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MODELER AAC Coaching Intervention with an iPad During Shared Reading and Play in Early Childhood as Multiple Means of Action and Expression

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Abstract

The purpose of this study was to examine the impact of teacher coaching and augmentative and alternative communication (AAC) modeling using an Apple iPad, during the implementation of Model, Encourage, Respond (MODELER) for Read and Talk and Play and Talk for children with complex communication needs (CCN). The study assessed the results of AAC teacher modeling, using a single-case multiple baseline design. The AAC intervention took place in an inclusive early childhood setting, and included three child participants, and three teacher and student teacher participants. Results indicate significant gains in AAC modeling by teachers.

Keywords

Augmentative and alternative communication, assistive technology, AAC modeling, iPad

Introduction

Inclusion in the expressive communication experiences of early childhood is important. For many children who are able to speak and communicate competently, participation in early childhood classroom environments is easily accessed. However, for children with complex communication needs (CCN), who cannot fully use speech, communication with peers, and engagement with classroom activities remains challenging (Beukelman & Mirenda; Romski, Sevcik, Barton-Hulsey, & Whitmore). Throughout the past few decades, early childhood programs in the United States have steadily moved towards inclusive models of education (Odom, Buysee, & Soukakou). Yet, unfortunately many of these children continue to have difficulty engaging with peers and activities within the classroom environment due to a lack of communication skills.

Universal Design for Learning in Early Childhood

Universal Design for Learning (UDL) has emerged as a promising organizational framework for helping educational teams include children with CCN (Stockall, Dennis, & Miller). The framework advocates learning environments be made accessible through providing: (a) *multiple means of representation*, (b) *multiple means of action and expression*; and (c) *multiple means of engagement*. While all three elements of UDL are important, multiple means of action and expression emerges as a key area of need for children with CCN.

AAC as Multiple Means of Action and Expression.

For children with CCN, who may not be able to communicate fully using speech, *Augmentative and Alternative Communication* (AAC) affords the ability to use multiple modalities to communicate such as speech, gestures, sign language, writing, and symbol-based paper or computer systems (Beukelman & Mirenda). The Apple iPad has emerged as an

extremely popular AAC tool in the field through combining it with speech synthesis apps (Mirenda). Chai, Vail, and Ayers noted that when used appropriately, technology can assist students with disabilities in participating in the same activities as their typically developing peers. AAC can help provide a solid foundation in which children can develop their spoken language comprehension, as well as create a platform for expressive communication growth during a child's preschool and early elementary years (Ronski and Sevcik; Ronski, et al.). Despite the popularity of the iPad and other mobile technologies in both American culture and in AAC, we frequently encounter early childhood education providers who lack knowledge and skill in AAC intervention.

Communication Partner Coaching to Close Skill Gaps

Communication partner coaching holds the potential to create a mechanism of change through impacting the intervention performance of the communication partners that interact with young children with CCN (Kent-Walsh, Murza, Malani, and Binger; Sennott, Light, & McNaughton). AAC modeling is a fundamental component of AAC intervention in early childhood that has demonstrated positive results across communication turn taking, vocabulary building, multi-turn communication utterance, and morphology skills (Mirenda; Sennott, Light, & McNaughton). "The increase in AAC modeling combined with speech turns provides language input to children who require AAC to communicate, which better matches the way they communicate expressively" (Sennott & Mason, p. 11). This in turn positively impacts the child's expressive communication in the form of increased communication turns.

Discussion

Study Research Questions and Design

In order to further explore the impact that teacher coaching has on AAC intervention for

children with CCN in early childhood, this research study examined the following questions:

1. What is the impact of utilizing the MODELER for Read and Talk and MODELER for Play and Talk strategy instructional packages on the frequency of teacher AAC modeling while using an AAC iPad-based system with children in preschool? (see figure 1)
2. What is the feasibility of pre-service early interventionists implementing the MODELER intervention piloting a technology supported coaching system during AAC intervention?

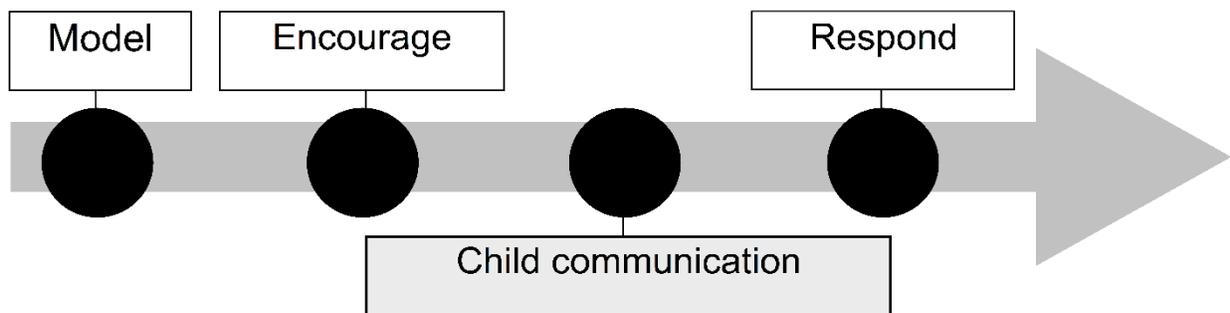


Fig. 1. MODELER AAC intervention strategy.

This study used a single case design (SCD). Specifically, this study used a combination design that included a single case multiple baseline, multiple probe design combined with an alternating treatment design (Kratochwill et al.). The alternating treatment consisted of interventions focused on reading and play. Within a 10-minute session, five minutes were devoted to a reading session and five were devoted to a play session. Randomization of session order was applied in the form of a coin flip. Additionally, a blocking strategy was used so that if there were two sessions in a row that began with the same activity, the alternate activity was to be first during the following session. The study's dependent measure was the teacher's AAC modeling communication utilizing an AAC device based upon the strategies outlined in the MODELER for Read and Talk strategy instructional package (Sennott & Mason). An AAC

model in this study is defined as the teacher using one or more AAC symbols as they speak an utterance during a communication turn using the iPad-based AAC system.

Setting and Participants

The study was conducted in a Reggio Emilia inclusive early childhood education center located in an urban area in the USA. The inclusion criteria child participants included: (a) children aged 3 through 5 years; (b) had severe speech impairment as evidenced by no intelligible speech production or a repertoire of fewer than 50 intelligible spoken words. The inclusion criteria for the communication partners included: (a) works with the child regularly (typically at least 3 times per week) and (b) had worked with the child for longer than 4 weeks. Intervention coaches were three pre-service early intervention Master's students.

Jessie and Ali.

Jessie, the teacher of Ali, has a Master's Degree and twenty years of teaching experience working with children of varying ages and level of ability. Jessie has worked in many inclusive educational environments, and had experience with children with disabilities. Previous to the study, Jessie worked with one student who used AAC, but had not received any formal education of the use of AAC. Ali, a five-year, two month-old female child, was diagnosed with a genetic condition called Hypomelanosis of Ito, developmental delay, and seizure activity. In addition, Ali also has visual and hearing impairments for which she wears glasses and a hearing aide in her left ear. Though Ali vocalizes, sings, and talks frequently, little of what she says is intelligible. Previous to the study, Ali was introduced to AAC when she was three years old; however, her mother reports that the intervention was not successful.

Ellen and Nolan.

Ellen, the teacher of Nola, had a Master's Degree and six years of experience teaching young children. She had other experience working with children with disabilities, but prior to this study did not have any experience utilizing an AAC device. Nolan, is a 3-year-old male with a medical diagnosis of autism spectrum disorder. Nolan was officially diagnosed with autism within the six months prior to the start of the study. During the implementation of the study, he received applied behavioral analysis (ABA) therapy five days a week and was served by a speech-language pathologist one time a week in his early childhood classroom.

Chris and Wyatt.

Chris was an undergraduate student teacher who has been working with children for two and a half years. Chris has been at his current position as a student teacher for two years. Chris has been working with Wyatt in the classroom for six months, and has never used AT or AAC interventions. Wyatt is a 3 year an 11-month old male with a medical diagnosis of cerebral palsy. Wyatt uses a walker for independent mobility, and has vision impairments that require the use of glasses. Wyatt has worked with AAC devices with his specialists, however his family reported that Wyatt has had little interest in using the various devices.

Methods

Table 1. MODELER for Read and Talk + Play and Talk Implementation Elements (adapted from Sennott & Mason).

Strategy Step	Description
Model	Teacher models one or more AAC symbols during the communication turn, using the iPad-based AAC system as they are speaking.
Encourage	Teacher provides a time delay or wait time until child takes a communication turn or 5-15 seconds.
Respond	Teacher responds to the student communication turn verbally, or with an AAC recast by repeating some portion of the student's utterance and models one or more AAC symbols during a communication turn using the iPad based AAC system
Read	Teacher reads a page or page spread in the book and uses MODELER
Play	Teacher engages in a play behavior and uses MODELER
Talk	Teacher makes a comment or asks a question using MODELER

Baseline

At the beginning of the reading portion of the session, the child was instructed to choose one of four books provided. Similarly, at the beginning of the play activity, the child was instructed to choose one of four play sets containing play materials adapted from the books utilized in the study. The teacher was given the direction to read or play with the student as they normally would for five minutes for each activity using the materials provided. Each of the sessions lasted approximately 10 minutes in duration and were coded for analysis. The investigator video recorded the session.

Intervention

After four (Ellen) or five (Jessie and Chris) stable baseline points for each teacher were obtained, training of MODELER began (see Table 1). The intervention phase is based on providing a six-part strategy instructional model that emphasizes coaching as the most important element. The MODELER for Read and Talk and MODELER for Play and Talk strategy instructional training (Sennott; Sennott and Mason) included the following steps: (1) develop background knowledge, (2) discuss MODELER for Read and Talk, (3) model MODELER for Read and Talk, (4) memorize MODELER for Read and Talk, (5) support MODELER for Read and Talk, and (6) independent performance of MODELER for Read and Talk. First, an initial training was conducted, that covered steps one to five. The materials used for this included an iPad running a training software and a speech-generating device with book specific activity boards, and a children's story book. For all participants, the initial training lasted 90 minutes.

The first phase of intervention sessions focused on the pre-service early interventionist providing a model of an intervention session. Added to the table were two iPads were equipped with Proloquo2Go communication software that included a core vocabulary, plus topic based fringe words. At the beginning of each model session, the teacher used an iPhone to complete a Google Forms based online check-in form rating his or her level of initial preparedness to implement the MODELER instructional approach (see Figure 2). Though the investigator led the model sessions, the teachers were able to participate in these sessions depending upon their level of comfort. At the end of the session, the teacher again used an iPhone to fill out the online check-out form rating their performance during the model session (see Figure 3). During the second phase of intervention, the teacher led each session utilizing the MODELER for Read and Talk and Play and Talk intervention. The investigator (coach) provided supportive and

informative feedback during the session (Sennott & Mason). Specific feedback included comments such as “nice model,” and in some cases, a redirecting comment such as “great work, remember to encourage before that model.” In addition, the coach worked to fade the feedback provided.

Check-in, Check-Out for AAC

Part one: Check-In

MODELER
Check-in, Check-out
**Required*

check-in

Before starting the session, activate your mind...

my name *
Your answer _____

child's initials *
Your answer _____

MODELER

Model → Encourage → Child Communication Turn → Respond →

Reading Playing

Talking comment
 question

Dr. Sennott using MODELER

Dr. Sennott doing a first s...

I am ready to Model, Encourage, and Respond. I will... (check items below) *

- Model using AAC as my voice
- Encourage communication through providing wait time
- Respond to child communication, by modeling AAC, repeating some part of what they said and adding something to it.

I will use MODELER for Read and Talk, and Play and Talk. I will... *

- Encourage communication through dramatic play that is fun and engaging
- Encourage communication by reading the book interactively

Sense of confidence (be real)

Not confident 1 2 3 4 5 Very confident

I'm ready to check out

NEXT Page 1 of 2

Fig. 2. Check-in for before the intervention session, powered by Google Forms.

Check-in, Check-Out for AAC
Part Two: Check-Out

MODELER

*Required

Check Out

Reflect...

Model *
Modeling using AAC as my voice

1 2 3 4 5

Very low amount Very high amount

Encourage *
Encourage communication through providing wait time

1 2 3 4 5

Very low amount Very high amount

Respond *
Respond to child communication, by modeling AAC, repeating some part of what they said and adding something to it.

1 2 3 4 5

Very low amount Very high amount

Overall session rating *
Overall, how did I feel about the session

1 2 3 4 5

Very poorly Very good

Plus *
Things I did well...

Your answer _____

Delta *
Things I'd like to change...

Your answer _____

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Fig. 3. Check-out for after the intervention session, powered by Google Forms

Post-Intervention

After the completion of the model and coached sessions, each teacher and student entered into the post-intervention phase. The post intervention phase consisted of independent performance of the MODELER for Read and Talk and Play and Talk strategies in the context of both reading and play. This completed the sixth step in the strategy instructional model. At this point, the teacher reached independence and investigator did not interfere with the session

through giving constructive feedback. Three post-intervention data points were acquired for each of the three student participants.

Scoring and Data Analysis

To code for the study measures, each shared reading and play session were videotaped with the camera positioned so that the student and teacher and use of the AAC communication system could be seen. Coding of the data was conducted using the StudioCode software. Each pre-service early interventionist investigator independently watched and coded the videos for their focus child. At least 20% of the videos were scored by a second rater, maintaining at least 80% inter-rater reliability. Data was scaled per minute using the following criteria: 0 = No instances of AAC modeling, 1 = Few instances of AAC modeling (< 1 per minute), 2 = Some instances of AAC modeling (< 3 per minute), 3 = Many instances of AAC modeling. (> 3 per minute).

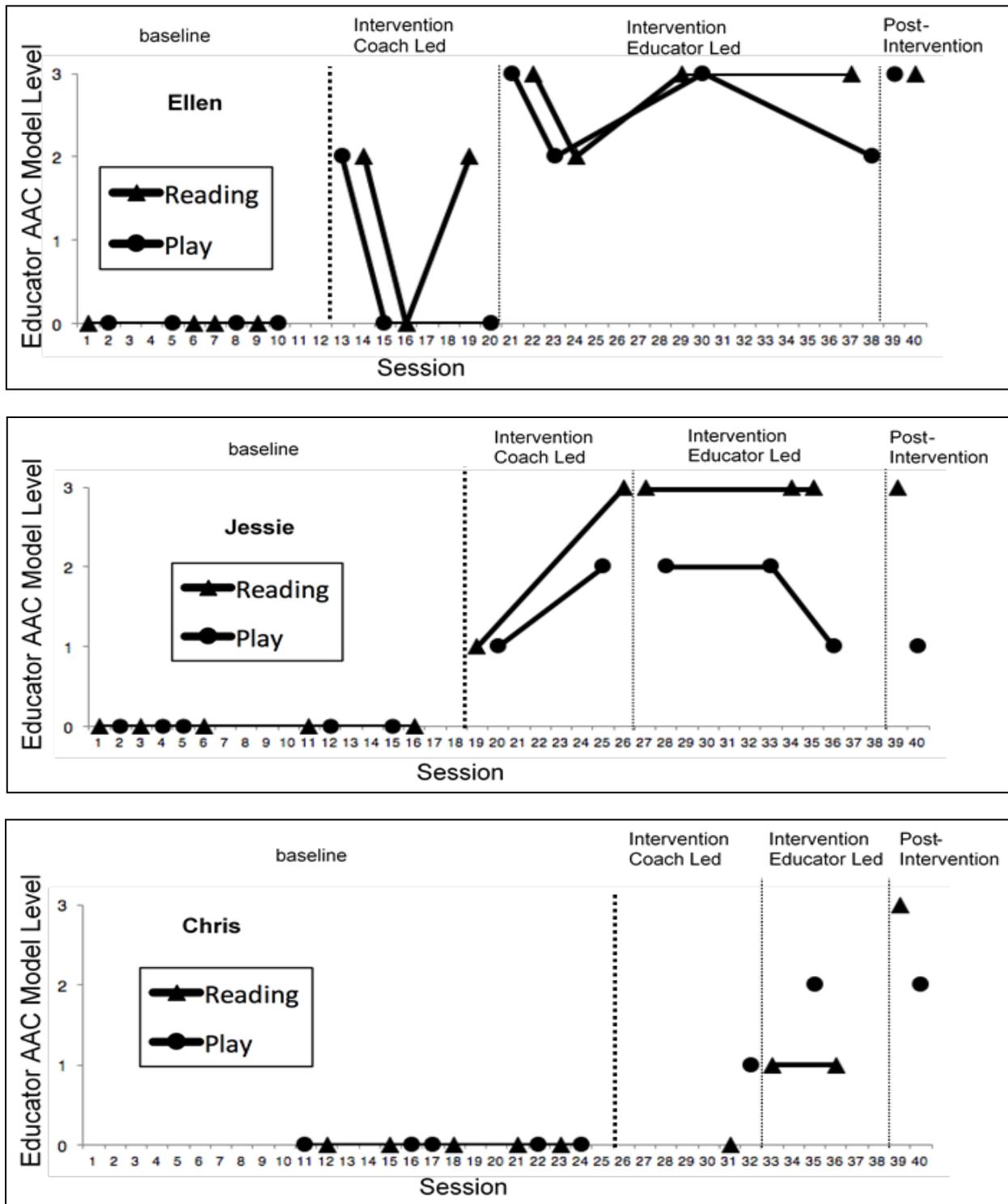


Fig. 4. The level of educator AAC models. *Note:* 0 = No AAC models, 1 = Few AAC Models (< 1 per minute), 2 = Some AAC Models (< 3 per minute), 3 = Many AAC Models (> 3 per minute)

Results

The graph in Figure 4 displays the AAC modeling performance results from all three participants, during both reading and play. During baseline, all three participants were not modeling AAC. For all three teachers, the data shows a predicted increase during the coach led intervention phase, with an even greater level gain during the educator led intervention phase when they are leading the session. All three teachers maintain the gains during the fully independent post-intervention phase, displaying a large number of AAC models.

Ellen demonstrated increased performance in AAC modeling through each phase of intervention and post-intervention. As observed across phases, at baseline Ellen did not initiate communication with Nolan to the extent at which she did in the intervention phase. After the MODELER coaching, Ellen began scaffolding communication attempts and encouraged communication. Anecdotally, Nolan increased his attempts as communication and engagement.

Chris, the student teacher, demonstrated growth in his ability to implement AAC modeling during shared storybook reading and play. During baseline, communication turns and engagement were limited between Chris and Wyatt. The AAC device served as a way for Chris to interact with Wyatt, which created a shared communication experience. Wyatt made gains in his communication turns during intervention and post-intervention.

Jessie made meaningful gains in her ability to model using the AAC device. During the first intervention session, Jessie engaged in only a few instances of modeling; however, by the end of the intervention period Jessie demonstrated large numbers of AAC models on the device per session. Allie also made meaningful communication gains. During baseline, Allie made multiple attempts at communicating verbally; however, the majority of her verbal

communication was unintelligible. After the introduction of the communication device, Allie took multiple turns activating the device to communicate her thoughts, ideas, and feelings.

Conclusions

Through the duration of this study, each teacher demonstrated a marked increase in his or her ability to implement AAC modeling during shared storybook reading and play. In addition, the investigators utilized this intervention as a dynamic assessment of each of the student's AAC needs. The incorporation of the Check-in, Check-Out for AAC procedure allowed both activation and reminder of the intervention and an efficient data collection method that appears to be clinically feasible. This dynamic assessment allowed us to gain insight into what additional supports or alternations to AAC supports are necessary in order for the student to effectively access his or her AAC device and communicate that to the children's support teams.

Though positive results for increased teacher AAC intervention performance were achieved, the results must be considered in light of various limitations. First, it should be noted that the researchers were Master's candidates in the field of early intervention/early childhood special education with a short time frame to plan, organize, and carry out the study. This limited the quantitative measurement to teacher performance. Future research should quantify the impact on child performance.

It is crucial that young children using AAC to communicate and interact, have access to appropriate educational supports that help create a rich language learning environment. Results demonstrated teachers creating a more immersive communication environment where children with CCN were given a means of expressive communication, and receive communicative input in an augmentative format that matches the way they communicate.

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