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

Janice Light*, Tom Jakobs*, Kathryn Drager*, Kelly Chewy, 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
   - This 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
2. 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

• Innovative JIT software called PlayTalk, developed by InvoTek, Inc.

Procedures
• Alternating treatment design with two conditions
  - 2 intervention sessions per week (counterbalanced)
  - One with JIT PlayTalk software
  - One with SDPro software
• AAC technology preprogrammed with VSDs / hotspots
  - Identical VSDs & hotspots programmed in each condition
• 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

Participants
• 3 children participated
  - Aged 3-5 years
  - Developmental delay
  - E.g., Down syndrome, severe developmental apraxia
  - Had complex communication needs
  - Speech inadequate to meet their communication needs
  - Used AAC to enhance their communication
  - Signs, low tech systems, schedules
  - Were not using VSDs at the time of the study

The Problem

Rehabilitation Research Project

Penn State University

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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

AAC Technology with JIT Programming

• 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
  - 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

Discussion
• Children with CCN took more turns during 15-min play interactions using JIT PlayTalk compared to SDPro and had access to more vocabulary concepts using JIT PlayTalk compared to SDPro
• System allowed partner to be more responsive to children’s interests
• Partner could easily capture new events & vocabulary in response to children’s interests
• Relevant VSDs and vocabulary were easily added
• Children were motivated to communicate since they had easy access to vocabulary of immediate interest to them
• Programming using the JIT PlayTalk software was very efficient
  - Takes less than 1 min from the time it is decided to add a VSD & hotspot until the child is able to use the new concepts to communicate
• Takes approx. 30 sec to take a photo & import it to the system as VSD
• Measures of the children’s engagement during JIT programming demonstrated high levels of interest
  - 97% engagement during VSD
  - 87% engagement during hotspot creation
  - Engagement levels were higher than expected
  - Children were very engaged in the process of building AAC displays
  - They assisted with the process

Limitations / Directions for Future Research
• Limited number of participants, Future research is required to investigate effects with larger number of children with CCN
• Short term evaluation; Future research is required to investigate effects over a longer time period across various partners and environments

Conclusions
• This project represents an exciting transition for the field to AAC systems that are truly dynamic
  • Capture interaction on the fly as it occurs
  • Support dynamic learning / growth
  • Allow partners to respond to children’s interests
  • Reduce programming demands on clinicians & families
• Incredibly easy and time saving
• With access to JIT technologies, parents & clinicians will be better able to support the language & communication development of children with CCN

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