A Dissertation

entitled

Contemporary Play: An Analysis of Preschool Discourse During Play Situations While Using Technology and While Using Traditional Play Materials

by

Christina M. Mirtes

Submitted to the Graduate Faculty as partial fulfillment of the requirements for the

Doctor of Philosophy Degree in

Curriculum and Instruction

_____

Dr. Joan Kaderavek, Committee Chair

_____

Dr. Laurie Dinnebeil, Committee Member

_____

Dr. Judy Lambert, Committee Member

_____

Dr. Ruslan Slutsky, Committee Member

_____

Dr. Patricia R. Komuniecki Dean
College of Graduate Studies

The University of Toledo

December 2014

An Abstract of

Contemporary Play: An Analysis of Preschool Discourse During Play Situations While Using Technology and While Using Traditional Play Materials

by

Christina M. Mirtes

Submitted to the Graduate Faculty as partial fulfillment of the requirements for the Doctor of Philosophy Degree in Curriculum and Instruction

The University of Toledo
December 2014

This study provided a preliminary analysis of discourse among preschool children while playing in contexts using traditional play blocks compared to while playing with a two-dimensional block building application on an iPad®. Participants in the single-subject study were 8 four-year-old children who progressed through a repeated measures alternating treatment design in pairs. During each play session, the children's discourse was recorded and transcribed by SALT transcription services providing a detailed discourse analysis and summary. These reports provided data to indicate if there was a difference in length and complexity (MLU) and in productivity (MTL) by comparing each child's average number of spoken words in the entire interaction (MLU) or per discourse turn (MTL) in each condition.

A Wilcoxon signed-ranks test examined the difference for the group of children's average MLU and MTL in condition A (blocks) compared to condition B (iPad®). Results indicated a significant difference with MLU's being greater during play contexts using the traditional play blocks compared to the iPad®. However, there was not a significant difference when comparing MTL's between the two conditions. An additional

investigation was conducted focusing on the children's vocabulary richness. This was accomplished by comparing each child's number of different words (NDW) in each condition. Results indicated a significant difference with NDW's being greater during the play contexts when children were playing with traditional play blocks compared to the iPad®.

With the rapid onset of technological advancements, young children are increasingly including hand held devices as part of their contemporary play routines. The results of this study inform practice that there was a difference in young children's language; as it was longer, more complex and had greater vocabulary diversity while playing with traditional blocks as compared to the iPad®. Implications regarding these findings are discussed highlighting contexts that influence play behaviors among preschoolers and how it relates to child development and possible areas of consideration for best practice in Early Childhood Education. Implications for future research are discussed.

To my father, Mr. Winfred D. Holt, who instilled the love of learning in my heart and brought me to realize, “The world is your oyster, kid”. To my parents, Marie (Holt) Conley and Thomas Dalton, thank you for your encouragement and unconditional love.

To my brother, Thomas Dalton, and sister-in-friend, Becky Dalton, who are always there to help the family out; especially while I’ve been committed to tasks which, at times seemed dauntingly insurmountable.

To my husband, Scott Mirtes, whose wit, companionship and support made this journey seem easier. I couldn’t be prouder to hold your name in the title Dr. Christina Mirtes.

Finally, I dedicate this work to my four children, Morgan, Jack Henry, Anna and Joey, who gave me the reason to do it. Always know: I love you more and the world is your oyster!

Acknowledgements

I would like to acknowledge the four members of my dissertation committee: Dr. Laurie Dinnebeil, Dr. Joan Kaderavek, Dr. Judy Lambert and Dr. Ruslan Slutsky. Each of them has been a facilitator of my learning by providing hours of guidance and wisdom, in and beyond their fields. I am so grateful to have had the privilege to collaborate with such a talented group of professionals during my years at The University of Toledo while in my role as Visiting Assistant Professor, while as a doctoral student and thereafter.

I extend my deepest appreciation to my dissertation chair who has been my advisor, mentor, colleague, cheerleader and friend, Dr. Joan Kaderavek. Thank you for the intellectual arguments which always keep me on my toes. Joan's expertise, precision, high expectations and compassion make her an exemplary model in education. She is simply the best!

Much gratitude goes to Adrian College for deeming this research worthy of earning the Faculty Research Grant award, ultimately funding this research in full. This generosity afforded me the opportunity to conduct research in uncharted territory and give back to the community.

Appreciation is also extended to the staff, teachers and families and, most importantly, the children who have been a part of this research. Without such support, flexibility and contribution, this would not have been possible.

Last, but certainly not least, I'd like to acknowledge every child whom I have had the privilege of being called their teacher. Thank you for all you have taught me. In final thanks, I offer words to my student teachers…

Every child will teach you great wonders, if you let them.

Table of Contents

List of Tables

List of Figures

List of Abbreviations

ECE .....Early Childhood Education

LSA .....Language Sample Analysis

MLU.....Mean Length Utterance
MTL .....Mean Turn Length

N...…….. Number
NC …….. Normal Children
NDW …….. Number of Different Words

SLI……Specific Language Impairment

List of Symbols

© .....Copyright
® .....Registered Trademark

μ .....Mean
Z .....Z-score

Chapter One

Introduction of the Study

It is widely accepted in the field of Early Childhood Education that best practice for preschool age children offers an environment with a multitude of ongoing opportunities for play in order to foster children's language development, social ability, and general development.

Play can be described as the essential venue in which children interact within their environment through varied situations including people and materials; play allows children to make meaning of their world. It has been established that in early childhood, play is the essential venue in which children interact within their environment including, situations, materials and peers - all of which add to the construction of meaning of their world.

It is important for early childhood educators and researchers to examine current trends in today's society influencing the way children play; in this paper the term "contemporary play" is introduced to describe contexts influencing children's play behaviors. Contemporary play describes the current conditions of a society or culture in respect to environment, people and materials influencing children's play behaviors. There are numerous factors in the context of social and cultural changes which affect children's daily lives and how children spend their time. Identifying factors contributing to these changes in behaviors can help educators understand and meet the needs of children in today's context of contemporary play.

As noted, children's play behaviors will look quite different and are influenced by various contexts. For example, play in a technology-rich play environment, such as the

incorporation of an iPad® is likely to look quite different than traditional dramatic play or block play. Changes in play contexts and the associated differences in behavior will be discussed further in the section of contemporary play. The following review of literature will provide the theory, conceptual framework and rationale to investigate variations in language discourse in preschool children as they are impacted by traditional play and technology-rich play contexts.

Chapter Two

Review of the Literature

Introduction

The following review summarizes and highlights the pertinent theory and current research relevant to (1) the vital role of play in early childhood development and (2) the various contexts which impact play behaviors among preschool aged children. Among these contexts, the environment, people and materials associated with various play situations are discussed as important conditions influencing typical play behaviors.

Development of Play in Early Childhood

Play can be described as the essential venue in which children interact with their environment including, situations, materials and peers adding to the construction of meaning of their world. As a child develops, the experiences in each stage of play serves as a scaffolding experience and a foundation for future, more complex and advanced forms of play. An example of this sequential play development is as follows, during a sensorimotor play experience, an infant realizes her hand can be moved to twirl a mobile or shake a rattle. Then, after having multiple and repeated experiences in this activity, the child develops eye-hand coordination and begins to learn the conceptualization of cause and effect. The child builds on these learning experiences leading to more complex forms of play as toddler, such as using acquired skills in eye-hand coordination and the concept of cause and effect to build and knock down a tower of blocks. If a child is deprived of play experiences and the learning does not take place, the scaffolding is not available to support future learning. These examples of play are those between a child and the materials within the environment (in isolation of other subjects, e.g. people).

Theorist, Jean Piaget has categorized the complexity of play into stages of child development (Garvey, 1990). Infants begin their journey in the sensorimotor exploratory phase using visual and motor actions of the objects and people in their surroundings. During this most rudimentary form of play, activity tends to be solitary play or nonsocial play. At this stage the child often plays alone, away from others, and may ignore the play of peers.

However, Halliday's study of language development elaborates this perspective by adding a socio-semantic perspective. Halliday expands the notion of solitary play by noting that the infant reacts to others (e.g., mother) by smiling and returning eye gaze and smiles. These first pre-symbolic acts occur between birth to 5 months and are acts that are "joint constructions, dialogically enacted between himself and some 'significant other' …" (Halliday, 2013, p. 153). This perspective allows us to hypothesize that even the very young child participates in a non-symbolic, non-verbal, social exchange (i.e., a form of discourse).

Later, around 4 to 5 months, this non-symbolic interaction transitions to systematic symbolic construction of meaning as the child begins to manipulate a material (e.g. rattle) and realizes it is not a part of himself. Construction of meaning continues to develop from experiences with others and materials subsequently leading to the ability to anticipate a reaction of a person or a toy. For example, by 12 months, children enjoy playing peek-a-boo with another person with abundant laughter when seeing an uncovered face! A similar response is likely to occur as the child interacts with materials, such as with a Jack-in-the-Box.

As infants develop into toddlers, they develop capabilities which enhance play. The socio-cultural theory suggests the development of language and experiences with others supports the development of play. Play behaviors of toddlers can be characterized as moving from solitary play (alone), onlooker play (observing others play), parallel (engaged in similar play next to playmate, yet not interacting) and associative play (children engaged in social interaction with little organization) behaviors (Parten,1943). These stages of play facilitate skills required for more advanced forms of play such as cooperative play. Bergen (1977) adds that these skills include (a) decontextualized pretense, (b) self-other relationship (c) object substitutions and (d) sequential combinations which enable toddlers to pretend and interact engage in purposeful play with others (Bergen, 1977).

At this stage, as toddlers are developing hand strength and coordination, they also are able to engage in functional / combination play where toys can be purposefully combined together. For example, a child may scoop sand into a bucket using a shovel then dump it into another bucket or dump truck. Toddlers can engage in another type of functional play called functional/imitation play. An example of functional/imitative play is using real objects to imitate an experience or situation, such as pretending to drink from an empty cup. Typically children will first engage in this type of imaginative play alone before moving into participation with others.

Finally, as a toddler develops socially, emotionally, cognitively and physically he or she is able to begin mental manipulation using problem solving skills, is able to sort objects by shape size or color, construct with blocks, produce simple forms of creative expression and literacy forms, and participate in pretend and fantasy play. All of these

types of play move from simple to more complex forms of play as the toddler moves into preschool age.

Preschoolers continue to build upon their previous experiences in all of the aforementioned forms of play and move into more complex versions to include associative and, later, cooperative play behaviors (Parten, 1943). Piaget (1962) theorizes that play serves as an assimilative function, enabling children to consolidate their experiences and construct knowledge.

This assimilative function of play is demonstrated when preschoolers spend less time engaging in exploratory play and more time engaging in practice play. "Practice play constitutes about 33% of the play of 3 to 5-year-olds, but less than 15% of the play of 6-year-olds" (Fromberg and Bergen, 2006). For example, a four year old child practices what he sees at home by pretending to cook breakfast in kitchen area of the playhouse using a play stovetop and oven. Additionally, as preschoolers develop social skills they frequently participate in constructive social play with pretense and purpose. Older preschoolers are capable of communicating and planning out their play forming, negotiating rules using symbolic representations and objects, and using their expanded cognitive and social abilities to play with their peers in the form of dramatic play (Bretherton, 1985).

It is important to note that although these stages and characteristics of preschool play behaviors are a part of a developmental continuum, they are not static. For example, a preschool child may choose to play alone by looking at a book in the reading corner; this solitary play behavior may be influenced by the desire to be in a quiet space of the

room (environment) or that the book is of interest (material). The observer should not assume that the child is "stuck in" or "regressed to" a particular level of play.

The Vital Role and Benefits of Play in Early Childhood

Importantly, research suggests that deprivation of play in early childhood has been associated with negative effects in relation to typical brain development (Garvey, 1990). Research conducted at The Center for Child Development at Harvard University indicates that the human brain is made of billions of cells called neurons which are necessary for cognitive, language, social, emotional & physical development. These neurons form connections called synapses when learning takes place. When the synapses are used repeatedly, neurologic pathways are formed. The highest number of synapses are developed in early childhood years (Nelson, 2000). However, as the child ages, the number of neurons and synapse formed declines; this is called pruning (Shonkoff et. al, 2005). If the synapse is not used, it will be lost. Importantly, sensory and physical stimulation is critical to the growth of synapses in the cerebellum (Frost et al., 2008). Thus, having appropriate play experiences in early childhood has beneficial effects on brain development.

Bergen contends that play involves integration of a child's emotions, language, memory, sensorimotor, social and cognitive skills. Accordingly, many areas of the brain are activated via play experiences (Bergen, 1977). The increase in neurodevelopment impacts a child's ability to learn. "Researchers have discovered that play is related to greater creativity and imagination and even to higher reading levels (Hirsh-Pasek & Golinkoff, 2003). Supporting that theory, other prominent figures in the research of play describe how it impacts many critical areas of development; play is, "a primary factor in

the development of intelligence, personality, competencies, sense of self and social awareness" (Van Hoorne, Nourot, Scales, & Alward, 2003). Narrowing in on particular areas of development, studies of cognitive development in early childhood supporting the play-learning relationship by reporting various learning outcomes in specific areas such as divergent thinking and creativity (Holmes & Geiger, 2002), language development and memory (Jensen, 2000). Play also supports verbalization, vocabulary, language comprehension, attention span, imagination, concentration, impulse control, curiosity, problem-solving strategies, cooperation, empathy, and group participation (Smilansky & Shefatya, 1990). It should be noted that although across cultures play is viewed as a means for learning - the nature of play interaction, the material used during play, and the perception of the cultural members of the role of play will vary. However, across cultures, play is viewed as a vital component of child development in all domains, beginning in infancy and continues throughout childhood.

In sum, children need a play environment that offers time to play with *others*, a safe *space* allowing for physical movement and play activities and developmentally appropriate *materials* to facilitate high-quality play. The following diagram (Figure 1) illustrates the conceptual framework highlighting contexts influencing play behaviors.

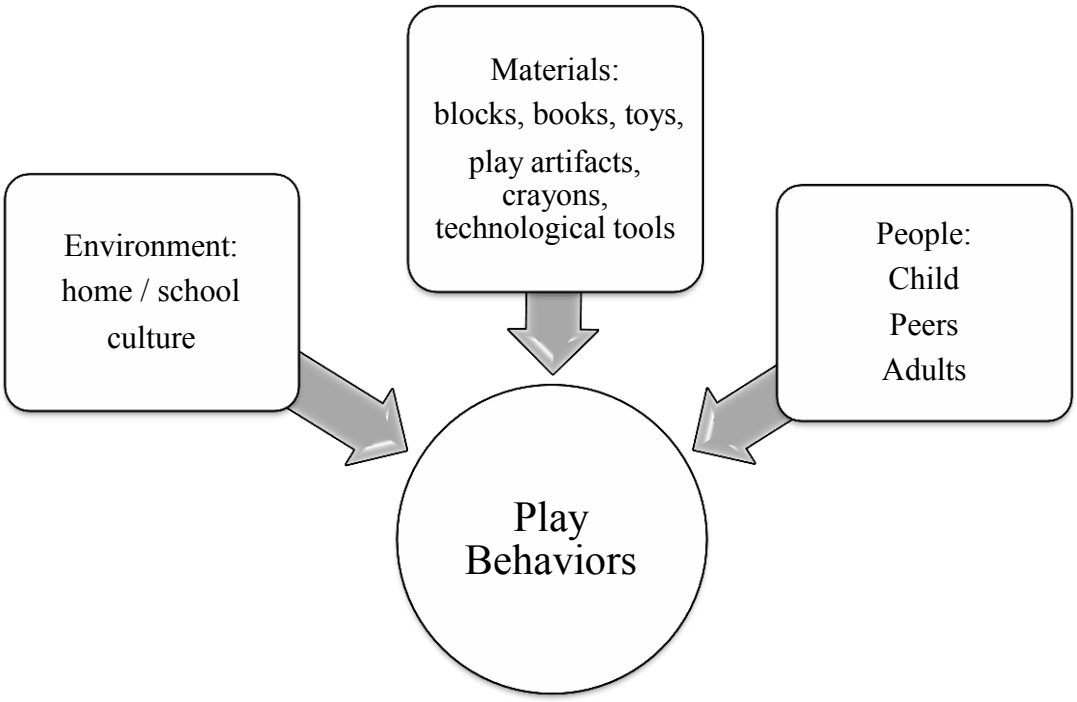

Figure 1: Contexts Influencing Play Behaviors.

The following sections will highlight the environment, materials and people as major contexts influencing play behaviors.

Environment

Among many constructivists, Bronfenbrenner adds to Piaget's theory that learning is an active process involving the interaction of the child and his or her environment with a perspective called the "ecological systems theory" (Bronfenbrenner, 1994). The ecological systems theory emphasizes how relationships and interactions with others across various environments impacting learning. Specifically, Bronfenbrenner's ecology of human development, posits that human development is affected by several nested environmental systems, with the systems closest to the child having the most direct effect (Bronfenbrenner, 1994).

This most direct influence begins with the child as an individual, along with his or her immediate family. These systems interact with other systems (microsystems) to include external environments such as childcare, preschool, neighborhood playgrounds etc. It is in this part of the system where a child adds to the home environment by being introduced to an additional environment, such as preschool where peer groups are formed and the child becomes a part of a new community. The next layer, the exosystem, includes extended family, friends, neighbors and community health services. Lastly, the macrosystem, includes environmental influences such as laws, culture, customs and values. The macrosystem will be further elaborated upon in the section of Contemporary Play.

Many children participate in an enhanced microsystem via their participation in childcare. Research conducted at the National Institute for Early Education Research reported that approximately 50% of 3-year-old and 75% of 4-year-old currently attend preschool in the United States (Barnett et.al. 2010). As children enter preschool, they are introduced to a new environment. This preschool environment is impacted by the structure of the routine/day (e.g. group time, quiet time, play time) as well as the physical space (e.g. learning centers, book corner, playground etc.). Within these spaces, *people* and *materials* also influence children's play behaviors.

Although typical preschool environments offer valuable opportunities for frequent adult-child interactions, it is also important to consider the structure of the environment since a significant part of the preschool day allows for unstructured, free-play opportunities. Free-play is defined as the time when the children are able to choose their play activities including playmates and materials within the limitations governed by

adults (e.g. materials available or length time) or particular environmental conditions (e.g. outside play spaces versus indoor play spaces).

Outdoor play spaces are likely to unconstrained by walls, play behaviors may be less restrictive and can look quite different as compared to indoor play behaviors. Play behaviors characteristic of an outdoor playground are likely to include large muscle movements such as running, chasing, skipping, throwing, riding and climbing. The outdoor environment is a space where children may be further away from one another and may typically be louder.

Indoor preschool play environment is typically arranged to offer a variety of learning experiences and play situations supporting development across all domains. Different indoor spaces are designed to influence and facilitate specific types of play behaviors. Examples of different play spaces include: the housekeeping area / play kitchen (practice play), dramatic play area (fantasy play), classroom library (reading) and floor area (constructive play with manipulatives). These indoor spaces, along with rules and routines that govern them, are environmental contexts influencing children's play behaviors. For example, consider an older preschool child who is playing the housekeeping area and while another child quietly asks a classmate, "Honey, would you like another cup of coffee?" This is an example of how the housekeeping space influences children's play behavior. This example also depicts how children often incorporate prior experiences from one environment to another as part of a play activity.

As the description of outdoor and indoor places spaces indicate, the classroom environment sets the stage for children to build, exchange and create knowledge through peer-related play experiences (Smilansky & Shefatya, 1990; Vygotsky, 1962). In these

spaces, children can practice moderating their discourse patterns during play while they draw from their home, school and peer cultures (Bicais & Correia, 2008; Corsaro, 1994).

People

The interaction with others during play impacts development and influences play behaviors. There is strong historical evidence underscoring the importance of children's social interactions and communication with others as a major theme. These established perceptions have contributed to the high regard of the contribution of social learning in early childhood education (Grisham-Brown, Hemmeter, & Pretti-Frontczak, 2002 p. 108). As described above, there are varying interpretations of learning theories; each theory sheds light on how children construct knowledge and interprets how the interactions between the child's environment, play behaviors, and communication patterns impact learning. The following theories address the impact of the child's communication partner on his or her learning and their play behaviors.

Social learning theory is based on the premise that much of human behavior is modeled after the behavior of others. For children, behavioral models include parents, peers, popular heroes, athletes, celebrities, and teachers. Social learning theory suggests that observation and direct experiences with others, including peer-to-peer discourse, are fundamental components in reinforcing behaviors that subsequently contribute to a child's social and conceptual development. Additionally, research the way in which a child communicates with others during play influences his or her social competence (Bergen, 2008). Importantly, a child social competence predicts future academic success (Webster, Stratton, Reid, 2004).

Bandura's (1977) interpretation of social learning contends that children learn through various antecedent, response, and consequence sequences that are moderated by the child's communication partner, these behavioral sequences influence a child's learning. Erikson's psychosocial theory (1950) suggests development is in relationship to social experiences. Both theories of Bandura and Erickson highlight the importance of social experiences with others during play activities impacting development. In a similar vein to Bandura and Erikson, Vygotsky's social constructivism theory suggests that learning occurs based on the interactions with others (to include cultural transmission of information) and that a child's most significant learning occurs in the child's zone of proximal development. The zone of proximal development (ZPD) refers to the mental space between what a child can do independently and what a child can do with the assistance of a teacher, tutor or a person more knowledgeable, to include a more knowledgeable or older peer (Vygotsky, 1962). Vygotsky's model of learning emphasizes that the child is active co-constructor of knowledge within a community of learners, into a community of practice where children use peer-to-peer social contexts to manipulate language as a way to make meaning of their world (Forman et al, 1998; Vygotsky, 1962).

Many early childhood environments today (e.g. inquiry based, hands-on, experiential, collaborative and project-based learning) are based on social-learning theories and subsequently offer play situations with abundant social interactions and opportunities for extended discourse. Language among children during play is an integral component for learning as it offers opportunities for child-initiated and child-directed social-play experiences. This language interaction facilitates children's

movement from an egocentric viewpoint into learning to take on the viewpoint of others. Taking the perspective of another via role playing or playing with another person, children have to control their own thoughts, impulses and emotions which helps them achieve healthy self-regulation, leading to social competence (Berk et. al., 2006). Children use and develop their expressive and receptive language skills while playing with others. Expressive and receptive skills are facilitated when children plan, organize, direct, negotiate and problem solve and develop shared realities with others. Erikson also adds that role playing with others revolving around themes of war or superhero play facilitates moral development and serves as venue to use language to express feelings surrounding threat, loss or even death (Erikson, 1950).

The peer discourse during play facilitates the development of shared realities (Farver, 1992a, 1992b; Giffin, 1984; Goncu, 1989; Goncu & Kessel, 1984, 1988) which is governed by socio-cultural contexts (Garvey, 1990) and depict children's knowledge of real-life events or linked to real-life experiences (e.g., building, cooking, shopping). In these peer learning spaces, children have the opportunity to create a context which combines home, school and peer cultures (Corsaro, 1994).

The aforementioned prominent learning theories, relevant research and current practice have established that communicating with others during play is highly valuable and contributes to child development in all domains. Furthermore, among the behaviors which occur during play, language and discourse with others are primary contributors to the interactions among peers and can contribute to the development of future play behaviors. Therefore, we must then have a clear understanding of the development of

language and discourse and the critical role it plays in supporting development in early childhood.

Development of Language and Discourse in Early Childhood

Domains of Language: Form, Content and Use

Language can be described the complex and dynamic system of conventional symbols used for thought and can be expressed orally, through writing, pictured symbols and manually, as in sign language (Kaderavek, 2009). To better understand the linguistics, or study of language, the following three domains of language will be discussed: the form of the message, the content of the message and the use or function of

the message (Bloom & Lahey, 1978). Although these components are described in isolation, it is important to add that they are interrelated in supporting language development and successful communication; and each domain follows a typical sequence and progression. The following model is an adaptation which demonstrates the intersection of these three domains (Bloom & Lahey, 1978, pp. 186-187).

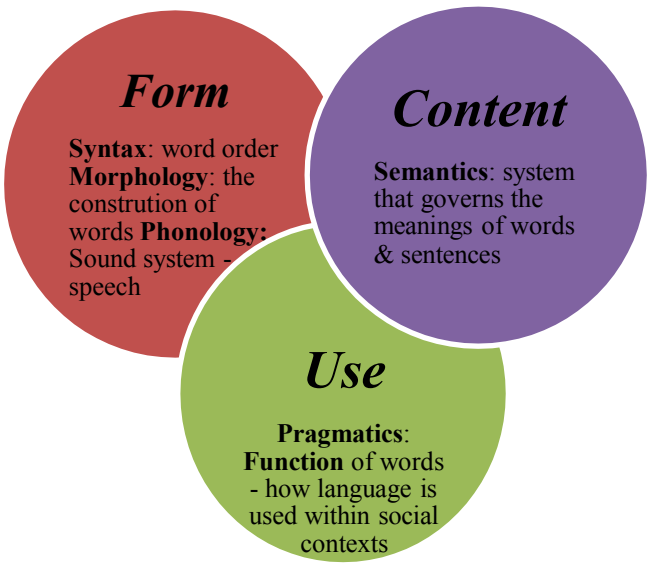

Figure 2. Domains of Language (Bloom & Lahey, 1978).

Language Form

In terms of spoken language, form encompasses: phonology, morphology and syntax. The first component of language form is *phonology*, or the systematic organization of speech sounds within the language. This includes the most basic units of sound called *phonemes* (constants and vowels used in combination to form words). Phonemes are not physical sounds. Rather, they are abstract mental images of the phonological units of a language associated with a particular sound. For example, altering the consonant in final position within the word "cup" from /p/ to /b/ alters the final sound, thus changing the word to "cub" which is a different word. The next domain of language form, *morphology,* refers to the system governing the structure of words and construction of word forms. A morpheme is the smallest unit of sound *to carry meaning*. This includes adding a prefix or affix (e.g. suffix) to an existing word to create a new word or by combining words to produce compound words. For example, a preschool child may take the word shave as a verb, then add the affix "er" to the end to derive to the new noun "shaver"– a *person* who shaves or a *thing* that shaves). This new word is considered to be more morphologically complex as it has more morphemes compared to shave. Another example of added morphological complexity would be a compound word such as "blackbird", referring to a bird which is black, which has been combined to create a new word of more complexity. Other examples include adding "s" to a word to produce a regular plural. It should be noted, that at a young stage of development, such construction and innovation of words does not ensure grammatical correctness and proper

morphological rule usage which is learned with experience and maturity. An example of a child using an innovative use of a morphological rule is using an irregular past tense rule. Here, the child adds "ed" to the word go, to produce the word "goed" rather than "went". Another example of innovative use of a morphological rule is in the case of irregular plurals whereas the child produces the word "deers" for the plural of form "deer". Although the morphological usage in an error, the child's usage of the morphological form informs the listener that the child is developing in the area of understanding and following the systematic rules and proper construction of words. The error also provides evidence that the child lacks *metalinguistic competence* or the ability to conceptualize, reflect upon, and analyze language as an entity in and of itself, which typically occurs later in language development (Nippold et. al., 2005).

This leads to the last area of language form: *syntax,* or the system which governs the order and combination of words to form sentences to include the relationships among the components within a sentence. As an example of syntax development, Hirsh-Pasek & Golinkoff (1996) suggests that by 17 months of age, a child typically will be able to discriminate between "Cookie Monster is tickling Big Bird.", and "Big Bird is tickling Cookie Monster" (Hirsh-Pasek & Golinkoff, 1996). The ability to use early word combinations appropriately, demonstrates the ability to express meaningful word combinations. However, although syntax use is emerging, the syntax of very young children (ages 2-3 years) developmentally will typically lack in function words (the, a) and auxiliary verbs (am, has, is). This communication is produced with syntaxically less-sophisticated patterns of usage. For example, a toddler at 26 months old utters, "Doggy gone?" omitting the verb "is" which is needed for the sentence to be in question form.

However, in this case the child uses intonation to form the question. In contrast, by preschool, the child is able to form a question via the use of the interrogative reversal, as "Is the doggy gone?" While children are developing in the language area of *form*, they are also developing in the areas of *content* and *use* of language.

Language Content

In the area of language content, the focus is on *semantics* which encompasses the words of the language and meanings associated with those words (Gordon, 1986). It is important to consider that in the acquisition of language, the words themselves do not necessarily lend the language learner the clues needed to appropriately identify what is being labeled which supports meaning. Consider, for example, seeing a bird bathing in a pond and hearing the word *birdie*. An early language learner may not know if that word is referring to the bird itself, its flapping wing or the act of bathing. Another example is a 12 month old sees a horse and calls it *doggy*. In this example, the word "doggy" is used a generalization for an animal with fur that walks on four legs. Piaget refers to this as *assimilation*, whereas the child takes in new information and incorporates it with existing schemata. This semantic pattern is very characteristic of children this age (Piaget, 1926). With experiences of trial and error, alongside feedback from more mature speakers within the language community (Vygotsky, 1962), understanding of word meaning continues. For example, in contrast to the child who calls all animals "doggy," by 16 months most children can distinguish between horse, dog and camel and identify each, respectively.

In later semantic development, typically by preschool, (36 – 48 months old) children use and understand "why" questions, use spatial terms (in, on, under), and words

depicting color, shape and numeration. The semantic development of 4 year olds typically continues to progress including understanding letter names and using conjunctions (and, because, when, so, if) to conjoin sentences. This continued development in gaining appropriate meaning associated with words offers a more sophisticated understanding of the words within a language community. While children are making strides in the area of semantics, they are simultaneously developing in the last of the three domains of language, *use.*

Language Use

The last domain of language is language use, or *pragmatics*. Pragmatics describes the communication skill that is used in functional and socially appropriate communication (Kaderavek, 2009). Pragmatics refers to the function of words and how the language is used within the social context. At this point, it is important that we consider communication to include symbolic (language) and non-symbolic information such as gestures, facial expressions and body language which can be a supplement to and/or a replacement for language. Consider, long before a child has developed form and content of language, infants are born with affective behaviors which are used to communicate their basic needs both symbolically (a cry in hunger) and non-symbolic (a smile to show contentment).

As a demonstration of pragmatic competency at nonverbal levels, within the first year, infants are communicators and demonstrate pragmatic skills. An example of non-symbolic language use is when a baby elicits joint visual attention by pointing to a pacifier sitting on a table as a request. Although the child may be unaware of his pre-linguistic behavior, the responses of the parent teach the communicative nature of

language use (Sachs, 2001). During this time infants develop non-verbal and verbal turn-taking and have eye contact with others.

Pragmatic skills continue to develop into the toddler and preschool years which children are characteristic of using language to request, demand, question, respond and state. For example, "Give me that block" is typical pragmatics of a 4 year old child as using language to request. Similarly, the child may also use language to negate by saying, "No." or "I don't want that block". This is important because as a child enters into a community away from home, such as preschool, he or she is able to use language to communicate basic needs and wants, learn new concepts, establish and maintain new friendships. Therefore, to become effective communicators, young children will need to be able to demonstrate the pragmatic behaviors to: request, ask questions, express agreement or disagreement, make demands or refuse, joke, apologize, express feelings, and tell stories.

Typically by preschool, children have also developed pragmatic skills to include early discourse skills such as initiating and maintaining topics as well as the ability to repair communication. Additionally, children need to develop an understanding of how to initiate, maintain and conclude conversations appropriately. Pragmatic skills required include: timing, turn taking, providing and responding effectively to feedback and staying on the topic at hand. This establishes the foundation for later development of pragmatic skills where children will move to more advanced forms of discourse and need to use language to maintain status with peers, demonstrate politeness ("Yes, please.") use sarcasm and humor and are able to produce narratives. Additionally, these discourse skills are influenced by the socio-cognitive context as the language is being understood

and used for *action* and takes on *perspective* (Gee, 1999). This can be seen in the example of a play situation in a housekeeping area where a child says "The coffee spilled, go get the mop" as compared to "The coffee spilled, go get the broom" (Gee, 2001). To maintain the discourse, the children would have the understanding of the "coffee" they spilled was in the form of a liquid or perhaps coffee grounds or beans.

It is these important interactions with others in the formative years which allow children opportunities to learn how to use language strategically and appropriately within various contexts. Language pragmatics typically continues to develop with communicative experiences and becomes more sophisticated throughout childhood. This suggests that the domain of language use, or pragmatics, is complex and also a critical aspect of successful communication which is both socially appropriate and functional. It requires the language user to know when and how to use language for communication, which is influenced by the situation or context for language, and is a component of discourse.

Discourse & Analysis

Discourse analysis is a growing field in a variety of disciplines to include linguistics, anthropology, philosophy and education. Therefore, the definition of discourse and discourse analysis may have different meanings depending on the given field (Schiffrin et.al, 2001). Many would agree that discourse is "anything beyond the sentence". However, others argue that the study of discourse is the study of language use (Fasold, 1990, p. 21). Adding to this, Gee (2001) suggested discourse is more than the act of using language. "Discourses always involve language (e.g., they recruit specific social languages), but they always involve more than language as well. Social languages are

embedded within discourses and only have relevance and meaning within them." He continues on to summarize discourse as, "Ways of combing and coordinating words, deeds, thoughts, values, bodies, objects, tools, and technologies, and other people (at the appropriate times and places) so as to enact and recognize specific socially situated identities and activities" (Gee, 2001). Furthermore, discourse is influenced by the context of the cultural model, or everyday theories such as storylines, ideas or schemas within the environment (Corsaro, 1994). This is very important notion, because one must consider the sociocultural contexts influencing the discourse itself. For example, discourse analysis of young children may look different than that of adults, who have acquired a more sophisticated level of language. Research in child discourse has shifted focus to not just the acquisition of language itself by examining language in meaningful contexts (e.g. Halliday, 1977; Locke, 1993) to self-relevance, for sense-making and for the construction of peer cultures and children's worlds. For example, McTear (1985) examined turn taking in children's discourse noting there were fewer overlaps and longer gaps compared to adults. Later, his longitudinal study found that even young children can project turn completion points and found the overlaps increased as the children grew older.

Typically, in early childhood, discourse can serve a variety of purpose to include: an enactment of an activity, a contribution to the activity, and the discourse itself can reflect meaning to others about a particular play activity. Discourse analysis (or an analysis of language-in-use) can be used as a tool to gain further understanding of the how language enacts social and cultural perspectives and identities. Therefore, depending on the context, relevant issue or research question, various discourse analysis

approaches or methodologies can be implemented at both the macro-level and the micro level. As an example of analyzing discourse at the macro-level, one might consider looking at language productivity or interaction between the children by accounting for the number of discourse turns or (how the language continues to go back and forth throughout the language sample) during a play situation. As an example of discourse analysis at the micro level, one might decide to measure the length and syntactic complexity of words spoken; which can be measured by calculating the mean length of utterance. Both of these are considered appropriate measures and can inform our understanding of children's play behaviors (e.g. discourse) in different play situations.

Among the contexts which influence play behaviors, it has been established that discourse with others has a significant role in preschool play and can add to our understanding of play behaviors in various play contexts. Along with people and the environment, the last of these three contexts influencing play behaviors are the materials.

Materials

The constructivist theories of Piaget and Bruner focus on the need for play experiences with concrete materials as a part of the learning process. In particular, Bruner theorizes that knowing is a not a product, rather it is an active process whereas play experiences in early childhood are a process for learning (Bruner, 1977). For example, rather than memorizing math facts, learning should involve understanding math processes in order to think like a mathematician (Ginsburg, Klein, & Starkey, 1998). To understand math process, the child needs to participate in hands-on play with materials to formulate concepts. Bruner theorizes that learning is a spiral process – the child connects new ideas

to original ideas and makes connections to build more sophisticated understandings. Therefore, the materials within the environment are an important component for learning.

As mentioned previously, early childhood environments are equipped with traditional play materials and toys specifically organized within the environment. For example, the housekeeping / play house area may contain play household items typically found in the kitchen. These items engage, inspire and influence play behaviors of children as they enact their life experiences and make meaning of their world. If a housekeeping area is equipped with play tools commonly found in the garage, it is likely that the children's play behaviors and language will center on maintenance, repair, or building. Similarly, if children are playing with blocks, they are likely to use the blocks to construct something familiar (a house) or also use the blocks to create a new structure.

During play, children use and create materials, and dramatize various roles and scenarios of vast themes. These forms of social play allow children to use their creativity while developing their imagination, cognitive, dexterity and physical strengths and communication. Through this communication, the notion of childhood material culture is also considered (Corsaro & Eder 1990).

There is a reciprocal interaction between materials and the discourse topic. Just as certain kinds of material will enable certain discourse topics, research also demonstrates that children's discourse practices can influence the materials the children select to use during play. As an example, research by Reifel (1984) reports that children's language during block play among 4 year-old and 5 year-old children reflects their knowledge, prior experiences, ideas, motivators and interests. This suggests the discourse during play can also influence the direction of future play practices to include: decisions

to change materials, use the material in a different way or create their own new materials (Reifel, 1984). This inter-relationship between discourse patterns and play materials suggests that researchers and educators should carefully examine how play materials influence play behaviors and how discourse patterns may vary in response to different play materials.

Contemporary Play: Play using Technology

It is important for early childhood educators and researchers to examine current trends in today's society influencing the way children play; the term "contemporary play" is introduced to describe contexts influencing children's play behaviors. Contemporary play describes the current conditions of a society or culture in respect to environment, people and materials influencing children's play behaviors. There are numerous factors in the context of social and cultural changes which affect children's daily lives and how children spend their time. Identifying factors contributing to these changes in behaviors can help educators understand and meet the needs of children in today's context of contemporary play. Among the various changes influencing play behaviors today, the evolution of technology and an increased accessibility technology tools is a significant cultural change in the lives of young children. Research has shown that today's young children are not passive users of the digital world. In contrary, these active consumers of technology are *young digital natives* (Rosen & Jaruszewicz, 2009); behaviors observed in young digital natives are familiarity with a variety of educational software, communication devices, the internet and multimedia authoring tools. It is considered to be highly useful to prepare children to navigate today's world by familiarizing them with technology tools (Crouse & Chen, 2010).

The use of a tablet such as the iPad is an increasingly popular trend in early childhood classrooms. Apple reports that 600+ districts in the United States that have launched what are called "one-to-one'' programs, in which at least one classroom in a school building is piloting the effect of having iPads® for each child in the classroom to use throughout the day (Stokes, 2011). Colorful, fast paced applications provide immediate feedback and include music and sound effects to impact student's attention and motivation to interact with the learning activity.

Use of the iPad® is being marketed as appropriate for even very young children. For example, the iPad® and applications developed for toddlers, was aired nationally in September, 2011. Since then, hundreds of applications for the iPad® targeted for preschool aged children have been developed and marketed. To evaluate this flood of information, The Early Childhood Technology Collaborative has created The Early Childhood Technology Today Survey; this survey aims to gather data to evaluate the classroom use of technological tools in ECE classrooms (Simon, et al 2013).

Among the 485 teachers and administrators surveyed, (a) 95% reported having a desktop / laptop in the classroom, (b) 58% reported children are using tablets during the classroom day and (c) 67% reported they introduced the use of technology to extend concepts and skills. Finally, (d) 66% reported they used the technology in order to familiarize children with the technology devices, and reported using technology to support children who vary in ability. Examples of software providing differentiated instruction are available including apps supporting basic communication and support for dual language learners (Gosnell et al. 2011).

Significance of the Study

It has been established that technology tools are being used in the majority of ECE environments. As with any other tool, using technology to support practice and enhance learning requires professional judgment regarding what is developmentally and culturally appropriate (Hobbs, 2010). NAEYC has created a developmentally appropriate framework and has outlined principles and guidelines which support developmentally appropriate practices regarding technology. NAEYC recommends that educators need to be technological savvy and have the ability incorporate technology and interactive media to *support* learning in early childhood education, rather than *replace* hands-on activities.

Unfortunately, there are limitations of our *current knowledge* and *pool of authoritative research* on the possible short term and long term effects of such technology (Rideout, Vanderwater & Wartella, 2005); these limited data suggest that additional focused research is needed to investigate the effects of contemporary technological play on very young children (Christakis & Zimmerman, 2009). Similarly, there is very little empirical evidence on how children's play behaviors during contemporary play may differ as compared to children's play behaviors and peer-to-peer discourse using traditional materials. As previously noted, there is a great pool of evidence suggesting that the language and discourse with others during play in early childhood supports healthy child development. Consequently, understanding children's discourse behaviors in response to technology is an area worthy area of investigation. This leads to the following research questions.

Research Questions

1. Among preschool children, does the discourse differ in length and complexity (MLU) while engaged in constructive play experiences with constructive play experiences using concrete materials compared to 2-dimensional virtual technology?
2. Among preschool children, does the discourse differ in productivity (MTL) while engaged in constructive play experiences with concrete materials compared to 2-dimensional virtual technology?

Chapter Three

Methodology

Introduction

The methodology for this study included various components which will be described in this chapter. Specific details are outlined in the following areas: participants, the setting, experimental design, materials, procedures, transcription and data analysis.

Participants

The inclusion criterion for the participants was based on recommendations for single subject research methodology (Worlery & Ezell, 1993). The participants were 8 children (4 pairs of four year olds) ranged in age from 4.2 to 4.9, varied in socio-economic status, attended preschool full-time and were identified by the teacher as being playmates. After sending out a Recruitment Letter (Appendix A) to all children in the classroom (N=21) each participant's parents or guardian agreed to their child's participation by completing the Parental Permission for Child Participation in Research (Appendix B); and Child Information Sheet (Appendix C). This information reported by parents offered specific demographic data (Table 1) and typical play behaviors at each child's home environment (Table 2). The play habits reported by parents include the average hours spent per week for the following: playing on the computer, playing on an iPad® and playing with blocks. Additional information reported also includes the top three play preferences for each child.

Table 1

Participant Demographic Data

Gender		
Female	5	
Male	3	
Age		
Range	4.2-4.9	
Mean	4.6	
Ethnincity		
Multi-racial	1	
Hispanic	1	
Caucasian	6	
Education Level	Mother	Father
Not High School Graduate	1	1
High School Graduate	0	1
Some College	2	2
College Graduate	2	1
Graduate School	3	3

Table 2

Participant Play Habits at Home Environment

Child	Hr/week Computer	Hr/week iPad®	Hr/week Blocks	Play Choice #1	Play Choice #2	Play Choice #3
1	5	6	1.5	Outdoor	iPad®	Pretend, Lego
2	2	2	0.5	scooter/bike	Swings	Baseball
3	2	8	0	Outside	board games	Reading, dress-up
4	2	1	0	cars/trucks	build things	art or play outside
5	0	1	4	Outside	Reading	dress-up
6	1	1.5	1	physical play	imaginary play	color, hide & seek
7	0	8	0	ride bike	Dolls	iPad®
8	0	8	0	Television	play outside	Leap pad

Exclusion criterion was determined by data collected through observational notes on each participant behavior and attendance records (Birnbraurer, 1981; Lane, Little, Redding-Rhodes, Phillips, & Welsh, 2007; Worery & Ezell, 1993) to ensure an appropriate participation. If a child reported he or she didn't want to participate or play the session would end. Additionally, participants of the study were limited to English speaking children of the same age, and have not been identified as having a speech, hearing or language disorder. This was intentional to establish a more homogeneous group with similar language development and abilities since discourse was the dependent variable.

The pairs of children were randomly assigned by the teacher while keeping in consideration that the children were identified as being playmates. Each pair was identified as a color (blue, green, white and yellow) to maintain anonymity of all participants and to distinguish partnerships while in communication with SALT and for record keeping purposes. Anonymity of the subjects was further protected by using

numbers to report and record information identifying each participant during the transcription and data analyses process. During all phases of the study names were omitted and substituted with numbers (Smith, 2003) and parent information was kept separately.

The Setting

The setting selected for the study was a collaborative model in education at Adrian College's Institute for Education (http://adrian.edu/academics/institutes/education/preeschool/). Within this program, Adrian College has partnered with Adrian Public Schools and the YMCA to provide an educational preschool, Little Maples Preschool, housed at Lincoln Elementary, an International Baccalaureate® Primary Years Program candidate school (http://www.ibo.org/). The program is designed for children in the community and also for the students and faculty at Adrian College. The preschool at Lincoln is a laboratory classroom for the research for the Education students and faculty at Adrian College. With permission of the school Principal, this study was conducted in the library in the school near the children's classroom. This room is very familiar to the children and is used routinely. Conducting the study in a familiar environment is consistent with best research practice for young children.

Experimental Design

The design of the study was a paired sampling single subject alternating treatment design, whereas half of the partners progressed through an A-B-A-B sequence and the other half progressed through a B-A-B-A design (Barlow & Hayes, 1979). This methodology allowed the researcher to demonstrate critical replication of effects by

repeating the experimental effect with each participant more than once in the same study. As in single subject research, the individuals himself or herself were the primary unit of analysis; each participant served as his/her own control. The participant's behavioral performance was compared across two different conditions; the two conditions are the independent variables (Horner et al., 2005). During Phase A, the children were invited to a block play situation with wooden table blocks as the material. Phase B, was the alternate condition of block play whereas play took place using the *Build with Blocks* application on an iPad®.

Build with Blocks is a free application geared for 3-6 year old children compatible with iPod®, iPod Touch®, iPhone®, iPad® or iPad mini® which requires iOS 4.0 or later. The design is simple, as children interact with colored blocks of different shapes and sizes in two dimensions. Children can choose to build with blocks varying in size, shape or color. The format is versatile with no specific expectations on the users. The application can be downloaded to a compatible device by accessing applications via iTunes® with the size of 44.6 MB.

Materials Used During Phase A and B

1. Phase A included one 10 minute session with each pair of children playing with traditional Lakeshore® wooden blocks. Children are familiar with these blocks as they are used in the current curriculum.

   Materials: 2 large tubs of traditional Lakeshore® wooden blocks, table and 2 chairs. Lakeshore® blocks are traditional blocks that vary in size, shape and color.

Researcher Materials: digital video camera, audio recorder, SALT hardware and software to record session on laptop, notepad and pencil, dry erase board and marker.

2. Phase B included one 10 minute session with each pair of children playing on an iPad® with the *Build with Block* application. Children were already familiar with this application as it is a part of the current curriculum.

   Materials: 2 ipads® with *Build with Blocks* application open, table and 2 chairs.

   Researcher Materials: digital video camera, audio recorder, SALT hardware and software to record session on a laptop, notepad and pencil, dry erase board and marker.

It should be emphasized that the play materials used in this study were already a part of the children's classroom routine and all children have been introduced to and have had multiple opportunities over several months to play with the Lakeshore blocks and play *Build with Blocks* on the iPad®. Prior to the study, children were observed in their classroom to determine that they are comfortable using the materials and are competent in using the technology tool prior to the study, thus controlling for novelty of technology.

During both of these experimental phases, the audio recorder was the primary method used to record data, which was saved to the computer and uploaded directly to the SALT website. The video recordings were used only in the case if there was as discrepancy as to who the speaker was. Additionally, the researcher took field notes before, during and after each play session to document observational and anecdotal notes in terms of child participation, play behaviors and any other details which may have been pertinent information. Included in the field notes were the researcher's typed

transcription notes for each play session. These field notes were also uploaded to the SALT website. These precautions supported accuracy in SALT transcription analyses results.

Response Definitions and Measurement Procedures

Training of the Researcher

The quality of the data taken on the dependent variable and the ability of the researcher to establish reliability of the data is based on the skill of the researcher to accurately identify the target behavior and record the data accurately. This can be accomplished through rigorous training on data collection methods prior the implementation of the study. Although there is no widely accepted convention on best methods for training the researcher, it is generally recommended that the researcher and any observers complete several steps (Cooper, Heron & Howard, 2007; Tawney & Gast, 1984). As aforementioned, in this study the researcher took detailed field notes, used dual recording devices and reviewed data prior to transcription to support accuracy of data.

The most significant variable relating to the methodology was accurate transcription of child discourse during play via a language sample analysis, (LSA). Therefore a professional transcription service was hired to complete the analysis. The service selected was a computer-aided LSA (CLSA), called the *Systematic Analysis of Language Transcripts* or SALT which is a four-step process (SALT; Miller & Iglesias, 2006). This CLSA requires hardware and software to enable digital audio recording, transcription and analysis of children's language samples. Compatible software for this is *Audacity* for audio recording (http://audacity.software.sourceforge.net) and *Transcriber*

for transcription (http://sourceforge.net/projects/trans), respectively. This particular CLSA method was chosen because research provided evidence that this transcription service results an efficient and accurate manner (Price, et al. 2010).

Procedures

With the A-B-A-B and B-A-B-A schedule, all pairs of children participated in both Phase A and Phase B two times each, over a four week period with a total of (4)10 minute play sessions. The schedule and attendance of each child's weekly participation was documented by the researcher on the Research Participation Schedule sheet (Appendix D).

Phase A: During Phase A, children play in this condition, for one (1) 10 minute session. The researcher followed this protocol:

1. Prior to inviting children, prepare all materials and ensure recorders are ready and in working order. Record date, time, and participant identification on dry erase marker to document session on video recorder.
2. Invite the pair of children to the library for some play time.
3. Place the two containers of colorful Lakeshore® wooden blocks on table.
4. Have computer nearby and audio and video recorder in place to record spoken language.
5. Researcher says: "Let's see what amazing creations you two can make out of these wooden blocks. Feel free to play together. I am also going to record your creations with these recorders". Show recorders and begin recording.
6. Begin play session with recording with date and time of session on dry erase board.

7. Record any observational research notes or issues that may arise on the observation sheet. Include participants' pair color (i.e. Blue) numbers (i.e. 1 and 2), date, time, and observation.
8. Type the spoken language of the children.
9. After 10 minutes, stop recording. Direct the children that it's time to clean up and return to the classroom.
10. Double check the accuracy of typed transcription field notes by comparing with video recording. Save all files.
11. Upload the audio recording and transcription field notes and to SALT website. Place observation sheet in the research documentation binder and indicate participation on the Research Participation Sheet.

Phase B - During Phase B, children play in this condition, for one (1) 10 minute session. The researcher followed this protocol:

1. Prior to inviting children, prepare all materials and ensure recorders are ready and in working order. Record date, time, and participant identification on dry erase marker to document session on video recorder.
2. Invite the pair of children to the library for some play time.
3. Have the two iPads® with *Build with Block* applications open and place them in the middle of the table with two chairs. (The decision to include two iPads® was to reduce the issue of not having adequate materials in which to work or share. The children were free to share one iPad® and work together, or work independently.)

4. Have computer nearby and audio and video recorder in place to record spoken language.
5. Researcher says: “Let’s see what amazing creations you two can make out of these blocks on the iPads®. Feel free to play together. I am also going to record your creations with these recorders”. Show recorders and begin recording.
6. Begin play session with recording with date and time of session on dry erase board.
7. Record any observational research notes or issues that may arise on the observation sheet. Include participants’ pair color (i.e. Blue) numbers (i.e. 1 and 2), date, time, and observation.
8. Type the spoken language of the children.
9. After 10 minutes, stop recording. Direct the children that it’s time to clean up and return to the classroom.
10. Double check the accuracy of typed transcription field notes by comparing with video recording. Save all files.
11. Upload the audio recording and transcription field notes and to SALT website. Place observation sheet in the research documentation binder and indicate participation on the Research Participation Sheet.

Transcription

The discourse that occurs between children was recorded, transcribed and analyzed using the SALT computer language sample analysis (CLSA). Any discourse that was not relevant to task (i.e. needing to use the restroom) was omitted. The typed transcription field notes of the spoken language and the audio recording of each session

was coded (i.e. Blue 1A indicating the pair, play session number and condition / phase type) and uploaded to the SALT website to be transcribed by professional language transcription service. As a result of this process, the dependent variables (length and complexity of utterance) were determined for each child per each session. The length of utterance was measured by the number of words spoken. The complexity of spoken utterances is measured (by counting morphemes) and syntax for each individual to derive a mean length of utterance (MLU). The higher the MLU, the more complex are the words being spoken by the individual (Nippold, 2009). This is common practice among Speech and Language Pathologists to measure discourse in terms of syntactic complexity. Lastly, the remaining variable analyzed was measuring language productivity. This was accounted for by calculating the mean turn length (MTL) which is the average number of words spoken per discourse turn for each child during a play session.

Transcription Procedural Fidelity and Reliability

Procedural fidelity refers to the implementation of a research plan, as intended leading to accountability of how procedures of an experimental condition are implemented (Gast, 2010). The procedures for collecting data were clear, detailed and outlined in procedures section, to include documentation on Research Participation Schedule and observation sheets and typed transcription field notes. However, since the most significant measure for procedural fidelity in this study was transcription accuracy, the procedures for transcription were measured and reported. To account for this, SALT reported on average 90% accuracy in following transcribing procedures and the validity of the procedures have been well documented (Heilmann, Miller, Iglesias, Fabiano-Smith, Nockerts, & Digney Andriacchi, 2008).

To account for reliability, one randomly selected language sample was double coded by two independent certified transcribers. Therefore, inter-relater reliability was calculated by using the following formula: (agreement / agreement + disagreement). Each matching word in each utterance when comparing the two transcripts was counted as an agreement; each discrepant word as it occurs in each utterance when comparing the two transcripts was counted as a disagreement. An acceptable percentage of inter-rater reliability agreement is 80% or greater. Should the inter-rater reliability be less than this rate, it would raise question in procedural fidelity and reliability and require discussion and re-transcription of further samples by certified transcriptionists until a satisfactory level agreement of 80% or greater is achieved (Krippendorf, 2004). However, in this case an inter-rater reliability was calculated at .89 which is acceptable.

Data Analysis

To analyze the data, after SALT transcribed each of the 16 language samples, transcription analyses reports were produced. Sample reports are found in APPENDIX F, APPENDIX G, APPENDIX H and APPENDIX I. Using these data, the following formulas were used for all 8 individuals for four samples (i.e., two from Phase A and two from Phase B) in order to make a quantifiable comparison of child language behaviors in these two conditions.

To achieve the statistic for MLU, the mean was calculated (i.e., Phase A formula: μ= MLUA1 + MLUA2 / 2). Respectively, the mean MLU was calculated for Phase B. The same process was used to calculate the mean MTL per child per condition. From there data were analyzed descriptively via graphing comparisons as well as using non-parametric analyses.

For descriptive analyses, the graphs compare the mean length of utterance for each participant recorded during each session; data were charted on a graph for each participant (see Figures 3-1 and Figure 3-2). The X-axis reflects each participant; the Y-axis reflects the mean length of utterance per condition. Both condition A and B were graphed side-by-side. Similarly, the second graph displays the MTL. The X-axis reflects each participant; the Y-axis reflects the mean turn length per condition. Both condition A and B were graphed side-by-side. The differences between the conditions were calculated using the formula (μA-μB) for each individual (see Table 3.1 and Table 3.2).

The Wilcoxon signed-rank test is a nonparametric test is equivalent to a paired-samples dependent *t*-test which compares repeated measures; it is an appropriate statistic for small sample size (e.g. Ballard et al 2010). With such a small sample size (N=8), the median was used to calculate for differences as it accounts for any extreme statistic or outliers as compared to comparing the mean. This test is used to compare medians for both conditions for both MLU and MTL.

Chapter Four

Results

Introduction

This study provided an analysis of discourse among preschool children while playing in pairs within two play conditions. The goals of the study were to: (a) determine if there was a difference in length and complexity (MLU) while engaged in constructive play experiences with constructive play experiences using concrete materials compared to 2-dimensional virtual technology (research question one) and (b) determine if there was a difference in productivity (mean turn length) while engaged in constructive play experiences with constructive play experiences using concrete materials compared to 2-dimensional virtual technology (research question two).

To achieve the statistic for MLU, the mean was calculated (i.e., Phase A formula: μ= MLUA1 + MLUA2 / 2). Respectively, the mean MLU was calculated for Phase B. The same process was used to calculate the mean MTL per child per condition. From there data were analyzed descriptively via graphing comparisons as well as using non-parametric analyses.

For descriptive analyses, the graphs compare the mean length of utterance for each participant recorded during each session; data were charted on a graph for each participant (see Figures 3-1 and Figure 3-2). Similarly, the second graph displays the MTL. The x-axis reflects each participant; the y-axis reflects the mean turn length per condition. Both condition A and B were graphed side-by-side. The differences between the conditions were calculated using the formula (μA-μB) for each individual (see Table 3.1 and Table 3.2).

As described above, the statistic for MLU, the average was calculated in both phases for each child by using the following formulas: μ= MLUA1 + MLUA2 / 2 and μ= MLUB1 + MLUB2 / 2. The table below (Table 3) provides the average MLU in each of these conditions, the MLU difference between conditions and the Z-score for each child.

Table 3
Mean Length Utterance Data

Child	μ MLU Blocks	μ MLU iPad®	MLU diff	MLU Z-score
1	4.94	3.99	0.95	1.0036
2	3.72	3.51	0.21	-0.48919
3	3.83	3.76	0.07	-0.77161
4	4.60	4.33	0.27	-0.36815
5	5.21	5.26	-0.05	-1.01368
6	5.13	5.09	0.04	-0.83213
7	4.65	3.76	0.89	0.88256
8	6.97	5.73	1.24	1.58861

The following graph is a figure (Figure 3) displaying the average MLU in Morphemes for both conditions (Phase A - blocks and Phase B - iPad®) and placed side-by-side offering a visual comparison for each child.

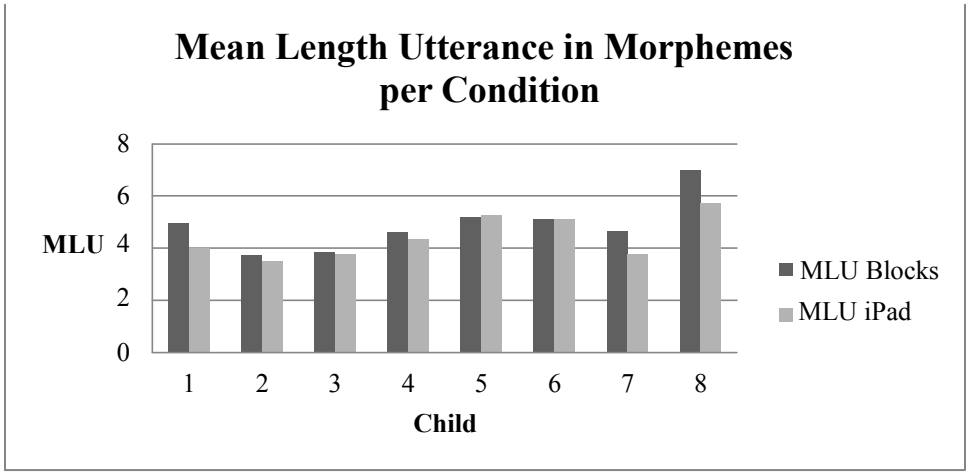

Figure 3. Mean Length Utterance in Morphemes per Condition.

Next, the average for MTL was calculated in both phases for each child by using the following formulas: μ= MTLA1 + MTLA2 / 2 and μ= MTLB1 + MTLB2 / 2. The table below (Table 4) provides the average MTL in each of these conditions, the difference in MTL between conditions and the Z-score for each child.

Table 4
Mean Turn Length Data

	μ MTL Blocks	μ MTL iPad®	MTL diff	MTL z-score
Child 1	1.75	2.37	-0.62	-0.82056
Child 2	2.18	2.21	-0.03	0.06979
Child 3	1.29	2.08	-0.79	-1.07711
Child 4	2.41	1.99	0.42	0.74888
Child 5	1.62	1.86	-0.24	-0.24711
Child 6	2.19	1.62	0.57	0.97524
Child 7	1.78	2.62	-0.84	-1.15256
Child 8	2.98	2.06	0.92	1.50342

The next graph presented (Figure 4) is as a figure displaying the average MTL for both conditions (Phase A - blocks and Phase B - iPad®) and placed side-by-side offering a visual comparison for each child.

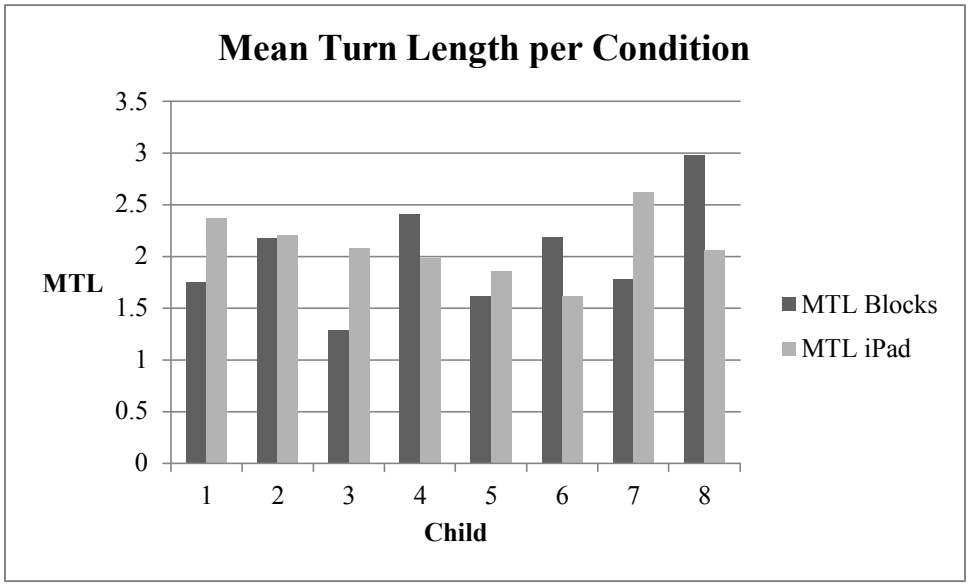

Figure 4. Mean Turn Length per Condition. This figure illustrates the combined average MTL for each child in both conditions.

Upon reflection during the analyses process, potential differences in the children's vocabulary were noted. Consequently, in order to explore an additional aspect of potential variation in child discourse, the number of different words (NDW) spoken were compared using the same statistical process as for MLU and MTL as described previously. NDW is a measure of semantic performance offers data relevant to use of vocabulary and will be further discussed in the next chapter.

The following table (Table 5) provides the average NDW in each of these conditions, the NDW difference in averages between conditions and the Z-score for each child.

Table 5
Number of Different Words Data.

	μ NDW Blocks	μ NDW iPad®	NDW diff	NDW Z-score
Child 1	111	84	27	0.56236
Child 2	84	56	28	0.63434
Child 3	62.5	56.5	6	-0.94927
Child 4	97.5	68	29.5	0.74232
Child 5	103	91	12	-0.51737
Child 6	101	97	4	-1.09323
Child 7	47	41	6	-0.94927
Child 8	111.5	70.5	41	1.57012

Lastly, the following graph is a figure (Figure 5) displaying the average NDW for both conditions (Phase A - blocks and Phase B - iPad®) and placed side-by-side offering a visual comparison for each child.

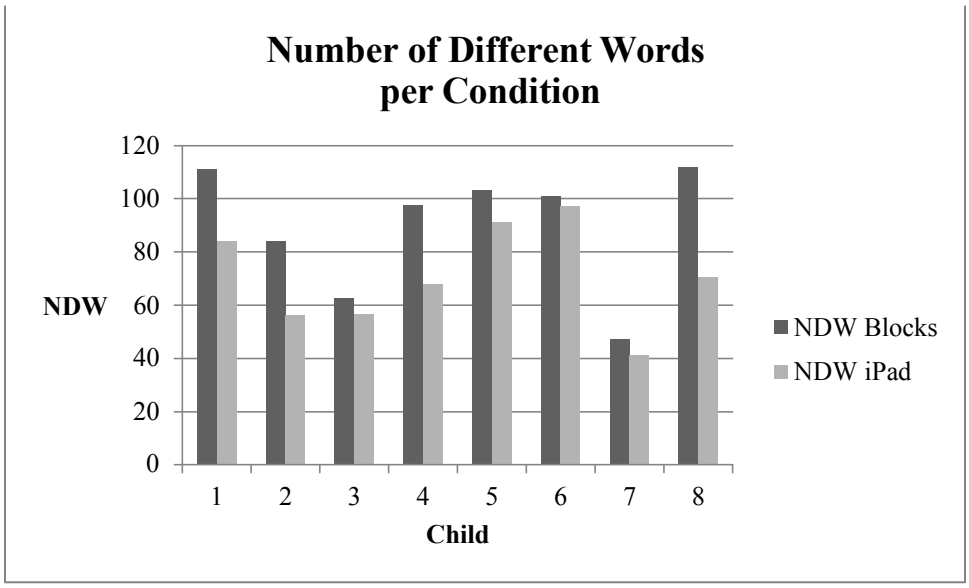

Figure 5. Number of Different Words per Condition. This figure illustrates the combined average of NDW for each child in both conditions.

Wilcoxon Signed-Ranks Test

A Wilcoxon signed-ranks test (*W)* examined the differences between condition A (blocks) and condition B (iPad®) for research question one (MLU), research question 2 (MTL) and the additional information provided by the computation of NDW also were compared using Wilcoxon signed-ranks test. For both conditions, the group's average MLU, MTL and NDW are presented in the following table (Table 6). Also included are the group's standard deviations with minimum and maximum averages. Lastly, this table presents the group's Z-scores for median MLU, MTL and NDW in each condition and levels of significance, respectively. The Z-score indicates if a particular score is equal to the mean, below the mean or above the mean. With the mean being zero, the Z-score can also indicate how far a particular score is away from the mean.

Table 6
Descriptive Statistics Wilcoxon Signed Ranks Test

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
MLU A	8	4.8813	1.00871	3.72	6.97
MTL A	8	2.0250	.52799	1.29	2.98
NDW A	8	89.688	23.5735	47.0	111.5
MLU B	8	4.4288	.82482	3.51	5.73
MTL B	8	2.1013	.30647	1.62	2.62
NDW B	8	70.500	19.2261	41.0	97.0

Z Score Test Statistics[c]

	MLU B - MLU A	MTL B - MTL A	NDW B - NDW A
Z	-2.240[a]	-.420[b]	-2.524[a]
Asymp. Sig. (2-tailed)	.025	.674	.012

Results from the Wilcoxon signed-ranks test examined the difference for the group of children's average MLU in condition A (blocks) and condition B (iPad®) by analyzing the group's median. The test indicated a statistically significant difference with children demonstrating greater sentence length and complexity during block play (median = 4.80) as compared to iPad® play (median = 4.16), $Z = 2.24$, $p < .05$, $r = .79$. This is a large effect size. Examples of general guidelines for assessing the magnitude of effect size (or levels of effect) include: 0.0-0.20 as a small effect size, 0.20-0.50 as a medium effect size, and 0.80 and above as a large effect size (Cohen, 1988).

A Wilcoxon signed-ranks test examined the difference for the group of children's average MTL in average turn length during block play (median = 1.98) as compared to iPad® play (median = 2.07), $Z = .42$, $p > .05$, $r = .15$. This is a small effect size.

A Wilcoxon signed-ranks test examined the difference for the group of children's average NDW in condition A (blocks) and condition B (iPad®). The test indicated that the children had a statistically significant difference demonstrating greater vocabulary diversity during block play (median = 99.25) as compared to iPad® play (median = 69.25), $Z = 2.52$, $p<.05$, $r = .89$. This is a large effect size.

Chapter Five

Conclusions and Discussion

Introduction

This study focused on discourse analyses among preschool children while they were engaged in constructive play experiences with concrete materials (traditional wooden building blocks) as compared to constructive play with 2-dimensional virtual technology (a block building application on an iPad®). The primary investigation measured the children's discourse length and complexity (MLU) and productivity (MTL) in both conditions. Following the initial planned analyses of MLU and MTL, another discourse feature called the number of different words (NDW) was computed and analyzed. NDW accounts for the variety of vocabulary used during each play session. Chapter 5 provides statements regarding conclusions, discussion of findings, implications and limitations. Lastly, areas of future research are discussed and finalizes with a brief summary.

Conclusions

In investigating research question one, the length and complexity of the children's discourse was found to be statistically significantly different; the children had longer and more complex language over the course of the entire conversation while engaged with the concrete blocks as compared to building blocks on an iPad®.

In investigating research question two, there was no difference found in the productivity of the children's discourse when analyzed by turn length while engaged with the concrete blocks as compared to building blocks on an iPad®.

Finally, the children's language diversity was found to be statistically significantly different; there was greater vocabulary diversity while engaged with the concrete blocks as compared to building blocks on an iPad®.

Discussion

In response to research question one, "Among preschool children, does the discourse differ in length and complexity (MLU) while engaged in constructive play experiences with constructive play experiences using concrete materials compared to 2-dimensional virtual technology?" findings demonstrated that the children's sentences were longer and more complex over the course of conversation while engaged with concrete block play as compared to while building blocks on an iPad®. Thus, the children's sentences were shorter and less complex while playing on the iPad®. These data provides evidence that the materials influenced a difference in syntactic complexity and morphology. These findings are noteworthy. As discussed in Chapter 2, syntactic complexity and morphology are both critical components of language development in early childhood education.

The results regarding research question two, "Among preschool children, does the discourse differ in productivity (MTL) while engaged in constructive play experiences with concrete materials as compared to 2-dimensional virtual technology?" The results provide no evidence of a difference in language productivity in the two play contexts when considering children's turn length. This suggests, on average, the number of spoken words per child were similar in both play contexts in a turn-by-turn analysis. The materials did not influence a difference in the children's language productivity. This is

noteworthy as these findings suggest the interaction between the children was similar in both play contexts.

The last area investigated was to determine if there was a difference in the children's vocabulary diversity (NDW) while playing with constructive play experiences using concrete materials measuring the number of different words (NDW). The results provide evidence that there was more vocabulary diversity while engaged with the concrete blocks as compared to building blocks on an iPad®. These data provides evidence that the materials influenced a difference in the number of different words spoken in each play context. These findings are noteworthy. As discussed in Chapter 2, within the language areas of *content,* (see Figure 2-2) semantics is another critical area of language development in early childhood education (Gordon, 1986). Semantics supports the acquisition of language by gaining an understanding of words and the meanings associated with those words.

For example, a study with focus on vocabulary richness concluded the more children hear, see and engage with words, the better they will learn them. This finding suggests that children need to be immersed in meaningful contexts to facilitate vocabulary development (Armbruster, Lehr, Osborn & Adler, 2001). Also discussed in the literature review, vocabulary development is an integral component of early literacy development supporting children's conceptual development, knowledge and reading skills. Lastly, as mentioned in Chapter 2, discourse is defined as the connected and contingent flow of language between two or more individuals. Vocabulary usage, in conjunction with morphologic and syntax skills, are critical components of a connected and contingent flow of information (Kaderavek, 2015).

Although this study was unique in comparing preschool aged child's NDW across conditions, other researchers have used NDW as a quantitative measure to analyze children's language development over time and across ability groups. For example, Watkins et al., (1995) and Klee (1992) compared NDW for preschool children with typical verses delayed language. They reported that NDW was a valid measure of language development and evidence of children's semantic development over time (Owen & Leonard, 2001; Richards & Malvern, 1997). The present study, along with the previously aforementioned studies, have a commonality in demonstrating effectiveness of collecting LSA among preschool children as a sampling of their natural communicative behavior within their natural environment. The LSA increased the ecological validity of this study, in that data were used to explore how children interact in real-life settings (Dunn, Flax, Sliwinski, & Aram, 1996; Miller, 1996).

The experiences that children have with different play contexts in their natural home environment are also worthy of consideration. The present study focused on discourse while playing with blocks as compared to playing on the iPad®. Because of this planned variation, although not considered as a primary research question, the investigator retrospectively analyzed the participants' overall home experience in these two different play contexts as reported by parents. As discussed in Chapter 2, the conceptual framework highlighting the play contexts (See Figure 2.1) includes people, environment and materials. The home environment is an important context and offers relevant information to the study.

In this study, parents reported (See Table 3.2) a variety of play activities as children's favorite choices (e.g., dress-up, outside, Legos® etc.) at home. As mentioned

in the literature review, offering opportunities for a variety of play contexts is important because some play contexts (e.g., materials) are more likely to facilitate development in particular domains than others. For example, it could be hypothesized that typical play experiences on an iPad® for a preschooler are likely to be more of a solitary model of interactive discourse simply because the majority of applications on an iPad® at the preschool level are designed for a single user. Likewise, although block play can be a solitary activity, preschool children are likely to engage in parallel play or cooperative play experiences while using blocks because the nature of the *material* may facilitate a different type of social interaction (e.g. proximity to a peer or sibling while negotiating materials, physically stacking and knocking down blocks, open ended play without the limitations of a programmed device, etc.). This variation with regard to the effects of specific materials on children's behavior, language, and interaction style reinforces the notion that adults should provide preschool a variety of play contexts because features of specific materials are likely to facilitate development in particular domains. Further, since contemporary play includes technology (e.g. the iPad®) in early childhood settings, this study suggests that educators may want to facilitate peer-peer and adult-child discourse while using the iPad® in addition to expecting that a child will only use technology on his or her own.

Similarly, the amount of time children play with materials is a very relevant component within the environment influencing play behaviors, having implications on child development in various domains. Data provided by parents included, on average, the amount of time each child spent each week playing on the iPad® and with blocks; the primary play materials for this study. Parents reported the children spent on average 4.19

hours of play on the iPad® and only .88 hours of time playing with blocks at home per week. Although the report didn't include *what* the children were playing on the iPad®, the length of time was reported as being significantly greater while playing on the iPad® as compared to block play at home. This underscores that careful consideration is made to ensure children are offered a balanced amount of time and variety of play contexts in order to facilitate optimal opportunities for discourse.

Implications

The significance of this study will be discussed in the form of four implications; importance of language in preschool, best practice in early childhood environments, relevance to Common Core and individual learning and differentiation of instruction.

Importance of Language in Early Childhood

The importance of language development in early childhood as it supports child development in all domains has been established, as extensively outlined in Chapter 2. The findings of this study conclude that children's language was greater in length, complexity and vocabulary diversity while engaged in concrete block play as compared to block play on an iPad®. An implication of these data is the suggestion that educators should carefully consider the effects of varying contexts because context does influence play behaviors. This study demonstrated the impact on children's language, an established critical component of child development across academic and social domains. This study broadens the pool of preschool language development research by highlighting how *materials* influence children's play behaviors, with a significant difference in the children's language in the two play contexts.

It is critical to carefully consider the effects of varying play contexts on children's language output since studies underscore the relationship between preschool classroom experiences and reading development (Dickinson, McCabe, Anastasopoulous, Peisner-Feinberg, & Poe, 2003); inadequate language experiences can have potentially long-term negative effect on children's reading comprehension (Snow & Dickinson, 1991) and fourth-grade reading performance (Dickinson & Porche, 2011; National Early Literacy Panel, 2009).

A practical recommendation for adults is to consider the important role of language in preschool by offering plenty of play opportunities in order to facilitate both child-child and adult-child discourse during play activities and throughout their day. One way to accomplish this is to consider the nuanced task requirements of a particular play routine and monitor the associated level of discourse which is used during a particular activity. For example, consider how a child playing independently on an iPad® might look different than three children who are building on the carpet with a basket full of blocks. Other examples to increase discourse during play is to embed open-ended questions or prompts, such as, "Tell me about your building." rather than, "What did you build?" which might result in the child simply saying, "A house". Another consideration is to continue to offer opportunities for children to make connections from their prior experiences within and across the contexts of their homes, the school and the community. As an example, the early childhood educator could add a classroom photo album highlighting and documenting the children's play experiences in and around the preschool classroom. This teacher could use this literacy artifact to encourage the children to recall events, which could be used as a springboard for conversation to

facilitate children's interest in different activities and to foreshadow future activities. These are examples of countless practical implications highlighting the important role of language for preschool children.

Best Practice in Early Childhood Environments

Similarly noted, and as established in Chapter 2, environments in ECE should contain a variety of play contexts which facilitate development in all domains. The present study provides evidence that the *materials* are a context that influence differences in children's play behaviors (e.g. discourse). This suggests a recommendation to all parties responsible for the care and development of young children (parents, primary caregivers, ECE professionals, etc.) to consider how the *materials* may be influencing children's language output.

The position statement from NAEYC regarding the use of technology in ECE, suggests that technology should support and enhance children's classroom experiences, but should not replace existing play materials within the curriculum. The data from this study suggest, when incorporating technology in ECE environments, educators should identify the purpose of the technology, monitor the length of time children are engaged in technology, consider the language requirements of the technology task, and conduct observations of children's play behaviors within technology play contexts. This process will (a) allow adults to make informed decisions to ensure that materials support child development and (b) provide an environment that is parallel with NAEYC's guidelines for best practice in using technology in ECE.

Relevance to Common Core

A third implication of the data is the suggestion that children need experience engaged in discourse rich activities in early childhood. Opportunities for discourse serve as the foundation for future learning activities in K-12 as required and outlined in the Common Core State Standards. The Common Core initiative has been adopted by 43 states, the District of Columbia, four territories and the Department of Defense Education Activity (DoDEA). Particularly relevant to the data in the current study, the Common Core State Standards are designed to support, enhance and extend children's learning by enhancing their problem-solving, collaboration, communication, and critical-thinking skills.

As discussed in the literature review, problem-solving, collaboration, communication, and critical-thinking are facilitated when children are engaged in discourse-rich play contexts. In sum, the data from the current study underscore how varying play contexts differentially impact children's opportunities to practice the foundational skills highlighted in the Common Core State Standards.

Individual Learning and Differentiation of Instruction

Best practice in early childhood education calls for teachers to respond to young children's changing developmental characteristics as well as to their culture, language and individual learning needs. Preschool children will vary in their abilities along the developmental continuum, across all domains. In this study, while searching for iPad® applications suitable for this research, the investigator discovered a wide range of applications designed to support existing early childhood curricula and differentially meet children's needs across domains. As an example, Park Math is an application offering

colorful imagery to the tune of nursery rhymes such as "Wheels on the Bus". This application can be used as a supplemental activity to support and reinforce cognitive skills for preschool and Kindergarten math. To meet an individual's targeted learning goals, many early childhood applications could be used to reinforce introduced concepts and/or offer opportunity for practice with correct response feedback via visual and auditory reinforcements. Additionally, many applications incorporate the use of multiple senses (e.g., auditory, visual); the multi-media approach can support children's varying learning styles. Finally, the iPad® continues to make communication more accessible and cost-effective for learners with developmental and speech disabilities via alternative and augmentative communication applications such as iCommunicate®. The use of the iPad® as a communication device can support learner' peer interaction and discourse skills.

In sum, there is a role for technology in ECE and educators should consider how technology can support existing curricula and the diverse and individual needs of young learners. Differentiation of instruction is an important component in ECE and technology can be incorporated in a variety ways to support children's individual needs. The data from the current study demonstrated *materials* differentially influence play behaviors. Therefore, the educator must make informed decisions on how *materials* of technology can be utilized and manipulated in varying ways (e.g. length of time, frequency of use, type of application) to meet individual needs of preschool children, while keeping best practice in consideration.

Limitations

The present study has two limitations in the area of external validity. External validity is defined as the extent to which the results of a study can be generalized to and across populations, settings and times (Johnson & Christensen, 2000).

First, a small purposeful sample (N=8) was used for this study using a paired sample repeated measure comparison for each child across conditions. This repeated measure comparison demonstrated a critical replication of effects, thus supporting external validity of the study. However, the larger a group of study participants the more representative of the population of interest, the greater the external validity. Future studies including additional participants will increase the generality of findings; in particular, if the additional participants differ in some way (e.g. age). This leads to the second limitation, a lack of subject diversity.

The selection of participants was limited to children who attend the same preschool within in the same community, speak English, of the same age, and have not been identified as having a speech, hearing or language disorder. While establishing a more homogeneous group was intentional to control for the influence of confounding variables, future research should expand the diversity of the sample to include a broader spectrum of SES, ethnicities, disability categories and regions of the country.

Future Research

With the limited pool of authoritative research in early childhood in the area of Contemporary Play, further research on the contexts that influence young children's play behaviors should be ongoing and is essential. First, as aforementioned, future research of the present study consisting of an expanded sample is recommended.

Secondly, upon reflection, the data collected from the present study offer an opportunity for further analysis in the area of language function. According to Halliday (1973), preschool children tend to use language in one distinct function at a time. These seven functions are categorized as: instrumental, regulatory, interactional, personal, heuristic, imaginative and informative. A study conducted by Feng & Benson (2009) investigated the language patterns of children in the computer environment and reported the function of regulatory language as the most frequently used language function in the computer environment; followed by *heuristic* and *informative* functions. The present study produced discourse analysis transcripts and videos offering sufficient data to conduct analyses of language patterns relevant to the function of the children's language in both contexts of constructive play building with concrete materials and while building on an iPad®. Further, analyzing these data by categorizing the function of the children's language would result in identifying language patterns in each play context. This is an opportunity to investigate the function of language and identify potential similarities or differences across different contexts within the environment.

Next, it has been established that interactions with others is a context which influences play behaviors. The present study focused on child-child discourse during play situations with the manipulated variable being *materials*. However, there is great evidence surrounding the pivotal role of adult-child discourse in preschool (Vygotsky, 1962) as it fosters language and conceptual development and is later related to school age reading comprehension scores, (Dickinson & Porche, 2001). Therefore, research in the area of contemporary play behaviors to include adult-child discourse analysis within technology contexts is recommended.

In order to acquire reliable language samples the methodology of the present study required children to play in a space away from the classroom (e.g. the library) so the language was audible. However, by doing so, it created a controlled situation. In consideration how the *environment* is a context influencing play behaviors, the children's language could look quite different in a contextually rich environment such as a typical preschool classroom. Therefore, it is recommended that future research might take place within the confines of the participant's natural environment. Examples include an embedded site within a typical preschool classroom or at the home environment of the participants.

With the increased use of technology (e.g., an iPad®) within ECE environments, further opportunities for research are recommended to compare the discourse of preschool children while using other variations of applications on an iPad® as compared to play while using traditional materials. Along with considering further investigation of children's discourse (e.g., language), examples of other important domains within child development worthy of investigation could be expanded to include areas such as children's social interaction or cognitive development within the two play contexts.

Lastly, further research is needed to better understand how young children use and learn from technology and to assess the short-term and long term effects of technology play. As an example, the amount of time (e.g. screen time) is an environmental context that may influence play behaviors. Thus examining the relationship between exposure and language output during technology play is an area warranting further research.

Summary

This study highlighted the vital role of play in early childhood and how it impacts child development in all domains. The concept *Contemporary Play* was introduced and defined as the current conditions of a society or culture in respect to *environment, people* and *materials* influencing children's play behaviors. Within this conceptual framework of contexts influencing play behaviors, discourse and language with other *people* has been established to be a critical element facilitating social, emotional, cognitive and physical development in early childhood. However, children's experiences with technology and interactive media (e.g. iPad®) are increasingly a part of the context of their lives and must be a part of the developmentally appropriate framework to make informed decisions regarding best practice in early childhood education. Therefore, it was logical to investigate *Contemporary Play* behaviors to ascertain if the *materials* influenced a difference in discourse among preschool children's discourse while engaged in constructive play experiences with concrete materials (traditional building blocks) as compared to building with technology using 2-dimensional virtual blocks (iPad®). This was accounted for by measuring the length and complexity (MLU) and productivity (MTL) of the children's language in both play conditions.

The results provided evidence that the children's language was statistically significantly different with the language being longer and more complex while engaged in play experiences with the traditional building blocks as compared to the play experiences on the iPad®. Although there was not a significant difference accounting for (MTL) productivity, further analysis offered evidence indicating a statistically significant difference in the number of different words (NDW) spoken, with greater diversity in

vocabulary occurring during play experiences with the traditional building blocks as compared to the play experiences on the iPad®. Further, the data as reported by parents prompted discussion regarding an environmental issue surrounding the variance in *materials* and amount of time preschoolers are consumers of particular *materials* (e.g. iPad®) while highlighting that technology is culturally relevant to today's young children. These findings underscore the important role of adults in (a) monitoring the amount of time and type of materials children use during play and (b) ensuring children are engaged with materials that facilitate social interaction and are (c) implementing best practice in early childhood education.

In final, the conceptual framework introduced in this study highlights the contexts influencing play behaviors to include: *environment, people* and *materials*. It is within and across these contexts that offer a wide range of variables resulting in differing play behaviors among young children. Adults can use this model as reference points to make informed decisions as they continually observe, monitor, and assess young children's *contemporary play* behaviors.

References

Armbruster, B.B., Lehr, F., Osborn, J., & Adler, C.R. (2001). *Put reading first: The research building blocks for teaching children to read, kindergarten through grade 3.* Washington, DC: National Institute for Literacy, U.S. Department of Education.

Ballard, K., Robin, D. McCabe, P., McDonald, J. (2010). A treatment for dysprosody in childhood apraxia of speech. *Journal of Speech Language and Hearing Research 53,* 1227-1245

Bandura, A. (1977) *Social learning theory*. Englewood Cliffs, NJ: Prentice Hall.

Barlow, D. & Hayes, S. (1979). Alternating treatment design: One strategy for comparing the effects of two treatments in a single subject. *Journal of Applied Behavior Analysis, 12,* 199-210

Barnett, W.S., Epstein, D.J., Carolan, M.E., Fitzgerald, J., Ackerman, D.J, & Friedman, A.H. (2010). *The state of the preschool 2010: State preschool yearbook (p. 5).* New Brunswick, NJ: National Institute for Early Education Research.

Bergen, D. (1977). Stages of play development, In D. Bergen (Ed.) *Play as a medium for learning and development* (pp. 30-47). Harvard University Press.

Berk, L., Mann, T., & Ogan, A. (2006). Make-believe play: Wellspring for development of self-regulation. In D. Singer, R. Golinkoff, & K. Hirsh-Pasek (Eds.), *Play=learning: How play motivates and enhances children's cognitive and social-emotional growth, (*pp. 74-100). Oxford, UK: Oxford University Press.

Bicais, J., & Correia, M. G. (2008). Peer-learning spaces: A sample English language learner's' tool kit for developing language and literacy. *Journal of Research in Childhood Education, 22*(4), 363-375. Retrieved from http://search.proquest.com/docview/203881278?accountid=26172

Birnbrauer, J. S., (1981). External validity and experimental investigation of individual behavior. *Analysis and Intervention in Developmental Disabilities, 1,* 117-132.

Bloom B. & Lahey, B. (1978). *Language development and language disorders.* (pp. 186-187). New York: Wiley.

Bretherton, I. (1985), The origins of attachment theory, developmental psychology (1992), *28*, 759-775

Bronfenbrenner, U. (1994). Ecological models of human development. *International Encyclopedia of Education, Vol. 3, 2nd Ed.* Oxford: Elsevier.

Christakis, D. A. & Zimmerman, F.J. (2009). Young children and media: Limitations of current knowledge and future directions for research. *American Behavioral Scientist,* April 2009 52: 1117-1185, DOI: 10.1117/0002764209331540

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd Ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.

Corsaro, W. & Eder, D. (1990). Children's peer cultures. *Annual Review of Sociology*. Vol. 16, 197-220.

Corsaro, W. A. (1994). Discussion, debate and friendship processes: peer discourse in U.S. and Italian nursery schools. *Sociology of Education, 67* (1), 1-26.

Corsaro, W. & Eder, D. (1990). Children's peer cultures. *Annual Review of Sociology, 16,* 197-220.

Couse, L.J., & Chen, D.W. (2010) A tablet computer for young children?: Exploring its viability for early childhood education. *Journal of Research on Technology in Education,* 43(1), 75–98.

Dickinson, D., & Porche, M. (2001) Relation between language experiences in preschool classrooms and children's kindergarten and fourth-grade language and reading abilities. *Child Development, 82* (3), 870-886.

Dickinson, D., McCabe, A., Anastasopoulous, L., Peisner-Feinberg, E., & Poe, M. D. (2003). The comprehensive language approach to early literacy: The interrelationships among vocabulary, phonological sensitivity, and print knowledge among preschool-aged children. *Journal of Educational Psychology, 95,* 465-481.

Dunn, M., Flax, J., Sliwinski, M., & Aram, D.M. (1996). The use of spontaneous language measures as criteria for identifying children with specific language impairment: An attempt to reconcile clinical and research incongruence. *Journal of Speech and Hearing Research, 39,* 643-654.

Erikson, E. (1950). *Childhood and Society*. (p. 75), W. W. Norton & Company.

Fasold, R. (1990). *Sociolinguistics of Language.* (pp. 132-133). Oxford: Blackwell.

Farver, J. (1992a). An analysis of young American and Mexican children's play dialogues. In C. Howes, O. Unger, & C. Matheson (Eds.), *The collaborative construction of pretend.* New York: SUNY Press.

Farver, J. (1992b). Communicating shared meaning in social pretend play. *Early Childhood Research Quarterly, 7,* 501-516.

Feng, S. & Benson, T. (2007). The language patterns of preschool children in the computer environment. *Journal of Research in Childhood Education, 24* (4), 341-3l1.

Forman, G., & Fyfe, B. (1998). Negotiated learning through design, documentation and discourse. In C. Edwards, L. Gandini, & G. Forman (Eds.), *The hundred languages of children: The Reggio Emilia approach — advanced reflections (2nd ed.,* pp. 239-260). Stamford, CT: Ablex Publishing Corporation

Fromberg, D.P. and Bergen, D. (2006), Introduction in, D.P. Fromberg and D. Bergen (Eds.) *Play from birth to twelve: Contexts, perspectives and meanings* (pp. 8-10). New York, Routledge.

Frost. J. L., S.C., Wortham S.C. & Reifel, S. (2008). *Play and child development.* Upper Saddle River, New Jersey: Prentice Hall.

Funk, J.B., Brouwer, J., Curtiss, K., & McBroom, E. (2009). Parents of preschoolers: Expert media recommendations and ratings knowledge, media-effects beliefs, and monitoring practices. *Pediatrics, 123* (3), 981-988.

Garvey, C. (1990). *Play.* (pp. 1-15). Cambridge, MA: Harvard University Press.

Gee, J.P. (2001). Reading as a situated language: A socio-cognitive perspective. *Journal of Adolecent & Adult Literacy, 44* (8), 714-725.

Giffin, H. (1984). The coordination of meaning in the creation of shared make-believe reality. In I. Bretherton (ed.), *Symbolic play* (pp. 73-100). New York: Academic Press.

Göncü, A. (1989). Models and features of pretense. *Developmental Review, 4,* 341-344.

Göncü, A. (1993). Development of intersubjectivity in the dyadic play of preschoolers, *Early Childhood Research Quarterly*, 8 (1), 99-116.

Göncü, A., & Kessel, F. (1984). Children's play: A contextual-functional prospective. In F. S. Kessel & A. Göncü (Eds.), *Analyzing children's play dialogues* (New Directions for Child Development, Vol. 25) San Francisco: Jossey-Bass.

Göncü, A., & Kessel, F. (1988). Preschoolers' collaborative construction in planning and maintaining imaginative play. *International Journal of Behavioral Development, 11,* 327-344.

Göncü, A., Patt, M. B, & Kouba, E. (2002). Understanding children's pretend play in context. In P. K. Smith & C. H. Hart (Eds.), *Blackwell heandbook of childhood social development (*pp. 418-437). Oxford, England: Blackwell.

Gordon, Lynn. 1986. *Maricopa morphology and syntax*. University of California Publications in Linguistics, (p. 108). Berkeley: University of California Press.

Gosnell, J., Costello, J., and Shane, H. (2011). Using a Clinical Approach To Answer "What Communication Apps Should we Use?", *Perspectives on Augmentative and Alternative Communication, 20* (3), 87-96.

Grisham-Brown, J., Hemmeter, M.L., & Pretti-Frontczak, K. (2005). *Blended practices for teaching young children in inclusive settings.* (pp. 108) Baltimore: Paul H. Brookes Publishing Co., Inc.

Halliday, M.A. (1973*). Explorations in the functions of language.* London: Edward Arnold.

Halliday, M.A. (1994). *Functional grammar (2nd ed.).* London: Edward Arnold.

Halliday, M.A. (2013). The place of dialogue in children's construction of meaning, In *Theoretical Models and Processes of Reading (6th ed.)* Alvermann, D.E., Unrau, N.J., and Ruddell, R.B. (Eds.), (p. 153), International Reading Association.

Heilmann, J., Miller, J., Iglesias, A., Fabiano-Smith, L., Nockerts, A., & Digney Andriacchi, K. (2008). Narrative transcription accuracy and reliability in two languages. *Topics in Language Disorders, 28* (2), 178-188.

Hirsh-Pasek, K. & Golinkoff, R. (1996). (Eds.) *The origins of grammar: Evidence of early language comprehension.* Cambridge, MA., MIT Press.

Hirsh-Pasek, K., & Golinkoff, R. M. (2003). *Einstein never used flash cards: How our children really learn and why they need to play more and memorize less.* New York: Rodale.

Hobbs, R. (2010). Digital and media literacy: A plan of action. Washington, DC: The Aspen Institute. Retrieved from http://www.knightcomm.org/wp-content/uploads/2010/12/Digital_and_Media_Literacy_A_Plan_of_Action.pdf

Holmes, R. & Geiger, C. (2002). The relationship between creativity and cognitive abilities in preschoolers. In J.L. Roopnarine (Vol. Ed.), *Conceptual, social-cognitive, and contextual issues in the fields of play* (pp. 127-148). Westport, CT: Ablex.

Horner, R., Carr, E., Halle, J., McGee, G., Odom, S., and Wolery, M. (2005). The use of single subject research to identify evidence based practice in special education, *Exceptional Children, 71* (2), 165-179.

Jensen, E. (2000). Moving with the brain in mind. *Educational Leadership*, 58 (3), 34-37.

Kaderavek, J. (2009). Evidence-based communication assessment and intervention, *3 (* 2) (pp. 83-86). Psychology Press: Taylor and Francis Group DOI: 10.1080/17489530903007524

Kaderavek, J. (2015). Language disorders in children: Fundamental concepts of assessment and intervention. (2nd Ed.), (p. 34), Upper Saddle River, N.J., Pearson Education Inc.

Klee, T. (1992). Developmental and diagnostic characteristics of quantitative measures of children's language production. *Topics in Language Disorders, 12* (2), 28-41.

Krippendorf, K. (2004) Reliability in content analysis: Some common misconceptions and recommendations. *Human Communication Research, 30*, 411-433.

Lane, K. L., Little, M. A., Redding-Rhodes, J. R., Phillips, A. & Welsh, M. T. (2007). Outcomes of teacher-led reading intervention for elementary students at-risk for behavioral disorders. *Exceptional Children, 74,* 47-70.

Lillard, A. (2002). Pretend play and cognitive development. In U. Goswami (Ed.), *Blackwell handbook of childhoood cognitive development* (pp. 206-226). Oxford, England: Blackwell.

Lim, E. M. (2012). Patterns of kindergarten child'en's social interaction with peers in the computer area. *International Journal of Computer-Supported Collaborative Learning*, *7*(3), 399.

McTear, M. (1985). Pragmatic disorders: a case study of conversational disability. *International Journal of Language & Communication Disorders (20)* 2, Blackwell Publishing Ltd. http://dx.doi.org/10.3109/13682828509012255

Miller, J. (1996). Progress in assessing, describing and defining child language disorder. In K. Cole, P. Dale, & D. Thal (Eds.), *Assessment of communication and language* (309-324). Baltimore, MD: Brookes.

National Governors Association Center for Best Practices, Council of Chief State School Officers Title: Common Core State Standards. Publisher: National Governors Association Center for Best Practices, Council of Chief State School Officers, Washington D.C. Copyright Date: 2010

Nelson, C.A. (2000). Neural plasticity and human development: The role of early experience in sculpting memory systems. *Developmental Science, 3*, 115-130.

Nippold, M. A., Hesketh, L. J., Duthie, J. K., & Mansfield, T. C. (2005). Conversational versus expository discourse: a study of syntactic development in children, adolescents, and adults. *Journal of Speech, Language and Hearing Research, 48*, 1048-1064.

Owen, A. & Leonard, L. (2001). Lexical diversity in the speech of normally developing and specific language impaired children. *Poster presented at the Symposium for Research in Child Language Disorders,* Madison, WI.

Parten, M., & Newhall, N. Social development of preschool children. In R. Barker, J. Kounin, and H. Wright (Eds.), Child behavior and development. New York: McGraw Hill, 1943.

Piaget, J. (1926). *The language and thought of the child*. London: Routledge & Kegan Paul.

Piaget, J. (1962). *Play, drama and imitation in childhood*. New York: Norton.

Reifel, S. (1984a). Symbolic representation at two ages: Block buildings of a story. *Discourse Processes,* 7, 11-20.

Rideout, V.J., Vandewater, E. A. & Wartella, E. A. (2005). Introduction: electronic media use in the lives of infants, toddlers, and preschoolers. *American Behavioral Scientist*. *48*, 501-504.

Rosen, D.B., & Jaruszewicz, C. (2009). Developmentally appropriate technology use and early childhood teacher education., *Journal of Early Childhood Teacher Education,* 30 (2), 162–71.

Sachs, J. (2001). *Communication intervention: birth to three* (2nd ed.), 39-61. New York: Allyn & Bacon.

Shiffrin, D., Tannen, D. & Hamilton, H., (Eds.) (2001). *The handbook of discourse analysis.* Malden, MA: Blackwell Publishers.

Shonkoff, J. P. Sameul, F., & Gingold, R. (2005). *The science of early childhood development: Closing the gap between what we know and what we do.* Colloquium presentation, November 30, Harvard University, Cambridge, MAUniversity Press.

Simon, F., Nemeth, K. & McManis, D. (2013). Technology in ECE Classrooms: Results from a New Survey and Implications for the Field. *Child Care Exchange.* Retrieved on October 29, 2013 from http://www.childcareexchange.com/catalog/product/technology-in-ece-classrooms/5021368/

Snow, C. E., & Dickinson, D. (1991). Skills that aren't basic in a new conception of literacy. In A.C. Purves & E. Jennings (Eds.), *Literate systems and individual*

lives: perspectives on literacy and school (pp. 172-192). Albany, NY: SUNY Press.

Stokes, K. (2011) Steve Job's education: How the entrepreneur's technology changed schools in state impact (A reporting project of local media and NPR). Retrieved on October, 6, 2011 from http://stateimpact.npr.org/indiana/2011/10/06/a-steve-jobs-education-how-the-entrepreneurs-technology-changed-schools/

Smilansky, S., & Shefatya, L. (1990). *Facilitating Play: A medium for promoting cognitive, socio-emotional, and academic development in young children.* Gaithersburg, M: Psychological and Educational Publications.

Watkins, R., Kelly, D., Harbers, H., & Hollis, W. (1995). Measuring children's lexical diversity: Differentiating typical and impaired language learners. *Journal of Hearing Research, 38*, 1349-1355.

Webster-Stratton and Reid, M.J, (2004). Strengthening social and emotional competence in young children – the foundation for early school readiness and success incredible years classroom social skills and problem solving curriculum. *Infants and Young Children*, *17 (*2), 96–113.

Worery, M., & Ezell, H. K. (1993). Subject descriptions and single subject research. *Journal of Learning Disabilities, 26,* 642-647.

Van Hoorne, J., Nourot, P., Scales, B., &Alward, K. (2003). *Play at the center of the curriculum* (3rd.ed). New York: Merrill.

Vygotsky, L. (1962). *Thought and language*. Cambridge, MA: MIT Press.

Vygotsky, L. (1978). *Mind in society: The development of psychological processes.* Cambridge, MA: Harvard University Press.

Appendix A

Recruitment Letter

Dear Parents of Little Maples Preschool,

My name is Christina Mirtes and I'm an Assistant Professor in the Teacher Education Department at Adrian College with expertise in Elementary and Early Childhood Education. I am fortunate to be a part of the partnership between Adrian College and Lincoln Elementary School supporting Little Maples Preschool. As a supervisor of Adrian College Associate Teachers, I visit the school on a weekly basis. Additionally, I am a Doctoral Candidate at The University of Toledo. As a part of my dissertation, I will be conducting a research project at Lincoln Elementary school focusing on how children interact in "traditional play" (e.g. playing with blocks) as compared to using an iPad® (using a block app). I have the materials required (iPads®, software and building blocks etc.).

I'd like to request that you grant permission for your child to participate in the study. For this short study, your child will be invited to a total of (4) building block play situations with a playmate in the classroom for approximately 10 minutes each. These play sessions will occur approximately once a week over a four week period and will be video recorded. If you'd like for your child to participate in the play interactions, please sign and return the enclosed Parent Permission for Child Participation in Research form and complete the Child Information Sheet; then place the forms in the envelope and return it to your child's teacher at Mini Maples by June 2, 2014.

If you would rather that your child not participate, do not sign the forms but please return the envelope to your child's teacher by June 2, 2014. Participation is purely voluntary and all information you share shall remain confidential.
If you allow your child to participate, this information will help educators understand more about how children interact during traditional and technology-based interactions. Please feel free to contact me if you have any questions or if you'd like more information about the study.

Very Much Appreciated,

Christina M. Mirtes Ph.D., ABD
Assistant Professor
Adrian College
Teacher Education Department
Valade Hall 209
110 S. Madison Street
Adrian, Michigan 49221
517.265.5161 x3951

Appendix B

Parental Permission for Child Participation in Research

PARENTAL PERMISSION FOR CHILD PARTICIPATION IN RESEARCH

Principal Investigator: Joan Kaderavek, Professor, The University of Toledo
Joan.Kaderavek@utoledo.edu
Primary Researcher: Christina Mirtes, Doctoral Candidate, The University of Toledo
cmirtes@adrian.edu 419.822.7947

Purpose: You child is invited to participate in my research project on Contemporary Play: The use of Technology in Play which is being conducted at the YMCA's Mini Maples Preschool at Lincoln Elementary in collaboration with the Institute for Education at Adrian College. The purpose of this study is to investigate contemporary play behaviors among preschool children in order to gain a better understanding of how children's play behaviors may differ while engaged in play situations using technology compared to play situations using traditional play materials.

Description of Procedures: This research will take place within your child's natural learning environment at Lincoln Elementary. First, during free play time, your child and a classmate will be invited to a 10 minute play session. There will be a total of 4 sessions, no more than 2 sessions per week. The materials during each play session will alternate - either playing with a block building application on an iPad® called Build with Block or playing with traditional Lakeshore® tabletop building blocks.
During that time, audio and video recordings will take place so data regarding the language which occurred between the children can be collected and transcribed and analyzed. Depending on the analysis and report, the information may be used to inform practice in Early Childhood Education via a conference presentation, scholarly article publication or for future research purposes. In this case, participant names will always remain anonymous.

- Permission to record: Will you permit the researcher to audio and video record images during this research procedure? Images may or may not be used for future publication purposes.

YES ☐ _____ Here NO ☐ Initial Here _____ Initial

Potential Risks: There are minimal risks for your child's participation in this study. This study is follows standards for conducting research with young children. Additionally, it has received support and authorization from the faculty and staff at YMCA's Mini Maples Preschool as well as approval from the Institutional Review Board at Adrian College.

Potential Benefits: Your child will be able to play with a classmate using developmentally appropriate materials and technology. Additionally, the information may be a useful to inform practice in Early Childhood Education via a conference presentation, scholarly article publication or for future research purposes.

Confidentiality: The consent forms with signatures will be kept separate from field notes and interview transcripts, which will not include real names.

Voluntary Participation: I hope you will participate in this research only if you truly feel comfortable with it and want to do it. If you have any misgivings, please do not feel you must participate. If your child does not wish to participate, he or she may decline at that time. Your decision not to participate in this study will not affect our relationship, your relationship with the YMCA, Mini Maples Preschool or Adrian College. Please remember that in addition, you may discontinue participation at any time without any penalty or loss of benefits.

Contact Information: If you have any questions at any time before, during or after your participation feel free to contact me, Christina Mirtes at (419) 822-7947, cmirtes@adrian.edu or (517) 265-5161 ext. 3951.

Before you sign this form, please ask any questions on any aspect of this study that is unclear to you.

SIGNATURE SECTION – Please read carefully

You are making a decision whether or not to participate in this research study. Your signature indicates that you have read the information provided above, you have had all your questions answered; agree to complete and return the Child Information Sheet and you have decided to take part in this research.

Name of Subject (please print)	Parent/ Guardian Signature	Date

Christina Mirtes, PhD, ABD		
Name of Person Obtaining Consent	Signature	Date

Please return both of these signed forms in the envelope provided to your child's teacher by Monday, June 2, 2014.

Appendix C

Child Information Sheet

Child's Name:
Parent Name (s): _____
Child's Date of Birth: **Gender:**_____**Male** _____**Female**
Complete Home Address:

_____

Phone Number:_____**Email Address** _____
Ethnicity/Race:_____**Caucasian** _____**Hispanic**_____**African American**
_____**American Indian** ___**Asian** ___**Multi-Racial**
_____**Other** _____

Child's Native Language(s):
Parent's Native Language: (if different from child's)

_____

Other Languages spoken in the home: _____

Mother's Educational Level
___**Did not graduate from High School**
___**High School Diploma**
___**Some College**
___**College Graduate**
___**Graduate School**
___**Other**

Father's Educational Level
___**Did not graduate from High School**
___**High School Diploma**
___**Some College**
___**College Graduate**
___**Graduate School**
___**Other**

Mother's Occupation:
_____

Father's Occupation:
_____

Siblings living with the child:

Name:	Age:	Gender:	Relationship to child:
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

1. **Does your child play on a computer or laptop at home? YES or NO**

2. **If yes, on average, how many hours does your child use the computer or laptop outside of school per week? _____**

3. **Does your child play with a handheld device (i.e. iPod, iPad) at home? YES or NO**

4. **If yes, on average, how many hours does your child use a handheld device outside of school per week? _____**

5. **Outside of school, does your child play with blocks (i.e. wooden or plastic blocks, Legos)? YES or NO**

6. **If yes, on average, how many hours would you say your child builds with blocks outside of school per week? _____**

7. **Outside of school, what are the top 3 play activities your child engages in most frequently?**

   First: _____
   Second: _____
   Third: _____

8. **If your child could choose any play activity at home, what would he or she choose to do?**

Thank you for taking the time to share this information. Please return this, along with your signed Parental Permission for Participation in Research, in the provided envelope to your child's teacher by: Monday, June 2, 2014.

Appendix D

Research Participation Schedule

Pair 1

Pair 2

	A	B	A	B
Child 1				
Child 2				
Child 3				
Child 4				

Pair 3

Pair 4

	B	A	B	A
Child 5				
Child 6				
Child 7				
Child 8				

Appendix E

Overview of SALT Transcription Process

SALT Software streamlines the language sample analysis process. It is a tool to help you manage data for transcription and analysis. Steps to process data include the following: sample elicitation, transcription, analysis, and interpretation.

Step 1: Elicit and record a language sample. Although SALT will analyze any language sample, elicitation protocols are provided.

Step 2: Use the SALT editor to transcribe the recorded sample. Type what was said, verbatim, including language such as filled pauses, repetitions, revisions, and errors using a simple set of SALT transcription conventions.

Step 3: Generate the analysis. The Database menu can also compare your sample to samples collected from typical speakers. The Standard Measures report provides data on MLU, number of different words, speaking rate, verbal fluency, omissions, errors, and more. This report shows a profile of the targeted speaker's strengths and weaknesses. Depending on the results of this report you may choose to run more detailed reports on specific areas of concern.

The Analyze menu contains many reports which provide details on language targets. Use it to generate measures when there is no database for comparison. And, use it to hone in on areas of concern perhaps highlighted by the database reports or based on clinical judgment or other performance measures.

Step 4: The last step in the process is interpreting the results and requires your clinical skills to pull together the information from the SALT reports. Following these four steps provides access to language sample analysis.

Appendix F

SALT Analysis Set Word and Morpheme Summary

Data Yellow Al
Analysis Set: C&I Verbal Utts

WORD AND MORPHEME SUMMARY

	5		6	
	Analysis Set	Total Utterances	Analysis Set	Total Utterances
MLU in Words	4.39	4.60	4.85	4.89
MLU in Morphemes	4.98	5.18	5.44	5.44
Brown's Stage	Post V	Post V	Post V	Post V
Expected Age Range	41 mos.	41 mos.	41 mos.	41 mos.
Number Different	94	101	103	115
Number Total Words	193	207	286	347
Type Token Ratio	0.49	0.49	0.36	0.33
50 Utterances				
Number Different			92	95
Number Total			247	251
Type Token Ratio			0.37	0.38
Number of Bound	26	26	35	39
Number of Maze Words	2	2	9	10
Number of Omitted	0	0	2	3
Number Omitted	1	1	0	0

NUMBER OF UTTERANCES BY UTTERANCE LENGTH
C&I Verbal Utts

Utterance Length in Words

	0	1		4	5	6	7	8	9	10	11	12	13	14	15+
5	0	8		4	5	7	2	3	1	0	0	0	1	1	0
6	0	12		4	5	8	14	4	0	2	1	0	0	0	0

Utterance Length in Morphemes

	1		4	5	6	7	8	9	10	11	12	13	14	15+
5	7		3	3	6	3	3	3	1	1	0	0	2	0
6	12		3	3	4	13	7	5	2	1	1	0	0	0

NUMBER OF UTTERANCES BY UTTERANCE LENGTH Total Utterances														
Utterance Length in Words														
	1		4	5	6	7	8	9	10	11	12	13	14	15+
5	8		4	5	7	2	3	1	0	0	0	1	2	0
6	15		4	6	9	15	5	0	2	1	0	0	0	1
Utterance Length in Morphemes														
	1		4	5	6	7	8	9	10	11	12	13	14	15+
5	7		3	3	6	3	3	3	1	1	0	0	3	0
6	15		3	4	5	13	9	5	2	1	1	0	0	1

Appendix G

SALT Analysis Discourse Summary

Data Yellow Al					
DISCOURSE SUMMARY					
	5			6	
	Number	percent		Number	Percent
TOTAL UTTERANCES	45			71	
Responses to	2	4.44		6	8.45
Requests for	1			0	
Yes/No Responses	0			3	
Other Responses	1			3	
Responses to	0	---		0	---
Imitations	0	---		0	---
Spontaneous	43	95.56		65	91.55
Statements (.)	34			42	
Exclamations (!)	3			8	
Questions (?)	6			9	
Abandoned	0			4	
Interrupted Utterances (")	0			2	
ANALYSIS SET (C&I	44			59	
Responses to	2	4.55		4	6.78
Requests for	1			0	
Yes/No Responses	0			3	
Other Responses	1			1	
Responses to	0	---		0	---
Imitations	0	---		0	---
Spontaneous	42	95.45		55	93.22
Statements (.)	33			38	
Exclamations (!)	3			8	
Questions (?)	6			9	
Responses to Questions					
Other Speaker	9			7	
Responses to	2			6	
% Responses to Questions	22.22%			85.71%	
TURN LENGTH					
Mean Turn Length	1.61			2.63	
Median Turn Length	1.00			2.00	

Mean Turn Length	7.39			12.85	
Median Turn Length (words)	5.50			10.00	
OTHER					
Total Completed	209			354	
Words Mentioned	68	32.54		94	26.55
Utts. with	7	15.56		6	8.45
Interrupted Other	2	4.44		0	---

Appendix H

SALT Transcription Analysis Example – Phase A - Blocks

(Yellow A1)

$ 5, 6
+ Language: English
+ ParticipantId: Mirtes Yellow 2A
+ Gender: Female
+ DOB: 07/23/1970
+ DOE: 6/5/2014
+ Grade: P
+ Context: Con
+ Subgroup: Play
+ Examiner: CM
+ Transcriber: JG
+ [EW]: error at word level
+ [EU]: error at utterance level
+ [EO]: error overgeneralization

-0:22
6 Look what I/'m make/ing.
5 Oh.
6 (Uh) well hey, XX^
5 Look what I/'m make/ing.
6 Aw man, what if there was more of these block/s?
; :10
= Blocks rustling around.
6 What if there/'s[EW:there_are] more of these block/s?
; :06
6 Man, O_name, can I have one of your round shape/s X look like a bridge because I/'m make/ing something really cool.
5 I/'m do/ing it too!
: :03
6 (Uh) I don't got[EW:have] much to build with.
6 Now I/'m make/ing it as a square.
5 If they climb and go up here X on the bridge so right there.
; :05
5 I need one of those, %er!
6 I need one of those, too %er!
; :07
6 Crap, I don't have enough.
; :03
6 O_name, I don't have enough.
; :05

6 Can I take some of your/s?
6 Because I only need one more to put.
5 {Sighs} (I/'m the) I/'m the only one use/ing them.
6 O_name, I need (a) one more round piece.
5 Well, my tower/'s gonna be long.
5 See, I win because I did it first.
: :02
6 O_name, I/'m not do/ing a race.
6 But can I have (the) a round piece?
6 Because I/'m try/ing to finish this tower.
5 Well, my tower is all done.
5 So you did/n't even win.
5 I did.
6 But I/'m (no*) not race/ing.
6 (I/'m) I/'m just not race/ing over here.
: :04
5 Today/'s my great and lucky day.
: :09
6 Well, I have a XX.
6 %Wah fire, ouch!
6 O_name, :02 for one second I need to get^
5 A_name, if you put one foot out you/'ll get a little bit tall.
5 But, if you don't, you/'ll get very tall.
5 I don't stand in[EW:on] chair/*s.
5 <A_name>, these are all mine.
6 (<But>) but I need one of those because that/'s all I have.
6 This is all I have.
5 Well, I/'m take/ing all of them.
6 {Sighs} O_name, this won't>
6 Share some of these block/s with me.
: :02
5 Hmm, hmm.
: :05
6 I need a longer piece than that.
5 Hmm.
: :06
6 Wait a second.
6 O_name, you can take some of these block/s.
5 <Thanks>.
6 <XXX>.
6 Wait.
6 Can I have that one piece of a block again?
5 This cylinder?
6 No.
5 Which one?
6 <This X>.

5 <You want this block>?
5 <It/'s a cube>.
6 <XXX>.
6 No.
6 The straight one that is red.
6 It is one *of these.
5 <One> of those?
6 <One>>
6 Yeah.
6 One of these.
5 You want/ed one that/'s long and red.
5 OK.
6 Yeah.
6 (Tha*) I need that one.
5 And I need this one to complete my tower.
6 What?
6 What?
5 {Gasps} I don't know.
5 Something/'s been on our tower for long year/s.
: :04
6 Now, I need to be careful for this.
5 Yeah.
5 And I need a cube to go here to hold a triangle on top.
; :02
5 OK, A_name.
5 Is your tower done yet?
6 No.
6 I have to fix it a little.
5 Mine too.
6 And done!
6 No.
6 You cannot *let any block/s tip over.
5 Yeah.
6 %Arr!
6 What?
6 This is horrible!
; :02
6 I don't know why this is happen/ing.
6 Now I/'m done.
6 I/'m done with my tower, O_name.
5 I/'m done with my tower, too.
5 I use/ed lot/s and lot/s of block/s.
6 I have to add one more block.
6 And then I/'ll be done.
5 Whoa, my tower!
6 My tower is get/ing a little tall, too.

6 Because I X more block/s to it.
5 I have more block/s, too.
6 I/'m get/ing more block/s to be mine.
5 OK, A_name.
5 My tower is done.
5 Is your/z?
6 No.
6 I/'m (s*) %arr!
6 Stupid block/s!
; :04
6 These block/s are just so annoying.
; :08
6 {Whispers} and I need one *of these and>
; :05
6 Mine/'s gonna be done in (a) <> a minute.
5 <%Aww>.
6 %Aah :03 my tower explode/ed a little!
6 <Now I have>>
5 <Explode/ed>?
: :05
6 Explode/ed mine, because mine explode/ed.
6 So, guess what?
-8:05

Appendix I

SALT Transcription Analysis Example – Phase B - Ipad®

(Yellow B1)

$ 5, 6
+ Language: English
+ ParticipantId: Yellow 3B
+ Gender: F
+ DOB: 07/23/1970
+ DOE: 06/10/2014
+ Grade: P
+ Context: Con
+ Subgroup: Play
+ Examiner: CM
+ Transcriber: JG
+ [EW]: error at word level
+ [EU]: error at utterance level
+ [EO]: error overgeneralization

-0:04
5 (M*) A_name, (do you want mine to be the same as y*) do you want to make your building to be the same as mine?
6 My building/'s gonna be>
5 Look at my building!
5 I/'ll put a cube *on.
: :03
6 I got[EW:have] a cube.
: :04
5 Is it like this?
: :03
6 *I/'m try/ing to make mine>
5 A_name, do you want to build the same as me?
6 Yeah.
6 I/'m try/ing.
5 <Yeah>.
6 <But X>>
5 This is it.
6 OK.
5 And (now you get some ed* now you get another blue c*) now you get another cube and put it on sideways.
6 I put it X.
6 Now I got another cube shape.
5 Sideways?
6 What are you do/ing?

5 Sideways?
: :04
6 I/'m do/ing the whole crash X them.
5 A_name, A_name watch this.
: :06
6 Watch this, O_name.
5 A_name (<wa*>)^
6 <%Doo>.
5 Watch what <mine can do>.
6 <%Doo>.
6 I can make it <hit the top>.
5 <Watch mine>.
6 Watch mine %pff!
6 %Wff %wtoo %shh.
6 I can make mine fly right into the trash can.
5 {Laughs} mine too.
6 My plane *went right to the trash can.
6 Hey, do you want me to move that one into the trash can.
5 Oops.
: :04
6 But one time I flew two into the trash can.
6 And I had one more.
6 So I put *it right there.
6 So that/'s easy.
6 Now what?
5 A_name, now get all of these.
: :05
6 I stack/ed all (of) that <I had>.
5 <Now get a> blue (s*) rectangular prism.
5 Then get another one.
: :05
6 You have to move it first.
5 Huh, lookit.
5 <{Laughs}>.
6 <{%Ngg}>.
5 {Laughs}.
6 <XXX>.
5 (<Now>) now get *a triangle.
6 We can/'t.
6 We have to move it.
: :05
6 What are you do/ing with that?
5 You just move it round around around_around_around into a circle.
; :04
5 Now get a triangle.
6 I got a triangle.

; :03
6 O_name, you need to move it first when you make it lower to do that.
; :04
6 Because these are alot bigger.
6 We had to do that in order to do that.
: :09
5 A_name, look.
5 I/'m add/ing some more.
6 What are you do/ing?
6 I gotta keep up with you.
; :04
6 I need to keep up with you, O_name.
; :19
6 I/'m stack/ing it in a long line.
5 Yeah.
5 It/'s very long!
; :03
5 A_name, look.
5 It/'s gonna be very long.
: :08
6 Look how long mine is.
5 Wow!
6 <{Laughs}>.
5 <Your/z> is as long as mine.
5 I/'m gonna get some more>
6 Mine is (r*) really long!
5 Mine/'s gonna be pretty long.
; :03
5 See?
6 Now you need to put it more like I did.
5 I/'ll get more triangle/s.
6 Yeah.
6 But just do this.
; :02
6 (W*) X one, get more.
6 I/'ll do a trick.
; :04
6 Throw throw_throw_throw_throw, see?
6 It/'s a trick.
5 I know.
6 It/'s a really good trick %mm.
5 A_name, throw throw_throw.
: :17
6 (D*) I stack/ed *a chair on top just like you did.
5 Now, get one more.
5 And then put it on top.

6 (And what) and what about do/*ing all that?
5 Yay!
5 That would be fun!
6 <Yeah>.
5 <A_name>, let's try to press the menu button and see what happen/3s.
6 Yeah!
6 XXX.
5 It disappear/3s!
6 Now do yours.
5 Whoa :02 {gasps} mine <XX>.
6 <No let's> build a new tower.
6 I maked|make[EO:made] my tower X.
5 Great idea!
; :05
5 A_name, :02 let's make Rapunzel/z tower.
5 Her tower is like this long.
; :06
5 This is like Rapunzel/z tower.
5 See?
5 Do the same as me.
; :02
5 It only has 1, 2, 3 of them.
: :06
6 Is that as high as it go/3s?
5 Yeah.
5 Then it has a triangle on>
6 And now what?
6 Throw it all away?
5 Oh yeah.
5 Wow, A_name!
6 I found my one.
6 Don't throw it away!
5 A_name, let's see what happen/3s if you throw it away.
6 Yeah.
6 But watch this.
5 Watch me.
-7:48