

AAC Options for Literate Users with Complex Communication Needs

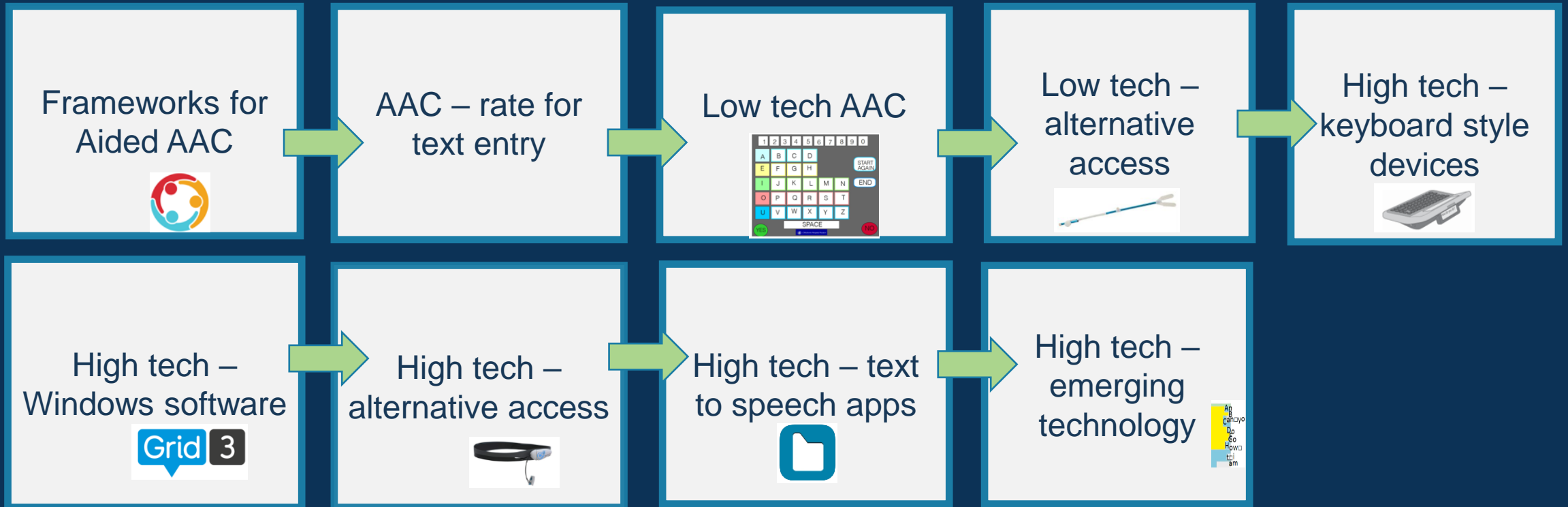
Medical Aids Subsidy Scheme

14 October, 2021



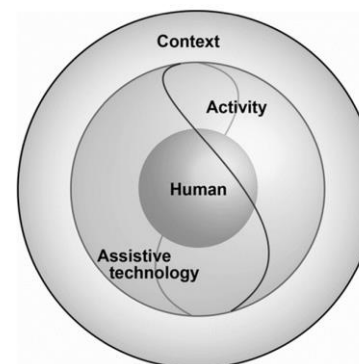
Queensland
Government

Overview



Frameworks for Aided AAC

- **Human Assistive Technology Model⁶**



Cook and Hussey, 1995

- **Speech Pathology Australia Clinical Guidelines for AAC, 2012**
(Client/family centred approach, Team approach, Participation Model
Dynamic assessment and feature matching, training, mentoring and support)
- **International Classification of Functioning, Disability and Health (ICF)**
- **Janice Light's Definition of Communicative Competence** (linguistic, operational, social, strategic and psychosocial competence)



Speed of Using Keyboards for People with Physical Impairments

One quantitative metric for average speeds is shared by Koester and Arthanat (2018)⁹:

- Automatic speech recognition = 15.4 words per minute
- Standard keyboard = 12.5
- Cursor on-screen keyboard = 4.2
- Scanning on-screen keyboard = 1.7

Other reports of 15 – 65 word/minute when using prestored sentences/paragraphs²

- ✓ Word and sentence prediction
- ™ Abbreviation expansion
- 👤 Personalised phrases
- 📶 GPS with Grid 3 (optional)

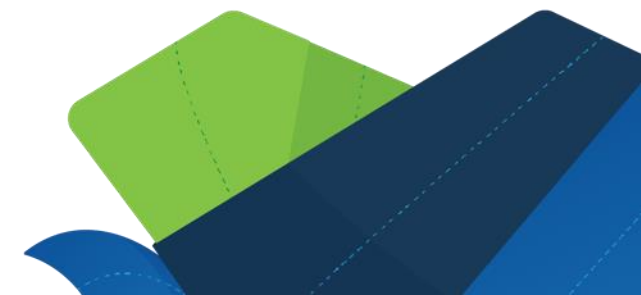


Low Tech Communication Aids

Pros: lightweight, easily portable, no need for power, low cost, can be easily cleaned if laminated, can be used when the client is in a variety of positions

Cons: vocabulary may be limited, no voice output, need to be dependent on the communication partner, cannot save messages

Considerations: access (physical, visual skills), size, number of letters/phrases/symbols per page, spaces between cells, use of colour, skills of communication partner



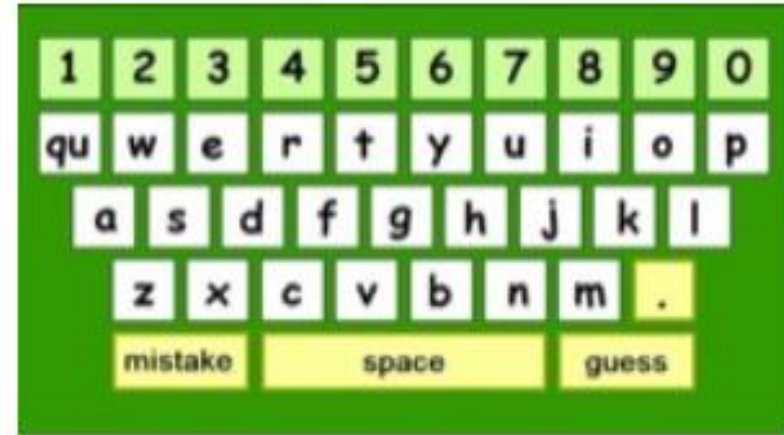
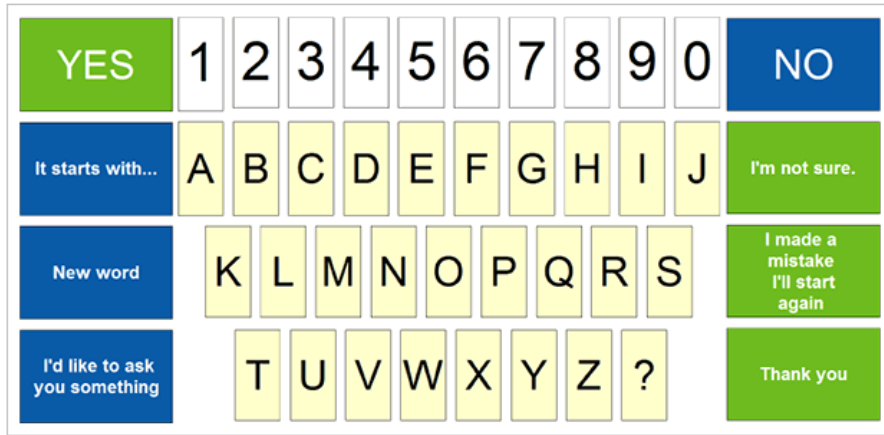
Queensland Health

Alphabet Boards – letters only

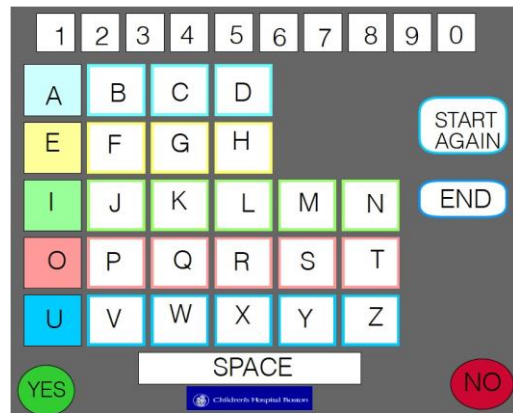


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Direct Access: ABC vs QWERTY layout

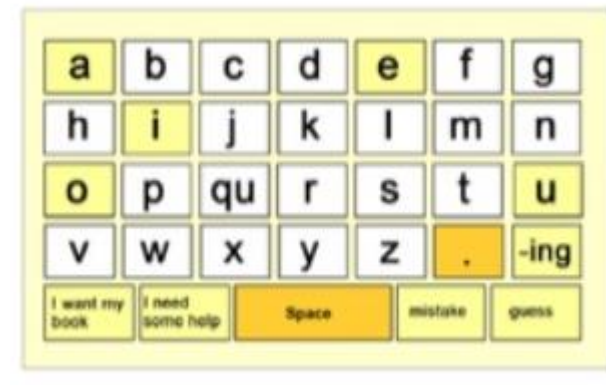


Alphabet Board ABC : Spectronics



Patient Provider Communication Alphabet Boards

ACE Centre Alphabet Charts



ACE Centre Alphabet Charts

AEIOU Layout – Prentke Romich Company



Please ask me if I would like to spell a message, be asked a yes/no question or say a quick phrase. For spelling, follow along as I point to a letter. If I cannot point myself, slowly point to and say A, E, I, O, U. When I indicate* my desired letter is in the row, point to each letter in that row until I indicate* my desired letter. If I want to say a phrase, point to and say 1-6 until I get to my desired phrase.

11/08/16 9:32AM
(5) ESSENCE LOW TECH

| | | | | | | | |
|--------------------|-----------------------|------------------|-----|-------|------------|---|------------|
| I want to spell it | Ask me a Y/N question | Go to my phrases | YES | NO | MAYBE | 1 | |
| A | B | C | D | space | start over | 2 | |
| E | F | G | H | guess | mistake | 3 | |
| I | J | K | L | M | N | 4 | |
| O | P | Q | R | S | T | 5 | |
| U | V | W | X | Y | Z | 6 | other side |

*Using an eye blink is often the most reliable way for a person to signal their partner; however, other movements may be used so long as the partner knows which response to watch for while communicating with the individual (i.e. looking up, smiling, or tapping a finger).



| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|----|

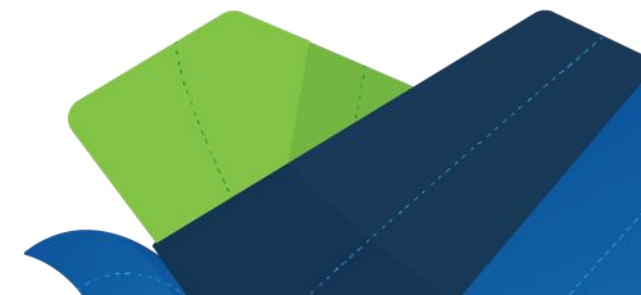
| | |
|---|------------|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | other side |

prentrom.com

Essence® for Accent Devices
By Prentke Romich Company

043018kmk

[Low Tech Boards Essence 043018.pdf \(prentrom.com\)](#)

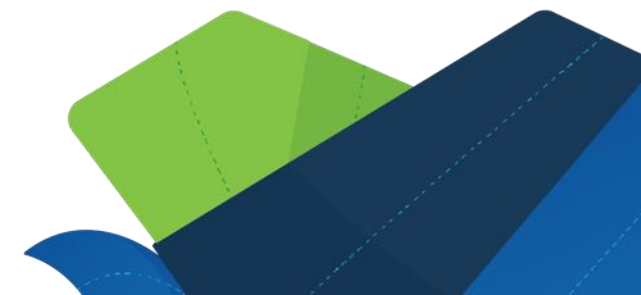


Hospital

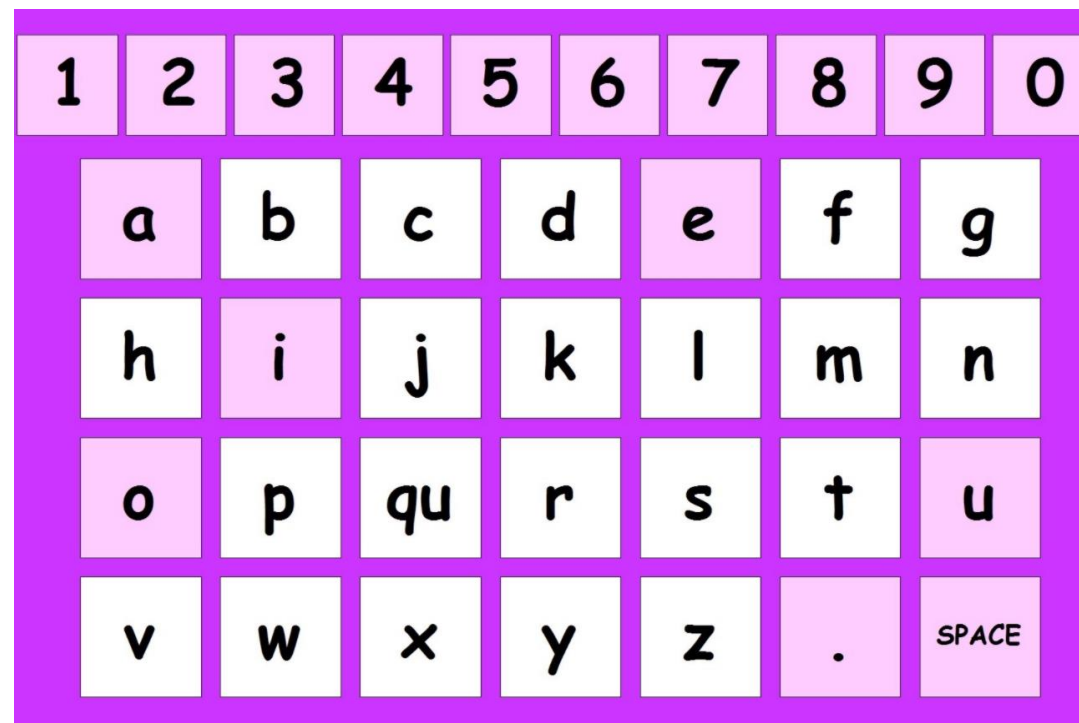
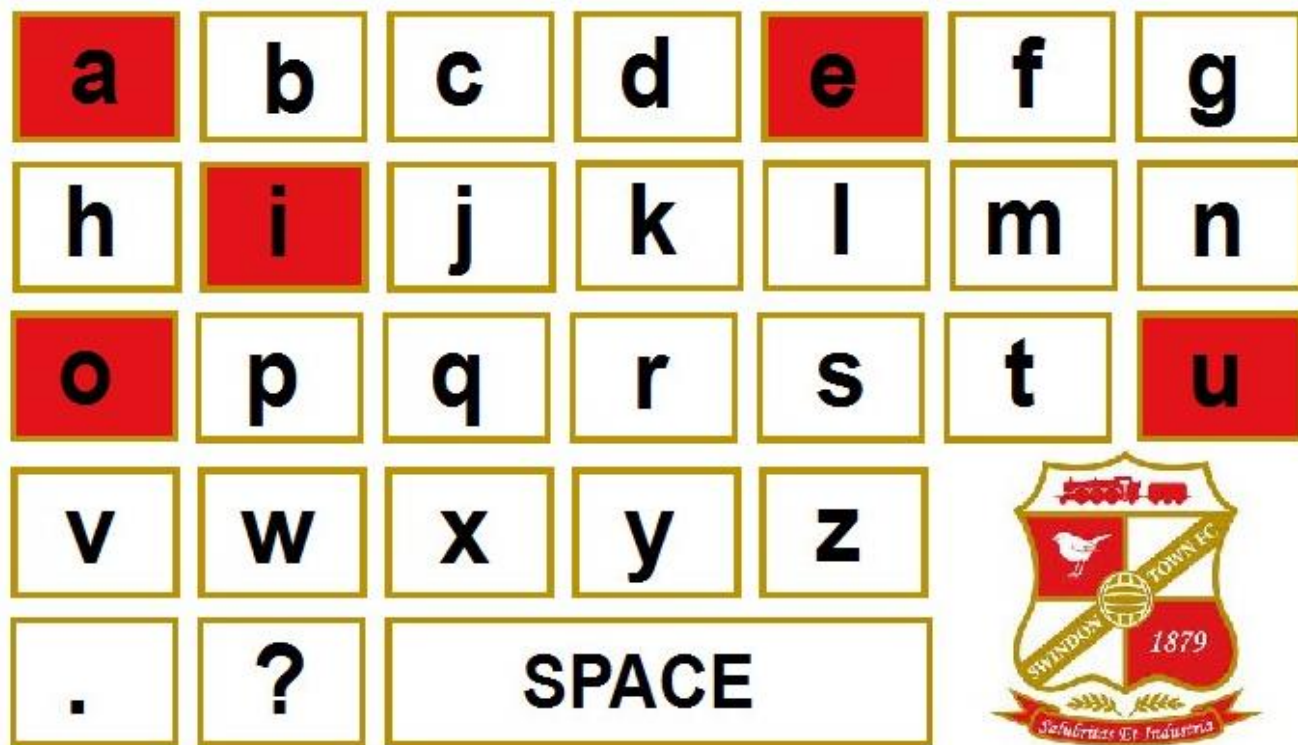
| | | | | | | | | | | | |
|---------------|--------|---|-----|---------|-------|---|------|------|---------|--------------------|---------|
| YES | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | NO |
| New word | A | B | C | D | E | F | G | H | I | J | Give me |
| Please repeat | K | L | M | N | O | P | Q | R | S | I don't understand | |
| STOP | T | U | V | W | X | Y | Z | More | | | |
| HELP | Hungry | | Hot | | Hello | | Cold | | Thirsty | | PAIN |
| | | | | Goodbye | | | | | | | |

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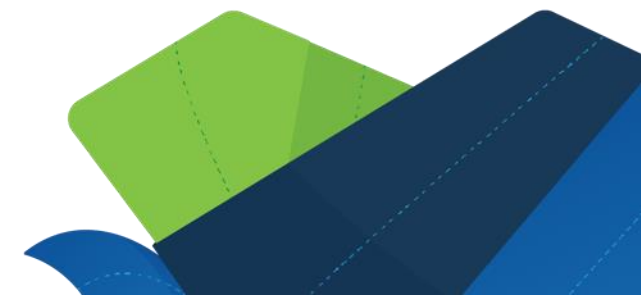
[Augmentative and Alternative Communication Devices - Amy Speech & Language Therapy, Inc.](#)



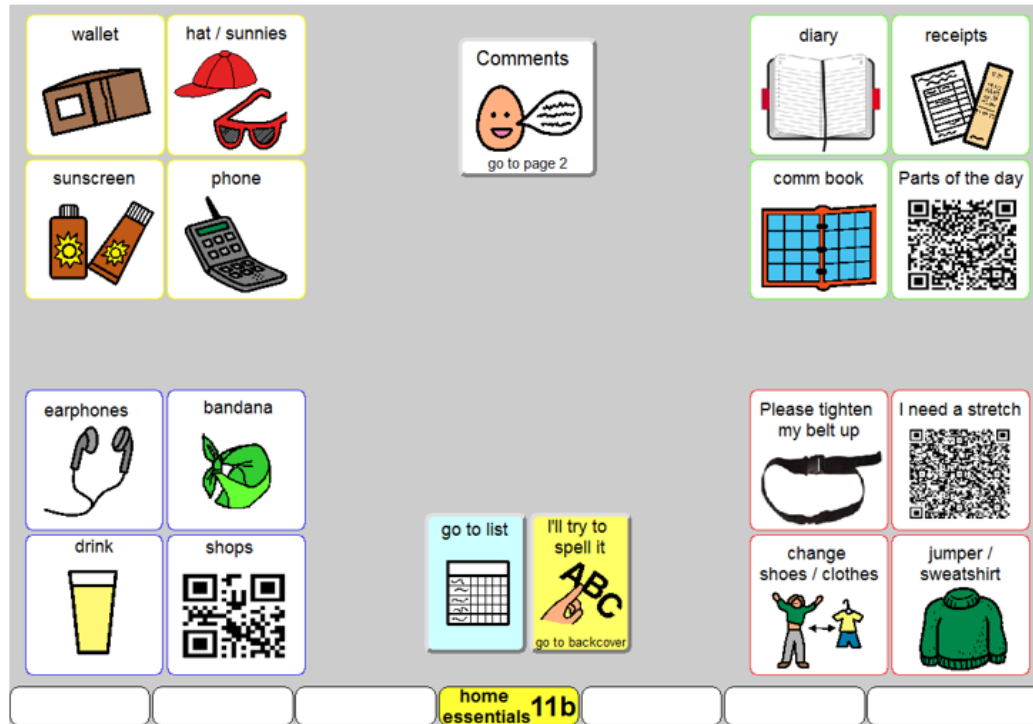
Personalised Alphabet Boards



<https://acecentre.org.uk/product-category/alphabet-charts/>



Incorporating QR Codes into Communication Books



Ruben shares a special moment:



A demonstration of modelling with an auditory scan book:



[Pragmatic-based Auditory scan book | Ace Centre](#)



Queensland Health

Alphabet Boards - Letters and Words



Queensland
Government

AlphaCore Communication Board

(Amy Roman – Amy and Pals, 2018)

| | | | | | | | | | | | | | |
|--------|-------|-------|--------------|------|-------|-------|--------|--------|------------|---------|-----------|------------|-------|
| A | About | All | Also | And | Any | Are | As | At | Be | Because | Been | But | By |
| Can | Come | Could | Did | Do | Does | Down | Every | Feel | For | From | Get | Give | Go |
| Good | Had | Has | Have | He | Help | Her | Him | His | How | I | I'm | If | In |
| Is | It | It's | Just | Know | Let | Like | Look | Make | Many | May | Maybe | Me | Might |
| More | Most | Move | Much | Must | My | Need | No | Not | Now | Of | Off | Okay | On |
| One | Only | Or | Other | Our | Out | Over | Please | Put | Rest | Said | Say | See | She |
| Should | So | Some | Still | Stop | Take | Talk | Than | Thanks | That | The | Their | Them | Then |
| There | These | They | Think | This | Those | Time | To | Today | Tom-morrow | Too | Up | Us | Use |
| Want | Was | We | Were | What | When | Where | Which | Who | Why | Will | With | Work | Would |
| Yes | You | Your | Qu | W | E | R | T | Y | U | I | O | P | . |
| | | | MESSAGE CODE | A | S | D | F | G | H | J | K | L | , |
| | | | SPACE | Z | X | C | V | B | N | M | BACKSPACE | START OVER | ? |
| -ed | -ing | -s | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | : |

Please say each word or letter aloud after I point to it.

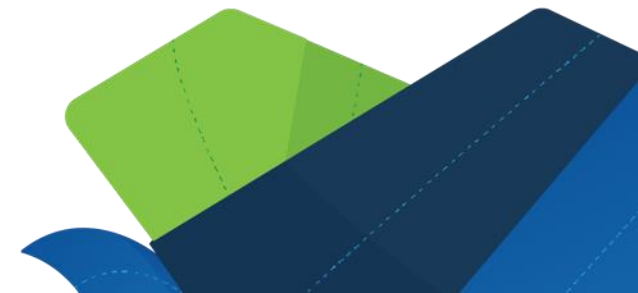
| A. Main Needs | B. Positioning | C. Social |
|--------------------------|--------------------------|---------------------------|
| A-1 I need suctioning | B-1 Elevate Head of Bed | D-1 Hi, How Are You? |
| A-2 I am in pain | B-2 Lower Head of Bed | D-2 What's New? |
| A-3 I need to pee | B-3 Adjust Head Pillow | D-3 How's the Family? |
| A-4 I need the bedpan | B-4 Adjust Other Pillows | D-4 Please Be Patient |
| A-5 I am cold/hot | B-5 Pull Me Up | D-5 |
| A-6 I need to be cleaned | B-6 Elevate Foot of Bed | D-6 |
| A-7 | B-7 Lower Foot of Bed | D-7 Tell Me More About it |
| A-8 | B-8 Reposition me | D-8 |
| A-9 | B-9 | D-9 It's So Good 2 C U |

Encoded Language



Different Ages – Different Vocabularies

Core word lists for different ages



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Alternative Access to Low Tech Communication Aids



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Stylus for Access



Eye Pointing

AEeyeOU board

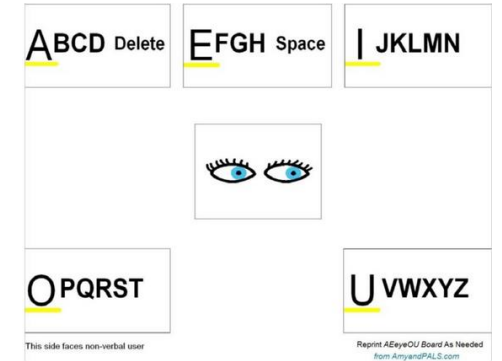
<https://amyandpals.com/communication-boards/>

Eyelink

[EyeLink Communication Boards - Assistive Technology - \(barnsleyhospital.nhs.uk\)](http://barnsleyhospital.nhs.uk)

SPEAKBOOK

<https://acecentre.org.uk/project/speakbook/>




Partner Assisted Scanning

Partner Assist AEIOU part I, II and III

Partner – Assisted Spelling using an AEIOU configuration

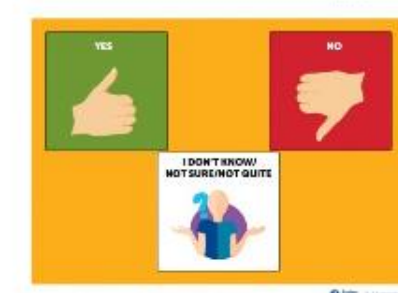
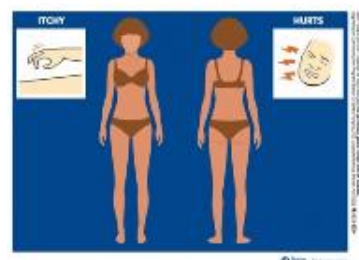
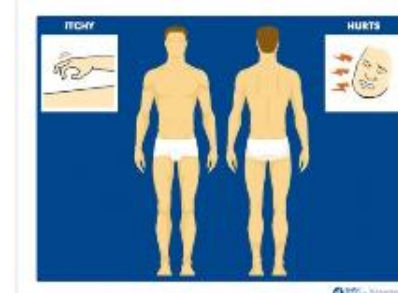
Watch later Share



Boston Children's Hospital
ALS Augmentative
Communication Program

Boston Children's Hospital
ALS Augmentative
Communication Program

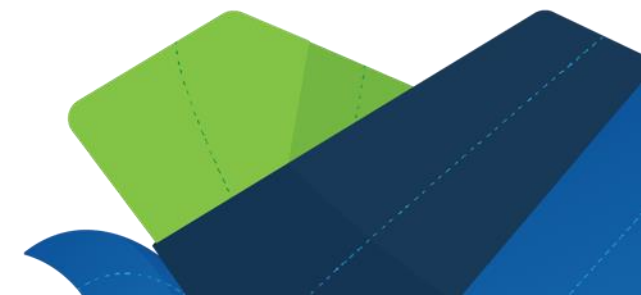
HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL



[Jay S. Fishman ALS Augmentative Communication Program | Quick-Access & Low-Tech Tools | Boston Children's Hospital \(childrenshospital.org\)](http://childrenshospital.org)

| | | | | | |
|---|---|----|---|----------|-------------|
| A | B | C | D | . | Mistake |
| E | F | G | H | New word | Start again |
| I | J | K | L | M | N |
| O | P | Qu | R | S | T |
| U | V | W | X | Y | Z |

[AEIOU Board \(barnsleyhospital.nhs.uk\)](http://barnsleyhospital.nhs.uk)



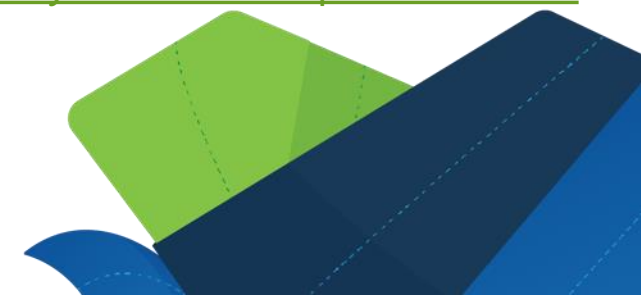
Partner Assisted Scanning Cont.

| | | | | | |
|-------|-----|------|---|---|---|
| A | B | C | G | H | I |
| D | E | F | J | K | L |
| M | N | O | S | T | U |
| P | Q | R | V | W | X |
| space | end | oops | Y | Z | |

| | |
|-----------------------|----------|
| Quick chat | go to 2 |
| Something's wrong | go to 3 |
| I don't like this | go to 4 |
| I like this | go to 5 |
| Categories | go to 7 |
| I want something | go to 9 |
| Let's go somewhere | go to 10 |
| I'm asking a question | go to 6 |
| I shall spell it | go to 18 |

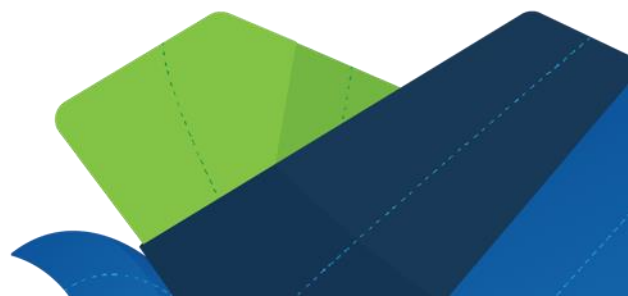
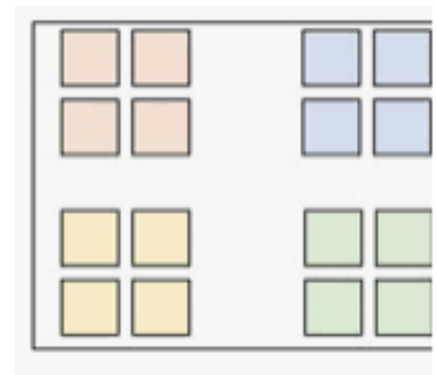
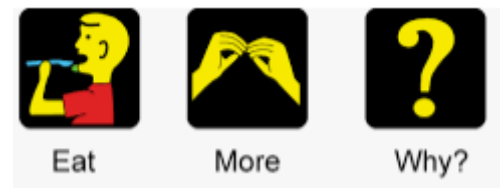
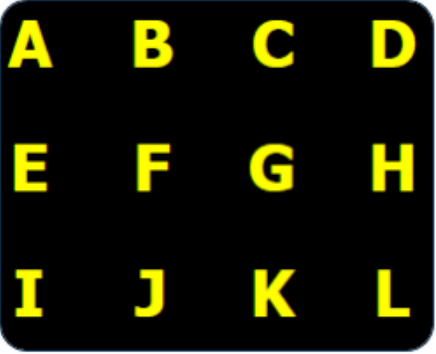
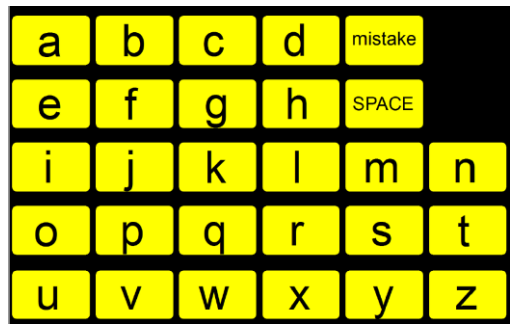
[Pragmatic-based Auditory scan book | Ace Centre](#)

[Alphabet Boards | Communication Tools and Materials
\(Patient-Provider Communication Network\)](#)



Support for VI

- High contrast letters, symbols
- Magnification/zoom
- Braille
- Auditory prompts on SGDs
- Layout alphabet like old phone



Support for PI

- Modified layout
- Modified technique
- Keyguards
- Adapted keyboards (e.g. compact, Cherry)
- Voice activation
- iOS and software accessibility features
- Partner assisted scanning
- Devices for indirect access e.g. switches, joysticks, head-operated devices, eye gaze

| | | | | | |
|-------|---|---|---|--------|---|
| z | v | c | h | w | k |
| f | i | t | a | l | y |
| SPACE | | n | e | DELETE | |
| g | d | o | r | s | b |
| qu | j | u | m | p | x |

[Ace Centre - Fitaly](#)



Speech Supplementation Strategies

Topic Cards

| People | Places | Thing | Time | Question | Describe | Action |
|-----------|--------|--------------|---------------|----------|------------|--------------|
| Family | Home | Food | Now | Who? | Looks like | Need or Want |
| Friends | School | TV | Before/ Past | What? | Used for | Help |
| Classmate | Work | Radio/ Music | Later/ Future | When? | Size | Tell |

Alphabet Cards

| | | | | | |
|----------|-----------|------------|-----------|--------|-----|
| A | B | C | D | | Yes |
| E | F | G | H | | |
| I | J | K | L | M | N |
| O | P | Q | R | S | T |
| U | V | W | X | Y | Z |
| New word | Not right | Start over | Next word | Thanks | No |

<https://praacticalaac.org/strategy/speech-supplementation-strategies/>

Combined – Topic and ABC

| Small Talk | Horses | Dogs | Cats |
|----------------|--------------------------|--------------|----------------|
| Family | Weather | Church | Food |
| Personal Care | A B C D START OVER | YES | PLEASE REPEAT |
| Transportation | E F G H | NO | EACH WORD |
| Travel | I J K L M N | MAYBE | SO I KNOW YOU |
| Appointments | O P Q R S T | I DON'T KNOW | UNDERSTAND ME. |
| Health | U V W X Y Z | FORGET IT | |
| Travel | I HAVE SOMETHING TO SAY! | THIS IS | |
| Trips | I WILL SPELL THE WORD. | IMPORTANT! | |
| Appointments | I WILL SAY THE WORD. | EXCUSE ME! | |

AlphaTopics - AAC

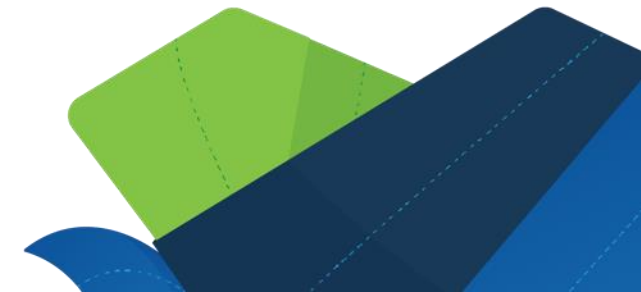
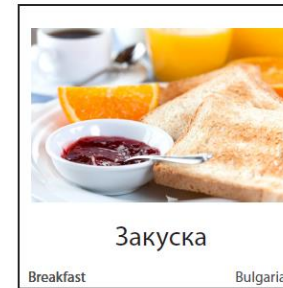


Cultural Considerations for using AAC

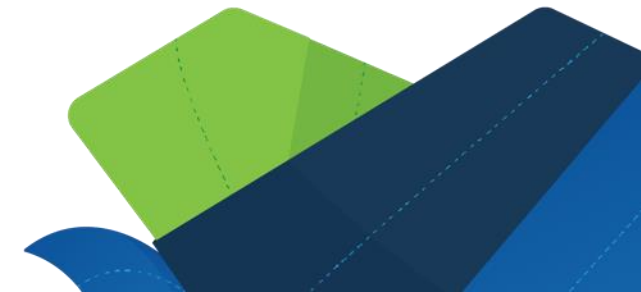
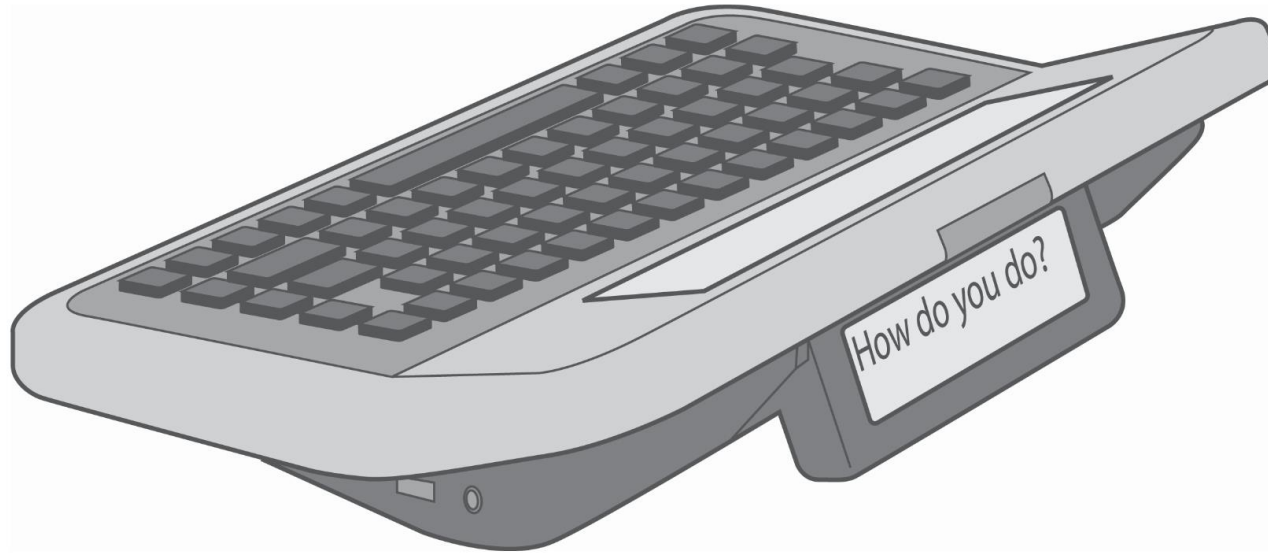
- Need to consider the attitudes, knowledge, and beliefs of the individual and his or her family members with regard to disability and the use of AAC
- Use an interpreter service or cultural liaison officer
- The [Centre for Cultural Diversity in Ageing](#) offers low tech communication boards in many different languages
- Qld government also has a [Ward Communication Tool \(health.qld.gov.au\)](#)
- Many software applications are available in different languages



Bulgarian/English Bilingual Communication Cards



High Tech Options



Considerations for AAC Selection

- Access and ease of use
- Ability to meet current and future communication needs
- Size of letters and symbols/photos
- Reliability
- Organisation of vocabulary
- Voice options, including integration of banked messages and voices
- Affordability and ease of maintenance
- Ease of editing/remote editing
- Levels of motivation of individual
- Technology skills/support of family and carers
- Seating and positioning
- Need for accessories e.g. switches and mounts
- Additional features – photos, music, phone, emails, social media, SMS by pairing phone to device, environmental control, games, ability to mount/integrate with wheelchair



Literate Users – Sequencing Symbols

- Semantic Compaction e.g. Unity, LAMP Words for Life
- Speak for Yourself app



Keyboard Style Devices

Lightwriter SL50

- Three different depth keyguards
- Range of rate enhancers and voices
- Phone calls and SMS (android phone)
- Scanning option

Allora 2

- One keyguard
- Range of rate enhancers and voices
- Detachable second display
- GEWA environmental control
- SMS
- Additional RealSpeak Languages (European)



Some Communication Software Options for Windows Devices



Communicator 5



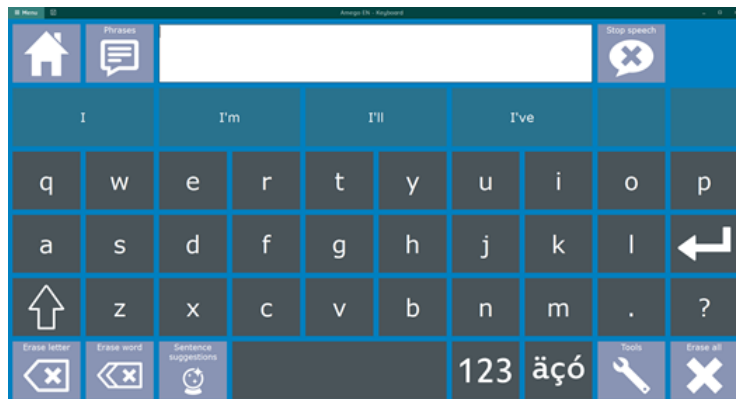
Grid 3



TD Snap



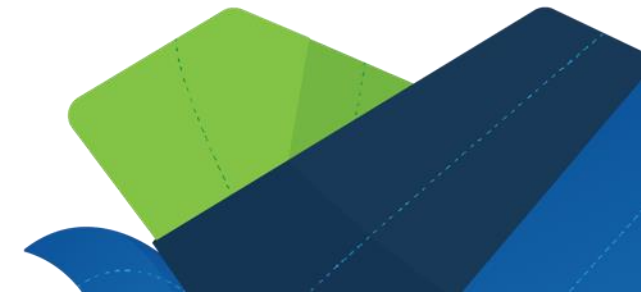
Essence



Mind Express 5



WordPower



Free Downloads

You could do a free trial of Grid 3 with your client (60 days)

- [Zytek - Electronic Assistive Technology Australia](#)

Or Mind Express 5 (60 days) – choose ‘demo’

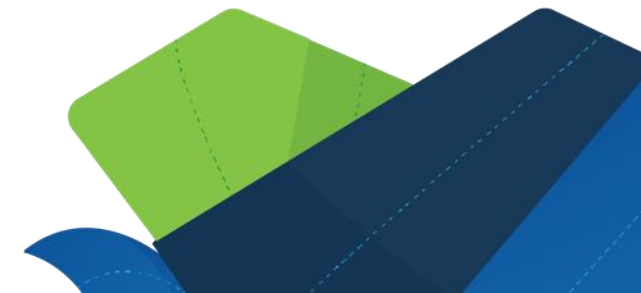
- [Zytek - Electronic Assistive Technology Australia](#)

Or Communicator 5 (30 days):

- [Communicator 5 \(mytobiidynavox.com\)](#)

Or TD Snap (without speech) (60 days)

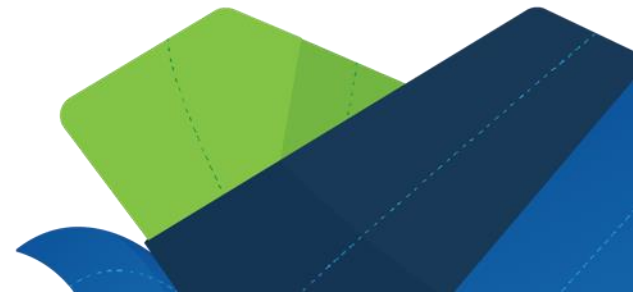
- [TD Snap \(mytobiidynavox.com\)](#)



Poll

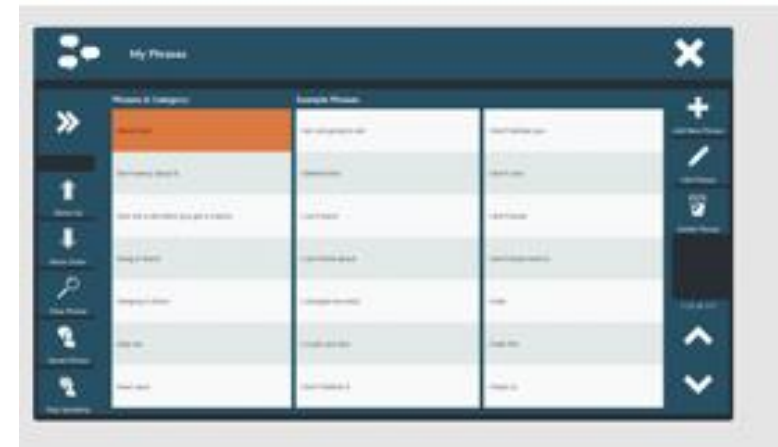
Which AAC text-based Windows software do you use with clients?

- Communicator 5
- Grid 3
- Mind Express 5
- Essence
- Other – please write in Chat



Communicator 5

- Keyboard plus phrases
- Multiple Access Methods
- Ability to control Windows desktop
- Access to variety of applications, including social media
- Stream movies and videos
- Choice of keyboard
- 'Quick-talk' feature
- Multiple languages



Grid 3 – Text Talker



| | | | | | | |
|------|---|---|---|---|---|----|
| I | O | A | E | N | C | D |
| I'm | T | H | S | L | M | V |
| I've | I | R | U | B | K | Qu |
| I'll | F | P | G | X | Z | |
| The | W | Y | J | | | |

Number of scan steps required:



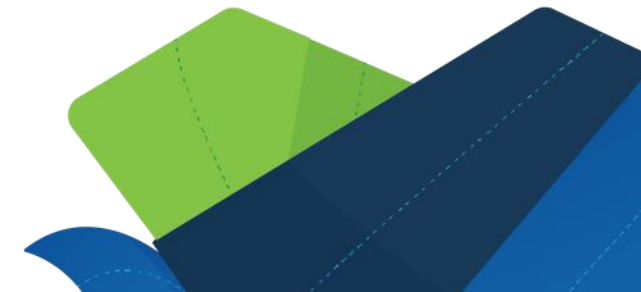
Message Banking

Please can I have something to eat?

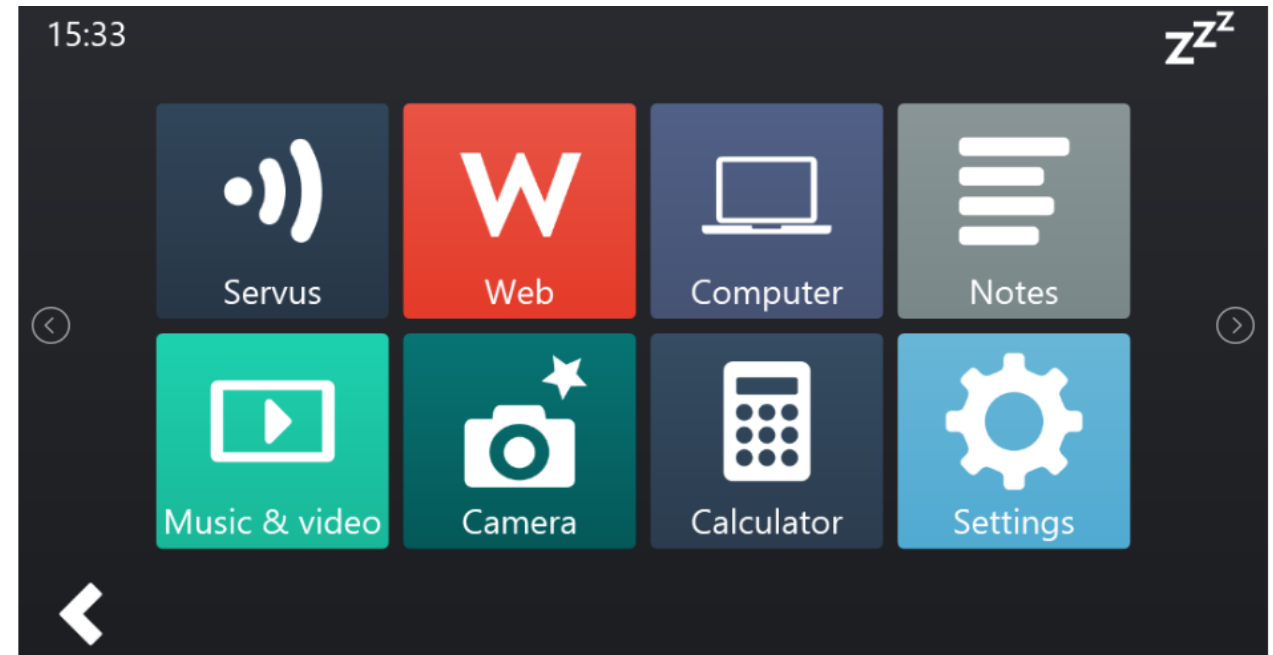
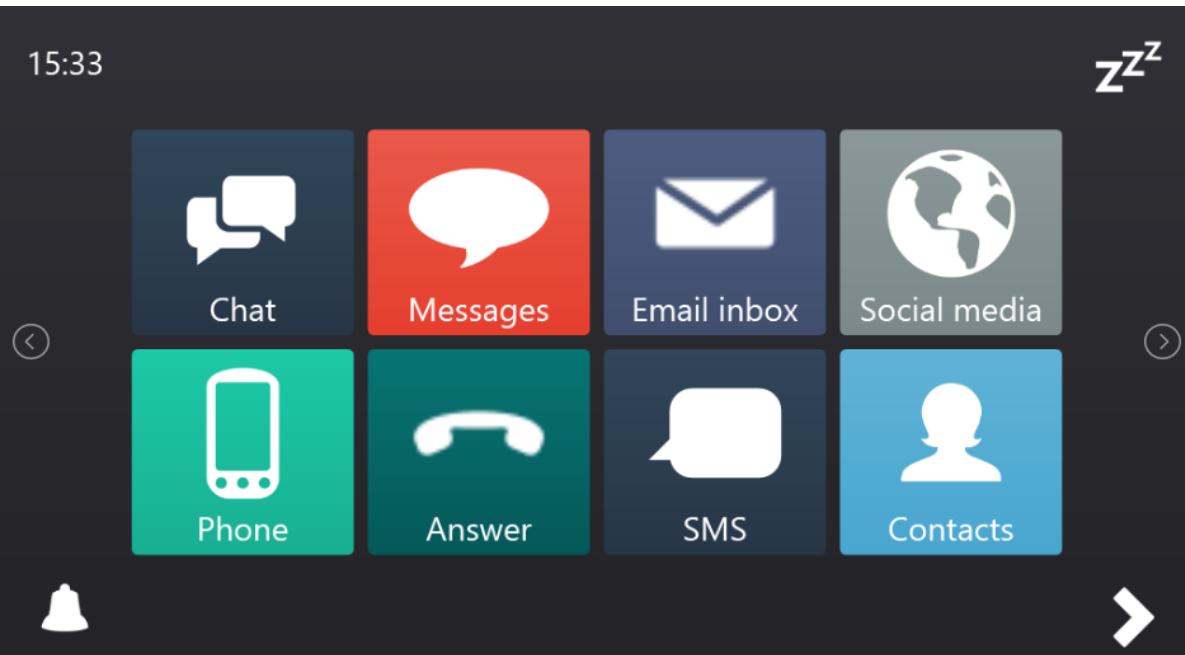
Quick Phrases

| | | | |
|----------------------|-------------------------------------|------------------------|---------------------------------|
| Eating and drinking | I'm hungry | I'm thirsty | I'd like a drink, please |
| Medical appointments | Please can I have something to eat? | Can I have some more? | Please can you pass that to me? |
| Shopping | I've had enough | I don't like the taste | It's delicious |

<https://thinksmartbox.com/news/get-started-with-text-talker/>



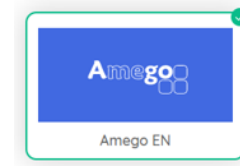
Grid 3 – Fast Talker



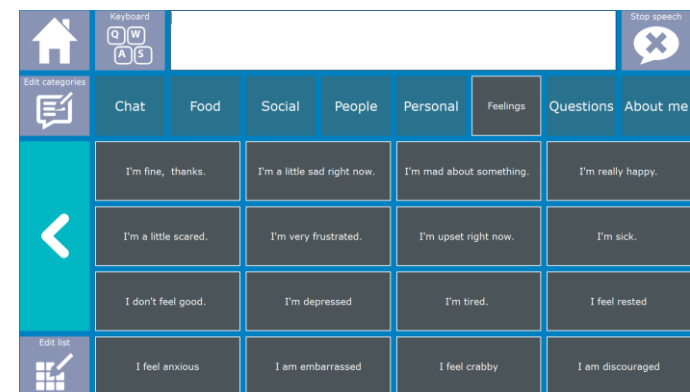
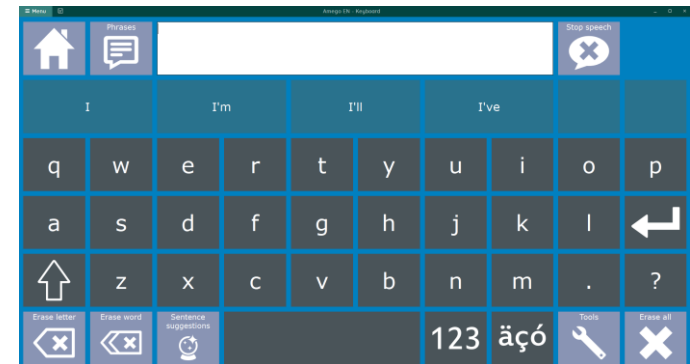
[Access options - thinksmartbox.com](http://thinksmartbox.com)



Mind Express 5 - Amego



- Access to words, phrases and sentences
- Amego is for text-based communication
- Verbs are auto-conjugated
- Word and sentence prediction
- Five keyboard choices
- Applications include SMS, email, Facebook, Twitter, Instagram, Kindle, WhatsApp and YouTube
- Environmental control
- Windows control
- Multiple access methods and pages will adapt depending on the access method chosen



Essence – PRC devices and Chat devices

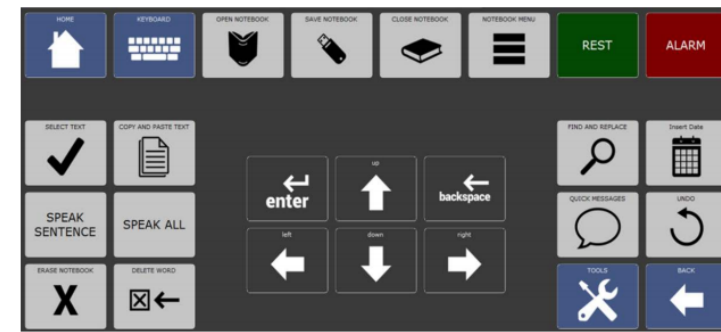
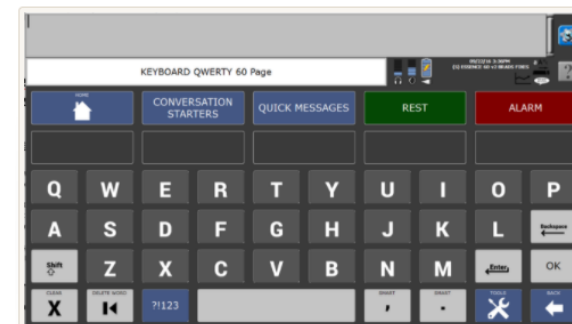
Keyboard options: 36, 50, 84, 144

ABC and QWERTY layouts

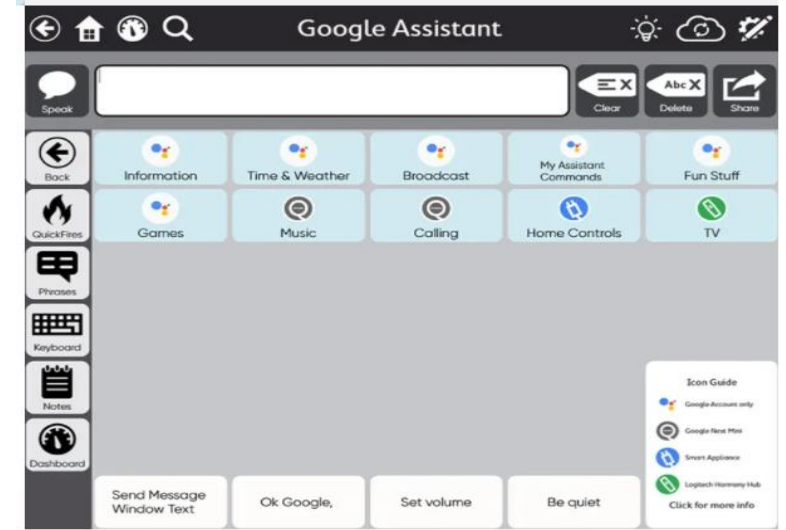
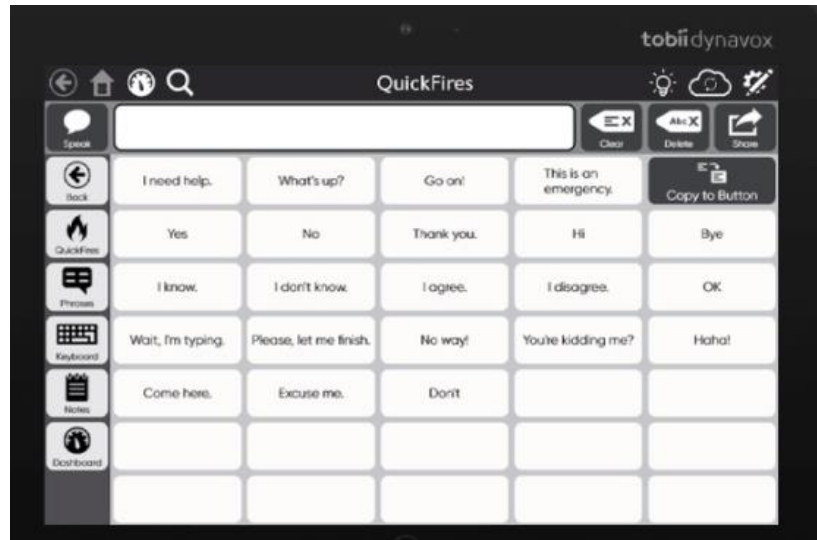
Face-to-face communication plus phone, notebooks, web browsing

Pages for environmental control

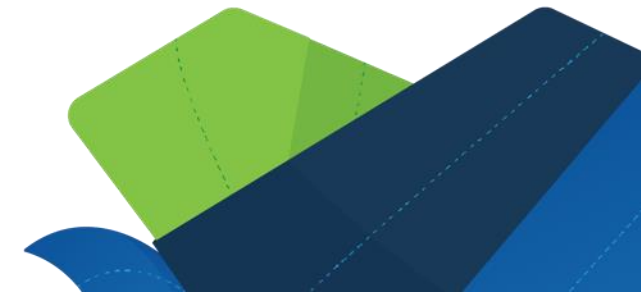
Supports virtual desktop, Facebook, gmail, Cortana, itunes, Skype



TD Snap



[TD Snap Text page set - Tobii Dynavox US](#)



Mouse Alternatives



Head pointers



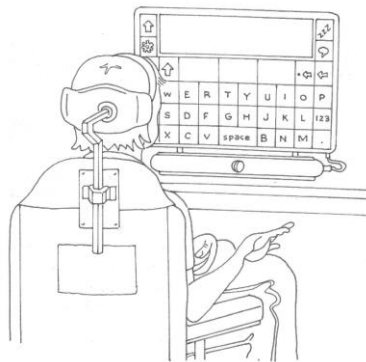
Quha Zono
gyroscopic mouse



Nous eye blink switch



IntegraMouse
Plus



Eye gaze



EMG switches



Brainfingers

Mounting Systems for SGDs



Wheelchair



ClampOnMount



Floorstand



Message Banking and Voice Banking

Windows software

- Communicator 5 (message banking and Acapela's My-own-voice)
- Grid 3 (message banking Model Talker and CereVoice Me)

IOS apps

- Predictable: download ModelTalker voice, Acapela's My-own-voice
- Dialogue: Can create a voice in TheVoiceKeeper in the app and can import ZIP files for banked messages
- Proloquo4Text: download Acapela's my-own-voice
- TouchChat HD: TheVoiceKeeper, VocaliD

Android apps

- NOVA Chat
- MyVocaliD – VocaliD custom voice



Considerations for Using iPads for AAC

Pros

- Multifunctional
- More motivating for some
- More affordable
- Lightweight, portable
- More socially acceptable
- User familiarity with device
- Carer familiarity with device
- SP familiarity with device

Cons

- Not as many access options
- Not dedicated (although can lock app in)
- Decreased volume (need accessories)
- Not as robust
- Lower battery life
- Other members of the family may borrow it



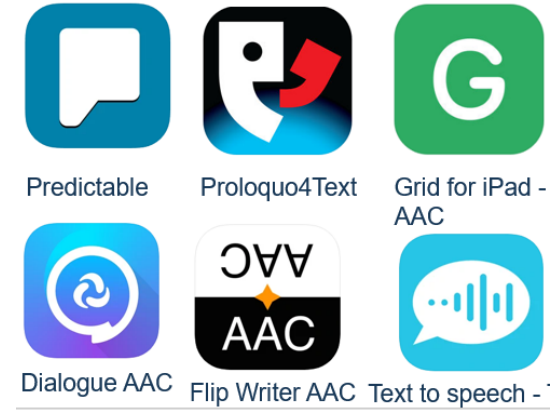
MASS - iPad for AAC Trial



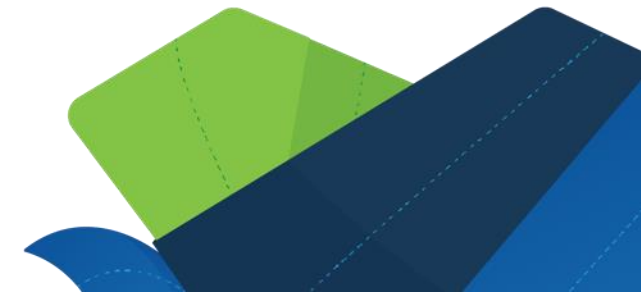
10.2" iPad



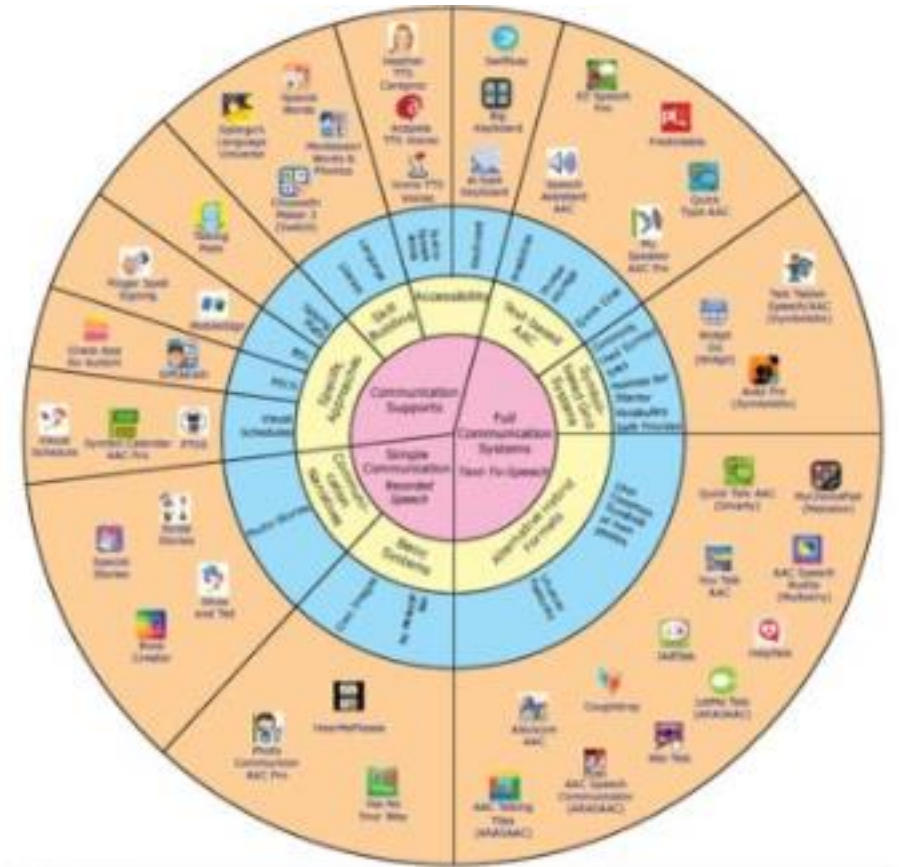
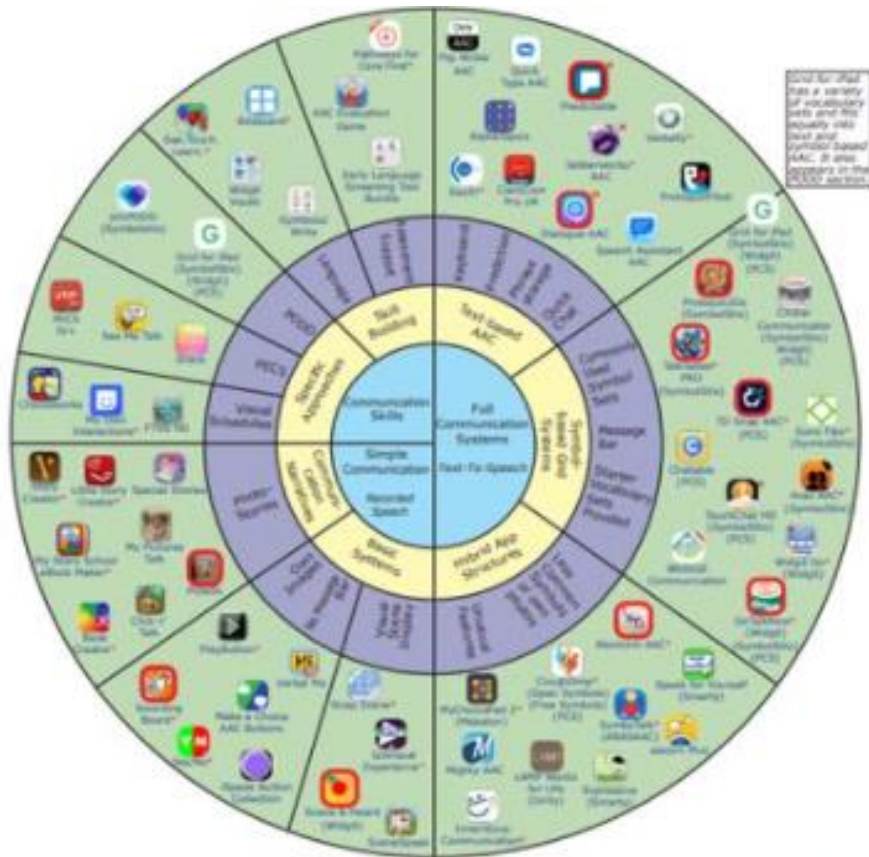
Speech Case



Choice of AAC app



Call Scotland AAC App Wheels



[Ipad Apps for Complex Communication Support Needs \(callscotland.org.uk\)](http://callscotland.org.uk)

[Android Apps for Complex Communication Support Needs \(callscotland.org.uk\)](http://callscotland.org.uk)

Text-based AAC Apps



Predictable



Proloquo4Text



Grid for iPad -
AAC



Verbally
(Premium)



ClaroCom (Pro)



Dialogue AAC



Flip Writer AAC



Text to speech - Talkie



Jabberwocky AAC

[Touch-Free Accessibility
- jabberwockyapp.com](http://jabberwockyapp.com)

Poll

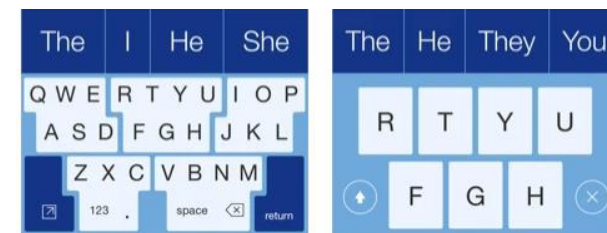
What text-to-speech apps do you use with your clients?

- Predictable
- Proloquo4Text
- Grid for iPad-AAC
- Verbally
- Other – please write in Chat



Alternative Onscreen Keyboards

- **Keedogo Plus** – different colour schemes, ABC layouts, fonts, capitals/lower case, word prediction
- **Keeble** – different themes, colours, fonts, word prediction, touch access options, 2 scanning options, auditory feedback
- **Superkeys** – Keys are clustered together and when you tap on the cluster, larger keys are shown. Can customise with colours and font
- **Smart Keyboard Pro** – For android devices. Customisable keyboard, available in different languages



Symbol-based AAC apps with text



Proloquo2Go



GoTalk Now



TouchChat HD



Sono Flex (Lite)



AVAZ Australia



CoughDrop



LAMP Words for Life



Speak For Yourself



TD Snap AAC



Tobii Dynavox
Compass Connect

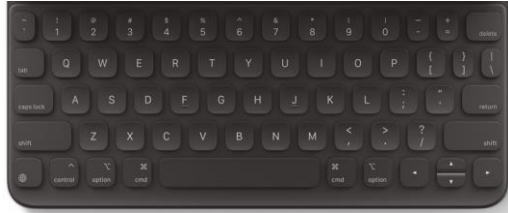
Feature Matching of Apps⁷

Table 1 Clinical Features Considered in the Selection of Apps

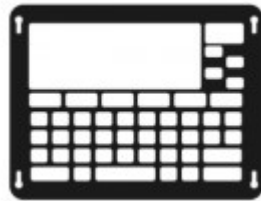
| Clinical Feature | Definition |
|-------------------------|--|
| Purpose of Use | Description of the app's purpose including receptive or expressive language needs |
| Output | The type of output provided by the device, for example, speech, text, or both |
| Speech Settings | The supralinguistic features of speech output (pitch, volume, rate) as well as whether the devices will speak after a word or phrase |
| Representation | The symbol types available for the app including the ability to import and modify icons |
| Display | The layout of the app including the size, font, and color of the symbols |
| Feedback Features | Whether the icon highlights, zooms, enlarges, or vibrates and also the extent to which these can be modified |
| Rate Enhancement | The features that improve the rate of communication output of the app and to what extent these are customizable |
| Access | How the user interacts with the device in terms of selection of items (scanning, pointer) and whether this can be customized |
| Required Motor | The motor abilities the user must possess in order to access the device |
| Competencies Support | Support provided by the app publisher mostly for resolving technical issues |
| Miscellaneous | Any additional options that are available with the app |

Note. Summarized from Gosnell, Costello, and Shane, 2011

Accessories to iOS Devices



iPad keyboard



Keyguards



Blue2 Bluetooth switch



AMAneo Bti iPad adapter



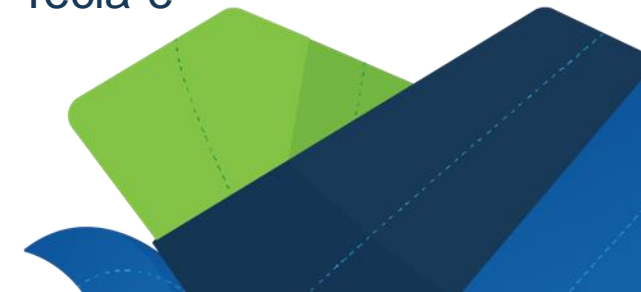
APPLICATOR



Modhose iPad mount



Tecla-e



Communication Partners

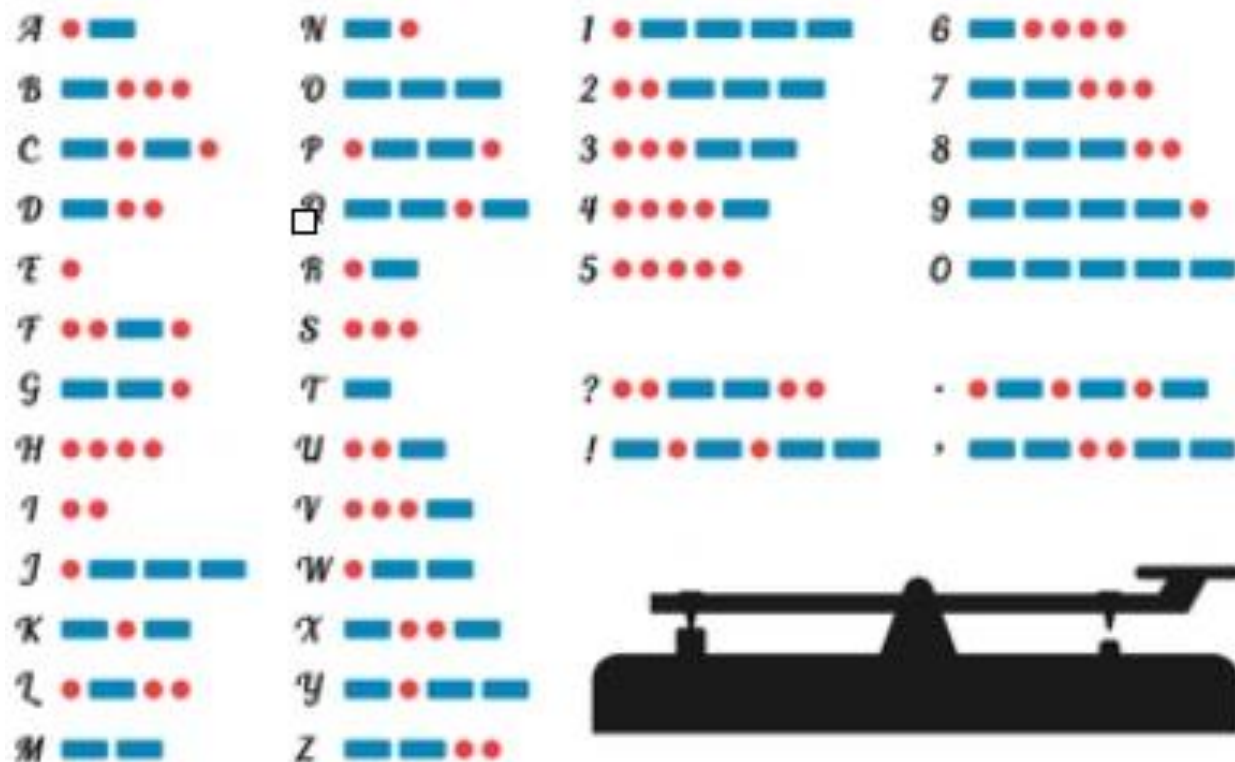
Follow their lead - how to be a respectful communication partner Amanda Hartmann, (AssistiveWare)



Jay S. Fishman ALS Augmentative Communication Program | Partner Training Videos | Boston Children's Hospital (childrenshospital.org)



Morse Code – another option??

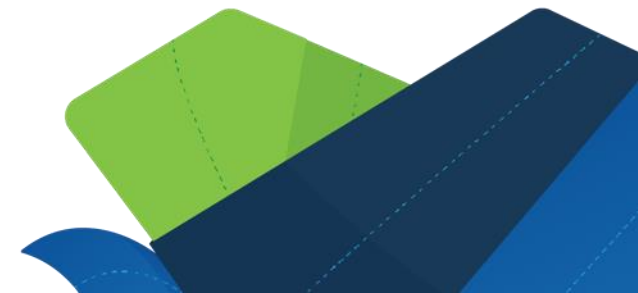


[Tania's Story: Morse code meets machine learning - YouTube](#)



Outcome Measures

- PREMS: Patient-reported experience measures
- PROMS: Patient-reported outcome measures
- Therapy Outcome Measure – AAC³
- [The Pragmatics Profile for People who use AAC](#)
- Language samples/data logging
- Goal Attainment Scale (GAS)



Emerging Technology

- [SmartPredict App for AAC Conversation](#) – co-construction of message with AAC user and conversational partner
- Plans for Dasher v6 to be incorporated into AAC software
[About Dasher | Dasher \(acecentre.net\)](#)
- AAC and Artificial Intelligence: ‘the capability of a machine to imitate human intelligence’ – relates to AAC assessment, intervention, system development, customised voices, access strategies¹⁴



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<https://doi.org/10.1080/10400435.2017.1291544>
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14. Sennott, S. et.al (2019). AAC and Artificial Intelligence (AI). *Topics in Language Disorders*, 39, 4, 389-40. <https://doi.org/10.1097/tld.0000000000000197>



Thank you!



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