. This was also highlighted by Dimian et al's study (2018), which highlighted that, 'Children with developmental disabilities face many barriers to accessing communication intervention and may not have access to interventionists with the expertise in AAC with a SGD'. Hall et al (2014b) indicated that a lack of SaLTs with expertise in complex communication impairment and AAC can be combated by the delivery of tele-AAC.

However, Lopresti (2015) described the need for additional staff to provide remote assistance to the AAC user, which would have substantial financial impact for the staffing of the service along with the equipment costs. It would be hoped that as the service became more established, the reliance on this additional staff member to manipulate equipment or support the completion of paperwork would reduce, but this was not cited as an outcome in the study.

Implications for Practice

For tele-AAC to be a successful model of service delivery, clinician's need to be expert in using AAC and techniques such as Aided Language Simulation (ALS), so that they can manage the additional demands posed by this model of working. The literature reviewed indicates that clinicians need to have access to the appropriate hardware and software so that they have a sufficient quality of audio and visual to view an AAC user's system, and can evaluate how the AAC user is accessing it. Some access methods and cognitive or physical limitations pose a barrier to accessing services in this way, and it may not be appropriate for the initial assessment phase.

Conclusions

Tele-AAC can be a solution to overcome geographical boundaries and lack of available specialists. At a service level, it can prompt time- and cost-efficiency savings. Tele-AAC can reduce stress for the client, therefore reducing DNAs and increasing job satisfaction and capacity for clinicians. Participation of broader stakeholders can be offered, along with the additional benefits of observing clients in their typical physical and social context. However, it is not suitable for all AAC users or clinicians and is perhaps more appropriate once the initial AAC assessment phase has been completed.

References

- Anderson, K., Balandin, S., Stancliffe, R. and Layfield, C. (2014) 'Parents perspectives on Tele-AAC support for families with a new speech generating device: Results from an Australian pilot study.' *Perspectives on Telepractice*. 4(2) pp 52-60.
- Anderson, K., Boisvert, M., Doneski-Nicol, J., Gutmann, M., Hall, N., Morelock, C., Steele, R. and Cohn, E. (2012) 'Tele-AAC Resolution' *International Journal of Telerehabilitation*. 4(2).
- ASHA (2019) 'Telepractice' <https://www.asha.org/Practice-Portal/Professional-Issues/Telepractice/>
- Curtis, T. (2014) 'Case studies for telepractice in AAC.' *Perspectives on Augmentative and Alternative Communication*. January 23(1) pp. 42-54
- Hall, N. Boisvert, M. and Jellison, H. (2014a) 'An investigation of the efficacy of direct AAC service provision via telepractice: A case study'. RESNA annual conference.
- Hall, N., Boisvert, M., Jellison, H. and Andrianopulos, M. (2014b) Perspectives on telepractice 4:2 pp 61-70.
- Hall, N. and Boisvert, M. (2014) 'Clinical aspects relating to tele-AAC: A technical report'. *Perspectives*. 23(1) pp. 18-33.
- Hall, N. and Johnson, H. (2014) 'How we do it - Tele-AAC' PracticalAAC.org
- Lopresti, E., Junks, A. and Simpson, R. (2015) 'Consumer satisfaction with telerehabilitation service provision of alternative computer access
- and Augmentative and Alternative Communication'. *International Journal of Telerehabilitation*. Fall 7(2) pp 3-14.
- Dimian, A., Elmquist, M., Reichle, J. and Simacek, J. (2018) 'Teaching communicative responses with a speech generating device via telehealth coaching'. *Advances in Neurodevelopmental Disorders*. 2(1) pp. 86-99



Give as you Live

Shop online through
Give As You Live and raise
free funds for us!

Go to:
<https://www.giveasyoulive.com/join/communicationmatters>



Buying a gift, treating yourself or just getting in some household essentials – have you signed up to **Amazon Smile**? Help us raise funds, at no cost to you, every time you shop on Amazon! We are registered under 'ISAAC UK'. Go to smile.amazon.co.uk today. **#fundraising #onlineshopping**

In Praise of Imprecision

DR. GEORGE TURNER

Email: opinionator12345@gmail.com

It is a truth almost universally acknowledged, that the prime reason why AAC devices exist is to convey messages, so the clearer the language they use the better. However, this article argues that all language is inherently unclear and that this can be a strength as well as a weakness.

Many people have noted the imprecision of language. For example, words frequently have more than one meaning and some words, such as *set*, have dozens. Indeed, Chomsky (2002) has argued that the vagueness and the ambiguity of language shows that its main purpose could not possibly be communication.

This raises the question of why English, and every other natural language, should be so imprecise. This article offers five answers, followed by a plea for users and programmers of AAC devices to appreciate and embrace the benefits of imprecision.

First, as already noted, one form of imprecision is that many words are

ambiguous and in English, at least, this has not decreased over time. Why should this be? One suggestion is that ambiguous words reduce the cognitive load (Piantos, Tily & Gibson, 2012). According to dictionary expert Susie Dent, the average English speaker knows around 40,000 words. Think how many other words they would have to learn to make language more precise! They would need one word for *bank* of a river, one for the financial institution and perhaps more for other kinds of banks where, say, blood or tissue can be stored. Both the sender and the receiver (the listener or reader) of the message would need a greatly increased vocabulary.

Second, messages are often made as precise as possible to help the receiver. However, sending a crystal clear, unambiguous message may not be the best tactic, for instead of engaging the receiver it makes them play a totally passive role. In contrast, a somewhat ambiguous

message must be interpreted. The receiver becomes actively involved in the disambiguation, often using the context as a clue. For example, they have to realise that the word *drink* in the message '*I want a drink*' may mean something different if spoken by a child on a hot day than by an adult in a rehabilitation centre.

Involving the receiver in the message turns a potentially bossy order or bland statement into more of an interaction. In addition, there is a theory of memory called Depth of Processing (Craik & Lockhart, 1972). This claims that the more one has to process information, the more likely it is to be remembered. For example, when first given someone's name, instead of simply repeating it, you could think about the name - possible origins, associations, etc. The more you do so, the harder that name is to forget. Ambiguous or unclear messages have to be worked on. This may make them more memorable.

Of course, messages can be so unclear they cannot be understood, but we are experts at extracting meaning from surprisingly limited information. Perhaps you agree that:

***Msgs mgt b hpt bi som lak of clrty:
mks u thk mor focs mor n remb mor.***

Third, some linguists believe that language does more than express pre-formed thought.

They believe language is an instrument of thought. Consider, for example, studying a new subject. One of the first things you will learn is the new vocabulary associated with that topic. Researchers like Eran Asoulin (2016) argue that such new vocabulary will help to guide your thinking. They do not claim that language is necessary for thought, merely that it aids thought. If true, then ambiguity (including the ambiguity of some common words) could be a catalyst to more profound thinking. Every word opens up a thesaurus, creating ripples of meaning in all directions, and this is especially true of ambiguous words, which can set neurons firing right across the brain. As Richard Solé and Luis Seoane (2015) argue, multiple meanings in language allow us to make fertile connections between disparate concepts. Imprecision can provide a short-cut between ideas.

Moreover, the vagueness of even a single apparently unambiguous word can be an aid to thought. This is because such words and the concepts that underpin them often have “fuzzy” edges (Aitchison, 2012). For example, take *machine* as a noun. Is a dishwasher a machine? Almost certainly, yes. What about a computer? What about the human body? Or the human brain? The flexibility and imprecision of language allows the meaning of an individual term to be extended to areas outside that term’s normal home. Thus, we can employ similes (*the brain is like a machine*) or, even more powerfully, metaphors (*the machine brain*). While treating the brain as if it were a machine or a computer or anything else has limitations, it also may bring great insights. This is only possible because of the “fuzziness”, the imprecision, of individual terms.

Fourth - imprecision and creativity are closely related. All classic literature is classic precisely because it is not precise, i.e., it is open to multiple interpretations. If Hamlet was a straightforward play with a clear message, would we need to see it more than once? Would it be worth re-reading a favourite poem if it had a single

meaning that was obvious at first glance? And why on earth read that classic novel again? When language is at its richest its precision may be at its poorest. Moreover, this very lack of precision leaves space for the receiver and their agenda. It allows them to become not just consumers of the world of the author, but co-creators of that magical world.

Of course, some AAC users may not be interested in great literature, but most will be interested in creating and telling jokes. Many of these jokes rely on the imprecision of language, which sets the mind on one course of thought and then derails it onto another.

Hence, the old joke about two fish in a tank where one says to the other, ‘*How do you drive this thing?*’. Of course, puns can also be serious (Hamlet was too much in the *sun/son*), and the imprecision of language also means that verbal irony, even sarcasm, can always lurk beneath the surface. For example, in Shakespeare’s Julius Caesar, every time Marc Anthony claims that Brutus is ‘an honourable man’, it drives home the conviction that Brutus may well be just the opposite. If language were completely transparent and clear-cut, there would be no room for any such subtext. Indeed, subtexts would not exist. The imprecision of language helps to give it its depth.

Fifth, and finally, it was noted earlier that not everyone believes that the main function of language is communication (Chomsky, 2002). Moreover, others believe that while communication may now be its main function, it did not begin that way. For example, Robin Dunbar (1996) argues that language developed as a form of social grooming and chit-chat, which, while still important for maintaining social relationships, is not noted for its precision. Alternatively, Dean Falk (2009) argues that language started as a way to help mothers soothe their babies (and there is even less need for precise content here). Whatever the truth, a major function of language today is social cohesion. The question is: how well would such cohesion be served if language were precise?

In diplomacy there is a concept called ‘strategic ambiguity’, often seen when two countries meet, fail to agree and then issue a joint statement to which both, thanks to the imprecision of language, subscribe heartily. What applies to countries may also apply to individuals. There is the story of a couple who went

to a book-signing. She loved the book; he hated it. Both repeated the words, ‘*I would like to say how much I enjoyed your work*’. The vagueness and ambiguity of language brought smiles all round.

To summarize: it has been argued that English is inherently imprecise and that this imprecision can be useful. In particular, imprecision reduces the vocabulary needed; it promotes engagement; it aids thinking; it spurs creativity, and it can help social cohesion. Of course, sometimes it is vital to be as precise as possible (emergency situations, legal documents, and articles such as this come to mind). However, a world that had no room for imprecision would be impoverished. It would be a world without simile, metaphor, irony, rhetoric, subtext or poetry. A world with limited imagination, thinking, creativity, humour or diplomacy. In short, it would be a world with limited humanity.

What does all this mean for the AAC user and their programmer? It means: don’t shy away from vague, ambiguous or otherwise unclear words, phrases and sentences. Instead, incorporate them into your devices and, when appropriate, use them. Relish their uncertainty and the complexity, subtlety and depth they can bring to your thoughts, your creativity and your conversation. Embrace imprecision as readily as you embrace precision: don’t linguistically short-change yourself or anybody else.

References

- Aitchison, J. (2012). Words in the Mind: An Introduction to the Mental Lexicon (4th Edition) Chichester, West Sussex: Wiley-Blackwell
- Asoulin, E. (2016). Language as an instrument of thought. *Glossa: A Journal of General Linguistics*, 1, 1, 1-23
- Chomsky, N. (2002). An interview on minimalism. *N. Chomsky, On Nature and Language*, 92-161.
- Craik, F. I. M., & Lockhart, R. S. (1972). Levels of processing: A framework for memory research. *Journal of Verbal Learning and Verbal behavior*, 11, 671-684.
- Dunbar, R. (1996). Grooming, Gossip and the Evolution of Language, Harvard: Harvard University Press
- Falk, D (2009). Finding our tongues: Mothers, infants and the origins of language. New York: Basic Books
- Piantadosi, S.T., Tily, H., Gibson E. (2012). The communicative function of ambiguity in language. *Cognition*, 122, 3, 280-291
- Solé, R & Seoane, L.F. (2015). Ambiguity in language networks. *Linguistic Review*, 32, 1, 5-35



AVAILABLE NOW: MIND EXPRESS 5

Shown here on
the new VIBE 12

NEW FEATURES INCLUDE:

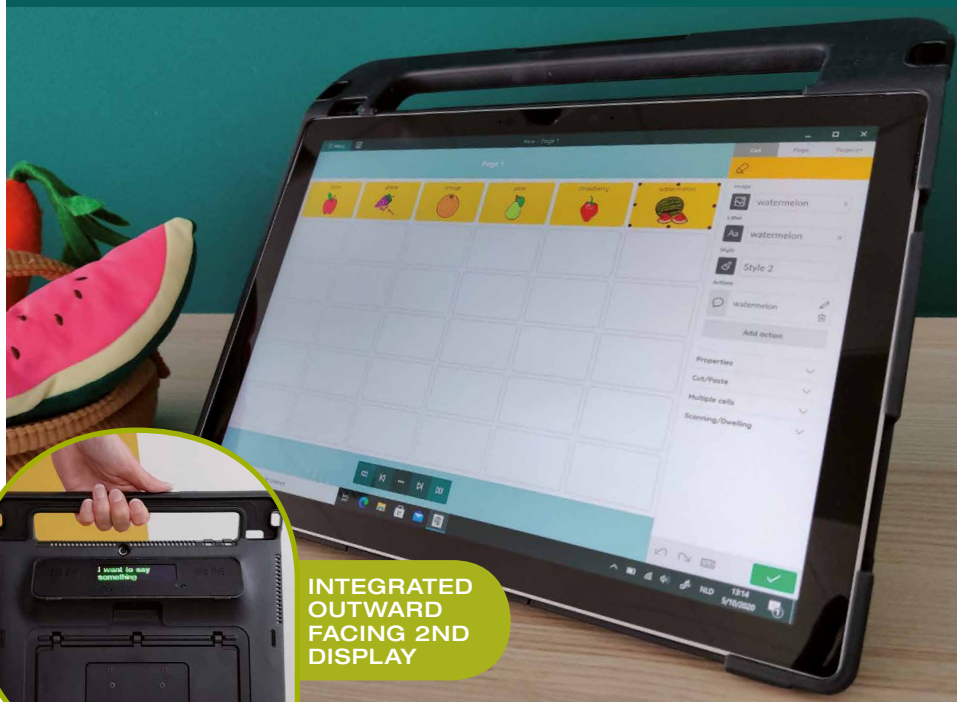
- ◆ The facility to change the label according to the grammar
- ◆ A find the word feature with a guided pathway
- ◆ Multiple dwell times
- ◆ Quick fill
- ◆ Up to 16 scan groups
- ◆ Remote Editing
- ◆ Onscreen wizards
- ◆ Extensive pre-made pagesets



TO FIND OUT MORE, VISIT:
www.techcess.co.uk/mind-express-5

INTRODUCING THE NEW VIBE 12

Call: 01476 561991 or email: sales@techcess.co.uk



**INTEGRATED
OUTWARD
FACING 2ND
DISPLAY**

The Vibe is our newest communication aid for active users. Its practical size and light weight makes it a highly portable.

FEATURES INCLUDE:

- ◆ Wake up or turn off with touch screen press
- ◆ Switch sockets
- ◆ Integrated Environmental controls
- ◆ Robust case with inbuilt carry handle
- ◆ Wheelchair mounting options
- ◆ Clearplex screen protector
- ◆ Front & rear cameras

Smartbox communication aids

Powered by

Grid

Grid Pad 12



Grid Pad 15



Dedicated AAC

High spec computer | Tough antiglare display | All day battery life
Built for all access methods | Environment Control | Remote power button

Touch Pad



Talk Pad



Portable AAC

Lightweight | Rugged case | Amplified sound | Mounting options
Keyguard compatible | Handle and adjustable strap

Arrange a free visit to try a device:
thinkSmartbox.com/visit