Short Course (Session 73): Theory & Principles of AAC Interface Design for Aphasia

Aimee Dietz, PhD, CCC-SLP
aimee.dietz@uc.edu

2019 Illinois Speech-Language-Hearing Association Annual Convention
Rosemont, IL

Abstract

- Intermediate
- This short course will build upon Dr. Dietz’s Friday course. The format will be a hybrid learning experience: (1) brief explanations by the speaker, (2) small-group breakout work, and (3) large group discussion. Participants will leave with a toolbox of aphasia-friendly communication apps and the ability to assess new apps.

Acknowledgements & Disclosure Statement

- NIH-NCRR 8KL2TR000078-05
- NIH-NCRR 8ULTR000077-05
- NIH-NIDCD: 1R15DC017280-0
- Collaborators
  - Dr. Jennifer Vannest, PhD – Cincinnati Children’s Hospital Medical Center
  - Dr. Jerzy Szaflarski, MD, PhD – University of Alabama at Birmingham
  - Dr. Krista Wilkinson, PhD— Pennsylvania State University
  - Dr. Weihong Yuan, PhD- Cincinnati Children’s Hospital Medical Center
- Research Assistants
  - Jacqueline “Alyse” Watt, MS, CCC-SLLP– University of Cincinnati
  - Thomas Maloney, MS - Cincinnati Children’s Hospital Medical Center
  - Mariah Emery
  - Cassandra “Cassy” Stall
- Statistical Support
  - Mekibib Altaye, PhD - Cincinnati Children’s Hospital Medical Center

Learner Outcomes

- At the conclusion of the session, participants will leave with
  1. a toolbox of aphasia-friendly communication apps and the ability to assess the appropriateness of new communication apps for people with aphasia.
  2. AAC treatment starting points for people with aphasia.
  3. online resources to guide AAC implementation for people with aphasia.
Stay tuned…..

- Follow-up Interview with Cases & Videos
  - Aphasia
  - ALS

- For any School-Based SLPs in the room
  - CP
  - Autism

**AAC Assessments Specific to Aphasia**

- Technology Instruction Personalization

Freely-available at: [https://cehs.unl.edu/aac/](https://cehs.unl.edu/aac/)

1. **Multimodal Communication Screening Test** for Aphasia
2. Aphasia Needs Assessment
3. AAC-Aphasia Categories of Communicators Checklist
**Multimodal Communication Screening Test for Aphasia (MCST-A)**

- Dr. Joanne Lasker provides an overview
  - [https://www.youtube.com/watch?v=38bV0-Zm9Oo](https://www.youtube.com/watch?v=38bV0-Zm9Oo)
- Stimulus Book
- Scoresheet & Instructions

**Aphasia Needs Assessment**

- As-is…not so aphasia friendly

- Advanced Seminar in AAC
  - Adapt the tool to be aphasia friendly!
  - Example 1
  - Example 2

**Saltillo Client Information for Individuals with Aphasia**

**AAC Aphasia Categories of Communicators Checklist**

**Garrett & Lasker Classification System with Low-Tech AAC Suggestions**

Partner-Dependent Communicators

- Emerging Communicator
- Contextual Choice Communicator
- Transitional Communicator

Emerging Communicator

- requires maximal assistance
- contextual awareness
- no initiation or repetition of verbalizations
- persistent global aphasia and severe neurological impairment

Emerging Communicator:

- Intervention Goals
  - Develop turn-taking
  - Develop choice-making ability
  - Develop referential skills
  - Develop clear signals for agreement and rejection
  - Teach partners to provide appropriate opportunities for above

Emerging Communicator:

- Partner Training
  - Develop contextual routines
  - Create scrapbook/remember photo book
  - Provide contingent feedback for communicator’s referential, joint attention, affirmation, and rejection signals
    - “Oh, you’re looking at the pink nail polish…so that’s what you want?”
    - “Speaking for” or verification (Simmons-Mackie, 200?)
  - Augmented Input

Augmented Input Strategy

- Partner identifies that PWA has misunderstood
  - (blank expression, nodding ambiguously, looks away, answers incorrectly)
- Partner then supplements the most difficult, or the most important concepts, by:
  a. Writing key words on paper
  b. Gesturing symbolically
  c. Gesturing deictically (pointing)
  d. Pantomiming
- Recheck PWA’s comprehension: “Got it?”

Contextual Choice Communicator

- cannot consistently initiate communication acts
- retains skills in automatic/familiar activities
- persistent global aphasia, expressive (Broca’s) aphasia, or receptive (Wernicke’s) aphasia

Primary Communication Strategy: Written Choice Strategy

- In this strategy, the partner scaffolds the conversation by...
  - Providing topic choices
  - Asking open-ended conversational questions (sincere questions)
  - Writing potential answers in the form of large print word/phrase choices (usually vertical, indicate start of phrase with * or :)
- OR uses graphic scales (see example)
  - Asking the PWA to point to a choice/scale to communicate
  - Continuing the conversation by asking a follow-up question

Contextual Choice Communicator: Intervention Goals

- to call for attention and/or assistance
- to introduce self in structured situation
- to communicate biographical information by pointing to written choices
- to communicate specific information by pointing to written choices
- to communicate opinions/preferences by pointing to qualitative rating scale

Written Choice Instruction Card

- I have had a stroke. I would like to talk to you, but I cannot speak. We CAN converse if you ask me a question and offer me written choices to point to.
  Here’s how:
  - THINK OF A QUESTION YOU WOULD HAVE ASKED ME BEFORE MY STROKE. TRY TO FIND OUT MY OPINION, GET MY ADVICE, OR PREFERENCES

Contextual Choice Communicator: Intervention Goals (2)

- Develop use of AAC strategies and tools to allow participation in controlled, predictable exchanges and routine conversations
- Teach both patients and partners to participate in these exchanges -- the partner has a huge role!

Written Choice Strategy cont’d

- ONCE YOU’VE ASKED THE QUESTION, THINK OF POSSIBLE ANSWERS OR CHOICES.
- WRITE THEM IN THIS NOTEBOOK. USE A DARK PEN OR MARKER.
- USE LARGE CAPITAL LETTERS. PUT A DOT IN FRONT OF EACH CHOICE. USE A SCALE FOR “HOW MUCH” QUESTIONS.
Contexts we have

Today’s session was....

1 2 3 4 5 6 7 8 9 10
Not good ok Very good

The pictures you used were....

1 2 3 4 5 6 7 8 9 10
Not good ok Very good

Other Intervention Strategies:

- When cued, learn to ask questions by pointing, gesturing, and/or using rising intonation
- Answer partner’s tagged “yes/no” questions with reliable gestures, head nods, or verbal responses

Place Time-Line


Historical Time-Line

- 1990 1998 2006
- 1993 2001 2009
- 1994 2002 2010
- 1995 2003 2011
- 1996 2004 2012

Contextual Choice Communicator: Partner Training

- to have a conversation with the patient using:
  - Written Choice Technique
  - Augmented Input
  - Tagged Questions
- to incorporate graphic rating scales where appropriate
- to respond to gestural, augmentative, vocal, or verbal communication attempts

Transitional Communicators

- retains a variety of fragments of communication skills
  - Recognizes pictured messages consistently; good text recognition for familiar words and phrases
  - attempts to communicate, including via natural speech
- Initiates communication with minimal cues
  - May use some natural communication modalities effectively including telegraphic or automatic speech, fragmented writing/spelling, some symbolic gestures
### Transitional Communicator: Intervention Goals

- to introduce self and ask questions
- to communicate via pointing to previously stored information
- to communicate via yes and no
- to communicate opinions and preferences using rating scales
- INITIATE communication using a variety of high and/or low-tech AAC strategies

### Independent Communicators

- Stored Message Communicator
- Generative Communicator
- Specific Needs Communicator
- Nonuser

### Transitional Communicator Partner Training

- Provide suggestions, hints, or direct instructions to encourage PWA
- Pause and expect communication
- Provide opportunities for communication of specific information within contextual familiar conversations and routines
- Assist PWA to develop scrapbook or communication BOOK, or assist with high-tech device PROGRAMING

### Stored Message Communicator

- Frequent efforts to initiate communication – responses, comments, questions - without waiting for cues
- Locates pre-stored messages symbolized with remnants, photos, pictographic symbols, or written words to communicate messages in specific contexts (e.g., community transactions, familiar conversations, doctor’s visits)

### Stored Message Communicator Intervention Goals

- Develop an organized means of storing messages and vocabulary for specific communication situations
- Teach PWA to access stored messages in a timely and appropriate manner
- Develop and teach breakdown resolution strategies using natural communication modalities
**Stored Message Communicator**

**Intervention Strategies (2)**

- Then communicate in real-life situations and evaluate:
  - Effectiveness of interaction
  - Efficiency of interaction
  - Changes in approach

- Gradually use the system in more demanding situations

---

**Generative Communicator**

- Independently combines a variety of modalities/messages through multiple modalities
- May utilize several steps to produce a single message (symbol sequences, word prediction, series of letters).
- Independently navigates to multiple locations in a communication system to retrieve appropriate messages

---

**Specific Needs Communicator**

- needs support in certain situations that require specificity, clarity, timeliness (e.g. on phone)

---

**Generative Communicator (Partner Goals)**

- to allow the individual to introduce self and explain disability
- to identify important biographical information for inclusion in notebook
- to ask appropriate yes/no questions
- to interpret and guess at specific words during first letter pointing
- to allow opportunities for person to ask questions
- to encourage patient to use most efficient modality for communication

---

**Specific Needs Communicator (Intervention Goals)**

- scripted conversations
- programmable voice output devices
- pre-written information

---

**Generative Communicator (Intervention Goals)**

- MULTI-MODALITY COMMUNICATION APPROACH....
  - breakdown resolution clues
  - conversational control strategies
  - electronic voice output device

- word dictionary
- alphabet card
- new information pocket
### Specific Needs Communicator: Partner Goals

- to help identify specific needs
- to assist in developing system components
- to provide opportunities to use system components

### Grid Displays

**PROS**
- Easily generate novel messages
- ENDLESS message opportunities!

**CONS**
- Inventory each cell to
- Relies on heavily on semantic & syntactic knowledge
- Requires learning a ‘new’ language
- High levels of working memory & attention

### Visual Scenes Displays

**PROS**
- Builds on intact autobiographical memory
- Taps residual visuospatial functions
- Capitalizes on mobile technology

**CONS**
- Limiting in terms of topics generated and novel creation of utterances

### Traditional Grid/Home Page/ Semantic Design

- [Diagram](image)

### The Ins and Outs of Interface Designs for People with Aphasia

…picking-up from Friday’s talk

*Theory & Principles of AAC Interface Design for Aphasia (Session 62 Room: 49/52-53)*

### VSD Displays

- [Diagram](image)

- Barkley Memorial Trust
- Communication Enhancement Rehabilitation Engineering Research Center (AAC-RERC)
  - Funded by NIDRR/USDE #H133E980026
- Technology Transfer Partner: DynaVox Technologies
  - Collaborative relationship to develop the software
- Multi-Site Collaborative Effort
  - UNL, UNO, & UNK Speech, Language, & Hearing Clinics
  - Madonna Rehabilitation Hospital (Lincoln, NE)
  - Quality Living, Inc. (Omaha, NE)

Definition of Contextually-Rich Images

Pictures, photographs, or images that represent situations, places, or experiences by depicting people or objects in relation to one another, the natural environment, and the central action of a scene
- Do not require inferences or verbalizations by a person with aphasia or a communication partner
- Contrast with portraits and iconic symbols that contain limited, usually decontextualized, information
- Holistic framework
  - Convey the “gist” of a situation or event
  - Provide support for conversational exchanges

Contextually-Rich Visual Images

- Provide a way to represent meaning
- Support navigation within an AAC system
- Serve as a platform for co-constructing messages
- Establish a shared communication space
- Allow for integration with other types of communication supports

Collaborative Team: CIRCA 2004-2007

- Research Team:
  University of Nebraska – Lincoln¹, Kearney², & Omaha³
  - David Beukelman¹
  - Aimee Dietz³
  - Karen Hux¹
  - Michelle McKelvey¹
  - Sarah Wallace¹
  - Kristy Weissling¹
- Technical Development Team:
  State University of New York – Buffalo¹ & DynaVox Tech²
  - Jeff Higginsbohm¹
  - Greg Leisher²
  - Linnea McAfoose²
  - Mike Rogers²

Evaluation of Images for Contextual Richness

Four criteria:
- Environmental context (setting, people, objects, and activities)
- Interaction with people or the environment
- Personal relevance
- Clarity regarding elements key to the implied relationships

Rating Scales

<table>
<thead>
<tr>
<th>Environment</th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
<th>Absent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interaction</td>
<td>High</td>
<td>Medium</td>
<td>Low</td>
<td>Absent</td>
</tr>
<tr>
<td>Personal relevance</td>
<td>High</td>
<td>Medium</td>
<td>Low</td>
<td>Absent</td>
</tr>
<tr>
<td>Clarity</td>
<td>High</td>
<td>Medium</td>
<td>Low</td>
<td>Absent</td>
</tr>
</tbody>
</table>
YOUR TURN!

Environment: High
Interaction: High
Personal relevance: High
Clarity: High
Comment: Satisfies all the elements for being a good contextually-rich picture to support a story

Environment: Absent
Interaction: Absent
Personal relevance: Absent
Clarity: High
Comment: Only serves to identify an object; typical of pictures available in stimulus sets

Environment: High
Interaction: High
Personal relevance: High
Clarity: Low
Comment: View is too distant to provide sufficient detail to support a conversation

Environment: Absent
Interaction: Low
Personal relevance: High
Clarity: High
Comment: Typical portrait that does not convey any contextual or interaction information

Environment: Absent
Interaction: Absent
Personal relevance: High
Clarity: High
Comment: More contextual richness and interaction are necessary to communicate a story; typical of pictures supplied by families
Environment: Medium
Interaction: High
Personal relevance: High
Clarity: High
Comment: Good picture for communicating a story about preparing for a wedding

Environment: High
Interaction: Medium
Personal relevance: High
Clarity: High
Comment: Could be a good signature photo for communicating a story about golfing with a grandchild

Environment: Medium or High
Interaction: Absent
Personal relevance: High
Clarity: Low
Comment: Serves only to identify a location or specific objects in a room

Environment: Absent
Interaction: Low
Personal relevance: Absent
Clarity: High
Comment: Does not provide sufficient interaction to communicate a story; could be used as a signature photo

Environment: High
Interaction: High
Personal relevance: High
Clarity: High
Comment: Good picture to communicate a story about a child's birthday party

Environment: Absent
Interaction: Absent
Personal relevance: Low
Clarity: High
Comment: Lack of context, interaction, and relevancy are problematic
Visual Scene Displays
• Include one or more contextually-rich images
• Combine with text, voice output, function buttons, highlighting, and color coding
• Allow communication partners to co-construct “the gist” of important life events or experiences
• Bypass reliance on linguistic processing and need for extensive verbalizations

Pat
At 52 years of age, Pat survived a left hemispheric cerebrovascular accident (CVA) that left her with severe aphasia and apraxia of speech.

She received traditional stimulation-facilitation speech-language intervention immediately following her stroke at an acute rehabilitation hospital. After several months of outpatient treatment, Pat was referred to the university clinic for AAC strategy development.

Intervention at the university clinic has focused on the use of low-tech AAC strategies including the development of a personalized low-tech communication notebook, gestures, and writing. Group therapy has also been incorporated into Pat’s intervention plan increase her interaction with peers.

Theme Development
• The process by which the content of the VSD is personalized.

• Three Phases
  1. Informant-Programming Phase
  2. Validation Phase
    – Trial Use
  3. Revision Phase
    – Refinement & Expansion

SO WHAT DO WE DO WITH THESE IMAGES???
At the time of this photo, Pat’s WAB was 16.5 and her communicative repertoire included the use of vocalizations, a single stereotype (i.e., “pa, pa, pa”), simple gestures (i.e., pointing, tapping), fragmented writing (i.e., single letters, a few words—TV, cup), and a low-tech communication book that contained mostly words. Pat was able to successfully interact with very familiar communication partners during structured situations. For example, if she wanted to cook dinner she went to the stove or refrigerator or she shook her head to indicate that she was doing well. However, Pat relied upon her communication partner to accurately communicate her intent and repair communicative breakdowns. According to Garrett and Lasker’s classification system (2005), Pat was a transitional communicator.

Rita participated in traditional therapy to address the aphasia and apraxia of speech following her stroke. She used a combination strategies to communicate: low-tech communication book (sectioned word lists), gestures, and vocalizations, and stereotypes (i.e., “Betty, Betty, Betty,” “Yes, yes, yes,” “No, no, no,”) She could chorally read prayers with a communication partner. Rita accurately read a few familiar single-words (children’s names, her town, yes/no) and produced occasional spontaneous speech to communicate messages (“Hello”).

Rita participated in traditional therapy to address the aphasia and apraxia of speech following her stroke. She used a combination strategies to communicate: low-tech communication book (sectioned word lists), gestures, and vocalizations, and stereotypes (i.e., “Betty, Betty, Betty,” “Yes, yes, yes,” “No, no, no,”) She could chorally read prayers with a communication partner. Rita accurately read a few familiar single-words (children’s names, her town, yes/no) and produced occasional spontaneous speech to communicate messages (“Hello”).

After 3 years of traditional intervention methods Rita’s language restoration plateaued with a WAB score of 13.5. She gestured to communicate a limited number of basic wants and needs. Rita regularly ended unsuccessful interactions by saying, “It’s alright” or gesturing with one palm turned upward. At the initiation of this study, Rita was classified as an Emerging Communicator.

The person with aphasia is provided time to explore the content— Trial use
The AAC facilitator works with the person with aphasia (and informant) to edit content

Refinement of themes is an ONGOING PROCESS
Low-Tech Resources

- Low-Tech Boards for Patient Provider Communication
  - http://www.patientprovidercommunication.org/communication_tools.htm
- Low-AAC Templates for Aphasia
  - https://cehs.unl.edu/aac/visual-scene-resources/
Low-Tech is Great but….

- Low-technology communication books
  - LONG linear searches to find pictures and messages
    - 105 pages
    - 377 messages
    - 185 pictures

High-Tech AAC Resources

- https://saltillo.com/
- http://www.aphasiafriendly.co/aphasia-and-technology.html?fbclid=IwAR3kn2cszoHJTRA4m8KKRSM7NnafuyICXy5_CjgvOpe6bLnasWrzDL4Wvxs
Feature Matching

- Match a person’s strengths and needs to an app or devices features
- AVOID trying fit a person to a specific platform or app!

OK, we have assessed the person, feature matched them, & personalized their system—now what?
AAC Treatment

- Navigation
  - Backward chaining with vanishing cues
- Communication
  - Avoid perpetuating learned non-use
  - Hebbian learning
- Apply to Low-Tech and Grid Systems?
- Apply to Restorative treatments?

Visual Scene Display for Restorative Intervention

WHO

WHAT

WHEN

(Adapted from Boyle & Coelho, 1995)

Practice-Determine the Starting Part

- “Patty”

Learner Outcomes

- At the conclusion of the session, participants will leave with:
  1. a toolbox of aphasia-friendly communication apps and the ability to assess the appropriateness of new communication apps for people with aphasia.
  2. AAC treatment starting points for people with aphasia.
  3. online resources to guide AAC implementation for people with aphasia.

Practice: Apply the Treatment

- Saltillo Videos
- Low-Tech
- Grids
- Restorative treatments?

QUESTIONS???