AAC Intervention with Just-in-Time Technology and Visual Scene Displays with Adolescents with Severe Disabilities

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INTRODUCTION

- Limited research exists in the area of interventions to improve social interactions and communication with adolescents and adults who are beginning communicators and have severe developmental disabilities.
- Many of these individuals may benefit from the use of augmentative and alternative communication (AAC) to meet their needs.
- However, there is a lack of appropriate intervention strategies documented in the literature that address a range of communicative functions (e.g., few studies examine AAC intervention for purposes other than simple requesting).

AAC technologies utilizing visual scene displays (VSDs) can significantly enhance the communication of beginning communicators.

VSDs:

- capture the daily experiences of individuals with complex communication needs (CCN)
- embed language concepts in the context of these familiar daily activities

Unfortunately, there are two major limitations to current AAC technologies and apps:

- It is time consuming to program new VSDs and vocabulary
  - As a result, partners do not add vocabulary frequently
- It is not possible for partners to dynamically capture new experiences / vocabulary and add them to AAC technologies on the fly during interactions
  - As a result, it is difficult for partners to respond to students' interests
  - It is difficult to capitalize on "teachable moments"

One potential solution to this problem is the implementation of AAC technologies that support "just in time" (JIT) programming.

JIT programming

- Allows the quick and easy import of photos as VSDs
- Allows the quick and easy programming of vocabulary as hotspots within the VSDs
- Allows partners to respond to the students' interests by adding new communicative contexts and vocabulary "on the fly" during daily interactions

RESEARCH QUESTION

What is the impact of appropriately designed aided AAC intervention using **just-in-time technology** on the frequency of turns produced by school-age children and adolescents with severe developmental disabilities during shared context activities?

METHOD

The investigation used a single subject multiple probe across participants design.

Five (5) school-age children and adolescents participated, between the ages of 9-18.

Participants were engaged in activities with the interventionist that were motivating and provided opportunities for sustained social interaction (e.g., reading books, music, games). Participants had access to their current communication systems during all phases of the study.

The following strategies were used during baseline and intervention:

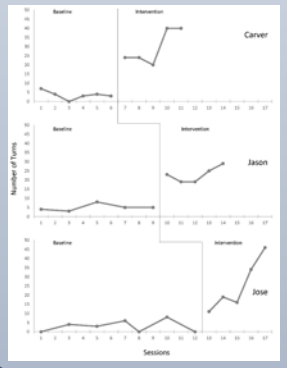
1) Providing opportunities to communicate
2) Encouraging the use of AAC and speech
3) Modeling the use of AAC
4) Waiting at least 5 s for a response
5) Responding to all communicative attempts

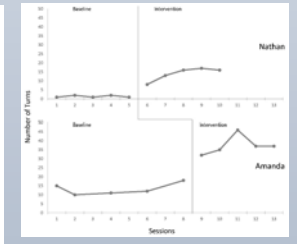
Intervention involved introducing an aided AAC system (i.e., Android tablet with EasyVSD app incorporating JIT technology)

The primary dependent variable was the frequency of communicative turns expressed by the participants during the 15-min interactions. A communicative turn was defined as any symbolic and intentional communicative act understood by the partner including speech or speech approximations, conventional gesture, sign or sign approximations, and/or selection of a hotspot on the AAC system.

Participant	Amanda	Jose	Jason	Nathan	Carver
Gender	Female	Male	Male	Male	Male
Age	14 years; 5 months	18 years; 11 months	14 years; 4 months	13 years; 11 months	9 years; 8 months
Disability	Multiple disabilities, including Fetal Alcohol Syndrome, ID, Chromosomal abnormalities, seizure disorder, ADHD, and Disruptive Behavior Disorder	Multiple disabilities, including cerebral palsy, ID, encephalopathy, spastic quadriplegia, seizure disorder, and CVI	Multiple disabilities, including cerebral palsy, ID, spastic quadriplegia, and seizure disorder	Multiple disabilities, including partial Trisomy 18, Hard of Hearing, seizure disorder, and vision impairment	Autism
Unaided means of communication	Physical communication, gestures, and 5-10 signs	Physical communication and gestures (e.g., eye rolling)	Physical communication, gestures (e.g., head shaking), and vocalizations	Physical communication	Physical communication and ~ 5 signs
Aided means of communication	SuperTalker 8	iTalk2 with "yes" and "no;" Quicktalkers	Trialed both Tech/Talk 8 and Tech/Talk 32	ProxPAD with Tangible Object Cards	Picture communication book with photographs and Mayer Johnson icons and BigMac
Mobility	Partner-controlled wheelchair	Partner-controlled wheelchair	Personally- and partner-controlled wheelchair	Partner-controlled wheelchair	Ambulatory
Interests and Preferred Activities	Fashion, looking at magazines, kittens, music	Friends, photographs of past memories, sneakers, dances	Hockey, music, YouTube videos, computer games	Football, John Deere tractors, music, and YouTube videos	Music, puzzles, gross motor activities

RESULTS





All participants demonstrated a large increase in communication turns upon introduction of the communication tablet with JIT technology (See Figure 2).

Percent Non-overlapping Data (PND) for all the adolescents who participated was 100%, indicating access to JIT technology was highly effective in increasing participation in communication interactions, as evidenced by communication turns

JIT ELEMENTS

The following elements were part of programming "just-in-time":

- taking a picture
- drawing a hotspot
- recording a message

Some of the participants were able to participate in these programming elements (most often taking a picture).

Completion of Programming Steps by Adolescents with JIT Technology					
	Independent Programming Completed in Intervention				
	Session 1	Session 2	Session 3	Session 4	Session 5
Adolescent					
Carver	5	4	0	3	0
Jason	2	0	2	1	0
Nathan	0	1	1	0	1
Amanda	0	0	0	0	0
Jose	0	0	0	0	0

An increase in participation in programming has important implications relative to supporting self-determination in beginning communicators and providing beginning communicators with control over the vocabulary available to them – an option that is rarely available.

CONCLUSIONS

All participants increased the number of turns taking in the 15-min sessions. This occurred despite no change in the level of partner support or prompting between baseline and intervention, and no additional instruction during intervention.

The introduction of the device with JIT technology allowed for partner responsiveness to the students' interests through the quick and easy import of photos as VSDs and quick and easy programming of vocabulary as hotspots, resulting in an immediate and sustaining jump in communication turns for all participants.

In addition, with no explicit instruction in JIT programming, 3 of the 5 participants also were actively involved in some of the programming elements (e.g., taking a photo for a VSD), further supporting active participation and self-determination.

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