

Effects of AAC systems with "just in time" programming for children with complex communication needs

Janice Light^{*}, Tom Jakobs⁺, Kathryn Drager^{*}, Kelly Chew^{*}, Sarah Guthrie^{*}, Lisa Mellman^{*}, and Katherine Riley^{*} *Penn State University and +InvoTek, Inc



The Problem

AAC technologies utilizing visual scene displays (VSDs) can significantly enhance the communication of young children with complex communication needs



- However, there are two major limitations to current AAC technologies/ apps:
 - 1. It is very time consuming to program new VSDs and vocabulary
 - As a result, partners do not add vocabulary frequently 2. It is not possible for partners to dynamically capture new
 - experiences / vocabulary and add them to AAC technologies on the fly during interactions in daily life · As a result, it is difficult for partners to respond to children's 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
- IIT programming
 - Allows the quick & easy import of photos as VSDs
 - Allows the quick & easy programming of vocabulary as
 - hotspots within the VSDs - Allows partners to respond to their children's interests by
 - adding new communicative contexts and vocabulary "on the fly" during daily interactions



Research Objectives

- 1. To investigate the effects of AAC technology that supports JIT programming
- 2. Specifically, to compare the effects of the JIT system to a traditional AAC system (without JIT capabilities) on: · the number of communicative turns taken and
 - · the amount of vocabulary available to preschoolers with CCN

Aged 3-5 years Developmental delay · E.g., Down syndrome, severe developmental apraxia Had complex communication needs Speech inadequate to meet their communication needs

3 children participated

 Used AAC to enhance their communication • Signs, low tech systems, schedules

Participants

Were not using SGDs at the time of the study



Procedures

- · Alternating treatment design with two conditions - 2 intervention sessions per week (counterbalanced)
 - One with JIT PlayTalk software One with SD Pro software
- AAC technology preprogrammed with VSDs /hotspots
- Identical VSDs & hotspots programmed in each condition
- · AAC technology introduced during play interactions with children
- New VSDs and hotspots added during the play interactions as required in JIT condition
- Not possible to add new VSDs or hotspots during interaction in SDPro condition

Traditional AAC Technology

- · SGD with Speaking Dynamically Pro (SDPro) software
- Allowed preprogramming of VSDs and hotspots
- Did not support JIT programming
- Utilized traditional menu system
 - Options represented through thumbnails of VSDs, but not always visible
 - Required navigation through main menu or forward /back arrows

http://aac.psu.edu



Innovative JIT software called PlayTalk developed by InvoTek, Inc. Allowed quick & easy import of photos as VSDs

- · Using cell phone with Bluetooth connection Allowed quick & easy addition of hotspots and programming
- of vocabulary Drawing of hotspots with finger or stylus
- Recording of digitized speech

rocess of adding

- Provided drawing function to add text, numbers, or pictures to VSDs
- Provided a simple menu easily understood by the children Options always visible; represented as thumbnails of VSDs

Results

Children with CCN took significantly more turns during 15-min play interactions using JIT PlayTalk compared to SDPro



Children with CCN had access to significantly more vocabulary concepts using JIT PlayTalk compared to SDPro



 Allow partners to respond to children's interests Reduce programming demands on clinicians & families

systems that are truly dynamic

 Incredibly easy and time saving With access to JIT technologies, parents & clinicians will be better

- Capture interaction on the fly as it occurs

Support dynamic learning /language growth

able to support the language & communication development of children with CCN

Limitations / Directions for Future Research

Short term evaluation; Future research is required to investigate

Conclusions

This project represents an exciting transition for the field to AAC

effects over a longer time period across various partners and

Limited number of participants: Future research is required to

investigate effects with larger number of children with CCN

Acknowledgements

We greatly appreciate the funding support provided for this study by NIH grant #1R43HD059231-01A1 SBIR Phase 1 Funding for the students involved in this project was provided by U.S. Department of Education grant #H325K080333

http://www.invotek.org

- We are very grateful to the children and families who participated in this study.

 Takes approx. 33 sec to take a photo & import it to the system as VSD Takes approx. 16 seconds to draw the hotspots & record vocabulary Measures of the children's engagement during JIT programming demonstrated high levels of interest 97% engagement during VSD

Discussion

Children with CCN took more turns during 15-min play interactions

using JIT PlayTalk compared to SDPro and had access to more

System allowed partner to be more responsive to children's interests

Partner could easily capture new events & vocabulary in response to

Children were motivated to communicate since they had easy access to

Takes less than 1 min from the time it is decided to add a VSD & hotspots

Programming using the JIT PlayTalk software was very efficient

until the child is able to use the new concepts to communicate

vocabulary concepts using JIT PlayTalk compared to SDPro

Relevant VSDs and vocabulary were easily added

vocabulary of immediate interest to them

- They assisted with the process
- 95% engagement during
 - of building AAC displays
- hotspot creation Engagement levels were higher than expected Children were very engaged in the process

children's interests

import / creation

.

environments