

DYNAMIC DISPLAYS AND PEER INTERACTION: A COMPARISON

BY

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Abstract

This was a study designed to compare the use of a visual scene display (VSD) versus a grid display on an electronic communication device by children with developmental disabilities during dramatic play sessions while interacting with typically developing peers. Using an alternating treatments design, three children between the ages of 3;9 and 4;5 with diagnosed developmental disabilities, language delays, and sufficient motor skills to directly select items on a touch screen were participants in this study. Three children between the ages of 4;1 and 7;11 who were typically developing participated in this study as peer playmates. Each participant completed 8 treatment sessions using 2 different play themes, 4 play sessions per theme. Each display type was given 15 minutes of use and then alternated with the other display type. The first two sessions of each theme were teaching sessions with the researcher. The second 2 sessions of each theme included a peer in which data was taken on the number of activations each participant made for each display type. Each participant activated each display type throughout the course of intervention and fluctuated their number of activations for both display types. Across all participants, each participant appeared to favor one display type over another, with Participants 1 and 3 favoring the grid while Participant 2 favored the visual scene display. The data revealed that over time, the visual scene display was used more frequently than the grid display.

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Chapter 1

Introduction

Augmentative and Alternative Communication (AAC) systems give children with severe communication disabilities more opportunities to participate in activities at home, school, and in the community. According to the American Speech-Language-Hearing Association (ASHA), "...an AAC system is an integrated group of various components, including symbols, aids, strategies, and techniques used by individuals to enhance communication," (ASHA, 1991, p. 9). Many children with severe speech, language, and developmental delays are often taught to use aided AAC systems to assist them as they acquire receptive and expressive language skills. An aided system includes an object or device that is used to transmit or receive messages (ASHA, 1991). Aids can include communication books and boards with static information as well as electronic voice output devices or computers that contain stored vocabulary that can be accessed for communication. The ultimate goal of AAC is to enable individuals to efficiently and effectively engage in a variety of interactions (Beukelman & Mirenda, 2005).

AAC and Young Children with Developmental Disabilities

AAC systems provide a way for young children to participate in social interaction and may facilitate children's development of language, literacy, social, and cognitive skills (Drager, 2003). AAC techniques are used frequently with children with developmental disabilities, including children with autism spectrum disorders, cerebral palsy, and developmental apraxia of speech (Beukelman & Mirenda, 2005). Children with autism spectrum disorders are diagnosed if they exhibit the following three features: impairments in social interaction; communication impairments; and restricted, repetitive,

and stereotypical patterns of behaviors, interests, and activities (American Psychiatric Association, 2000). The cognitive impairments of children with autism vary significantly. Children with autism have significant social and communication impairments. Such impairments include decreased joint attention, impaired social interactions skills, such as turn taking, and decreased language skills (ASHA, 2006). Some children with autism do not develop sufficient speech and language for a means of communication. If speech and language do develop, children with autism often produce speech containing echolalia and repetitive words or phrases. Their intonation is typically monotonous and they often interpret figurative language literally (ASHA, 2006). Many children with autism have visual-spatial and visual-memory skills that surpass their abilities in language (Tirosh, 1993). Other relative strengths include sustained attention, information processing, and graphic symbol comprehension (ASHA, 2006). Research has concluded that children with autism spectrum disorders frequently have strong visual processing skills, are often nonverbal, and generally do not have motor access difficulties (Shane, 2006).

A recent meta-analysis of studies examining the efficacy of AAC indicated that the majority of AAC interventions were either highly or fairly effective in terms of behavior change and generalization for children with autism, suggesting there is evidence for the use of AAC for individuals with autism (Schlosser, 2000). This research suggests that children with autism would benefit from AAC systems. Because autism affects social aspects of communication, it is important that interventions emphasize the pragmatics of communication. AAC systems can serve as both a buffer and bridge between children with autism and their communication partners (Cafiero, 2004). The

development of spontaneous communication is a dynamic, interpersonal process for a child with autism (Beukelman & Mirenda, 2005). When teaching new communication skills and AAC system use to this population, it is essential to teach the children these skills in the context of a natural environment using functional activities (ASHA, 2006). Because children with autism are visual learners who have difficulty processing multiple cues, an AAC system can serve to provide more complex visual support for this population (Cafiero, 2004).

Currently, there is some evidence from case studies and retrospective reports that children who use speech output technologies can positively affect their day-to-day communication abilities (Bornman & Alant, 1999; Light, Roberts, Dimarco, & Greiner, 1998; Mirenda, Wilk, & Carson, 2000). The use of all types of AAC systems with individuals with autism has been associated with improvements in behavior and social regulation; improvements in speech, expressive language, and social communication; and improvements in receptive language development and comprehension (ASHA, 2006). Recent evidence suggests that there are a range of AAC approaches that enhance the use of speech, lead to improvements in expressive language, and foster social interactions (Garrison-Harrell 1997; Light 1998; Mirenda, 2003; Schlosser, 2003). A naturalistic environment with a client and family centered approach is strongly recommended when introducing an AAC system (ASHA, 2004). There are now options with respect to speech generating device features and display types.

Another group of children who can benefit from the use of an AAC system are children with severe speech impairment. Children with severe speech impairment, often referred to as children with suspected childhood apraxia of speech, demonstrate

articulation errors as well as difficulty with volitional or imitative production of speech sounds and sequences (Bernthal, 2004). These children not only exhibit poor intelligibility but also communication frustrations, challenging behaviors, learned passivity, compromised social interactions, and delayed language development (Binger, 2007; Cumley, 1999; Harris, 1996). Children with suspected childhood apraxia of speech require intensive, ongoing speech therapy to improve their speech skills (Binger, 2007). In addition, many of these children may benefit from augmentative and alternative communication systems to address both their immediate and long-term functional communication needs (ASHA, (in press)).

There is limited research available with only a small number of children that has been conducted to examine the impact of using AAC with children who have severe speech impairments (Binger, 2007). Cumley (1997) reported that the speech of children with severe speech disorders might actually improve over time as a result of AAC use. He conducted activity-based AAC interventions for young children with suspected apraxia of speech during play activities with an adult (Cumley, 1997). He analyzed the level and type of comprehensible communicative behaviors across different modalities, as well as other variables. Cumley found that the children who used their AAC displays most frequently were those who had the most severe speech disorders, relative to the entire group. The AAC displays replaced the children's use of gestures with a more symbolic form of communication, making their communication attempts more intelligible (Cumley, 1997). The children with "less severe" speech impairments used the AAC displays as a secondary form of communication to their primary modes of spoken words and gestures (Cumley, 1997). The role of an AAC system for children with severe

speech impairment may be more of a supplement to their speech rather than a replacement because most of these children will rely primarily on their speech for communication (Binger, 2007).

Display Types

Dynamic display electronic devices present vocabulary in a touch screen format for individuals to select from. The benefit of using dynamic display technology is that the user is able to access a larger vocabulary set by having available multiple pages of vocabulary stored within the device (Drager, 2004). There are different types of displays available for use with a dynamic display AAC system. Traditionally, dynamic display AAC technologies have used a grid format, in which graphic symbols represent different concepts and are located in separate squares, organized in a row and column format (Drager, 2004). Another option for display layout involves directly embedded symbols for communication on the display of a contextually rich scene. These displays are known as integrated scenes or visual scene displays. For example, a digital photograph may be taken of a playground and the objects within the photograph would be used as the symbols for communication (Drager, 2004). See Figures 1 and 2 for examples of each display type.

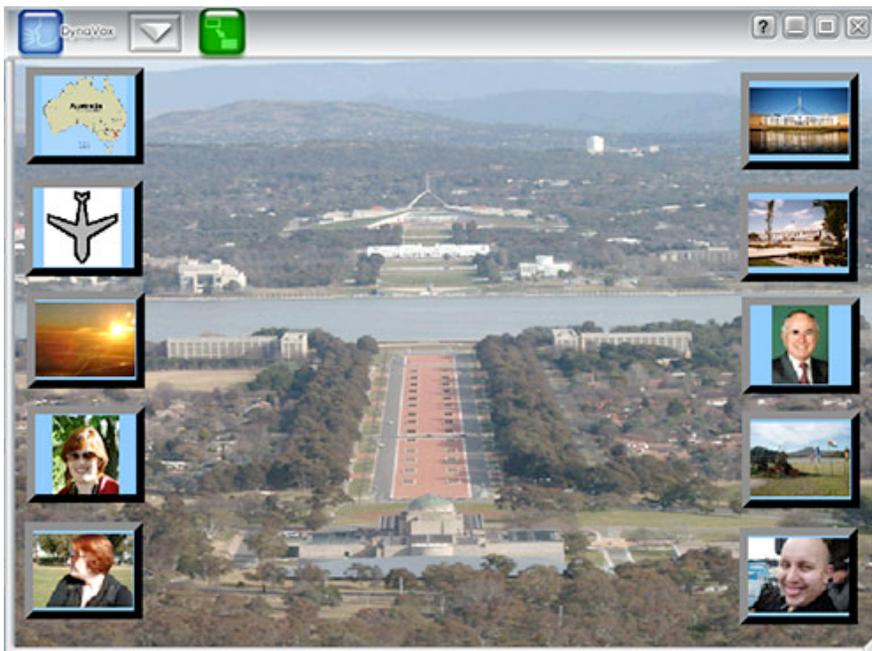
Figure 1

Example of a Grid Display



Figure 2

Example of a Visual Scene Display



System Display Research

Drager, Light, Speltz, Fallon, and Jeffries (2003) investigated the learning demands of dynamic display systems that differed in system layout and language organization. The display type used in this study was called a visual scene display in which symbols were arranged in a visual picture or digital photograph that was representative of a context in which they would naturally occur. The purpose of this study was to determine if context played a role in symbol identification. There was no direct teaching of the symbols in the study so the responses of the children were based on previous knowledge of symbol-referent characteristics. During the learning sessions, the

child was asked to locate a symbol on the display screen. If incorrect, the child was shown the correct symbol and given an explanation. If the child was correct, he or she was awarded with a brief play session. The results of this study indicated that when 2 1/2 year-olds developing typically participated in learning sessions using grid versus visual scene displays, they more readily learned the vocabulary in the visual scene (Drager et al., 2003). Drager et al. (2003) suggested some possible explanations for this result. One was that embedding language within contextual, visual scene displays reduced the metalinguistic demands of the task for the children. The vocabulary was presented within naturally occurring contexts as opposed to the isolated concepts in the grid condition (Drager et al, 2003). Young children often do not possess these metalinguistic skills of understanding concepts out of context until later in their development (Drager et al, 2003).

Drager, Light, Carlson, D'Silva, Larson, Pitkin, and Stopper (2004) conducted a study involving 3-year-old children who were developing typically and the use of both a contextual or visual scene display and grid format during play. They found that initially, the 3 year-olds performed equally well using both grid and visual scene displays. After the first learning sessions, the children performed significantly better with the visual scene display than a grid format. The children learned the symbols within the visual scene at a faster rate than in the grid display. Drager et al. (2004) suggested that future AAC systems, speech output devices in particular, must be redesigned to reflect the developmental models of children and that the results of the study should be validated with children with disabilities in future research (Drager et al., 2004). Thus far, the

research with visual scene displays has been with children without disabilities interacting with researchers.

Message Selection

Individuals who are not literate, such as young children with developmental disabilities, need ways to access vocabulary that are most functional for them. Single words and whole messages are often selected to meet individual communication needs. These messages are most frequently represented by different types of symbols (Beukelman & Mirenda, 2005). Young children with communication disabilities will benefit greatly from AAC if the appropriate vocabulary is available to them (Fallon, 2001). The initial vocabulary for preliterate AAC users must be meaningful, motivating, functional, and individualized. The vocabulary must also be appropriate to the child's age, gender, background, personality, and environments (Fallon, 2001).

Currently, there are limited tools available to help professionals and parents select vocabulary to be included in an AAC system for their children. Morrow, Mirenda, Beukelman, and Yorkston (1993) described five selection techniques, which include ecological inventories to survey the environments and activities in which children participate. These included communication diaries used to record an AAC user's interactions, core vocabulary list for an AAC user generated from standard word lists, an individualized list of words thought to be useful for an AAC user, and categorical frameworks used to identify words from different categories such as people, places, and feelings. In order to sufficiently identify all of the potentially important vocabulary words for a child, it is essential to use multiple vocabulary selection techniques to ensure both core vocabulary (i.e., words commonly used in a given situation) and fringe

vocabulary (i.e., words specific to an individual or activity) are included (Morrow, 1993). It is also important to involve multiple informants in the selection of vocabulary for a child (Fallon, 2001). For example, a parent may have knowledge of vocabulary used during specific family and social events that the child participates in while a teacher may have knowledge of the vocabulary used during school activities. Both the use of various selection techniques and the involvement of multiple informants is needed to generate a vocabulary that is sufficient for the individual and diverse needs of a child who uses AAC (Fallon, 2001).

Most people who use AAC represent messages that they communicate with symbols (Beukelman & Mirenda, 2005). A symbol is something that stands for or represents a referent (Beukelman & Mirenda, 2005). Symbols can be used both with and without communication aids, such as a voice output device, and they can convey whole messages such as “Stop,” as well as partial messages such as “I want” (Beukelman & Mirenda 2005). The meaning of a symbol is mediated by many factors that are intrinsic to the viewer, such as his or her motivation, neurological status, age, sensory abilities, cognitive skills, communication, language abilities, and world knowledge (Beukelman & Mirenda, 2005). To further understand the relationship between development and learning of language, Smith (2006) explains both aspects. She describes development as changes in behavior and knowledge, bounded by time, as a result of biological and environmental conditions (Smith, 2006). It is a process of adaptation and change. She describes learning as also a change in knowledge but it is related specifically to the experiences of an individual as opposed to biology. Smith concludes that language is a process of development in humans and aided communication systems are a process of

learning. Many children are in the process of developing language while learning graphic symbols at the same time (Smith, 2006).

Purpose

Young children with speech and language disabilities can benefit from AAC systems. There are options in terms of systems and system displays. Research with children developing typically and interacting with researchers has shown that these children have a preference for visual scene display.

The purpose of this study then was to compare the use of visual scene displays with grid displays by children with developmental disabilities while interacting with peers who are typically developing.

Chapter 2

Method

Participants

Participants were solicited from the Lawrence, Kansas area through local preschools, elementary schools, and newspaper announcements posted in the Lawrence Journal World newspaper. See Appendix A for the announcement. The criteria for selecting participants with disabilities was later changed to accept children using more words than the original announcement requested as there were few responses. Fliers were distributed to Lawrence public preschools and elementary schools, local private preschools, and early childhood centers. The fliers were sent home with children ages 2 through 7 who had developmental and language delays. See Appendix B for the flier. A letter of introduction was provided to the schools who distributed the fliers. See Appendix C. A phone conversation was held with a parent or guardian of the children with developmental disabilities who responded to the announcements and fliers to determine whether or not his or her child qualified for the study. See Appendix D. A letter of introduction (Appendix E) and a consent form (Appendix F) were mailed to the care providers of the children who qualified for the study. A consent form (Appendix G) was also mailed to the care providers of the peers who were developing typically who participated in this study.

The participants with disabilities fit the criteria for this study based on age, diagnosis, language delay, experience with AAC, sufficient motor skills to directly select items on a touch screen, and availability. The peer playmates fit the criteria by having speech and language skills that were typical for their age and being within 4 years of age

of the participants with disabilities. The language skills of the playmates were confirmed by administration of *The Preschool Language Scale-4 (PLS-4)* (Zimmerman, Steiner, & Pond, 2002) or *the Clinical Evaluation of Language Functions (CELF)* (Semel, Wiig, & Secord, 2004) at the beginning of the study. Race and gender were not considered when selecting participants for the study. All of the families of the children signed consent forms that explained the details and conditions of the study. These forms also confirmed their willingness to participate.

Three children, two boys and one girl, with diagnosed developmental disabilities and expressive language delays participated in the study. Three peers, 2 girls and one boy, who were developing typically, also participated in the study as playmates. All of the participants were from the Lawrence area. Five of the 6 participants were from English speaking families. One of the children with a disability was from a bilingual home in which the father was American and her mother was Czechoslovakian. Both parents spoke English with this child. Phone conversations were held with the families to determine whether or not their children qualified for the study.

Information to describe the participants was obtained through both formal and informal measures prior to the initiation of the study. Care providers of the children with disabilities completed *The MacArthur-Bates Communicative Developmental Inventory: Words and Gestures* (Fenson, 1998) to document the number of words and gestures the participants used. The participants with developmental disabilities were observed in their homes during a play session with a family member and/or researcher to assess the forms and functions of the participants' communication. The form of communication is the way an individual expresses wants, needs and feelings, such as gestures, facial

expressions, or vocalizations. The function of communication is the reason or purpose for the communication exchange, such as making requests or protesting (Downing, 2005). The researcher observing the play session of the children with disabilities completed an inventory of forms and functions of communication (see Appendix H). See Table 1 for demographic information relative to participants with disabilities. See Table 2 for a list of participants with disabilities' forms and functions.

Table 1

Participants with Disabilities

Participant	CA	Diagnoses	MacArthur	
			Understands	Understands and Says
P1	4; 5	Autism Spectrum Disorder	302/424	16/396
P2	3;9	Pervasive Developmental Disorder	264/424	114/396
P3	3;10	Speech and Language Delay	420/424	284/396

Table 2

Participants with Disabilities: Forms and Functions of Communication

Participant	Forms of Communication	Functions of Communication
P1	Gross vocalization Distal Gestures Facial Expressions Simple Actions on People Simple Actions on Objects Simple Body Movements American Sign Language	Protest/Reject Make a request Gain/Direct Attention Comment/Label
P2	Gross vocalization Distal Gestures Facial Expressions Simple actions on People Simple Actions on Objects Simple Body Movements Speech	Protest/Reject Make a Request Gain/Direct Attention Comment/Label
P3	Gross Vocalization Distal Gestures Facial Expressions Simple actions on People Simple Actions on Objects Simple Body Movements Speech	Protest/Reject Make a Request Gain/Direct Attention Comment/Label

The Preschool Language Scale-4 (PLS-4) (Zimmerman, Steiner, & Pond, 2002) or the *Clinical Evaluation of Language Functions Fourth Edition, Screening Test (CELF-4)* (Semel, Wiig, & Secord, 2004), depending on the age of the child, was administered to the peer participants to assess their expressive and receptive language skills. The test was administered in their homes or at the Schiefelbusch Speech-Language-Hearing Clinic depending on family preference. The results of these tests indicated that all of the peers participating in the study had typical expressive and receptive language skills for their age. See Table 3 for peer playmate demographics and test results.

Table 3

Playmate Information

Playmate	CA	PLS-4 Total Language Score	CELF-4 Total Language Score
PM 1	5;1	108	
PM 2	4;1	124	
PM 3	7;11		20

Note. Mean Standard Scores for the PLS-4: 100 with a standard deviation of 15. Criterion Scores for the CELF-4 Screening Test: 16 for age 7;0-7;11. PM 3 scored above the Criterion Score for his age range, placing him WNL.

Participant 1. Participant 1 was 4 years, 5 months old at the time of the study. He was diagnosed with autism in the summer of 2005. He had one younger sister. He attended the Language Acquisition Preschool (LAP) at the University of Kansas 4 days a week for one-half of the day. Participant 1 also received sensory integration therapy weekly with a licensed occupational therapist. This therapy focused on vestibular and proprioceptive movements. The strategies used at home by his parents included manual signing, visual supports, social stories, and social games that incorporated socialization and interpersonal skills. His family reported that he was a social, happy child. He communicated primarily through facial expressions, some gestures, vocalizations, and physically showing his parents what he wanted when making a request. Participant 1 was not using any formal AAC system at the time of the study.

Participant 2. Participant 2 was 3 years, 9 months old at the time of the study. He was diagnosed with Pervasive Developmental Disorder at 18 months of age. He had one older brother. He attended a special education preschool four mornings a week and

also received speech therapy for one hour a week as well as occupational therapy for an additional hour per week at his school. He communicated primarily through 1-3 word phrases and physically showing his parents what he wanted when making a request.

Participant 2 was not using any formal AAC system at the time of the study.

Participant 3. Participant 3 was 3 years, 10 months old at the time of the study. She was diagnosed with a severe speech and language delay at 2 years, 5 months of age. She was an only child. She attended the Language Acquisition Preschool at the University of Kansas 4 days a week for one-half of the day. She communicated primarily through words, vocalizations, and gestures. Participant 3 was not using any formal AAC system at the time of the study. She had had no prior experience with AAC.

Playmate 1. Playmate 1 was 5 years, 1 month old at the time of the study and was developing typically. She had one younger sister. Playmate 1 attended Educare, a childcare program at the University of Kansas, 5 days a week for the length of the day. She scored within normal limits on the PLS-4. Her family reported that she was a talkative, social child.

Playmate 2. Playmate 2 was 4 years, 1 month old at the time of the study and was developing typically. She had one younger brother. Playmate 2 attended a preschool in her hometown and she scored within normal limits on the PLS-4. Her family reported that she enjoyed playing with other children and that she was mature for her age.

Playmate 3. Playmate 3 was 7 years, 11 months old at the time of the study and was developing typically. He was an only child. Playmate 3 attended the second grade at a Lawrence elementary school and scored within normal limits on the CELF-4. His family reported that he was social and enjoyed playing with other children.

Setting and Context

Setting. The testing prior to the initiation of the study took place in the homes of the participants with the exception of one peer. This session took place at the Schiefelbusch Speech-Language-Hearing Clinic. The treatment phase of the study took place in the Schiefelbusch Speech-Language-Hearing Clinic at the University of Kansas in Lawrence. All sessions were conducted in a therapy room and recorded for further viewing.

Context. Both the teaching and peer play sessions incorporated dramatic play activities adapted from *Building a Language Focused Curriculum for the Preschool Classroom, Volume II: A Planning Guide* (Bunce, 1995). A dramatic play activity is a child-centered play setting where toys and other manipulatives specific to a particular theme, such as kitchen or sports, are provided for a child to play with while interacting with a facilitator. The purpose of dramatic play is to build on the child's existing play skills and introduce new language and vocabulary. Dramatic play routines facilitate language-learning, social development, and cognitive development (Bunce, 1995). To determine what dramatic play themes would be most appropriate for the participants, the researcher provided the children's care providers with a list of themes over the phone and the care providers chose the top three that would be of interest to their child. Two play themes were chosen from the care provider's selections and each theme was used during four treatment sessions. The chosen play themes were kitchen and transportation.

Stimuli

Communication system. A Dynavox Technologies DV4 communication device was used to display and access vocabulary in both a grid and visual scene display format

during treatment sessions for all participants. See Figures 3 through 6 for the grid and VSD used. The DV4 was chosen because the Dynavox system allows for easy creation of visual scene displays and the screen is ideal for displaying digital images due to its large size. The DV4 weighs approximately 5 pounds, 13 ounces, is 12" x 9" x 3" in size, and uses a 12.1" active matrix color TFT-LCD touch screen to activate the icons.

Figure 3

Visual Scene Display for Kitchen Theme

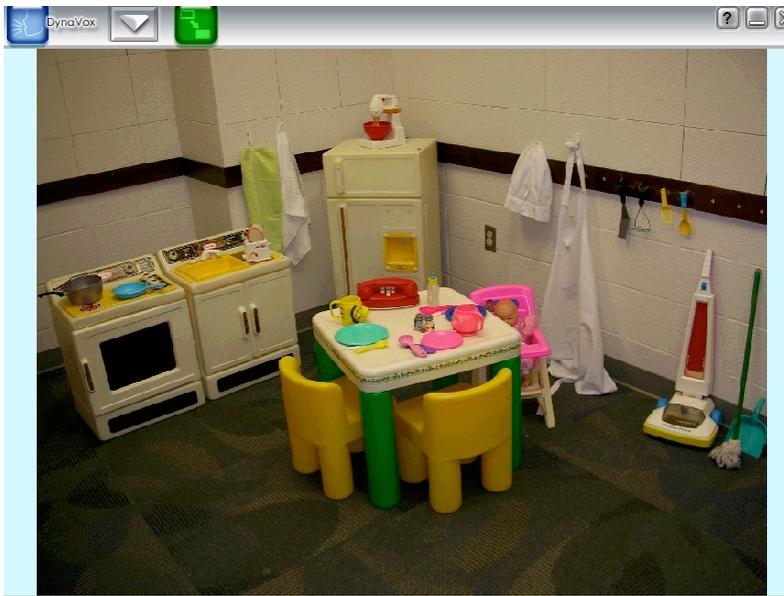


Figure 4

Grid Display for Kitchen Theme

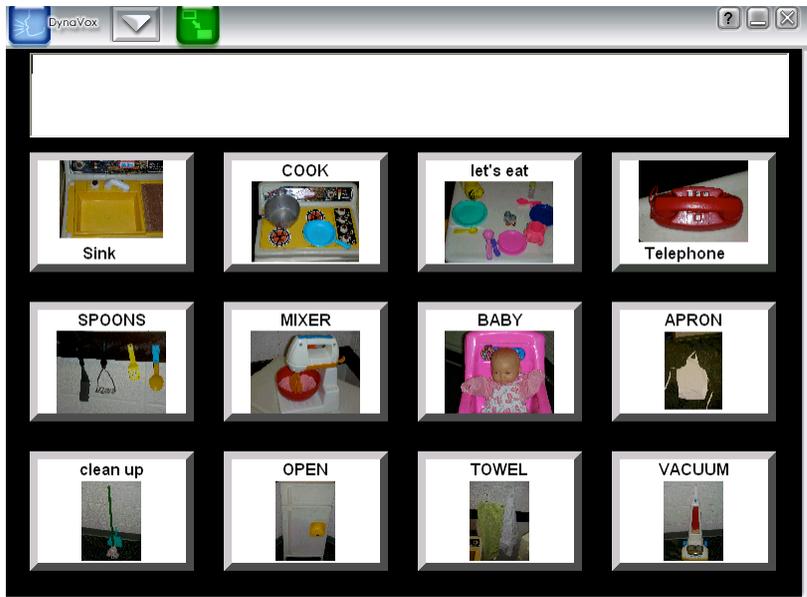


Figure 5

Visual Scene Display for Transportation Theme



Figure 6

Grid Display for Transportation Theme



Vocabulary and display design. The vocabulary chosen was based on the design of the dramatic play theme and the particular items that were available for play. Twelve vocabulary words and phrases that were functional for the activities within each play theme were chosen. The vocabulary for each theme can be seen in Table 4. For each theme, the vocabulary was organized in both a grid and visual scene display format.

Table 4

Vocabulary Used

Kitchen Theme	Transportation Theme
Let's eat	Cars
Wah, wah (cry of a baby)	Drive
Open	Race
Cook	Ready, set, go
Apron	Garage
Ring, ring (sound of telephone)	Wash,
Clean up	Fix it
Vroom, vroom (sound of vacuum)	Tools
Spoons	Towel
Wash	Fill it up
Mix it	Stop
Towel	Beep, beep (sound of car horn)

Procedure

Intervention. An alternating treatments design was used throughout this study with each participant having 8 sessions with both the grid and visual scene displays, using the two dramatic play themes, kitchen and transportation.

The first two sessions of each theme were completed with the researcher and lasted thirty minutes. During these sessions, the children learned the vocabulary on the device as the researcher provided aided input during play. The last two sessions of each dramatic play theme consisted of the participants playing with a peer without disabilities. The peers were encouraged to play and interact with the child with disabilities. Using an alternating treatments design, each display type was given 15 minutes of use time, per session for each theme. For example, with the kitchen theme, a session started with the use of either the grid format with kitchen vocabulary or the visual scene format

containing the same vocabulary. After 15 minutes, the other format was introduced for the remainder of the session. The display types were alternated each session throughout the course of the treatment for both the sessions with the researcher as well as the sessions with the researcher and playmate. The researcher alternated the order of presentation of the visual scene display and grid display each session.

The sessions were scheduled during times when the participants and researchers were available. The dates and times varied for each participant based on their commitments outside of this study. The session schedule for each participant is included in Tables 5, 6, and 7.

Aided input or modeling was used to teach the use of the symbols in each display type for communication during the sessions. Components of aided input include the use of an electronic voice output communication device, encouragement to use the device, and the facilitator's use of the device to augment his or her spoken language (Beukelman & Mirenda, 2005). As the individual watches others use the graphic symbols in natural interactions they will start to understand how symbols can be combined in different ways to facilitate communication during activities (Beukelman & Mirenda, 2005). Aided input was used throughout the study to teach the symbol referent relationships in each condition. This aided input was used within the context of dramatic play routines because of the language opportunities a dramatic play environment provides. Two researchers participated in the teaching sessions, the facilitation of the play sessions, the data collection and the completion of reliability. While one researcher facilitated the session, the other researcher recorded the session and took online data. If Researcher 1 facilitated the first session of the theme with a participant, Researcher 2 typically

facilitated the second session of the theme. The facilitation by the researchers was alternated throughout the teaching and peer play session to maintain the interest of the participants and to give the children exposure of aided input from more than one individual to further understand the communicative function of the device. View Tables 5, 6, and 7 for a review of the teaching and facilitation of the play sessions.

Table 5

Participant 1: Play Session Information

Date	Teaching or Peer Session	Theme	Facilitator	Data Collector
2/18/07	Teaching	Kitchen	Researcher 1	Researcher 2
2/18/07	Teaching	Kitchen	Researcher 2	Researcher 1
2/20/07	Peer 1	Kitchen	Researcher 1	Researcher 2
2/26/07	Peer 1	Kitchen	Researcher 2	Researcher 1
2/26/07	Teaching	Transportation	Researcher 1	Researcher 2
3/11/07	Teaching	Transportation	Researcher 2	Researcher 1
3/11/07	Peer 1	Transportation	Researcher 1	Researcher 2
3/15/07	Peer 1	Transportation	Researcher 2	Researcher 1

Table 6

Participant 2: Play Session Information

Date	Teaching or Peer Session	Theme	Facilitator	Data Collector
2/20/07	Teaching	Kitchen	Researcher 2	Researcher 1
3/5/07	Teaching	Kitchen	Researcher 2	Researcher 1
3/11/07	Peer 2	Kitchen	Researcher 2	Researcher 1
3/11/07	Peer 2	Kitchen	Researcher 1	Researcher 2
3/13/07	Teaching	Transportation	Researcher 1	Researcher 2
3/13/07	Teaching	Transportation	Researcher 2	Researcher 1
3/14/07	Peer 2	Transportation	Researcher 2	Researcher 1
3/14/07	Peer 2	Transportation	Researcher 1	Researcher 2

Table 7

Participant 3: Play Session Information

Date	Teaching or Peer Session	Theme	Facilitator	Data Collector
3/5/07	Teaching	Kitchen	Researcher 1	Researcher 2
3/6/07	Teaching	Kitchen	Researcher 1	Researcher 2
3/6/07	Peer 2	Kitchen	Researcher 2	Researcher 1
3/12/07	Peer 2	Kitchen	Researcher 1	Researcher 2
3/12/07	Teaching	Transportation	Researcher 1	Researcher 2
3/13/07	Teaching	Transportation	Researcher 2	Researcher 1
3/14/07	Peer 2	Transportation	Researcher 1	Researcher 2
3/14/07	Peer 2	Transportation	Researcher 2	Researcher 1

Data Collection and Analyses

Data collection. All of the sessions, teaching and play, were recorded onto a DVD and the 4 sessions with playmates were analyzed at the completion of the study. A total of 4 sessions per participant with playmates were used for data collection.

Activations of the device were of interest. An activation was counted as any time during the session that the participant touched the screen and a voice output message was heard. Two full sessions were lost due to a recording malfunction and were not analyzed.

Therefore, online data was included for participant 1.

Data analyses. Data were analyzed descriptively.

Reliability. Ten of the 12 play sessions with playmates were reviewed for interobserver reliability by two researchers. Two sessions for Participant 1 and 4 sessions for Participants 2 and 3 were judged for reliability. Reliability was calculated by dividing the total agreements by the total number of agreements plus disagreements.

Reliability for Participant 1 was 100%. Reliability for Participant 2 was 95%. Reliability for Participant 3 was 98%.

Chapter 3

Results

This study compared the use of a contextually organized visual scene display (VSD) versus a non-contextualized, grid based display during dramatic play sessions by three children with diagnosed developmental and language delays while they played with three children who were developing typically. After two teaching sessions within two play themes with the researcher and children with disabilities, two sessions within each theme were facilitated with both the children with disabilities and the peer playmates.

Use of Display Types

Participant 1. During the four teaching sessions, Participant 1 activated the grid 19 times and visual scene display once. This data was taken online and used for comparison to the data collected from the peer sessions. See figure 7 for his device during the teaching sessions. The data from the first two peer sessions from Participant 1 is not included in this study. There was a malfunction with the recording equipment and these data have been lost. According to the online data taken by the researchers during these sessions, Participant 1 did not show a preference for either display type in the peer play sessions with the kitchen theme. During the first peer session of the transportation theme, Participant 1 did not activate either display. He activated the grid display 3 times during his second peer session of his transportation play theme. Participant 1 activated the display types inconsistently throughout the intervention sessions. See Figure 8.

Figure 7

Participant 1: Display Activation for All Teaching Sessions

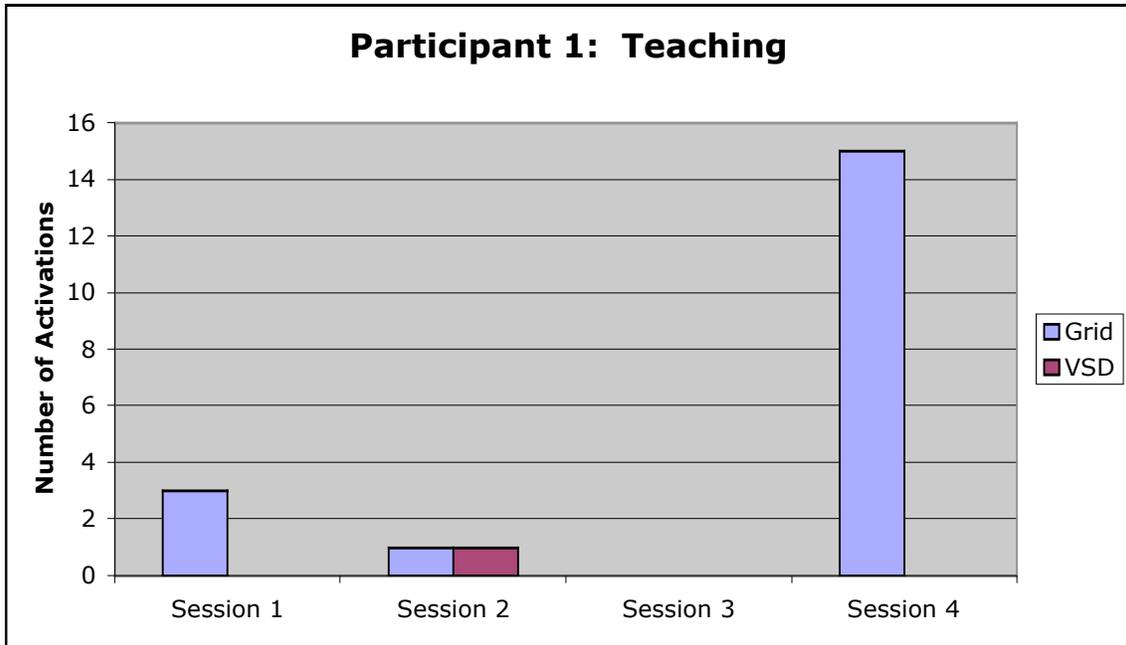
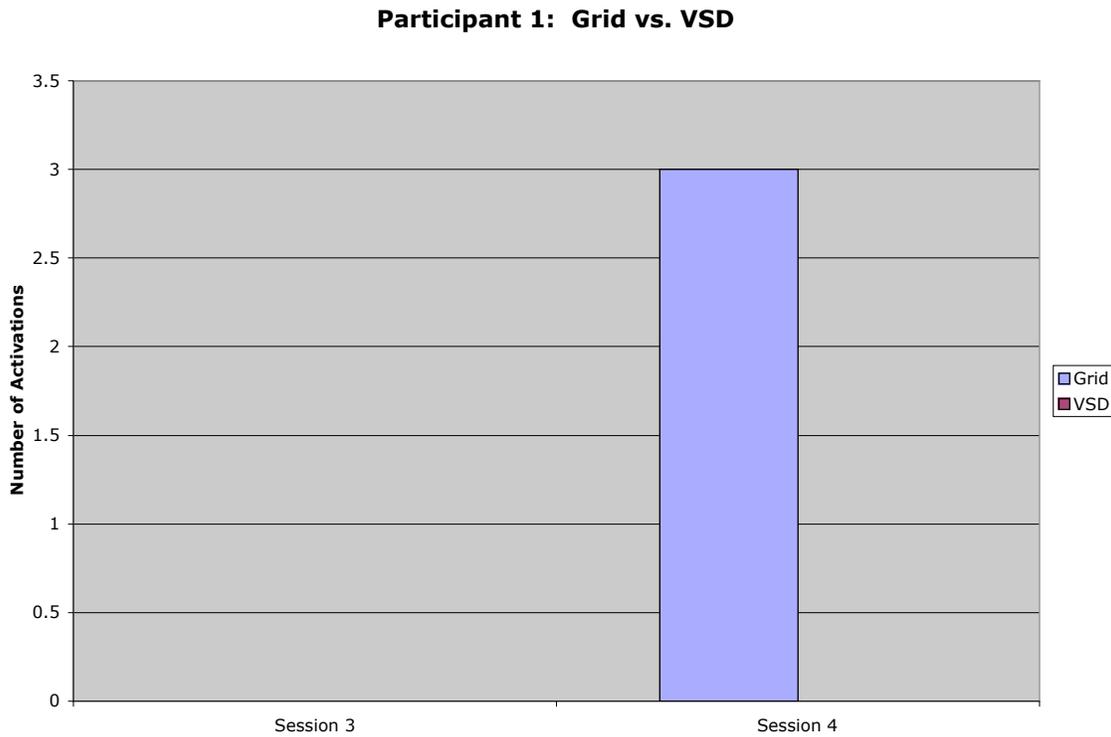


Figure 8

Participant 1: Display Activation for All Peer Play Sessions



Participant 2. During the four teaching sessions, Participant 2 activated the grid 62 times and the VSD 42 times. This data was taken online and used for comparison to the data collected from the peer sessions. See Figure 9 for his device use during the teaching sessions. Over the four play sessions, Participant 2 used the device 55 times. He used the grid display 27 times and the VSD 28 times. During the first peer play session with the kitchen theme, Participant 2 activated the grid display 22 times and the visual scene display 6 times. He did not activate the grid display at all during the second peer play session of the kitchen theme and used the VSD 3 times. During the first peer play session of the transportation theme, Participant 2 activated the grid 3 times and the

VSD 9 times. During the final peer play session of the transportation theme, he activated the grid twice and the VSD 10 times. See Figure 10.

Figure 9

Participant 2: Display Activation for All Teaching Sessions

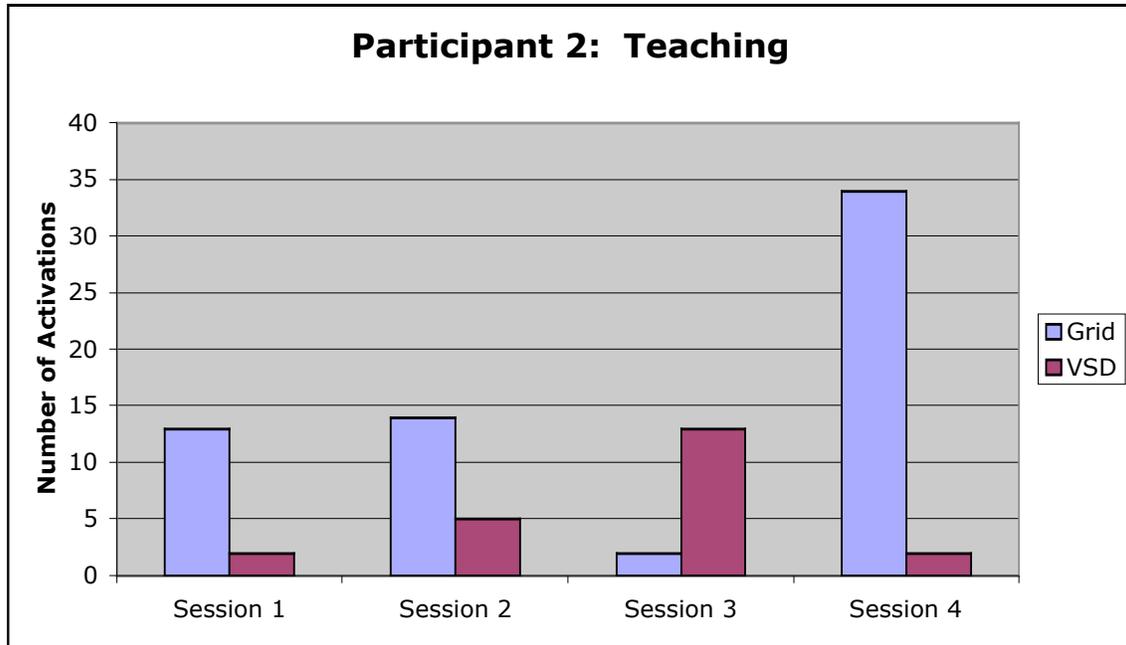
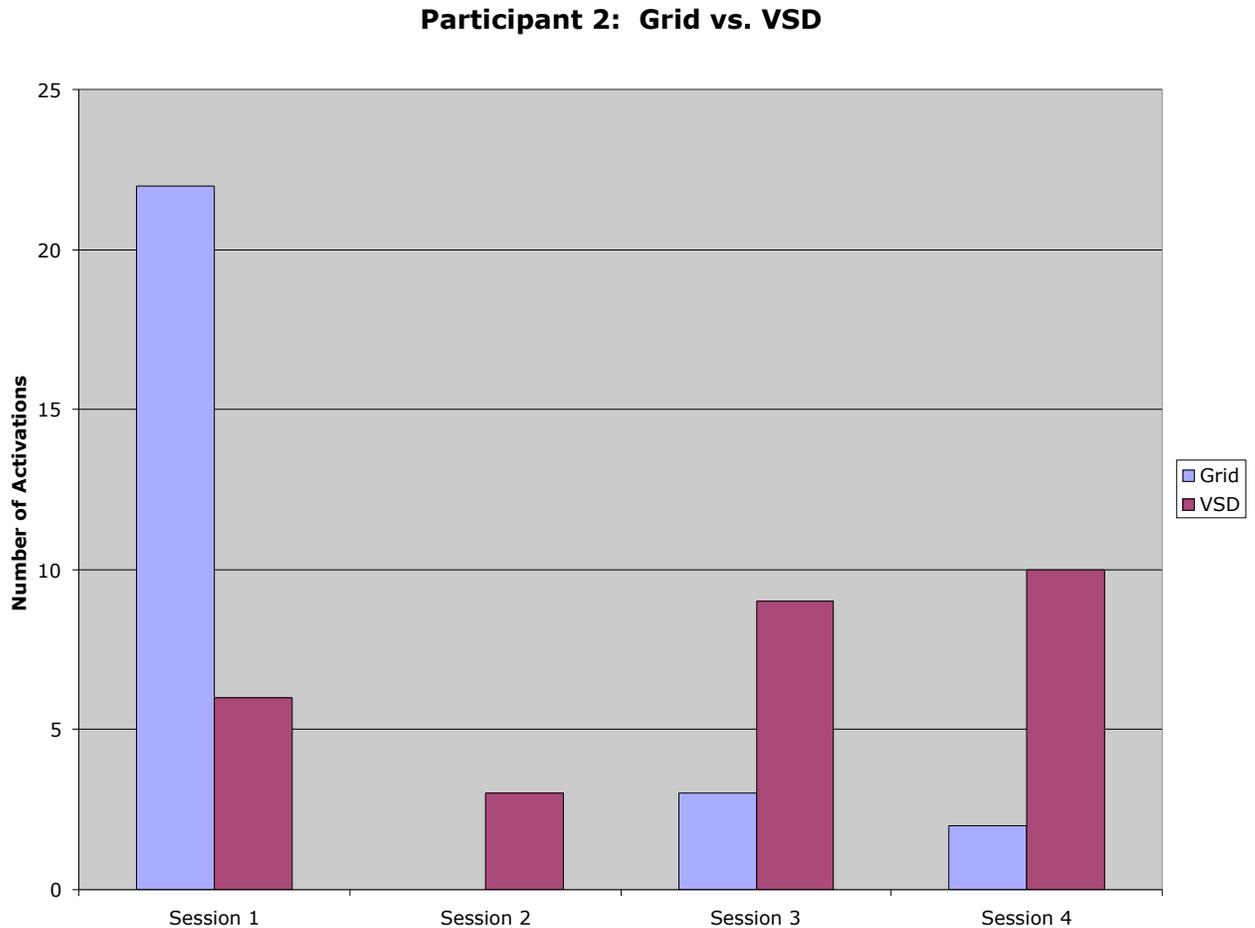


Figure 10

Participant 2: Display Activation for All Peer Play Sessions



Participant 3. During the four teaching sessions, Participant 3 activated the grid 24 times and the visual scene display 34 times. This data was taken online and used for comparison to the data collected from the peer sessions. See Figure 11 for her device use during the teaching sessions. Over the four play sessions, Participant 3 used the device a total of 62 times. She activated the grid display 38 times and the VSD 24 times. During the first peer play session of the kitchen theme, Participant 3 activated the grid display 18 times and the VSD 10 times. She activated the grid 15 times and the VSD 4 times during

the second peer play session of the kitchen theme. Participant 3 activated the grid 3 times and the VSD 4 times during the first peer play session of the transportation theme.

During the final peer play session of the transportation theme, she activated the grid twice and the VSD 6 times. Participant 3 used the grid display more frequently during the first two sessions and gradually used the VSD more towards the end of intervention. See

Figure 12.

Figure 11

Participant 3: Display Activation for All Teaching Sessions

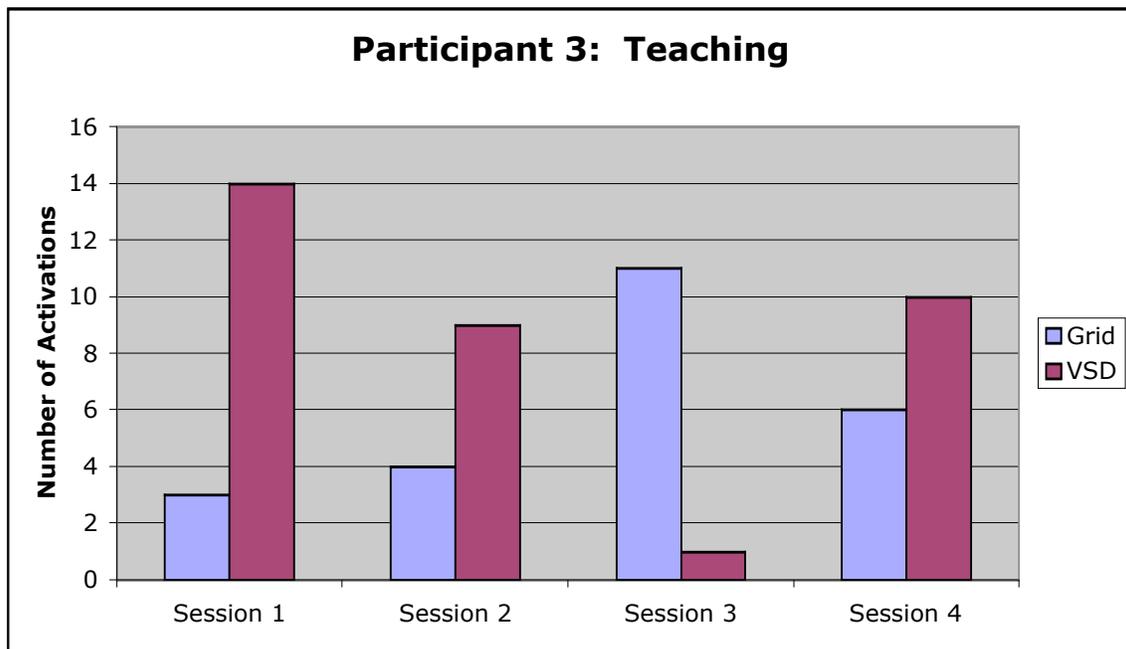
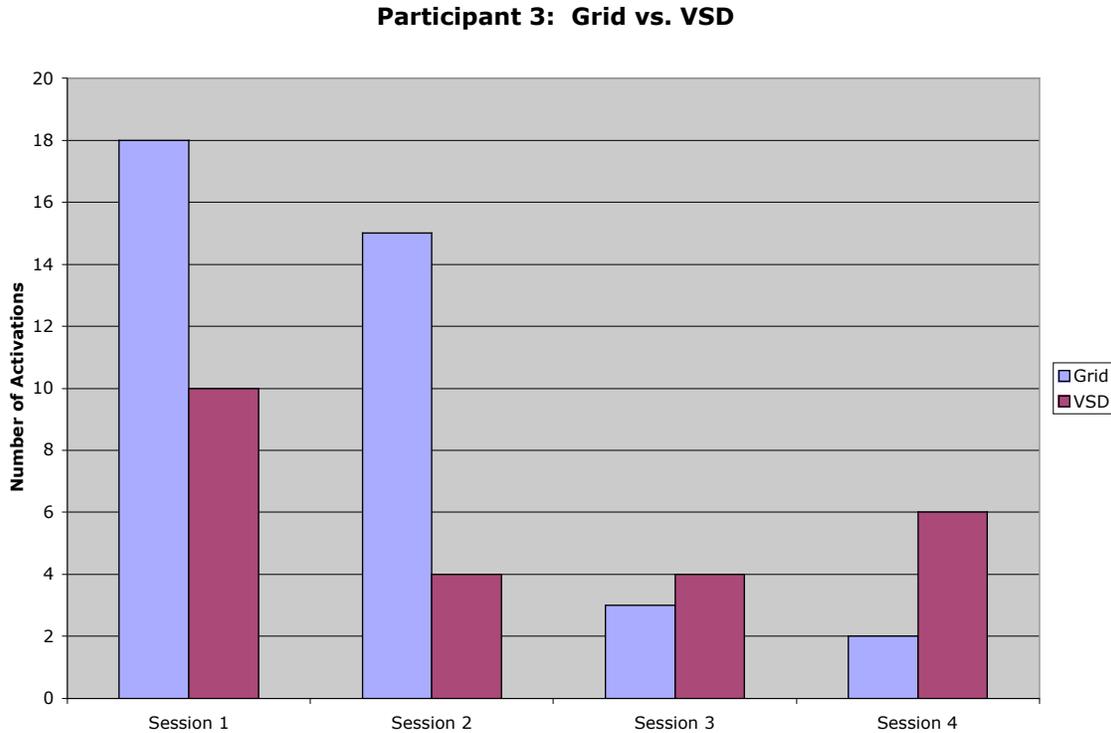


Figure 12

Participant 3: Display Activation for All Peer Play Sessions



Overall, the participants activated both the grid and visual scene displays.

Participant 1 appeared to favor the grid as did Participant 3. Participant 2 favored the VSD. However, the activations varied from session to session and across treatment conditions. Figure 13 depicts the total number of activations made during the teaching sessions across participants for comparison to the peer data. Figure 14 depicts the total number of activations made throughout the course of intervention during the peer sessions across participants.

Figure 13

Total Number of Activations During Teaching Sessions Across Participants

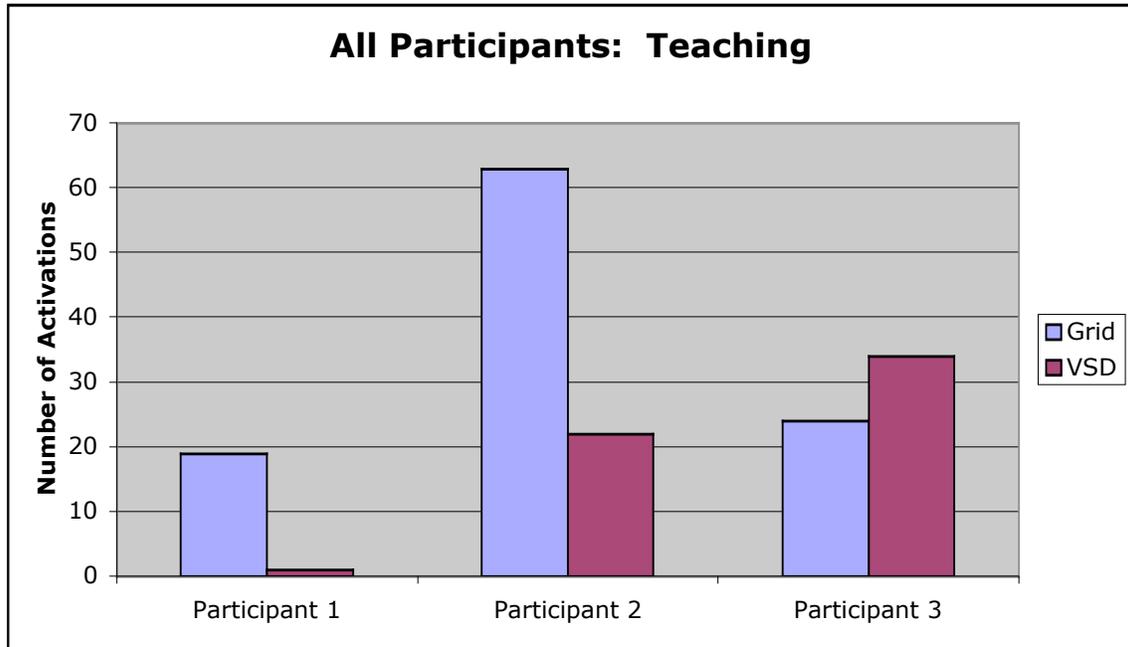
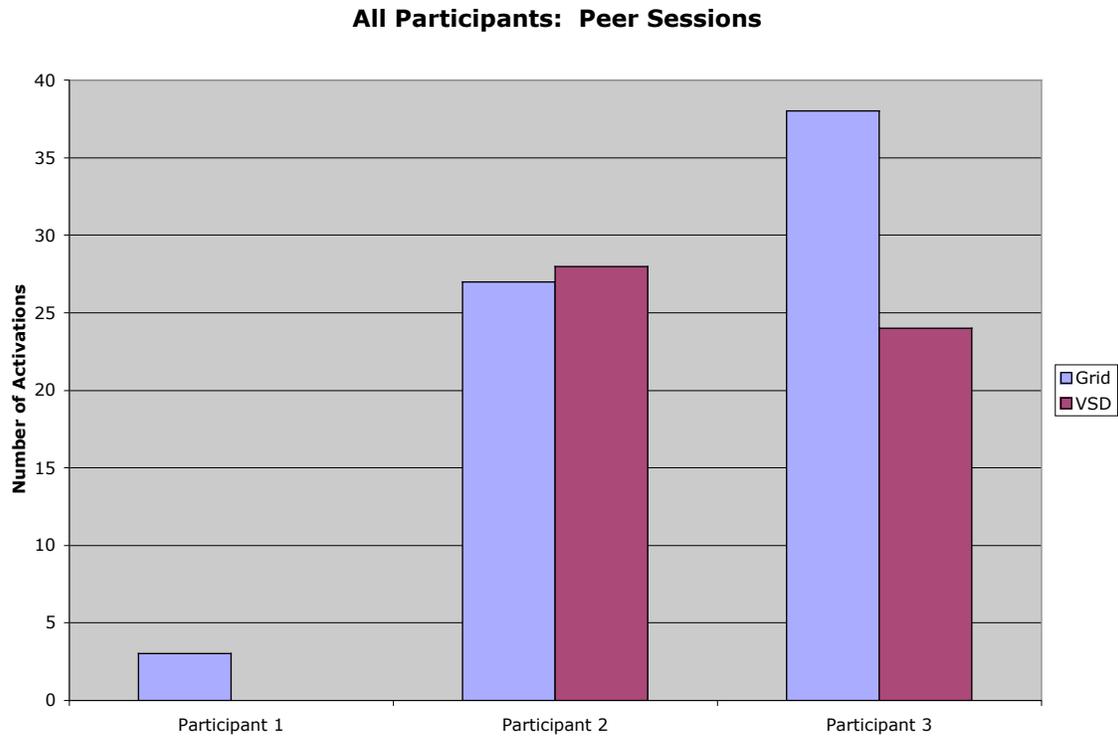


Figure 14

Total Number of Activations During Peer Play Across Participants



Chapter 4

Discussion

This study compared the use of a visual scene display versus a grid display on an electronic communication device by children with developmental disabilities. Data was collected on the children's use of both display types while interacting with peers who were developing typically during themed play sessions. Two of the 3 participants used each display type during the study. The dramatic play sessions provided a context for the 12 vocabulary items and the aided input served as a source of teaching for the participants. The dramatic plays provided the participants an opportunity to comprehend the symbols and use them meaningfully. Because the use of each display type varied for each participant and across participants during the length of this study, it is important to examine some possible variables that may have affected the results of the study.

Participant Variables

The participants' use of each display varied throughout the intervention. The participant variables that may have influenced display use include learning styles and interest in peers over time.

Participant 1 did not use either display type frequently. Data from the final two sessions of the transportation theme were included for collection and analysis. The first two sessions of the kitchen theme were lost due to a recording error and this data was not included in the results of the study. However, online data was collected for Participant 1 during these play sessions. Participant 1 did not use either display type during these first peer play sessions. He did use the grid display 3 times during the first teaching session with the kitchen theme, both displays once during second teaching session of the kitchen

theme, and had a total of 7 grid uses on the second teaching session of the transportation theme. This use may have been because of his interest in the device and the lack of peers to interact with. Participant 1 appeared to use the device more as intervention progressed. During the final sessions that were used for data collection, Participant 1 used the grid display in the final play session. He may have used the device more towards the end of intervention because it took him longer to learn the communicative value of the device. He may have needed time to observe the device being used by others and process the aided input to understand the meaning of the device.

Participant 2 activated both display types throughout this study. His use of the grid display decreased and his use of the VSD increased as the study progressed. This may have been due to the presentation of the various display types. Participant 2 also appeared to use whichever display type was initially presented during each session. He appeared to attend more to the display type that was presented first each session. However, this was not always the case. In the final session, the grid was presented first and Participant 2 used the VSD more. Maybe Participant 2 needed more exposure to the VSD to learn where the vocabulary was located so that he could use it where the grid display was well defined. As time progressed, his interest in the device itself decreased and his play with the peer increased. This may have impacted his device use as well.

Participant 3 activated both display types throughout this study as well. During the first two sessions with the peer, she activated the grid display more frequently than the VSD. The presentation of the different display did not affect her use of either display because when either the VSD or grid was presented first during these sessions, she used the grid more. During the final 2 sessions, Participant 3 used the VSD more frequently

than the grid. Overall, she decreased her activation of both displays as the sessions progressed. This may have been because she interacted more with the peer and was less interested in the device.

Contextual Variables

Sessions and themes. The different themes may have affected how frequently the children used the display types. For example, Participant 1 was very interested in the racetrack during the transportation theme, which may have distracted him from using either display. Participant 3 was often more interested in playing with the toys and peer than activating the displays. The children's moods and energy levels may have impacted the study as well. All of the participants, with the exception of Participant 1, had 2 consecutive sessions because of scheduling difficulties. This may have affected the child's interest in the displays. The length of the sessions may have affected the children's activation of the displays as well. Thirty minutes appeared to be a long time to maintain the interest of the children during play and to maintain their interest in the device. The fatigue of the children was especially noted when two sessions were held on the same day. Another factor that may have influenced the participants' use of the VSD was that not all of the images within the display were given voice output messages. On occasion, a participant would become frustrated that an item on the VSD did not make a sound. This may have been confusing to the participants and may have made the VSD less attractive when compared to the grid because each button on the grid produced the vocabulary item when activated.

Researchers and aided input. Throughout the course of intervention, the average number of aided input activations was 176. The greatest number of aided input

activations was 239 and the least number of activations was 108. The variation in aided input was due to environmental factors. Sometimes the peer playmate asked the researcher many questions, which prevented as much input. A malfunctioning prop may have occupied the time of the researcher, such as the car wash collapsing during a transportation session. Both the participant and the peer playmate may have been distracted by something in the therapy room, such as the presence of a care provider. All of these environmental factors may have affected the researcher's use of aided input throughout the course of intervention. This in turn would have influenced the child's use of the device. Overall, all of the Participants used both display types when Researcher 2 facilitated the sessions. This may have been coincidental or could have been a result of the participants' comfort level with the researcher or possibly the amount or timing of the aided input provided during the sessions. However, aided input was consistent throughout the intervention sessions, with Researcher 1 providing slightly more aided input than Researcher 2, suggesting that the amount of aided input was not a factor.

Vocabulary. The vocabulary use among all three participants varied. Participant 1 used two vocabulary words (towel, drive) and one of those words (towel) was used twice. Participant 2 used a wide variety of vocabulary items and those items were frequently selected multiple times in a row. On one occasion, he used one item only three times in a session. This limited use is likely due to peer interactions. On all other occasions, Participant 2 activated multiple and a variety of vocabulary items throughout each session. Participant 3 also activated multiple and a variety of vocabulary items throughout each session with the peer playmate.

Peers. The presence of the peer also may have impacted the participants' use of the display types. On many occasions, the participants were engaged with the peer playmate and the device was not a priority during these sessions. This was especially noted toward the end of intervention when friendships were formed. Both display types were used less as intervention progressed and the peers began to understand their new playmates better.

Study limitations

Because this study only included three participants with developmental disabilities, it may be difficult to generalize this information to the greater population of all children with developmental disabilities. Also, the participants in this study were members of either the population of children with autism or the population of children with severe speech and language impairments. Children with other developmental disabilities may have used the display types differently.

Each participant participated in eight, thirty-minute sessions; four teaching sessions and four peer play sessions. There were only four peer sessions to gather data. If more sessions were included and the study was lengthened in this way the participants would have had more time to learn the device and to become more familiar with their peers.

Another limitation of the study was that even though the sessions were centered around play-based activities, the sessions were held in a clinic setting as opposed to a more natural environment, such as the participants' homes. The results of this study may have been different if the setting of the sessions was a more familiar environment for the participants.

Future research

Future research should include a larger number of participants with a variety of developmental disabilities. It may be beneficial to train the peers who are developing typically as to how to provide aided input for the participants. This input could have an impact on how frequently the participants use the communication device. It may also be beneficial to prepare the participants on what to expect during the study and how the communication device is used during play by providing them with a video to watch prior to the start of the study. The video would give the participants a sequence of each session, including who will be present during the study, what activities they could expect, and would demonstrate the use of a communication device. This may alleviate any anxiety the participants may face prior to the sessions and will better prepare them for the study. The larger sample size and peer involvement will assist future clinicians in their programming of electronic communication devices for children with developmental disabilities. Given the age of the children, it may be beneficial to shorten the lengths of the sessions so that they do not lose interest in both the activity and display type on the device.

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Appendix A

Researchers Seeking Children to Participate in Study

Kansas University researchers are seeking children for a study focusing on the use of electronic communication devices in play. The researchers are looking for children between the ages of 3-7 who have been diagnosed with a developmental disability, have language delays, who use less than 25 words expressively, and who have motor skills to directly select items on a touch screen. The study will compare children's use of 2 different types of displays on an electronic communication device while playing with a typical peer. The researchers are also seeking children who have no communication challenges to participate in the study as peer playmates. The research will be conducted at KU. For more information, contact Angie Turner at aturner@ku.edu or Jane Wegner at jwegner@ku.edu or 864-4690.



WHAT?

A STUDY AT KU FOCUSING IN THE USE OF COMMUNICATION DEVICES IN PLAY.

WHO?

CHILDREN WHO HAVE COMMUNICATION

CHALLENGES: have been diagnosed with a developmental disability, have language delays, use less than 50 words expressively, have motor skills to directly select items on a touch screen, and have had minimal or no use with an electronic communication device.

CHILDREN WHO HAVE NO CHALLENGES:

are developing typically and would like to play with a friend who has communication challenges.

HOW?

CONTACT ANGIE TURNER (ATURNER@KU.EDU) OR JANE WEGNER (JWEGNER@KU.EDU) FOR MORE INFORMATION.

Appendix C

(Date)

Dear (*school contact name*),

My name is Angie Turner and I am a graduate student in speech-language pathology at the University of Kansas. I am conducting a study focused on the use of 2 different types of screen displays on electronic communication devices by children with developmental disabilities and expressive language delays. The study will examine a child's use of the two different display types during play activities with a peer who is developing typically. I am seeking participants between the ages of 2 1/2-7 who have a diagnosed developmental disability, expressive language delay, and developmentally appropriate motor skills to access a computer touch screen as well as peers who are developing typically who like to play.

This study will be conducted at the Schiefelbusch Speech-Language-Hearing Clinic in Haworth Hall on the University of Kansas Campus or in a place convenient to the family. Prior to the first meeting, I will collect data through formal and informal assessments. Each participant's care provider will also complete an inventory of words or gestures the child uses. The study will involve 8 sessions for the children with communication challenges and 4 sessions for the children developing typically. In the first 4 sessions, the children with communication challenges will be taught how to use the communication device in play with the researcher. These sessions will last about an hour. During the final 4 sessions, they will use the device in play with their peer in sessions lasting about 30 minutes. Each session will be videotaped for later analysis of the participants' use of each display type.

We would greatly appreciate your passing the enclosed information on to the families who have 4-7 year old children who fit the criteria described above. The packets include an informational letter, consent form, contact information, and a self-addressed stamped envelope. Interested parents can contact me, or my faculty advisor directly if they wish to participate or if they have questions.

For further information, questions, or concerns, please contact Angie Turner at atruner@ku.edu. You may also contact my faculty advisor, Dr. Jane Wegner at 864-4690 or Jwegner@ku.edu to provide you with any further information and answer any questions you may have. Thank you so much for your time and consideration.

Sincerely,

Angie Turner, B.A.
Graduate Student

Jane Wegner, Ph.D., CCC-SLP
Faculty Advisor

Appendix D

Phone Conversation Intake Form

Child:

Age:

Diagnosis:

What is your child's communication like? How do they communicate?

How many words does your child use?

How many words does your child understand?

What services does your child receive at school?

Does your child have any experience with AAC? If so, please explain.

How does your child interact with siblings and/or peers?

How does your child play?

What types of activities is your child interested in as far as play?

Appendix E

(Date)

Dear Parent or Care Provider (children with communication challenges),

My name is Angie Turner and I am a graduate student in speech-language pathology at the University of Kansas. I am conducting a study focused on the use of 2 different types of screen displays on electronic communication devices by children with developmental disabilities and expressive language delays. The study will examine a child's use of the two different display types during play activities with a typically developing peer. I am seeking participants between the ages of 2 1/2-7 who have a diagnosed developmental disability, expressive language delay, and developmentally appropriate motor skills to access a computer touch screen.

This study will be conducted at the Schiefelbusch Speech-Language-Hearing Clinic in Haworth Hall on the University of Kansas Campus or at a place convenient for you. Prior to the first meeting, I will collect data through formal and informal language assessments. These assessments will include a language test, the Preschool Language Scale (3-6 year olds) or the Clinical Evaluation of Language Functions (7 year olds) and the analysis of a tape of your child playing with you or with me. I will look at the tape to determine how your child communicates (sounds, gestures, words, etc) and for what reasons (to request things, to make comments, to protest etc). I will also ask you to complete an inventory of words or gestures your child uses. After the assessments are completed, your child will participate in 8 play sessions. In the first 4 sessions, I will teach your child how to use the communication device while we play. These sessions will last about an hour. During the final 4 sessions, your child will use the device while playing with a peer in sessions lasting about 30 minutes. Each session will be videotaped for later analysis of your child's use of each display type.

If you wish to have your child participate in this study, please complete the consent form and mail it to the Schiefelbusch Speech-Language-Hearing Clinic in the stamped envelope that is provided.

For further information, questions, or concerns, please contact Angie Turner at aturner@ku.edu. You may also contact my faculty advisor, Dr. Jane Wegner at 864-4690 or Jwegner@ku.edu. We will be happy to provide you with any further information and answer any questions you may have. Thank you so much for your time and consideration.

Sincerely,

Angie Turner, B.A.
Graduate Student

Jane Wegner, Ph.D., CCC-SLP
Faculty Advisor

Appendix F

Form of Consent and Authorization

A comparison of two different dynamic displays during play with a peer

Introduction

The Department of Speech-Language-Hearing: Sciences and Disorders at the University of Kansas support the practice of protection for human subjects participating in research. The following information is provided for you to decide whether you wish for your child to participate in the present study. You may refuse to sign this form and not have your child participate in this study. You should be aware that even if you agree to allow your child to participate, you and your child are free to withdraw at any time. If you do withdraw from this study, it will not affect your relationship with this unit, the services it may provide to you, or the University of Kansas.

Purpose of This Study

The purpose of this study is to compare the use of a visual screen display versus a grid display on an electronic communication device by children with developmental disabilities between the ages of 4 and 7 while interacting with a peer. Results from this study may provide professionals with further insight when selecting appropriate augmentative and alternative communication system displays for children who do not have functional expressive language.

Procedures

During this study, your child will participate in 8 play sessions in which the only participants will be the researcher and your child or the researcher, your child, and another child, a peer. The sessions will take place in a separate room from a regular classroom. The sessions will be at least 30 minutes in length and will be divided into 2 dramatic play theme activities. There will be one theme for 4 sessions and then another theme for the next four sessions. Examples of possible themes include circus, farm, and kitchen or cooking. We will ask you to help us pick themes your child would like. During the first two sessions of each theme your child will play with the research while he/she learns about the communication device. During the second two sessions of each theme, you child will play with a peer who does not have communication challenges and will use the communication device. The dates and times of the sessions will be determined after consent has been made and will be convenient to your schedule. We will also meet at a place convenient to you.

The play sessions will consist of two 15-minute segments. During each 15-minute segment of play, an electronic voice-output communication system will be used with your child. Two different displays will be introduced containing the same vocabulary

words relevant to the play theme. One will be in a grid format and the other in a picture scene. Attached is a picture of the two display types. Each display will be activated using a touch screen. The researcher will model use the device and will encourage your child to use it as well.

All sessions will be videotaped for later viewing to count your child's use of the each display type. The tapes will be stored in a locked cabinet in the Pardee Augmentative and Alternative Communication Laboratory office located in the Schiefelbusch Speech-Language-Hearing Clinic in Haworth Hall at the University of Kansas. The videotapes will be destroyed two years after completion of the project.

The investigator, Angie Turner, will be the primary interventionist for each session. Angie will model use of the communication system while she participates in the play activities.

Before the intervention begins, the researcher will collect some background information about your child's language skills by having you complete some questionnaires. She will give your child a language test at a time and place that is convenient for you. She will also observe how you and your child communicate together during play, in a time and place that is convenient for you, to record how your child communicates (words, gestures, etc.) and for what reasons (to request, comment, protest etc.).

Results of this study may help us understand if there is one type of display that children learn more easily and use more playing with a peer.

Risks

No risks are anticipated to be associated with participation in this study.

Benefits

Your child may benefit directly or indirectly from participation in the intervention sessions. He or she will have experience with two different communication system displays that may provide a mode of communication he/she may not have experienced. This could expand your child's ways of communicating. Your child may also enjoy playing with a peer. The results of the intervention will be shared with you and this information may be useful to your family as well as your child's educational providers.

Payment to Participants

There will be no payment to participants in this study.

Information to be Collected

To conduct this study, the investigators will collect information regarding the words your child understands and says. This information will be obtained through both formal and

informal measures, including the MacArthur Bates Communicative Development Inventory: Words and Gestures (Fenson, Dale, Reznick, Thal, Bates, Hartung, Pethick, & Reilly, 1993) to be completed by you to document the number of words and gestures the participant currently uses and understands, the Preschool Language Scale-4 (Zimmerman, Steiner, & Pond, 2002) to assess your child's current receptive and expressive language skills, and an informal observation of your child and you playing together to describe his/her communication with others, the forms and functions of communication that he or she uses, and how he or she plays with his or her toys.

Your name or your child's name will not be associated in any way with the information collected about you or with the research findings from this study. The researchers will use a number instead of your name or your child's name.

The information collected about your child will be used by: Angie Turner, Dr. Jane Wegner, and members of the thesis committee from the Department of Speech-Language-Hearing at the University of Kansas.

Some persons or groups that receive your information may not be required to comply with the Health Insurance Portability and Accountability Act's privacy regulations, and your information may lose this federal protection if those persons or groups disclose it.

The investigators will not share information about you and your child with anyone not specified above unless required by law or unless you give written permission.

By signing this form, you give permission for the use and disclosure of your information for purposes of this study at any time in the next 2 years.

Refusal to Sign Consent and Authorization

You are not required to sign this Consent and Authorization form and you may refuse to do so without affecting your right to any services you are receiving or may receive from the University of Kansas or to participate in any programs or events of the University of Kansas. However, if you refuse to sign, you and your child cannot participate in the study.

Canceling This Consent and Authorization

You may withdraw your consent to have your child participate in this study at any time. You also have the right to cancel your permission to use and disclose information collected about your child, in writing, at any time, by sending your written request to: Angie Turner, Schiefelbusch Speech-Language-Hearing Clinic, 2101 Haworth Hall, 1200 Sunnyside Ave., Lawrence, KS 66045. If you cancel permission to use your child's information, the investigators will stop collecting additional information about your child. However, the research team may use and disclose information that was gathered before they received your cancellation, as described above.

Participant Certification

I have read this Consent and Authorization form. I have had the opportunity to ask, and I have received answers to, any questions I had regarding the study and the use and disclosure of information about myself, and my child for the study. I understand that if I have any additional questions about my child's rights as a research participant, I may call 785-864-3441 or write the Human Subjects Committee Lawrence Campus (HSCL), University of Kansas, 2385 Irving Hill Road, Lawrence, KS 66045, e-mail dhann@ku.edu.

I agree to let my child take part in this study as a research participant. I grant the researchers permission to videotape my child during this study for data collection. I further agree to the uses and disclosures of my child's information as described above. By my signature, I affirm that I am at least 18 years old and that I have received a copy of this Consent and Authorization form.

Type/Print Child's Name

Date

Type/Print Legal Guardian's Name

Phone/E-mail Address

Guardian's Signature

Appendix G

Form of Consent and Authorization-Typical Peers

A comparison of two different dynamic displays during play with a peer

Introduction

The Department of Speech-Language-Hearing: Sciences and Disorders at the University of Kansas support the practice of protection for human subjects participating in research. The following information is provided for you to decide whether you wish for your child to participate in the present study. You may refuse to sign this form and not have your child participate in this study. You should be aware that even if you agree to allow your child to participate, you are free to withdraw at any time. If you do withdraw from this study, it will not affect your relationship with this unit, the services it may provide to you, or the University of Kansas.

Purpose of This Study

The purpose of this study is to compare the use of a visual screen display versus a grid display on an electronic communication device by children with developmental disabilities between the ages of 2 1/2 and 7 while interacting with a peer. Results from this study may provide professionals with further insight when selecting appropriate augmentative and alternative communication system displays for children who do not have functional expressive language.

Procedures

During this study, your child will participate in 4 play sessions in which the participants will include your child, a child with communication challenges, and the researcher. The sessions will take place in a room separate from a regular classroom. The sessions will be at least 30 minutes in length and will be divided into 2 dramatic play theme activities. There will be one theme for 2 sessions and then another theme for the next 2 sessions. We will ask you to help us pick themes your child would like. Your child will be encouraged to play with a child who has communication challenges, who will be using a communication device. The dates and times of the sessions will be determined after consent has been made and will be convenient to your schedule. We will also meet at a place convenient to you.

The play sessions will consist of two 15-minute segments. During each 15-minute segment of play, an electronic voice-output communication system will be used with the child who has communication challenges. Two different displays will be introduced containing the same vocabulary words relevant to the play theme. One will be in a grid format and the other in a picture scene. Attached is a picture of the two display types. Each display will be activated using a touch screen.

All sessions will be videotaped for later viewing to count the child's use of the each display type. The tapes will be stored in a locked cabinet in the Pardee Augmentative and Alternative Communication Laboratory office located in the Schiefelbusch Speech-Language-Hearing Clinic in Haworth Hall at the University of Kansas. The videotapes will be destroyed two years after completion of the project.

The investigator, Angie Turner, will be the primary interventionist for each session. Angie will model use of the communication system while she participates in the play activities.

Before the intervention begins, the researcher will collect some background information about your child's language skills by having you complete some questionnaires. She will give your child a language test at a time and place that is convenient for you. She will also observe how you and your child communicate together to record how your child communicates (words, gestures, etc.) and for what reasons (to request, comment, protest etc.).

Results of this study may help us understand if there is one type of display that children learn more easily and use more while playing with a peer.

Risks

No risks are anticipated to be associated with participation in this study.

Benefits

Your child may not benefit directly from participation in the play sessions, but may enjoy playing with a peer. The results of the study will be shared with you and this information may be useful to the families who have children with communication challenges and those professionals who serve them.

Payment to Participants

There will be no payment to participants in this study.

Information to be Collected

To conduct this study, the investigators will collect information regarding the words your child understands and says. This information will be obtained through both formal and informal measures, including the MacArthur Bates Communicative Development Inventory: Words and Gestures (Fenson, Dale, Reznick, Thal, Bates, Hartung, Pethick, & Reilly, 1993) to be completed by you to document the number of words and gestures the participant currently uses and understands, the Preschool Language Scale-4 (Zimmerman, Steiner, & Pond, 2002) to assess your child's current receptive and expressive language skills, and an informal observation of your child and you playing

together to describe his/her communication with others, the forms and functions of communication that he or she uses, and how he or she plays with his or her toys.

Your name or your child's name will not be associated in any way with the information collected about you or with the research findings from this study. The researchers will use a number instead of your name or your child's name.

The information collected about your child will be used by: Angie Turner, Dr. Jane Wegner, and members of the thesis committee from the Department of Speech-Language-Hearing at the University of Kansas.

Some persons or groups that receive your information may not be required to comply with the Health Insurance Portability and Accountability Act's privacy regulations, and your information may lose this federal protection if those persons or groups disclose it.

The investigators will not share information about you and your child with anyone not specified above unless required by law or unless you give written permission.

By signing this form, you give permission for the use and disclosure of your information for purposes of this study at any time in the next 2 years.

Refusal to Sign Consent and Authorization

You are not required to sign this Consent and Authorization form and you may refuse to do so without affecting your right to any services you are receiving or may receive from the University of Kansas or to participate in any programs or events of the University of Kansas. However, if you refuse to sign, you cannot participate in the study.

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Participant Certification

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785-864-3441 or write the Human Subjects Committee Lawrence Campus (HSCL),
University of Kansas, 2385 Irving Hill Road, Lawrence, KS 66045, e-mail
dhann@ku.edu.

I agree to let me child take part in this study as a research participant. I further agree to
the uses and disclosures of my child's information as described above. By my signature,
I affirm that I am at least 18 years old and that I have received a copy of this Consent and
Authorization form.

Type/Print Child's Name

Date

Type/Print Legal Guardian's Name

Phone/E-mail Address

Guardian's Signature

Appendix H

Communicative Forms or Behaviors

<i>Communi- cative Function or Intent</i>	Gross Vocaliz- ation	Distal Gestures	Facial Expressi- ons	Simple Action on People	Simple Actions on Objects	Simple Body Movem- ents	Speech/M- anual Signs
Protest/Rej- ect							
Make a Request							
Gain Attention/ Direct Attention							
Comment/ Label							

Other Observations/ Comments: