Visual output strategies for Deaf students who require AAC systems.

James McCann, MS, CCC-SLP
Gallaudet University
Outcomes

Upon completing this seminar participants will be able to:

- identify and describe the impact of hearing loss on accessing AAC systems
- generate and modify AAC strategies to support a variety of communicative intents in students who require a system with visual output.
- discuss the role of cochlear implants and listening skills in accessing voice output.
Rationale

- Setting for students with significant hearing loss and additional disabilities
  - Role of the SLP
- Lack of resources to support this population
- Functional Outcomes for all children
Rationale

- Increase in number of students requiring AAC overall
  - Binger and Light, 2006
  - Applications to this population and limitations

- AAC intervention should start early
  - Cheslock, Romski, and Sevcik (2007)

- Could these strategies have use with children without hearing loss?
Agenda

- Introduction and Overview
- Describing the population and identifying their needs as they relate to accessing AAC systems
- Identifying Strategies for visual output for early AAC users
Agenda continued

- Case Study- A Pre-school classroom
- Future directions
- The role of cochlear implants
- Conclusion, Wrap-Up, and discussion
Format

- Clinical Discussion
- Practices with evidence will be shared
- Future possibilities and limitations will be discussed
- Comments, questions, and concerns are encouraged
Defining the population

- Deaf or hard-of-hearing to a degree that spoken language may be a challenge to understand with or without aids
- Additional disabilities that impact the child’s use of visual (sign communication) or spoken output
Methods of output/challenges for children with hearing loss

- **Voice**
  - The Audiogram
  - Background classroom noise
  - Synthetic Voice

- **Print**
  - Challenges may not be based on hearing loss, but additional disability
  - Hearing loss may impact literacy skills
Other Outputs

- Animation
- Symbols/symbol sequencing
- Switch activated device
- Pointing
- Eye gaze
- Video
Considerations

- Variety of communicative intents
- Variety of opportunities
- Variety of partners
- Output that matches what the child’s would be if there were not an additional disability
- Full access to receptive information
Considerations related to visual output

- Peer access
- Situation of equipment - classroom space
- As with any AAC approach, may require multiple strategies
Input Considerations

- Children must have an accessible receptive communication system
  - This may include sign, cued speech, spoken language or a combination
  - At times, setting does not provide a fluent user of sign communication which will further impact the child’s output
  - Impact of interpreter/classroom aid as primary model
Direct Select (eye gaze, pointing) Strategies

- Immediate feedback
- Contingent response provided by communication partner
- Contingent response provided through providing sign on child’s person (may be more internal through “teaming”)
  - For Deaf parents interacting with their children, a form of motherese is signing on their child’s body
Direct select strategy activities

- Attendance
- Recurrence
- Wants/Needs
- Yes/No
- Commenting- limited by what options are presented
- Controlling others’ behavior- limited by options
Switch activated device strategies

- May support internalizing of responses
- Limited to what toys/technology allow
- Multiple switches may increase number of options if the child can manage this
Switch Activated Device Strategies
Switch Activated Device cont.
Everyday switch activated technology

- Power Point through switch activated mouse click
- Switch activated computer software
Case Study

- Total Communication Pre-school classroom (ages 4-5)

- Professionals involved
  - Teacher-Implementation when possible
  - Classroom Assistant- Support classroom use
  - PT-positioning and switch placement
  - OT-Switch activation
  - Audiologist- Appropriate amplification
    - In other settings may include an ASL specialist, reading specialist, AT specialist, etc.
Case Study-Children

- Male (M)
  - Diagnosed with spastic CP-limited volitional limb movement
  - Severe-profound hearing loss
  - Appeared limited benefit from HA’s
  - Limited home resources
  - Appeared to have cognitive skills
  - Significant pre-natal history
  - Nutrition NPO
Case Study Children cont

- Female (C)
  - Diagnosed with spastic CP - limited volitional limb movement
  - Moderate-severe hearing loss
  - Appeared to benefit from hearing aids
  - Consistent home support
  - Appeared to have cognitive skills
  - Primary nutrition PO - purees
Strategies implemented

- Eye Gaze
  - Attendance (Came to school v. Stayed Home) students and staff included
  - Choice making for snack
  - Recurrence
Strategies Implemented

- “songs” with recurring lines
- Books with repeated lines
- Regulating others’ behaviors given one choice
- Switch training software
Outcomes

- Increased awareness of peers and professionals through eye gaze and body movement
- Increased task attention
- Increased intentional switch activation
  - Interactive vs. independent activities
- Increased speech approximations for hard-of-hearing student
- Decreased avoidance communication behaviors (e.g. crying) for the male student
Where do we go from here?
Considerations in using video output

- Symbol paired with sign
  - Photo of real object
  - Drawing
  - Abstract representation (ex. Names)
    - Picture of student, name sign
  - Use of some portion of the sign
Considerations cont.

- Delay in sign initiation following selection
- Voice use
- Scanning or direct selection
- The video output should to the best extent possible match what the child’s natural output would be
- The use of motion in symbols
  - Jagaroo and Wilkinson (2008)
Possible set up

- Traditional grid display
- Visual Scene Display?
- Where does the video appear- in a button or full screen?
- What is the technology delay?
ASL v. Sign with voice
Delay in sign following selection
Limitations/Future Directions

- How do you make the system generative?
- How do you make the output accessible to all peers
- Classroom set-up
- Available hardware/software
- Time and money
The role of cochlear implants

- Historic perspective on students with additional disabilities
- Centers are increasing the number of students with additional disabilities who receive implants
Wiley, Meinzen-Derr, Choo (2008)

Disability v. no disability
- Both groups showed similar progress, but disability group started at a lower level

DQ
- Significant difference in rate of progress
Outcomes

- Berretini, Forli, Genovese, Santarelli, Arslan, Chilosi, Cipriani (2008)
  - Children with HL and additional disabilities- included a range of functioning
  - Looked at speech perception category, communication mode (none used sign), and perceived benefit
Students with additional disabilities demonstrated progress.

It appears that additional disabilities are not a counterindication for a CI.

The progress in auditory skills does not indicate that the student has full access to the spoken language.
Listening Skills

- Options for snack time or preferred sensory/toys may target identification of syllable number differences
- Switch activation may be used for detection
- Switch activation may be used for identification of a target
References


Discussion and Questions

- Thank you for coming
- Contact information:
  - James (Jim) McCann
  - (202) 448-6965
  - James.mccann@gallaudet.edu
- Department of Hearing, Speech and Language Sciences, Gallaudet U. Washington, DC, 20002
Questions/Discussions during and following presentation (slide added following presentation): Thank you to all who added to this seminar

- Some videos removed to meet size requirement for upload to ASHA site
- Question- Clarification for signing on person
  - Signing is done by a provider (not the initiator of the interaction) in the students physical space
- Question- What about avatars?
  - One program was identified by presenter- Sign Smith Studio
    - Utilizes avatars and may promote generative language
    - Program allows for facial grammar, mouth morphemes, role-shifting etc.
    - The simultaneous nature of ASL versus sequential nature of spoken language for students with more advanced language skills should be considered when exploring this type of synthetic language
  - Not specifically explored by author for this presentation
- Comment from audience-expectations of speed of computer advances may eliminate the potential delay of visual output for high tech devices