Participatory Design of AAC Systems: Practical Strategies & Positive Outcomes

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Participatory design emphasizes the role of persons using AAC systems.

A participant-centered approach seeks to involve persons with complex communication needs (CCN) in all aspects of intervention planning. This suggests that gains are possible when students are involved in the design & set-up of AAC systems.

Using a limited case study approach we wanted to determine if:

1. Students with CCN could be involved in the design & set-up AAC systems.
2. If so, does this generalize to further positive outcomes?

We provide 2 case studies illustrating participation of students in design of 2 different AAC systems: a high tech AAC device & low- tech communication displays.

Participants were two students who use AAC.

Participants relied heavily on unaided modes.

- 2 elementary school age children
- Language, literacy & cognitive skills
  - Ability to make choices & contribute information about preferences by answering questions
- Diagnoses
  - Severe speech & physical impairment
  - Cerebral palsy, hearing within normal limits, 1 student has cortical vision impairment (CVI)
- Access
  - Fatigue, range & accuracy impact access, assessment is ongoing
  - Direct selection w/ hand
  - Direct selection w/ tracker/light pointer with head
- Communication Modes
  - Primary modes were body- based: facial expressions, gestures, vocalizations

Students were actively involved.

Students actively participated in the design of their AAC tool or device, making decisions related to:

- Desired content: choose topics, messages including phrases, words
- Desired representations: pictures, photos & picture symbols, including alterations of size & color
- Desired organization: spatial arrangement, placement & order

Method

- SLP & educational team conducted communication needs assessment. Team prioritized options for modes, tools, access & developed a participation plan (Beukelman & Mirenda, 2005).

- SLP obtained information from parents, special & general education teachers, paraprofessionals. Multiple informants critical to obtain a number of personal, individualized options.

- SLP worked with students to customize, personalize AAC system, with particular attention given to the students' preferences for vocabulary, picture symbols & layout.

Getting Started: Tools & Resources

- *Social Networks Inventory* for information about partners, modes, strategies, topics (Blackstone & Hunt Berg, 2003)
- Vocabulary Selection Questionnaire (Fallon, Light & Paige, 2001)
- Vocabulary lists: Compile greetings, small talk, wrap up remarks, topics, scripts & other messages for student review. (Beukelman & Mirenda, 2005, http://aac.unl.edu/, http://www.aacintervention.com)
- Staff survey: Vocabulary options that reflect unmet needs in a particular environment or activity. Contributions that may reflect knowledge of popular culture.
- Ecological inventory in general education class w/ same age, gender peers
- Communication logs: Use post-its & simple talking switches to record peers' messages on the spot which student liked & wanted to use. Train instructional assistants to "listen for what other kids are saying" & document on ongoing basis.

Trying it out

- Establish a regular routine (weekly meeting) to review vocabulary options with student
  - Be prepared with examples of lists of vocabulary, topics, words, phrases, stories they may want to tell etc.... Cannot ask “So, what do you want to say?” provide content options & facilitate participation!
  - Offer choices & sort options using yes/no questions “Do you want to say…?”
  - Determine ‘trial’ period for messages (use for 3-4 months) & check with student “Is this still useful?” (Balandin & Iacono, 1998)
  - Teach & model strategy, provide message for student control:

    “I NEED A NEW WORD”

- Show options & demonstrate
  - Provide choices of picture symbols. Some symbol sets have several options for a single word. Internet images, photos, popular childrens’ characters appeal to kids. Students can be very thoughtful in considering choices of color, size & shape. Consider student vision profile.
  - Determine layout: provide sample/ template to work from in beginning. Begin picking location, order; have student ‘test-drive’ for access.

Case example 1

- 9 year old girl who is academically competitive in 3rd grade general education science class. Interested in space & books. Often limited to responding yes/no with familiar partners asking ‘20 questions’. Experiences extreme frustration with communication breakdowns. Access to complex VOCA (Vanguard II) via Tracker head mouse system is fatiguing & difficult.
- Goals
  - Increase symbolic communication
  - Increase independent access to language; in particular: feelings, opinions, comments
  - Learn & use strategies to repair communication breakdowns
- Priorities for AAC system development
  - Develop low tech system to supplement high tech; use now while working on access; may be back-up in future.
  - Focus on access: direct select w/ light pointer or eye pointing may develop control & accuracy needed for Tracker.
  - Prioritize needs, modes & tools for different situations. For example, she needed easy access & voice output to express a message like “move please” while driving.
  - Introduce strategy to request new vocabulary & negotiate communication breakdowns

Results

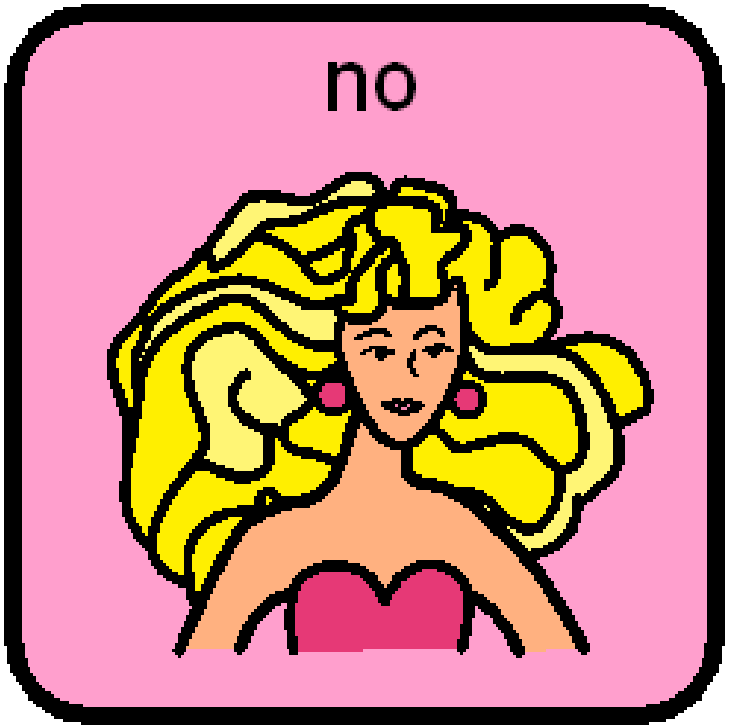
Student Design Choices:

- Selected picture symbols that reflected her experiences: ‘dog’ that looked like her own dog; chose pink background for ‘silly’ symbol because she thinks pink is a “silly” color (she thinks of herself as a tomboy).
- Selected picture symbols that expressed her personality & preferences: Designed ‘YES’& ‘NO’
- Expressed definite preferences for organization of picture symbols. Items she chose for top row were selected the most. Frequency of use impacted spatial arrangement.

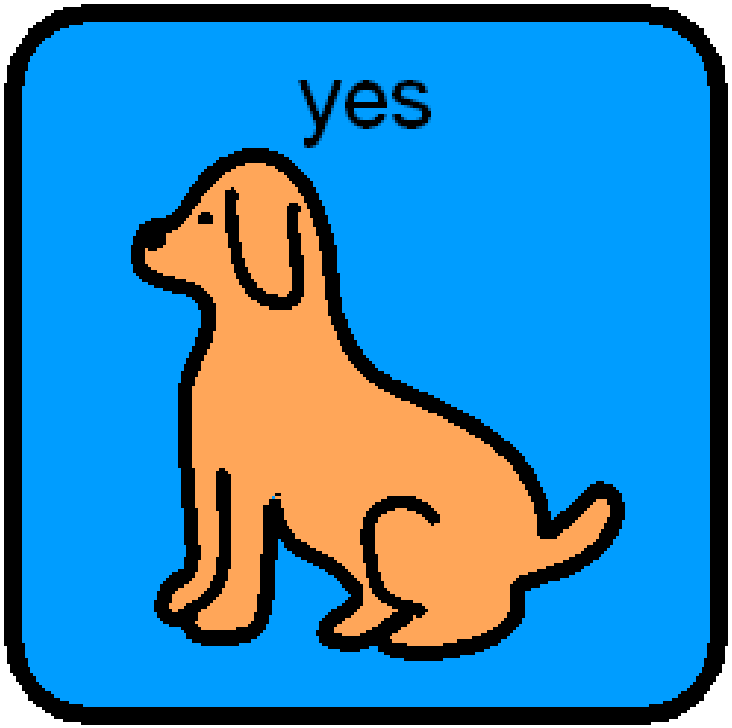
Student Outcomes:

- Increased frequency of use. Reluctant to use symbolic AAC systems prior to intervention.
- Initiated requests for new low tech boards & identified self-designed boards as most preferred mode at school.
- Increased participation in academic activities with less-familiar partners & peers.
- Successfully participated in structured social interactions with peers & unfamiliar partners using communication boards to contribute personal information.

Student designed her own symbols.



Chose picture of Barbie for ‘NO” because she does not like dolls or color pink.



Chose picture of dog for ‘YES” because she likes dogs & color blue.

Case example 2

- 10 year old boy who loves movies, watching sports & TV. Prefers hanging out with other boys in 4th grade general ed. class. Passive communication style, answers yes/no questions when asked directly. Has had DynaVox 3100 for 5 years with limited functional use. Tried a number of selection techniques in past, direct selection with hand is a recent option. Diagnosed with CVI this year.
- Goals
  - Increase frequency of communication
  - Increase use of symbolic communication
  - Sustain interactions beyond 1 turn
  - Initiate topics of personal interest
- Priorities for AAC system development
  - Develop high tech system consistent with his needs and organizational schema, no consistent framework or structure to system at start.
  - Identify motivating topics & meaningful vocabulary
  - Create displays that support extended conversations. For example displays containing social scripts, partner-focused questions, maintainers.
  - Provide auditory feedback when he touches the screen. Visual impairment significantly impacts learning.

Results

Student Contributions:

- Selected topics (power-wheelchair, specific movies, fast food, activities & people).
- Selected colors of symbols, colors of pages, colors of linking buttons. Limited options for picture symbols in his communication device, often modified standard symbol to reduce visual clutter.
- Organization of display important as he may use location & size rather than visual information from picture symbol to locate messages.

  Lots of blank space on pages.

Student Outcomes:

- Increased use of AAC system, prior to intervention was not using VOCA at all.
- Initiated favorite topics independently with family & unfamiliar partners & expanded interactions about topics.
- Initiated request for new vocabulary independently (“I NEED A NEW WORD”).
- Provided information to direct partner telling SLP “ALADDIN”,”HUGE””BLUE” when the Genie’s name was not on the Aladdin page.
- Demonstrated ownership of AAC system & sees it as a promising option for communication.

Student-designed high tech display.

Conclusions

- Students readily & happily participated in design process.
- Each student made unique choices:
  - Personal preferences for topics, messages
  - Personal experiences reflected in picture representations

- Motor & sensory capacity reflected in spatial organization.

- Significant increase in initiations with familiar & unfamiliar partners may be result of increased motivation to use AAC system.

- SLP observed that student choices were different than choices she would have made for the student. Optimizing personal choice allowed factors to be examined: such as, students' developing language categories & spatial arrangements that accommodate motor patterns.

- Additional cases need to be undertaken to learn more about how children design their own AAC systems given the opportunity.

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