A case study on how preschool children play: comparing parental beliefs and preschoolers' home technology use

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A Case Study on How Preschool Children Play: Comparing Parental Beliefs and Preschoolers’ Home Technology Use

by

Lori M. DeShetler

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

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Technology is being used around the globe by people of all ages. Digital products are marketed for the use of children as young as infants. Research reveals that children are engaging with media. What makes this problematic is the lack of evidence to support how technology affects young children. Guidelines do not exist for the types of media and how much media should be used by young children. Some researchers suggest technology use is harmful to children while others claim that it is beneficial to social and cognitive development. Studies have predominantly focused on school-age children, but we must consider how preschoolers are engaging with technology and how this impacts the skillset they arrive with at school.

This study was conducted in the Midwest among urban and suburban settings and aimed to understand how preschool children play, how much time is spent on traditional forms of play versus digital devices, if they engage in more than one activity at a time, and parental perceptions about their child’s technology use. Data were collected from n=33 surveys and n=6 parent interviews. Results of the study showed that preschool children are playing with technology as much as traditional forms of play and they do not engage in more than one activity while using media except for eating. Throughout the
data, parents described a need for balance between technology and traditional play. A distinct role of technology emerged as parents discussed its educational benefits and the entertainment value for their child. There are implications for future research on understanding preschoolers’ technology use and how kindergarten teachers may better meet the needs of their digitally savvy students.
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List of Abbreviations

AAC .......................... Augmentative and Alternative Communication
AT ........................... Assistive Technology
GED .......................... General Educational Development
NAEYC ....................... National Association for the Education of Young Children
Chapter One

Introduction

Statement of the Problem

The same technological devices that adults operate on a regular basis have infiltrated the lives of preschool children. Companies market digital products specifically designed for preschoolers. Some packages tout educational benefits in attempt to persuade parents who are interested in providing experiences for their children that will help place them ahead of their peers. The great academic race in the United States has spawned a slew of technology-based products geared toward even earlier stages of childhood such as infancy. However, the effects of technology use at a young age are unknown (Hofferth, 2010). There is research available on the use of media by school age children, but few studies examine the technology brought into play by preschoolers.

Theoretical Framework

As children’s play has diverged into something that now encompasses technology and the latest gadgets, the context in which children play should be reevaluated. Drawing from the philosophy of Developmentally Appropriate Practice, it is important to consider how children’s experiences have changed and how current methods of play impact their learning. Piagetian theory and Vygotsky’s social constructive views help us to understand the dynamics of play and how it affects children’s acquisition of knowledge. According to Vygotsky, “play leads development, that social engagement and collaboration with others is the powerful force that transforms children’s thinking” (Gestwicki, 2013, p. 44).

Play comes in many shapes and sizes with a myriad of definitions, but can be thought of as intrinsically motivated, spontaneous, actively engaging, and process-
oriented. Piaget’s cognitive theory of intellectual development identifies play as symbolic, functional, and games with rules, and both Piaget and Vygotsky refer to play as “the vehicle for children’s construction of knowledge” (Gestwicki, 2013, p. 37). As such, play has tremendous influence over children’s thought processes and development of concepts. Therefore, attention must be given to the role of play as it evolves.

This study focuses on how children engage in various forms of play and the amount of time devoted to those activities. Developmentally Appropriate Practice can be used as a marker to create modern educational goals for the early primary level by identifying the forms of play in which preschool children engage. The information gathered from this research should be examined to construct opportunities for learning that include appropriate integration of non-technology play, outdoor play, and technology interaction to best match the children’s interests.

Purpose of the Study

The purpose of this study is to understand how much of preschool children’s play is infused with technology and to learn the role of technology. Specifically, this study will identify the media that three to five year-olds employ, the amount of time spent, and if any other activities are engaged in during media play. A related interest of the project is to understand parent and guardian perceptions of their children’s use of technology. Survey and interview questions will help illustrate their beliefs on any possible connections between preschool children’s technology skills and educational preparedness.

Research Questions
The focus of this study is as follows: 1) What activities do preschool children partake in during a typical weekday and on a typical weekend day? 2) How often do preschoolers engage in technology use, non-technology play, and outdoor play? 3) Do preschool children engage in other activities while using technology? 4) What do parents believe about technology use for their preschool child?

**Research Assumptions**

Questionnaires were provided in paper format and the researcher assumed that parents of preschool children at the participating sites have the ability to read and write. It is assumed that the children have some access to technology. The researcher created a diary for parents to enter their child’s activities between the hours of 7:00 a.m. and 9:00 p.m. on two self-selected days. It is assumed that most preschool children do not wake up and begin to play until 7:00 a.m. and that most disengage in play and go to bed by 9:00 p.m. It is assumed that parents are able to appropriately classify their child’s activities into one of the following four categories: technology, non-technology, outdoor, or non-play related. The researcher also assumed that parents are able to accurately record the duration of each activity.

**Rationale for the Research Design**

A mixed methods approach of quantitative and qualitative methodology was chosen for this project. It was important to understand the context of the home environments and family makeup of the subjects in this study. Therefore, parents were asked to respond to demographic questions including their child’s gender, race, ethnicity, family structure with respect to number of parents and siblings, family income, and maternal and paternal education, occupation, and employment status. Qualitative
questions were asked to illuminate how the children play and if and how they use technology. Specific to media, parents were asked how its use is monitored, why it may or may not be limited, why it may or may not benefit the child, and if and how technology impacts school readiness.

At the end of the questionnaire, in lieu of direct researcher observation, parents were asked to document the activities that their child engages in on a typical weekday and on one weekend day in a table-formatted diary. These activities were compared against parent responses and demographic information at the beginning of the survey. The two forms of data collection, survey questions and diary, were chosen to better understand parental perceptions of technology use versus actual implementation, and these responses helped the researcher to triangulate the data. It is also important to allow the parent to identify typical activities through responses that may not be presented in the diary due to an atypical day despite the request to document typical behavior.

In addition to the survey questions and diary, an interview component was implemented to increase the scope of the qualitative data. Questions were derived from results of the questionnaire. The researcher examined patterns that emerged and areas of further interest to construct the questions. These nine questions were asked in individual interview sessions with six different parents.

**Participants in the Study**

Consent was first obtained from Human Subjects to conduct the research study. Following Human Subject approval, initial contact was made with the head of each preschool to obtain permission to conduct the study at their site(s). Preschool directors assisted with the project by sending consent forms and questionnaires home with parents.
of three to five year-olds at the center. Data were collected during the fall of 2012 and fall of 2013 through spring of 2014. A total of n=33 surveys and n=6 interviews were voluntarily completed and all data were included in this study. The parents who completed the survey had a child who was enrolled at one of the six different preschools that participated in the study. These preschools are comprised of children of different age, gender, race, ethnicity, family structure, etc. The parents’ level of education and professions were also diverse. Participants who completed the interview were obtained through a convenience sample. Although they had a child between the ages of 3 and 5, they were not enrolled at one of the six participating preschools.

**Context of the Study**

The research was conducted in the Midwest United States among preschool sites located in urban and suburban settings. Sites were diverse in the range of socioeconomic backgrounds they served as well as the location and type of facility. All of the chosen preschools had at least one other site within a 40 mile radius. Each participating site enrolled children from infancy through at least age 5, while three of the centers also offered programs for school age children.

**Significance of the Study**

This study aims to understand how preschool children of today play and how much of their time is allocated to technological devices. This information will show parents how children spend time playing and with which modes of activity: technology, non-technology, or outdoor play. Data will help educators to understand play preferences and the forms of technology that preschool children are familiar with, signifying possible skills that these children bring to the kindergarten classroom. The researcher will utilize
results to suggest how experiences and instruction may be modified to create appropriate learning goals and meet the needs of all children.
Chapter Two

Literature Review

History of Play

Play is referred to as an act that imitates life experiences and serves as an educational tool (Frost, Wortham, & Reifel, 2008). Many believe that play is a necessary component of healthy child development. Researchers indicate that play is closely related to “emotions, motivation, cognition, socialization, culture, and learning” (Frost et al., 2008, p. 3). It is a complex activity that can be organized or unstructured, rationalized or flow naturally to an individual. One of the greatest difficulties in understanding the history behind play is due to a “lack of documentation of what people actually did when they played in ancient times” (Frost et al., 2008, p. 5).

In ancient Greek times, play was a discussion point for Plato, Socrates, and Aristotle. These philosophers examined the role of play in the human world and made connections with respect to religion. However, the ancient Greeks failed to acknowledge the importance of how children played. In fact, “play actions of children outside of ritual activities were not recorded” (Frost et al., 2008, p. 8), so little is known about the range of children’s activities during these times. Throughout the Enlightenment and Romantic Eras, this trend repeated as other philosophers failed to pay attention to the actual activities in which children engaged. Despite this, the significance of children’s play was called to attention when researchers finally recognized it for its potential to boost the spirit and well-being.

The understanding of play continued to evolve into the Modern Era. It was at this transitional time when the emphasis shifted away from a spiritual and religious aspect
and resurfaced with a fresh perspective (Frost et al., 2008). The context of play in the Modern Era highlighted child development and encompassed educational benefit. Researchers for the first time focused on examination of how children played. Today, we understand that play is shaped by culture and can be described as a “set of naturally occurring actions that are connected with the larger society in which they occur” (Frost et al., 2008, p. 203). Play takes place both indoors and outdoors, and there is a difference in the type of activities between these categories. Over time, outdoor play environments have morphed from naturally occurring spaces such as wooded areas and streams to include outdoor settings like courts and playgrounds with equipment built especially for children (Frost et al., 2008). These outdoor designs were a direct reflection of culture and political influence throughout the 19\textsuperscript{th} and 20\textsuperscript{th} centuries.

The preschool age is considered to be the time when children play the most and develop their motor skills. At this stage, children engage in imaginative and dramatic play. Common gross-motor movements are running, jumping, climbing, and hopping, while popular fine-motor activities include cutting, painting, blocks, and puzzles (Frost et al., 2008). Since the late 20\textsuperscript{th} century and the beginning of the 21\textsuperscript{st} century, new forms of tools used for play have emerged. According to Frost et al. (2008), “over the past 50 years, the transformation of toys has included more technology and they are mass produced with unlimited variety” (p. 158). There is great concern over the amount of time that children spend with electronic devices. And with the rapid pace of technological advances, it is uncertain how electronic media may impact children’s health and development. Researchers are also unaware of the type of technology in which preschool children engage and the frequency of these interactions.
Play Versus Technology

Although technology is prominent in the lives of children, traditional forms of play are still recognized by researchers and parents alike as an important component of development. Play is essential for children’s learning and is necessary in school (Frost et al., 2008). “Play also helps children develop imagination and creativity, which are key building blocks for future cognitive and emotional development and academic success” (Lieberman, Fisk, & Biely, 2009, p. 304). Naturally, children engage in play-based activities at home. Yelland (2011) recommends that parents connect with their children at home during play to “ask questions, share ideas and extend the potential of the activity” (p. 6). There are numerous opportunities to extend play into the school environment. Teachers should engage students in lessons that include exploration, creativity, and stimulate the imagination.

Researchers suggest that children engage in authentic play with tangible objects of the real world (Yelland, 2011). Despite this recommendation, standardized testing in schools has driven a shift to prescriptive curriculum that minimizes these contextualized experiences. Another force that reduces opportunity for authentic play is the digital world where children play via a screen. One may argue that technology has the ability to produce lifelike images and exposure to a barrage of topics, but children are limited to two-dimensional representations that lack capacity for multisensory contact. Yelland (2011) indicates that children are spending approximately two hours of screen time per day. In comparison, Jordan conducted a similar study and found that participants reported three hours of television watching per day by children (as cited by Wartella, Vandewater, & Rideout, 2005). It is unclear whether the difference in the amount of screen time in
these two studies is a result of the type of screen media or differences in the age of the subjects. Either way, results show that children are engaging with two or more hours of technology on a daily basis.

Experts question whether technology time is beneficial for children. Yelland (2011) asserts that even though playtime experiences with tangible objects are critical, staying abreast with current technology is a necessary component of multi-literacy today. Screen media is in widespread use throughout the country and 1:1 student to device ratios are being implemented where resources can provide. Yelland (2011) warns that schools will become irrelevant if they do not offer the types of technology and experiences that children are exposed to outside of school. There are implications for educators here with respect to the preschool age to understand what technology children are familiar with, how much time is spent on these activities compared to traditional styles of play, and what technology skills these children arrive with when they begin kindergarten. This information will help instructors to prepare meaningful lessons that engage the current generation of students and enhance learning.

Comparable to Yelland (2011), Johnson and Christie (2009) believe that educators should investigate ways to include both play and technology to support learning. Taking this model a step further, they examine the incorporation of media to supplement play. For example, screen time can be used to stimulate play in which children “use computer content in off-screen play activity” (Johnson & Christie, 2009, p. 286) to expand upon children’s options. While technology affords ways to enhance play, Johnson and Christie (2009) point out that adults should balance the amount of time
children spend with digital media versus traditional play. Technology should be used to enrich the activity but should not be used in isolation from traditional methods.

**Use of Technology**

Technology has a place in the homes of most American families, spanning from televisions and computers to mobile devices. Media use is not reserved for adults only. Researchers are attempting to understand the use of technology by school age children but few studies examine such use by preschoolers. The research that exists helps clarify the role that variables, such as age, play in identifying patterns of media use. Studies show that school age children engage with various forms of technology on a daily basis (Hofferth, 2010).

Some researchers suggest positive effects while others are concerned that screen media may have a negative impact on children. Clements (2002) notes the advantages of technology such as reflection and higher-order thinking, and other advocates believe technology benefits social and cognitive development. Meanwhile, researchers like Almon (2009) warn that media use may impede cognitive development. And, Arthur (2010) cautions that screen media may be detrimental to the physical health of the child. Other researchers who suspect that there may be adverse effects of screen media related to brain development argue that there is not yet enough longitudinal data to rule them out.

The American Academy of Pediatrics does not recommend screen time for children under two years of age (Arthur, 2010). Despite this, companies have marketed many different varieties of videos and computer games, and there is a plethora of tablet applications for children in this age range. Wartella et al. (2005) report that industries are even producing “special keyboard toppers for children as young as 9 months old” (p.
Linn (2009) believes that too many digital devices are promoted for and used by children, and consequently these gadgets are robbing them of imaginative play. According to Linn (2009), DVD players in particular cause children to:

- look to screens rather than their environment for stimulation; to expect to be entertained rather than entertaining themselves; that interacting with family during meals is so boring that they need the inducement of screen entertainment to get through dinner, and;
- they learn that eating is something to do while you’re doing something else. (p. 46)

Therefore, unlimited media access deprives children of creative play and the effects of technology use on children’s brains are unknown. Similarly, Wartella et al. (2005) are most concerned that “very little is known about young children’s use of such media or the impact of such media use on their development” (p. 501).

Many studies have examined possible relationships between the use of technology and age and gender. Findings demonstrate that age tends to be the leading factor attributed to media use: as children age, their use of media increases until they reach primary school (Anand & Krosnick, 2005). Anand and Krosnick (2005) interviewed a sample of 1,065 parents by phone about the media use by a child in their home between the ages of six months and six years old. Questions revolved around the amount of time the child spent the day before or on a typical day watching television and videos, reading or being read to, playing video games and handheld games, and using a computer for games and other purposes. The researchers collected demographic information including the child’s age, gender, and birth order, participating parent’s race, marital status, and
age, both parents’ education and employment, and family income and household language.

Results of the study showed the children’s age to be significant. “As children aged from 6 months to 3 to 5 years, they increased their use of all media,” after which, use declined (Anand & Krosnick, 2005, p. 555). Calvet, Rideout, Woolard, Barr, and Strouse report that “computer use begins before age 2 and increases linearly up to age 6” (as cited by Wartella et al., 2005, p. 503). It is known that young children engage with computers and watch television. However, very little research narrows in on all types of media used and the frequency of these interactions. Researchers have identified television watching as one of the most common activities and some studies identify how much time is spent with this media. According to a study by Jordan, preschool children, on average, watch three hours of television per day (as cited by Wartella et al., 2005). The amount of time that children spend with media causes many to question its effects on brain development. Linebarger and Walker found particular television programs to benefit vocabulary and language development while other programs did not yield the same results (as cited by Wartella et al., 2005). Therefore, careful consideration should be placed on the types of media used to better understand how it affects developing minds. It is evident that young children are engaging with media, but the effects of use raise controversy among researchers. Additionally, skeptics worry about the loss of benefits reaped by traditional play.

The Importance of Play

Almon (2009) strongly believes that technology precludes play and consequently, “children have forgotten how to play” (p. 12). Preschoolers are being inundated with
gadgets and computerized toys that lead to a decrease in imaginative play with other children and in the world of make believe. Imaginative play requires children to make their own choices. High Scope 2006, as cited by Almon (2009), reports that children who were exposed to child-initiated learning in preschool were found to have higher cognitive ability and language development. Almon (2009) contends that the decrease in children’s play is associated with the decrease in children’s well-being over the past several decades. With teacher led instruction overtaking play opportunities in kindergarten and preschool classrooms, the absence of play eliminates children’s primary method of coping and comforting themselves in a negative situation (Almon, 2009).

Others associate child health problems with the rise in technology use and are troubled by the inactivity demonstrated by children in the United States. Alert to the childhood obesity dilemma, some believe this is directly related to media use. Arthur (2010) is concerned with the impact media has on children’s health. She attributes the increase of technology to the rising rate of overweight children and explains that “television viewing leads to obesity in children and has been linked to Attention Deficit Disorder later in life” (Arthur, 2010, p. 58). Similarly, Levin (2010) warns of the dangers media imposes on children in which they are becoming accustomed to sedentary lifestyles and fail to engage in physical activity.

While playing with technology, some children are engaging in activities while using another form of media at the same time (Levin, 2010). Although these are not disclosed, one must question a child’s ability to complete more than one activity at the same time. And, it is important to consider the consequences of so much technology use. Levin (2010) indicates that as children spend more time with screens and less time with
people, they fail to receive “concrete and immediate feedback about the effects of their interactions on others” (p. 17). This is harmful to children’s social development, creates a dependency on “fast-paced stimulation” (Levin, 2010, p. 21), and has far reaching negative effects. Advocates of traditional play stress that children need creative play to help them develop socially, emotionally, and intellectually and worry about the prevalence of media. However, if children are exposed to adequate amounts of creative play, can we strike a balance with appropriate doses of technology to induce positive development?

**Do Online Communities Contribute to Learning?**

Without definitive answers, researchers continue to speculate about the impact of preschooler’s technology use. At this time, studies do not show that media causes developmental deficits. Marsh (2010) calls for additional research with children and their participation with media such as online communities to learn how these environments are connected to the offline world. In fact, concerns about the safety of children outdoors have prompted more indoor activities including virtual play (Marsh, 2010). A contested topic is whether or not online communities can make a positive contribution to the educational welfare of children.

Marsh (2010) conducted a study of 175 children in a large city in England. The children were between the ages of 5 and 11 and attended primary school. Participants were asked to complete an online survey about Internet use and virtual worlds. After surveys were completed, Marsh (2010) interviewed 15 children in a group and individually about their use of virtual worlds. Results showed that most children chose virtual worlds to play games and that “the relationship between online and offline play
was close” (Marsh, 2010, p. 32). In many cases, play extended from one realm to the next as children continued activities from the online world into the physical arena. There are implications here for coupling offline and online material to enrich the experience.

Participants of the study reported that some of the online games were limiting in terms of their ability to manipulate characters or objects. For example, one child was frustrated that she could not illustrate her creativity with a character’s accessories in the game. Based on this study, Marsh (2010) does not believe that virtual worlds created for children foster creativity due to the limitations imposed. While technology does not harm children and offers another form of play, Marsh (2010) is not convinced that it is necessarily educationally cultivating. The researcher suggests careful examination of online worlds to identify how these experiences can be built upon for academic use in the early years. As with any materials to be used for educational purpose, it is important to thoroughly investigate the content and possibilities afforded to extend thinking.

Yarosz (2007) also acknowledges the potential for virtual worlds with respect to education. He believes that a virtual environment can help children explore different cultures and music from around the world from the comfort of their preschool classroom. Although theoretically based, Yarosz (2007) envisions a simulation in which young children are able to experience societies and cultures that are geographically impossible to experience otherwise. He cautions that such an environment would not take precedent over playtime or instruction; rather, the system has the potential to enhance preschool activities if teachers are comfortable in using technological equipment and navigating the virtual world. Opportunities also exist for classrooms to virtually connect with other classrooms across the globe to learn about different cultures. Researchers of this mindset
are optimistic about methods for increasing cultural awareness and experiences from the comfort of the home classroom.

Factors that Influence Selection of Toys and Play-Based Activities

Culture largely impacts the play in which children engage and as a result, technology may be selected by children to meet cultural norms. A study by Ruckenstein (2010) indicates that social constructs impact the types of toys children choose. She compared societal beliefs among Finnish and Japanese children’s media use. Even if technology toys were not culturally valued, the girls in one particular study “picked up the importance of digital devices in their everyday environments” (Ruckenstein, 2010, p. 508). In a preschool setting, Ruckenstein (2010) inferred that children were interested in digital toys for social inclusion in their communities. Thus, she believes that children choose toys based on whether or not they are socially acceptable and valued. This may be one clue for researchers as to how children develop preferences for certain types of play.

In addition to societal influence, toys are often selected based on the needs of the child. For example, technology can be a valuable tool for differentiation. Specific toys are available for children with special needs, such as Assistive Technology (AT) toys, designed for children with disabilities. However, there is little research on parents’ perceptions of particular toy features and whether the toys are appropriate for children with special needs.

Hamm, Mistrett, and Goetz Ruffino (2006) conducted a study of 46 families who received AT services. The sample consisted of children between the ages of 4 to 37 months. Participants varied in type of disability, socioeconomic background, level of education, and culture. Parents were asked to identify play outcomes for their child and to
choose toys that would facilitate meeting those outcomes. Results of the study showed that parents of special needs children were inclined to select toys based on the level of play options the toy provided, yet frequently engaged with toys that did not have many play options. “Symbolic toys, such as those that encourage pretend play and creativity, and offer more variety in play, were selected infrequently by parents” (Hamm et al., 2006, p. 33). One may deduce that parents of children with special needs do not select the types of toys that offer various levels of play because they do not understand how these toys can be beneficial to their child. Parents should be educated on the opportunities AT toys afford to promote use of imagination and increased options for play.

Children with disabilities may also benefit from Augmentative and Alternative Communication (AAC) technologies. Similar to Hamm et al. (2006), Drager et al. (2004) indicate that technology is an important tool in providing children with special needs options for play as well as communication. Drager et al. (2004) completed a study on 30 typically developing children from diverse backgrounds who had no experience with AAC technologies. Participants were exposed to AAC technologies either in their home or at preschool. Then, the children’s vocabulary knowledge within the format of three different screen layouts was assessed. Results showed that subsequent interactions with AAC technologies increased the children’s familiarity with the system and their vocabulary performance increased. Children performed better in the layout in which the vocabulary was contextualized. According to this study, technology use positively impacted development of communication skills through vocabulary lessons.

Drager et al. (2004) recommend the redesign of AAC technologies to better meet the needs of young children. Until the Modern Era, the significance of children’s play...
was undermined and attention was only given to adult recreation. In comparison, AAC technologies have been focused on the adult population. Drager et al. (2004) believe that these technologies have the potential to assist children if platforms are adapted to the learning styles of children by modifying the layout and format of programs. Technology may afford further benefit to young children with special needs. In addition to play and communication alternatives, software programs may also help children with disabilities develop socially (Hamm et al., 2006; Lau, Higgins, Gelfer, Hong, & Miller, 2005). Adequate teacher facilitation is recommended to maximize these social benefits (Lau et al., 2005).

Lau et al. (2005) investigated teacher facilitation of student computer use to determine if there was an impact on social skills. Eighteen groups of children with and without disabilities from a preschool located on a university campus participated in the study. Nine groups of children received computer intervention with teacher facilitation while the other nine groups received computer intervention without teacher guidance. In the computer-only group, teacher interaction was limited to promoting the initial activity and redirection of negative behaviors. In contrast, the teacher’s role in the facilitated group included prompting and cues to encourage specific outcomes. Researchers emphasize the importance of professional development in order for children to receive proper guidance and obtain the fullest benefit of the lesson. Lau et al. (2005) indicate that teachers in the facilitation group of this study received professional development training, as did the students who were involved, prior to computer use. According to Hutinger, Johanson, and Stoneburner (1996) as cited by Lau et al. (2005), assistive technology has great impact on the social and emotional outcome of students with multiple disabilities.
Results of the study showed that the facilitated group “helped promote social interactions between children with and without disabilities in inclusive classrooms” (Lau et al., 2005, p. 216). Therefore, assistive technology when paired with professional development increases the chances of positive social and emotional outcomes for all students.

Computer Use in the Classroom

Software. Software inclusion in preschools can provide many rewards for children. Marsh (2010) notes that media use may improve children’s computer skills. Likewise, Hofferth (2010) addresses research supporting that technology has the potential to boost habits, motivation, and knowledge related to academics. Many unique advantages to using software programs have been found. These include the manipulation of figures not possible with pencil and paper, fostering of higher-order thinking, and promotion of reflection by the user (Clements, 2002). Specifically related to academics, Clements (2002) investigates use of the Logo computer program which allows children to explore mathematics. The impact of the Logo program shows that technology has the capacity to enhance preschool learning when coupled with manipulatives. The component essential to learning here is the supplementation of traditional resources with technology. Studies show how computers can benefit learning. According to Davis and Shade (1999), “although computers have been available in the elementary school for nearly two decades, they have yet to meet the full potential they offer to education” (p. 5). This is due to many factors including lack of guidance and improper location of the equipment.

Teacher Guidance and Professional Development. Clements (2002) points to the necessity of several conditions for proper computer implementation. First, computers,
manipulatives, and print should be used together. Pairing of these resources provides multiple measures of exposure to a concept and offers the possibility for differentiated activities. Second, the outcome of technology and computer use in particular, is better when an adult supervises the activity. According to Binder and Ledger, “Children are more attentive, more interested, and less frustrated when an adult is present” (as cited by Clements, 2002, p. 171). Children benefit the most from teachers who closely guide, encourage, question, prompt, demonstrate, and enact whole class discussion (Clements, 2002). And lastly, the relationship between professional development and strategies employed by the teacher are extremely important to consider. Teachers who engage in professional development are more apt to develop appropriate strategies for technology implementation and as a result, children have increased opportunities to interact with a variety of resources.

While Clements (2002) advocates for the teacher as a guide in computer activities, Davis and Shade (1999) stress the importance of children developing independence from the teacher with respect to operational procedures. Children may benefit the most from a situation in which they are given the freedom to navigate through the software, learning as they progress, but while being provided support from the teacher. Guidance is paramount to enable children to learn and to build confidence as they work through the curriculum. The teacher may ask steering questions to help the child work through the problem but should avoid simply giving the solution. This strategy applies to both traditional methods of teaching and when incorporating technology into a lesson.
Other critical conditions to consider for successful computer implementation include age appropriate software and the type of program. While Clements (2002) believes that drill and practice software is beneficial in competence development, Haugland (1992) reports that drill and practice negatively affects children’s creativity (as cited by Martin, Forsbach-Rothman, & Crawford, 2004). Davis and Shade (1999) concur that drill and practice is not the best use of computer time. Rather, proper integration should involve the use of computers in which children can explore a variety of topics with different methods, both individually and in groups. Davis and Shade (1999) recommend that teachers carefully plan how to integrate technology into the curriculum “so that the children come to understand that the computer is one of many materials available and potentially useful for accomplishing personal goals” (p. 14). In this sense, technology is a resource to extend thinking and can be used with one child independently or with multiple children in a group setting.

**Physical Arrangement of Computers.** Researchers note other critical factors for successful implementation of computers in the classroom and call attention to proper physical location. Judge, Puckett, and Cabuk (2004) utilized a subsample of data from the Early Childhood Longitudinal Study in which information was collected on the availability and use of computers among kindergarten and first grade students. Like Davis and Shade (1999), Judge et al. (2004) emphasize the importance of computers located in the actual classroom instead of being situated in an isolated lab. From a historical perspective, computers have been incorporated into schools through the use of computer labs, which Davis and Shade (1999) consider misintegration. The use of a lab separates students from everyday access and learning. In contrast, computers should be a
part of the classroom to enhance the content of everyday lessons or as the teacher deems appropriate. Children should have the opportunity for regular access which instills the sense that the computer is a natural extension of the learning material instead of a foreign entity that can only be utilized on occasion. Computers are similar to encyclopedias on one level. Encyclopedias used to be the source of research information in a classroom but have been replaced by a single computer that has the capacity to provide much more. Why then, are computers not routinely situated in each classroom to offer students the many benefits?

In addition to location of computers, Judge et al. (2004) concluded that the software tools and training on technology are also important. These results echo findings by Haugland (1997), Clements (2002), Drager et al. (2004), and Martin et al. (2004) as previously discussed. Therefore, researchers can agree that appropriate integration is a multifaceted issue that includes how computers are to be used. Technology can provide very meaningful activities when children are given specific instructions for guidance and social interaction is encouraged (Davis & Shade, 1999). Developmentally appropriate software, stimulating graphics and sounds, and professional development on the technology are all important components for successful integration (Judge et al., 2004; Haugland, 1997; Clements, 2002; Drager et al., 2004; Martín et al., 2004).

Digital Media in Schools

Researchers believe that digital games have much to offer educational development and can foster exploration. Lieberman et al. (2009) acknowledge positive outcomes for the ways in which games can be interactive, rewarding, and offer opportunities for participation and winning. However, research does not indicate the
impact of digital toys on children’s creativity. Lieberman et al. (2009) report that children between the ages of three and six years spend an average of six to twelve minutes per day playing digital games. Although it is apparent that preschoolers are using digital media, few studies highlight how children between the ages of 3 and 5 are engaging with technology. Researchers have focused more effort on understanding the effects of digital games on older children and adults (Lieberman et al., 2009).

Blumberg (1998) conducted a study on the use of video games among grade school children in two different grade levels. Participants included 46 second grade and 58 fifth grade students who attended an urban public school in New York City. Blumberg (1998) was concerned with the ability of children to use game cues to strategize. In this project, children played a Sega Game Gear for ten minutes and then answered questions about what they were thinking during the game. Responses to the interview questions post video game play showed that children in the second grade attached personal feelings to the game. For example, they discussed how they felt when the character in the game performed a particular action. Meanwhile, the older children focused on goals to win.

One expected finding was that those who claimed to play video games often performed better than those who played less. Results did not reveal whether the children’s motivation to learn was impacted by different attention and performance levels (Blumberg, 1998). As educators contemplate the addition of gaming to curriculum, it is important to thoroughly consider the ways in which children are affected by digital media and how it can be attributed to learning. In this study, the younger children were less concerned with winning and more focused on how the game made them feel. These cues can inform educators who plan to incorporate this type of technology in their classrooms.
Children enjoy using media and are able to quickly adjust to different platforms. As Prensky first stated, the youth of today are “digital natives” (2001). They have grown up with digital technology in contrast to “digital immigrants” who are transitioning from less technology savvy methods and adopt the new technology at a somewhat slower pace. According to Prensky (2001), the difficult truth is that “today’s students are no longer the people our educational system was designed to teach” (p. 1). It is problematic to assume that Digital Natives should continue to be taught according to the methods that were created for older generations. Children today think and process information much differently due to their daily experiences with technology (Prensky, 2001). Therefore, education must be restructured to reach the new population of students.

According to Prensky (2001), children are using different parts of their brains to learn opposed to their predecessors. This new generation likes fast information, multi-tasking, and graphics (Prensky, 2001). Prensky begs educators to consider a new methodology with content and strategies that mirrors the preferred styles of their students. Whether an educator integrates tablet devices or gaming with the lessons, he notes that the key to connecting with this new generation is in the presentation of material. Former models of teaching with textbooks, two dimensional figures, pen, and paper alone will no longer engage this group of learners. Prensky (2001) argues that to meet the needs of today’s students, lessons must be restructured to incorporate technology.

**Parental Involvement at Home**

Haugland (1997) recommended over a decade ago that teachers incorporate use of the home computer as a tool to connect learning experiences and collaborate with parents.
Today, email is a common form of communication between teachers and parents. Technology helps bridge classroom learning with the home by presenting parents with information on their child’s achievement and curricular goals. Some teachers utilize social media sites to keep parents informed. In addition to communication between schools and parents, digital media is an important way for students to expand their learning at home. Parental supervision of children’s computer use is an important aspect as consideration must be given to selection of Internet sites and software, participation of online activities, and amount of time spent with technology (Haugland, 1997). Internet and social media safety continues to be a concern among users of all ages. And as previously mentioned, software should be chosen with needs of the specific child in mind. Haugland (1997) recommends that programs be developmentally appropriate, violence free, and matched with the child’s interests to foster motivation. She indicates that parents must set time limitations with non-developmental software because of its tendency to reduce creativity and produce an addictive effect. However, the Internet can create wonderful educational experiences for children when used wisely (Haugland, 1997). Possibilities for learning at home with technology increase when guidance is provided and teachers collaborate with parents to facilitate activities.

The early childhood program at the University of Michigan-Dearborn also supports the notion that technology can enrich the learning experience. Preparing Tomorrow’s Teachers to use Technology, a federal technology grant awarded to the institution, allowed student teachers to implement various types of technology into their lessons (Hong & Trepanier-Street, 2004). Educators in the university’s program believe that “the application of technology in conjunction with the Reggio Emilia inspired
approach is a powerful vehicle for promoting children’s learning, teacher reflections, and in turn, improving the quality of learning and teaching in the classroom” (Hong & Trepanier-Street, 2004, p. 88).

The student teachers in the project worked collaboratively with cooperating teachers during their internship to utilize technology such as the Kid Pix and Kidspiration software programs. These programs were educational in nature and cameras were used to capture classroom activities. For example, children could manipulate content on a computer to visualize mathematic representations and build on their understanding of concepts. Student teachers found that the software “helped the children reflect and expand their understanding in different ways and on different social and cognitive levels” (Hong & Trepanier-Street, 2004, p. 89). Similar to Haugland’s (1997) discussion of parent and teacher teaming for extending the learning at home, the incorporation of media sites in this project allowed for parent collaboration as well through the tracking of classroom activities. Thus, the use of technology proved to be a valuable tool in gaining parental involvement (Hong & Trepanier-Street, 2004). The use of cameras was also beneficial to review lesson implementation. Recording classroom activities via cameras provided an avenue for teachers to replay portions of the day to examine student behaviors. Video allowed for reflection that benefited both the teacher and children (Hong & Trepanier-Street, 2004). The use of technology through this grant helped enhance learning outcomes and communication with parents.

**Preschool Use of Technology**

Research has shown that technology can be advantageous for students at the primary level, but what benefits can preschool classrooms reap? Stephen and Plowman
(2008) conducted a study in central Scotland in which they studied the learning contexts of eight preschool settings. Participants included 14 practitioners who used the same national curriculum guidelines. The purpose of the project was to examine how teachers can incorporate technology, including “digital cameras, video cameras, dance mats, electronic keyboards and toys that simulate laptops, barcode readers and mobile phones,” into preschool curriculum (Stephen & Plowman, 2008, p. 639). Through implementation of computer-based lessons, the teachers in the study became more confident in their ability to utilize the technology and were able to offer the children more opportunities. Likewise, the children benefited by gaining an understanding of basic functions and how to use the resources (Stephen & Plowman, 2008). However, Stephen and Plowman (2008) found that exposure to computer technology at the preschool level was limited due to time constraints, lack of user friendly systems, and varying degrees of resources among the schools. For technology to be most beneficial for preschoolers, educators must ensure adequate time for implementation of the activity and appropriate hardware and software that caters to this age group.

Preschool children are capable of using computers to learn. And yet, according to Edwards (2005), the use of computers at this level is still controversial despite research to support their benefit as a learning tool. Edwards (2005) interviewed twelve teachers of three and four year-olds in kindergartens and early learning centres from Melbourne. Teachers were asked why they used a computer in the classroom. Some responses reflected the teachers’ impression that children needed to keep up with technology and prepare for primary school. On these terms, computers were viewed as a secondary instrument for school readiness. Another two teachers expressed that they did not
consider the classroom computer to be of educational benefit. Each focused on how to add the computer into the curriculum as opposed to fully integrating it as a learning tool to accompany lessons on a regular basis. As a result of this study, Edwards (2005) highly recommends that teachers participate in professional development to learn how to effectively integrate the equipment into daily activities.

According to the National Association for the Education of Young Children (NAEYC), “technology plays a significant role in all aspects of [US] life today and this role will only increase in the future” (as cited by Edwards, 2005, p. 25). However, many teachers do not understand the potential for learning that computers, among other technology, encompass. Several of the Melbourne teachers shared their view of the computer as an extra standalone activity. The lack of knowledge for how technology can positively impact learning may cause teachers to feel leery about adding it to their instructional repertoire. One of these individuals also voiced concern about children not being able to interact with one another while using the computer.

Researchers have examined the effect of media on social engagement. Martin et al. (2004) surveyed 143 childcare settings from the Houston metropolitan area about the availability and use of computers in their facilities. The researchers found that technology in childcare settings leads to social benefits among other positive outcomes such as creativity and problem solving. However, Martin et al. (2004) also discovered over the course of their study that the majority of daycare centers providing computer time only allowed children to use it for basic skill practice. Further, in half of the sites, adults directed the computer time. Children did not have an opportunity to freely explore while being carefully guided by a teacher. Instead, explicit instruction was provided by an adult
and computer exposure was limited to basic drilling. According to Haugland, drill based software leads to decreased creativity (as cited by Martin et al., 2004). Equally troubling is the fact that there was a positive correlation between the cost of the childcare center and the availability of a computer. In general, there was a lack of computers among the preschool sites, and where computers were available, inadequate use of technology was found. The researchers only studied computer use at preschool centers and did not address how this age group might engage with technology at home.

**Technology Equity**

As Martin et al. (2004) found that the availability of technology was related to the amount charged by the preschool facility, equal access to resources is a concern among schools. Therefore, accessibility to technology is on K-12 school agendas. While districts are attempting to close the digital gap in terms of computer availability, Judge et al. (2004) note that “does not always insure equitable use” (p. 393). Student access to technology and digital resources is improving but is still not equal. Judge et al. (2004) examined the use of computers among lower and higher-income students. An interesting finding was that lower-income students used computers more on a weekly basis than higher-income students. However, the nature of the computer activity was starkly different among the two populations. The report suggests that although lower-income students engaged in more computer use, practice was repetitive in nature. Meanwhile, students of the higher-income group spent less time with computers but were exposed to more higher-order thinking activities. Judge et al. (2004) point to a prevalence of computers in primary and secondary school but explain that does not guarantee that the scope of technology use is equal.
According to the NAEYC’s Position Statement, it recommends “equitable access to computers for all children” and “that technology be integrated into the learning environment as one of several support options” (as cited by Judge et al., 2004, p. 385). Edwards (2005) supports the NAEYC statement on technology and believes it should be a fully integrated tool for learning. Despite recommendations and improvements in access, the social and economic factors may affect the overall distribution of technological resources within a community. Research shows that socioeconomic status can impact the extent to which technology is accessed by children. Research on children’s technology use and availability of technology has been concentrated at the primary and secondary levels. Very few studies exist that focus on the availability and use of computers at the preschool age. Circling back to the idea of preschool technology use, at what age should computers and other media be regularly implemented and how? And is the availability of resources directly related to socioeconomic status at this age group?

The Kaiser Family Foundation sponsored a telephone survey of the media use by children between the ages of six months and six years in 2003. Among the variables, results of the survey showed the child’s age to be significant. Another important finding was that income did not affect media use. Anand and Krosnick (2005) suggest that “income itself does not stratify society in terms of access to or use of potentially educational media for very young children” (p. 556). Similarly, they found no direct relationship with children’s gender and media use. Two drawbacks to the study were that media use was not categorized for the level of usage and respondents were not asked if the child’s time spent on activities was typical. There are implications for future research
to understand if socioeconomic status determines whether or not preschool children have access to and engage in technology-based activities. Data collection methods should take into account the time spent on activities and request information that reflects typical behavior.

**Parental Impact**

Access to home technology use may be heavily dependent upon not only finances, but also parental beliefs and lifestyles. Children between the ages of 3 and 5 rely on their parents to fulfill daily needs such as food, clothing, and shelter. Parents are also responsible for providing their children with opportunities to play and exposure to technology as they see fit. In most cases, it is the parents who determine the type of activities in which their children engage and the amount of time spent.

Research has shown that aside from children’s age, parents are a contributing factor to the use of media. Understandably, parents serve as providers and therefore directly impact the availability and use of technology in the home. As such, another interesting perspective to consider is the possible relationship between children’s media use and parental education. In addition to the factor of age, Anand and Krosnick (2005) examined whether the mother and fathers’ education had an impact on the technology in which children engaged. The researchers hypothesized that lower income and less parental education would result in more television watching, video game, and computer usage. At the other end of the spectrum, Anand and Krosnick (2005) presumed that if parents were more educated, they would be more likely to place value on books and to read at home. Thus, the children of more educated parents would be expected to engage in more reading. Anand and Krosnick (2005) indicate that previous studies have found
similar findings in which there is a negative correlation between parental education and children’s television watching.

Results of the study showed that children of both mothers and fathers with less education watched more television which supports the researchers’ hypothesis (Anand & Krosnick, 2005). And children of fathers who had some college education or who graduated college spent more time on computers than those whose fathers had the lowest level of education. Therefore, parental education may assist in predicting some aspects of children’s technology use. However, an interesting finding is that “time spent reading was lower for children whose mothers had moderate levels of education than for children with more-educated or less-educated mothers” (Anand & Krosnick, 2005, p. 553). The researchers argue that other factors such as parental values should be examined: “the values that more educated parents bring to child rearing lead them to discourage television viewing more and to advocate other activities instead” (Anand & Krosnick, 2005, p. 557).

Many parents are interested in ways to help their children advance academically and outperform their peers. They believe that digital devices like computers are one of the tools that provide such an avenue (Edwards, 2005). Parents are well aware of the societal demands their children will face in the world. As a result of their own position in life, parents encourage their children to utilize technology as a way to provide more opportunities, hoping their children will fare better (Plowman, 2013). Aside from academic advancement, media may also serve in the capacity of a babysitter in the home. Plowman (2013) addresses the lifestyle of today’s parents commenting that technology is an attractive alternative due to the exhaustion caused by work. Technology serves in this
role to occupy the child’s time while the parent is provided an opportunity to do something else. Plowman (2013) reports that while technology appears to hold several facets of value, parents also feel that a balance between traditional play and media use is necessary. This suggests that parents still place importance on more traditional methods like creative play.

Shiakou and Belsky (2013) conducted research on parental attitudes toward children’s play. The researchers conducted a study of 142 Greek/Cypriot parents of children between the ages of 4 and 7 who were enrolled in preschool. The demographic information collected included parents’ age, education, income, and hours of employment. Shiakou and Belsky (2013) reviewed previous research about parents’ perceptions of children’s educational programs and their beliefs about play. Through this process and in the collection of data from their study, an overarching theme emerged. Shiakou and Belsky (2013) discovered that parental differences were rooted in cultural practice and as a result, parental beliefs affected the ways in which children played. According to the researchers, “parental attitudes toward play and learning differ within…cultures, and that the parental practices used to encourage children academically and the time allocated, or left, for play also differs between cultures” (Shiakou & Belsky, 2013, p. 21). Just as cultural practice impacts the types of play in which children engage, parental education may be a factor that has an effect on the activities that children choose. While Shiakou and Belsky (2013) collected parental level of education, they did not address if or how the parents’ education impacted responses in the study. It is important to consider how parental education may contribute to differences in the perceived importance of academics, technology, and play.
In another study, Hofferth (2010) examined children’s home technology use, achievement, and behavior, and the relationship with parental involvement. The study consisted of children between the ages of 6 and 12 who lived with their mothers. Data were obtained from a 1997 and 2003 longitudinal study, the Panel Study of Income Dynamics, in which participants were asked to record the child’s activities over a 24-hour period. Hofferth (2010) discovered that technology use was dependent upon parental attributes. Specifically, children’s dependence upon their parents creates a control system in which the parents’ characteristics determine the children’s media use (Hofferth, 2010). Hofferth (2010) found that black children had lower vocabulary scores, a lower family income, and lived with mothers who had less education than those of white children. Thus, she concluded that parental education had an effect on technology use. Results showed that children whose mothers completed college “played fewer video games, watched less TV, and spent more time reading” compared to those whose mothers had not gone to college. The researcher suggests that parental education is one factor that may predict children’s engagement with technology.

An additional area of focus in this study was technology accessibility in the home. Hofferth (2010) points out that less education and families with lower income are associated with decreased access to media. While black boys and girls used a computer less frequently than white boys and girls, the black children watched more television than white children. These findings suggest relationships among maternal education, socioeconomic status, and achievement. Hofferth (2010) proposes multiple links associated with children’s use of technology. Possible relationships between achievement and socioeconomic status, technology and socioeconomic status, and maternal education
and technology are presented. Further research is warranted to understand the dynamics of parental impact on technology use. In accordance with Hofferth’s (2010) findings, parental education may lead to differences among technology availability and use by children.

**Should Technology Use be Limited?**

Educators have not yet determined which types of technology and the amount of exposure that is appropriate for preschoolers. The lack of research causes many to question the suitability for children’s use. Hofferth (2010) reports that few studies of children’s technology use exist because reports have not compared similar groups of children nor broken data down by age. Additionally, researchers have not examined how children use technology while doing other activities. Hofferth (2010) is concerned that technology may affect other habits and activities like television watching, studying, free-time play, and sleeping. Most children today are interacting with some form of technology on a daily basis. Regardless of the experience, digital devices have entered into the picture and are a prominent fixture in children’s daily lives. Without research that shows a positive correlation to technology use and cognitive development, opponents argue that media use may lead to potential harm. Therefore, further delineation among technology use by young children must be explored.

While some parents believe that technology should be used in moderation, it is unclear whether too much time staring at a screen is harmful to the eyes or brain development. Parents carry a certain set of beliefs that impact how their child plays and engages with technology, and these perceptions also determine whether they feel the need to set limitations. At the present time, research is unavailable to guide parents in choosing
what types of technology are healthy for their child and if limitations should be placed on use based on age. Before we can understand how technology impacts the development of preschool children, further research is warranted to delineate children’s activities and what parents attribute to their reasoning for promoting or rejecting technology use in the home. It is important to highlight not only the parental beliefs that affect the amount and type of technology used in the home, but also how decisions may have emerged from cultural practice and personal experiences.

We do not fully understand how preschool children are playing with technology. Therefore, this study explores what tools and play activities preschoolers engage with and how often, with a focus on traditional methods and technology. Throughout the course of history, the importance of child’s play has not always been addressed. Today, we realize that play is a significant component of development. And over time, new play tools have emerged that affect how children engage in play, but there is a lack of knowledge about how preschoolers’ time spent with technology compares to the time spent with more traditional forms of play.

Knowing that parents have a large impact on the technology brought into play by young children, it is equally troubling that there is little systematic work looking at parents’ feelings about their children’s use of technology. There is a clear gap in the research on what new forms of play preschoolers are utilizing, how much time is allocated to these activities compared to others, and what parental beliefs are about how their children play and their preschoolers’ use of technology. And so, we do not fully understand how preschool children are playing with technological tools. This review of the literature leads me to investigate how preschoolers play in more depth. In this study, I
explore what tools preschoolers engage with, how often, and I will address some of the
gaps in our understanding of how preschool children use technology. Thus, the research
questions to be addressed are 1) What activities do preschool children partake in during a
typical weekday and on a typical weekend day?; 2) How often do preschoolers engage in
technology use, non-technology play, and outdoor play?; 3) Do preschool children
engage in other activities while using technology?; and, 4) What do parents believe about
technology use for their preschool child?
Chapter Three

Methodology

Rationale for Mixed Methods Study

A mixed methods approach was chosen for this study to better understand the subjects in the project and their reported behaviors. In terms of quantitative aspects of data collection, parents were asked to respond to demographic questions and closed-ended questions about their child’s typical activities and how much time was allocated to those activities. Qualitative methods were also implemented to obtain open-ended responses about the typical activities in which children engage, how children interact with technology, and to understand parents’ perceptions about technology and possible connections to school readiness. Further, the format of the questionnaire was designed with overlap between the questions and activity diary for an opportunity to triangulate data. Parents were asked to provide details on the type and frequency of their child’s activities in both the diary and survey questions.

Additionally, a separate sample of n=6 parents were interviewed to better understand their views on play and technology. The interview questions were created after reviewing data from the surveys and diaries. Another rationale for these open ended questions was to allow an opportunity for the researcher to strengthen the existing survey questions and make modifications for future research.

Participants

The participants in this research were parents of 3-5 year old preschool children, and the target population for this study was 3-5 year-old preschool children from a range of socioeconomic backgrounds in the Midwest. Therefore, the researcher contacted
various preschool centers for authorization to disseminate surveys to the parents or guardians of the enrolled children. There was no direct contact with any children or parents to facilitate approval of the study from the institution’s research board and to simplify the process of data collection.

Initial data were collected during participation with Dr. Slutsky for the researcher’s independent study on technology and play. These data consisted of 20 questionnaires which were completed in the fall of 2012. Approximately 70 consent forms were delivered to three preschools for the pilot research and 57 parents provided consent to participate for a response rate of 81.43%. From this group, 20 questionnaires were completed, yielding a 35.09% return rate from those who gave consent to participate in the study. Additional data were obtained by the researcher for this dissertation between late fall 2013 and the spring of 2014. Approximately 360 consent forms were dropped off at 11 preschools during this timeframe and 59 parents provided consent for a response rate of 16.39%. From this group, 13 questionnaires were completed for a 22.03% return rate from those who gave consent to participate. The researcher also conducted 6 parent interviews for the dissertation research.

Preschool directors who agreed to assist with the project were asked to communicate with parents as necessary to aid in the distribution and collection of consent forms and questionnaires, but were not asked to answer any questions directly related to the research. Parents were given forms with the researcher’s telephone number and email address to contact if they had any questions pertaining to the study. Directors from each individual site agreed to collect completed consent forms and questionnaires from parents. The researcher occasionally asked directors to have conversations with parents to
remind them about completion and submission of the consent form and survey once it was disseminated to increase the number of submissions. Lastly, the researcher maintained contact with site directors throughout the study and followed up with each after the last survey was collected.

No direct contact by the researcher was made with any parents during the dissemination and collection of the surveys and diaries. The only direct contact with participants occurred when the researcher interviewed a sample of parents in person to gain a better understanding of perceptions of their preschool child’s play and technology use. This separate group was obtained from a convenience sample: the researcher asked an acquaintance at work, two friends, and three neighbors of a friend if they would participate. All six parents had a preschool child between the age of 3 and 5 and agreed to be interviewed. These interviewees completed a consent form but demographic information was not collected to maintain anonymity.

**Instruments**

Two instruments were used in this study. The first instrument was taken from a pilot study conducted with the researcher’s dissertation advisor, Dr. Slutsky. It was designed in three parts (see Appendix A). At the beginning of the survey, parents were asked for demographic information. These questions included child’s age in months, gender, preschool attendance (part-time or full-time), ethnicity (Hispanic or Latino, or Not Hispanic or Latino), race (American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, or White), family structure (one parent, two parents, or other), and age and gender of siblings. Parents were also asked to provide responses to mother and father’s highest level of education completed
(less than high school, high school/GED, some college, 2-year college or degree, 4-year college degree, Master’s degree, Doctoral degree, or professional degree), occupation, employment (not employed, part-time, or full-time), and total family income (less than $30,000, $30,000-$52,499, $52,500-$74,999, or over $75,000). Following the demographic section, the second portion of the survey contained 14 questions to illustrate the activities in which children engaged, parental preferences of play, and technology use, associated rules, and parental perception of technology and impact on school readiness. For example, question 13 asked, “Do you think the use of technology benefits your child? Explain why or why not.” Parents were given ample space to provide responses to the open-ended questions.

The last section of the questionnaire included instructions for completing the diary of activities over the course of one typical weekday and one typical weekend day. Parents were instructed to choose an applicable day and record activities in the provided log. Examples of activities and placement in the log were given to show how time should be documented, such as use of a tablet, watching television, playing soccer outside, playing with matchbox cars, and eating dinner. Directly below the example followed the diary in a table format for the parents to record the activities in which the child engaged on one weekday. The log consisted of 15 minute increments beginning at 7:00 a.m. and concluding at 9:00 p.m. Parents were asked to place their child’s activity in one of four columns: technology play, non-technology play, outdoor play, or non-play related activities. Lastly, another table was included but separated for parents to record the activities in which their child engaged on a chosen weekend day.
The second instrument (see Appendix B) included interview questions which were derived from the preceding questionnaire. These questions were asked of a separate sample of parents and allowed the researcher to make further connections between parental beliefs and their preschooler’s play and use of technology. Responses also provided the researcher with an opportunity for comparison with data from the questionnaires.

**Analysis**

Each questionnaire was assigned an alphanumeric code (A1, A2, etc.) and each interview was assigned a code beginning with P1 and concluding with P6. Then, all responses from the questionnaires and interviews were recorded in an Excel spreadsheet to systematically organize the data. Beginning with the questionnaire, responses to demographic information (see Appendix C) were coded as follows:

1) *Child’s age in months:* A numerical value between 36 and 71 was entered as reported by the parent.

2) *Child’s gender:* Males were coded 0 and females were coded 1.

3) *Child’s preschool attendance:* Part-time was coded 0 and Full-time was coded 1.

4) *Child’s ethnicity:* Hispanic or Latino was coded 0 and Not Hispanic or Latino was coded 1.

5) *Child’s race:* American Indian or Alaska Native was coded 0, Asian was coded 1, Black or African American was coded 2, Native Hawaiian or Other Pacific Islander was coded 3, and White was coded 4.

6) *Family structure:* 1 parent was coded 0, 2 parents was coded 1, and Other was coded 2.
7) *Sibling ages and gender:* Sibling ages were assigned a numerical value based on the age as reported by the parent, and males were coded 0 and females were coded 1.

8) *Mother’s highest level of education completed:* Less than High School was coded 0, High School/GED was coded 1, Some College was coded 2, 2-Year College Degree was coded 3, 4-Year College Degree was coded 4, Master’s Degree was coded 5, Doctoral Degree was coded 6, and Professional Degree was coded 7.

9) *Mother’s occupation:* The occupation was recorded as reported by the parent. As themes emerged among this data field, occupations were placed in a classification together. For example, a high school teacher, preschool teacher, and professor were coded teacher.

10) *Mother’s employment:* Not Employed was coded 0, Part-time was coded 1, and Full-time was coded 2.

11) *Father’s highest level of education completed:* Less than High School was coded 0, High School/GED was coded 1, Some College was coded 2, 2-Year College Degree was coded 3, 4-Year College Degree was coded 4, Master’s Degree was coded 5, Doctoral Degree was coded 6, and Professional Degree was coded 7.

12) *Father’s occupation:* The occupation was recorded as reported by the parent. As themes emerged among this data field, similar occupations were placed in a group together.

13) *Father’s employment:* Not Employed was coded 0, Part-time was coded 1, and Full-time was coded 2.

14) *Total family income:* Less than $30,000 was coded 0, $30,000-$52,499 was coded 1, $52,500-$74,999 was coded 2, and Over $75,000 was coded 3.
Then, the researcher utilized the constant comparative method to analyze each line of qualitative responses. Codes were assigned to allow for themes or patterns to emerge from the data. This information was examined to help the researcher understand the role of technology in the lives of preschoolers with respect to how and why it is implemented and to understand factors associated with parental perceptions of the importance of technology, or lack thereof, for school readiness.

Data were analyzed for patterns of play to determine if activities or frequency were more common with groups of children from similar demographic makeup. Qualitative data were examined against quantitative measures to support emerging themes. Therefore, data comparison was used to compare information from these qualitative and quantitative responses. For example, the researcher analyzed the context of the home to look for any unique patterns in how much technology the child engaged and how it was used in comparison with children of different socioeconomic backgrounds. Data display in the form of tables and figures was used to visually represent qualitative and quantitative results.

The researcher was able to triangulate data by comparing the activities parents provided in the diary with their responses to open-ended survey questions and answers to interview questions. The following survey questions were examined to determine if there was any crossover:

1) List activities that your child engages in that you pay for him/her to participate in—sports, Chuck E. Cheese’s, swim lessons, dance, gymnastics, etc. How many hours per week does your child spend in these activities?
2) Describe all technology-based activities your child engages in (TV, computer, cell phone, iPad, video games, etc.).

3) How many hours per week does your child engage in technology use?

4) How many hours per week does your child engage in non-technology indoor play?

5) How many hours per week does your child engage in outdoor play?

11) When your child uses technology, what types of specific things are they doing: Webkinz, learning math facts, reading, playing games, etc.?

12) What other tasks or activities does your child take part in at the same time they are using technology?

**Procedures**

Preschool directors were called and or emailed to discuss the study. The process for data collection was thoroughly explained and it was important to disclose that no direct contact would be made with the children. Further, the researcher shared with the director that he or she need not document any activities while the children were at the center. They were informed that the questionnaires should be completed at home by the parent. Also, the cover letter of the questionnaire explicitly instructed parents to respond to questions and record the activities their child engaged in while at home.

The directors who agreed to participate provided the researcher with a letter indicating that the research could be conducted at their center(s). After Institutional Research Board Approval, all directors who granted permission to utilize their site met with the researcher to discuss the study and procedures. The researcher emailed the director electronic copies of the consent form and questionnaire as requested. However,
all sites were given hard-copy consent forms for distribution to the parents of the 3 to 5
year-olds at the preschool.

The researcher met with the director to determine the process and timeline for
parental completion of consent. Depending on the chosen method, the director either
distributed consent forms to the parents individually, through the children’s mailboxes,
classroom teacher dissemination, or by the researcher leaving consent forms in the
children’s cubbies. Parents who were interested in participating in the study completed
the consent form and submitted it to their director. After one to three weeks, the
researcher contacted the director to arrange a second meeting to collect completed
consent forms. This process was repeated as needed to obtain additional consent. At this
second meeting, the researcher provided the director with questionnaires to give to the
parents who completed a consent form, or the researcher left a questionnaire in the
responding children’s cubbies. Completed consent forms were stored by the
researcher separately from other materials related to the study to maintain confidentiality.

Once parents completed the questions and diary, they were instructed to omit their
name and turn the packet in to their site director. The researcher contacted the site
directors again after one to three weeks to arrange a third meeting and collect completed
questionnaires. This process was repeated often to obtain additional participants based on
who had completed the consent form. Directors maintained an electronic version of the
questionnaire in the event that a parent informed them of their preference to complete the
information electronically. However, none of the n=33 participants chose this option.
Throughout the study, the researcher was available to respond to any phone calls or
emails from directors or parents with questions about the research. Regular
communication was kept between the researcher and directors, but over the course of the study, only one parent/guardian contacted the researcher by phone. This parent submitted a consent form but did not complete the questionnaire.

Following collection of the completed questionnaires and diaries, the researcher met with a separate group of parents individually. These parents completed a consent form that was maintained separately from their recorded responses. The researcher asked all n=6 participants nine questions and each interview lasted approximately twenty minutes. Each interview was scripted and assigned a numeric code that was different than the codes previously used for completed surveys. All interview responses were entered in an Excel spreadsheet for examination of patterns.

Limitations

There are limitations to this study. First, research is limited to the preschool centers in the metropolitan and surrounding areas who agreed to participate. The project spanned the winter months which may have skewed results. Temperatures were extremely cold during the 2013-2014 winter months when some data were collected which may have impacted the opportunities available for children to play. Further, several holidays occurred during portions of data collection which may have altered the usual behavior of the child. Potential travel and vacations may also have impacted the activities in which children engaged, although parents were asked to report on typical days. However, since these data span over different seasons, they may offer more reliability.

The researcher acknowledges that the questionnaire is very lengthy for a total of 12 pages. This is due to the desire to capture demographic information, responses to
qualitative questions, and a diary of activities over two different days in one document. To gather all of these data in one questionnaire, the researcher may have sacrificed the quality of responses due to the amount in which the parents were asked to write and record. Quality of data may also have been impacted by the day(s) in which the parent chose to report. The questions and diary solicit feedback on the child’s typical behavior. Parents may not have reported typical activities depending on the day(s) selected to complete the survey.

Asking parents to self-report is a limitation to the data. And, parents who are unable to read and or write may not be able to complete the survey. As contact was limited to the preschool directors unless parents contacted the researcher, it is unknown if parents experienced any confusion or difficulty in completing the questionnaire. This lack of direct contact with parents who were interested in completing the survey may have negatively affected the response rate.

Lastly, the parent interviews were completed with a convenience sample. Therefore, respondents may have offered inaccurate statements or answers to questions for which they felt the researcher was looking. And, some of the parents knew one another which may lead to similar beliefs and thus, comparable responses. All of these limitations may have an impact on the results presented in this study.
Chapter Four

Analysis of the Data

Survey

Demographic Information. During the fall 2012 pilot study, four preschools were contacted and all agreed to participate. 20 questionnaires were completed from three of the preschools. Beginning in late fall 2013, the researcher contacted 18 preschools and 83.3% (n=15) agreed to participate in the survey. Of those 15 centers, parents from eight preschools completed the questionnaire. A total of N=33 questionnaires were collected between the pilot and dissertation studies. Male preschoolers comprised 60.6% of the sample (n=20) and ranged in age from 36-60 months. 39.4% of the sample (n=13) were female and their ages spanned from 35-58 months. The median age of all children was 52 months and the mean age was 50.6 months. 33.3% of the children (n=11) attended preschool part-time and 66.7% (n=22) attended full-time.

The majority of children were not of Hispanic or Latino descent (n=30). 97.0% of parents (n=32) reported a race of White; included in this total, n=1 parent selected Alaska Native and White, n=1 parent chose Asian and White, and n=2 parents reported Black or African American and White (see Table 1). 90.9% of the children (n=30) lived in two-parent homes. N=2 preschoolers lived in a one-parent home and n=1 child resided in an other type of home in which a boyfriend stayed in the household. 63.6% of all families (n=21) had two children in the home. 15.2% (n=5) reported three children, 12.1% (n=4) had only one child, and 9.1% (n=3) had four children.
Table 1

Children’s Race

<table>
<thead>
<tr>
<th>Race</th>
<th>Number of Children (n=33)</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Indian or Alaska Native</td>
<td>1</td>
</tr>
<tr>
<td>Asian</td>
<td>2</td>
</tr>
<tr>
<td>Black or African American</td>
<td>2</td>
</tr>
<tr>
<td>Native Hawaiian or Other Pacific</td>
<td>0</td>
</tr>
<tr>
<td>White</td>
<td>32</td>
</tr>
</tbody>
</table>

The mothers’ education was diverse ranging from some college to a professional degree (see Table 2). 100% of the mothers (n=33) completed some college and 81.8% (n=27) earned a 4-year degree or higher. In comparison, the fathers’ level of education spread across a larger range from n=1 who completed less than high school to n=2 who completed a professional degree. 90.9% of fathers (n=30) completed some college while 69.7% (n=23) earned a 4-year degree or higher.
Table 2

*Parents’ Level*

<table>
<thead>
<tr>
<th>Level of Education</th>
<th>Mother (n=33)</th>
<th>Father (n=33)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than High School</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>High school/GED</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Some college</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>2-Year college degree</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>4-Year college degree</td>
<td>9</td>
<td>13</td>
</tr>
<tr>
<td>Master’s degree</td>
<td>15</td>
<td>7</td>
</tr>
<tr>
<td>Doctoral degree</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Professional degree</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Employment status among mothers and fathers was similar in which a majority were employed full-time (see Table 3). 78.8% of mothers (n=26) worked full-time whereas 84.8% of fathers (n=28) worked full-time. 12.1% of mothers (n=4) reported part-time status while just 3.0% of fathers (n=1) worked part-time. 9.1% of mothers (n=3) and 9.1% of fathers (n=3) reported that they were unemployed. The employment status was not provided for one father in the sample.
Table 3

*Parents’ Employment*

<table>
<thead>
<tr>
<th>Employment Status</th>
<th>Mother (n=33)</th>
<th>Father (n=33)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not employed</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Part-time</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Full-time</td>
<td>26</td>
<td>28</td>
</tr>
<tr>
<td>N/A</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Just as the levels of education were diverse, occupations varied greatly among the parents who responded to the survey. The most common position held by mothers related to teaching (see Figure 1). 43.0% of mothers (n=14) reported being a teacher, professor, lecturer, or instructor. The next two most populous fields were business and medicine in which each were represented by 15.0% (n=5) of the women.
Figure 1. Mothers’ Occupations

Fathers’ occupations were scattered among disciplines (see Figure 2). Some of these positions included business/finance (n=7), engineering (n=3), and managerial (n=2). The occupations that overlapped among both genders were business, medicine, teaching, and student.
Despite the wide variety of jobs, total family income fell at the upper end of the scale in which 69.7% (n=23) reported over $75,000 (see Figure 3). 12.1% (n=4) reported $52,500-$74,999, 9.1% (n=3) reported $30,000-$52,499, and 9.1% (n=3) reported less than $30,000.

**Figure 2. Fathers’ Occupations**

Despite the wide variety of jobs, total family income fell at the upper end of the scale in which 69.7% (n=23) reported over $75,000 (see Figure 3). 12.1% (n=4) reported $52,500-$74,999, 9.1% (n=3) reported $30,000-$52,499, and 9.1% (n=3) reported less than $30,000.
Figure 3. Family Income

Responses to Questions. Parents were asked to list the activities their children engaged in that they paid for to participate. 30.3% of parents (n=10) listed none while 69.7% (n=23) listed at least one activity. There was redundancy in responses for the following activities: Chuck E. Cheese, dance class, gymnastics, Imagination Station, seasonal events, soccer, swim lessons, Sylvania Playland, and the zoo. The most popular paid for activity was swim lessons in which 39.4% of parents (n=13) reported this answer. N=1 parent did not respond to this question.

In the next prompt, parents were asked to describe all technology-based activities that they engaged in with their child. The majority of parents (93.9%, n=31) listed television and movies. Other frequent responses included a computer, which 75.8% of parents (n=25) recorded, 48.5% of parents (n=16) listed a tablet, 42.4% (n=14) recorded video games, and 42.4% (n=14) reported using a cell phone with their preschooler. Of all technology users, parents were asked if their child was required to obtain parent permission first. Responses varied. 75.8% of parents (n=25) replied yes and 15.1% (n=5)
replied no. The remaining 9.1% of parents (n=3) explained that whether or not their child was required to obtain parent permission before using technology depended on the type of activity.

The parents in the sample described many different ways to monitor technology use. 51.5% of participants (n=17) indicated that they played along or watched the activity to monitor use. Other answers included setting time limits, only permitting age appropriate content and usage at particular times of the day, locating the device in a kitchen, and utilizing parental controls, passwords, and locks. One parent noted that other activities are required before the child may engage in screen time. Another parent replied that the child did not know how to use any devices. 6.1% of parents (n=2) did not provide an answer to this question.

Next, parents were asked to explain what types of specific things their child does while using technology. Many parents provided an explanation for each type of device used. For example, on a tablet, some parents reported that their children played educational games, crosswords, and read stories. While on the computer, other children watched YouTube videos, Skyped with grandparents, visited child oriented websites, listened to music, or typed their name and phone number. The most common responses pertained to games in which 75.8% (n=25) of parents provided an answer that fell in this category. The second most popular activity that children engaged in while using technology according to the parents was watching television in which 48.5% (n=16) listed this activity. N=1 parent did not respond to the question.

To determine if preschool children were solely focused on media, parents were asked if their child took part in another task or activity at the same time they used
technology. 36.4% (n=12) of parents responded that their child did not do anything else, and n=1 parent simply asked, “Can you really do more than one at a time?” For parents who did provide an activity that their child completed while using technology, the majority cited eating while watching television. 27.3% (N=9) of parents listed that their child ate while engaging with some form of technology.

The researcher wanted to understand if parents felt that technology was beneficial to their child. In the first n=20 surveys completed, parents were asked to respond to the following question: How do you think the use of technology benefits your child? Explain why or why not. This question was changed in the last n=13 surveys to be less biased, in which parents were asked, do you think the use of technology benefits your child? Explain why or why not. Despite the change in wording, responses were very similar. 15.0% (n=3) of parents in the first set of surveys referred to gross or fine motor skills whereas n=1 parent in the second group provided this answer. In the first set of surveys, 65.0% (n=13) of parents explained that technology is beneficial to learning and n=2 parents related technology to academics and teaching. 53.8% (n=7) of parents in the second group believed that technology was beneficial for learning and education.

Among all of the parents, a majority felt that technology had positive connotations for their child. However, one parent was not a proponent and responded to this question, “I think (the child) is too young to use technology. Also, it seems that (the child) is not very interested in using technology. (The child) loves to play toys and participate in social activity.” And, n=3 parents in the first group and n=2 parents in the second group of surveys expressed concern for how much time is spent with technology. For example, one comment was, “If I ever saw that my (child) would rather play with
electronics rather than play physically with another child or go to...soccer games, then I would think about enforcing limits. But (the child) has no problems at all with transitioning to physical play.” Another parent said, “In small doses, I think it’s beneficial for learning...However, I do not let (the child) play with just anything or watch anything. Everything is monitored and not for long periods of time.”

The last question of the survey was also modified after the first 20 questionnaires were completed to be less biased. In the first group, the question asked, in what ways do you think technology impacts your child’s school readiness? Please explain. The modified question read, do you think technology impacts your child’s school readiness? Please explain. One parent in the first group did not respond and n=3 parents did not believe that technology impacted their child’s school readiness. A parent stated, “I don’t really see how it impacts ‘readiness’ since most early childhood and elementary schooling doesn’t involve modern technology.” Another comment included,

For preschoolers, I don’t think there is any impact of technology on child’s school readiness. It’s the time for them to learn language skills, learn how to communicate with people effectively, to learn the world with their peers, their teacher and the parents, to form a good personality.

From the second group, one parent did not reply and 61.5% (n=8) felt that technology helped prepare their child for school. N=2 parents responded no: “No because it is monitored”; and, “No – most technology (the child) uses is academic related...” There may have been confusion about what the question meant regarding the type of impact that technology had, whether negative or positive, on the level of preparedness for school.
The researcher was trying to understand if parents associated a positive relationship between technology and school readiness.

**Diary of Activities.** Parents were asked to choose one typical weekday and one typical weekend day and provide their child’s activities between the hours of 7:00 a.m. and 9:00 p.m. The researcher copied these entries into an Excel spreadsheet and tallied the amount of time spent in each play category (technology, non-technology, and outdoor) per weekday and weekend day for each questionnaire. Of the weekday activities, n=31 parents reported a total of 53.00 hours of technology play for an average of 1.71 hours per child per day (see Table 4). There was an increased amount of time spent on non-technology activities listed by n=31 parents for a total of 59.25 hours and an average of 1.91 hours per child. A smaller number of parents (n=14) recorded outdoor play, totaling 17.50 hours with an average of 1.25 hours per child.

Table 4

**Breakdown of Play**

<table>
<thead>
<tr>
<th>Time of Week</th>
<th>Technology Play</th>
<th>Non-Technology</th>
<th>Outdoor Play</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekday</td>
<td>53.00 hours</td>
<td>59.25 hours</td>
<td>17.50 hours</td>
</tr>
<tr>
<td>Weekend</td>
<td>76.00 hours</td>
<td>107.25 hours</td>
<td>61.00 hours</td>
</tr>
</tbody>
</table>

The amount of time spent playing across all categories of weekend activities increased from the weekday activities. The most time was spent on non-technology play in which n=30 parents reported 107.25 hours. This is an average of 3.58 hours per child per day and an 87.4% increase in time per child on non-technology activities from
weekday to weekend. N=29 parents documented a total of 76.00 hours of technology play with an average of 2.62 hours per child per day, accounting for a 53.2% increase in average per child on technology activities from weekday to weekend day. Lastly, the number of parents reporting outdoor play on the weekend doubled to n=28. Children spent a total of 61 hours playing outside for an average of 2.18 hours per child which represents a 74.4% increase in average per child in time spent playing outside compared to the time spent outside on a weekday.

The majority of children engaged in non-technology play the most over both weekday and weekend play followed by technology based activities. However, the largest increase in participants occurred in weekend outdoor play. Although outdoor play still accounted for the least amount of total play hours during the typical weekday and weekend day, the overall amount of time spent playing outside on the weekend increased more from the weekday total than the other two forms of play. Outdoor play rose 248.6% in the total number of hours reported from weekday to weekend day. Non-technology play showed the largest increase in average time spent per child from weekday to weekend which resulted in an 87.4% rise while outdoor play trailed at 74.4%.

Between weekday and weekend activities, the highest and lowest amount of total time spent in each play category remained consistent. Parents reported that their children spent the most combined time on non-technology play, least time engaged in outdoor play, and technology play was in between the two for both weekday and weekend. Total play time increased in all three categories from weekday to weekend. Technology play on the weekend increased a total of 23.00 hours with a .91 increase in average hours per child. Non-technology play increased a total of 48 hours with a 1.67 increase in average
hours per child. And, the amount of time spent playing outdoors increased 43.50 hours with a 0.93 increase in average hours per child.

The type of technology that children played with during the week could be categorized into one of seven activities (see Table 5). Television was by far the most popular. Parents of n=28 children recorded television viewing. This was also the activity in which parents reported their children spent the most time compared to the other technology activities in which children engaged. The next most common activity involved a tablet in which n=13 children utilized this type of device and averaged 1.04 hours per day. Some parents listed two types of activities in the same cell of the table (i.e., iPad/Cartoons). It is unclear whether the child did both at the same time or alternated between the two during the time frame. Therefore, the researcher listed both activities but only counted the overall time spent in the category of technology once.
### Table 5

*Weekday Technology Play*

<table>
<thead>
<tr>
<th>Activity</th>
<th>n</th>
<th>Amount</th>
<th>Average Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>TV</td>
<td>28</td>
<td>32.25 hr</td>
<td>1.15 hr/day</td>
</tr>
<tr>
<td>Tablet</td>
<td>13</td>
<td>13.50 hr</td>
<td>1.04 hr/day</td>
</tr>
<tr>
<td>Video game</td>
<td>7</td>
<td>4.50 hr</td>
<td>.64 hr/day</td>
</tr>
<tr>
<td>Music/iPod</td>
<td>5</td>
<td>3.50 hr</td>
<td>.70 hr/day</td>
</tr>
<tr>
<td>Computer</td>
<td>5</td>
<td>2.00 hr</td>
<td>.40 hr/day</td>
</tr>
<tr>
<td>Cell phone</td>
<td>2</td>
<td>1.25 hr</td>
<td>.63 hr/day</td>
</tr>
<tr>
<td>Electronic toy</td>
<td>1</td>
<td>.75 hr</td>
<td>.75 hr/day</td>
</tr>
</tbody>
</table>

*Note: 1.00 hr activity reported but not disclosed*

Weekday non-technology play was more diverse which led to more categories than technology contained (see Table 6). The most popular activity was reading in which n=17 parents recorded, but the activity that accounted for the most amount of time was general toys which accounted for 16.50 hours. Although art and writing activities were only reported by n=6 parents, the children who engaged in this activity spent on average the most amount of time for that category at 1.42 hours per day.
Table 6

*Weekday Non-technology Play*

<table>
<thead>
<tr>
<th>Activity</th>
<th>n</th>
<th>Amount</th>
<th>Average Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read</td>
<td>n=17</td>
<td>11.00 hr</td>
<td>.65 hr/day</td>
</tr>
<tr>
<td>Toys (general)</td>
<td>n=15</td>
<td>16.50 hr</td>
<td>1.10 hr/day</td>
</tr>
<tr>
<td>Free play/pretend/dress-up</td>
<td>n=9</td>
<td>9.50 hr</td>
<td>1.06 hr/day</td>
</tr>
<tr>
<td>Cars/trucks/trains</td>
<td>n=8</td>
<td>5.50 hr</td>
<td>.69 hr/day</td>
</tr>
<tr>
<td>Puzzles/games</td>
<td>n=7</td>
<td>3.00 hr</td>
<td>.43 hr/day</td>
</tr>
<tr>
<td>Art/color/draw/write</td>
<td>n=6</td>
<td>8.50 hr</td>
<td>1.42 hr/day</td>
</tr>
<tr>
<td>Play with family/friend</td>
<td>n=5</td>
<td>6.00 hr</td>
<td>1.20 hr/day</td>
</tr>
<tr>
<td>Dolls/action figures</td>
<td>n=4</td>
<td>3.50 hr</td>
<td>.88 hr/day</td>
</tr>
<tr>
<td>Legos</td>
<td>n=2</td>
<td>.75 hr</td>
<td>.38 hr/day</td>
</tr>
<tr>
<td>Sport</td>
<td>n=1</td>
<td>1.00 hr</td>
<td>1.00 hr/day</td>
</tr>
<tr>
<td>Sing</td>
<td>n=1</td>
<td>.50 hr</td>
<td>.50 hr/day</td>
</tr>
</tbody>
</table>

*Note: 5.00 hr activity reported but not disclosed*

During the week, children played outdoors far less than with technology and non-technology. For those children who played outside, n=4 engaged in free play and the next most common activity included ride-on toys such as a bicycles, tractors, and scooters.
The average amount of time spent playing outside ranged from .81 (free play) to 1.50 hours per day (playground/sandbox).

Table 7

*Weekday Outdoor Play*

<table>
<thead>
<tr>
<th>Activity</th>
<th>n</th>
<th>Amount</th>
<th>Average Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free play</td>
<td>4</td>
<td>3.25 hr</td>
<td>.81 hr/day</td>
</tr>
<tr>
<td>Bike/tractor/scooter</td>
<td>3</td>
<td>3.50 hr</td>
<td>1.17 hr/day</td>
</tr>
<tr>
<td>Leaves</td>
<td>3</td>
<td>3.00 hr</td>
<td>1.00 hr/day</td>
</tr>
<tr>
<td>Playground/sandbox</td>
<td>2</td>
<td>3.00 hr</td>
<td>1.50 hr/day</td>
</tr>
<tr>
<td>Walk/dog</td>
<td>2</td>
<td>2.00 hr</td>
<td>1.00 hr/day</td>
</tr>
<tr>
<td>Soccer/basketball</td>
<td>2</td>
<td>1.75 hr</td>
<td>.88 hr/day</td>
</tr>
</tbody>
</table>

*Note: 1.75 hr activity reported but not disclosed*

Overall, children spent more time playing with technology, non-technology, and outdoors on the weekend day compared to weekday play in each corresponding category. Consistent with weekday technology, television represented the most common weekend technology activity in which 84.8% (n=28) parents reported this activity (see Table 8). Note that one parent listed television in the diary as a footnote but did not indicate the amount of time spent. Tablets were again the second most frequent form of technology use with n=13 children.
Table 8

*Weekend Technology Play*

<table>
<thead>
<tr>
<th>Activity</th>
<th>n</th>
<th>Amount</th>
<th>Average Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>TV</td>
<td>n=27</td>
<td>52.25 hr</td>
<td>1.94 hr/day</td>
</tr>
<tr>
<td>Tablet</td>
<td>n=13</td>
<td>12.00 hr</td>
<td>.92 hr/day</td>
</tr>
<tr>
<td>Computer/Skype</td>
<td>n=9</td>
<td>8.75 hr</td>
<td>.97 hr/day</td>
</tr>
<tr>
<td>Video game</td>
<td>n=5</td>
<td>2.75 hr</td>
<td>.55 hr/day</td>
</tr>
<tr>
<td>Cell phone</td>
<td>n=3</td>
<td>1.50 hr</td>
<td>.50 hr/day</td>
</tr>
<tr>
<td>Music/iPod</td>
<td>n=2</td>
<td>1.25 hr</td>
<td>.63 hr/day</td>
</tr>
<tr>
<td>Electronic toy</td>
<td>n=1</td>
<td>.25 hr</td>
<td>.25 hr/day</td>
</tr>
</tbody>
</table>

*Note:* 1.25 hr activity reported but not disclosed; and, TV, iPod, and video game reported but time undisclosed and not included in above table.

For weekend non-technology, activities overlapped with the weekday non-technology list with the exception of Chuck E. Cheese (see Table 9). However, one may argue that this type of play involves technology considering that the majority of activities at this facility are rides and electronic games. The most popular activity for weekend non-technology was reading, consistent with the weekday tallies, at n=22 children. And again, the most time consuming activity was playing with toys which comprised 29.25 hours of time. The highest average time per day spent on an activity was playing with a family member, friend, or pet in which n=4 children averaged 2.44 hours per day on the weekend.
Table 9

*Weekend Non-technology Play*

<table>
<thead>
<tr>
<th>Activity</th>
<th>n</th>
<th>Amount</th>
<th>Average Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read</td>
<td>22</td>
<td>17.25 hr</td>
<td>.78 hr/day</td>
</tr>
<tr>
<td>Toys (general)</td>
<td>16</td>
<td>29.25 hr</td>
<td>1.83 hr/day</td>
</tr>
<tr>
<td>Free play/pretend/</td>
<td>15</td>
<td>17.00 hr</td>
<td>1.13 hr/day</td>
</tr>
<tr>
<td>dress-up</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Art/crafts/color/draw/write</td>
<td>10</td>
<td>7.50 hr</td>
<td>.75 hr/day</td>
</tr>
<tr>
<td>Cars/trains</td>
<td>9</td>
<td>10.00 hr</td>
<td>1.11 hr/day</td>
</tr>
<tr>
<td>Puzzles/games/cards</td>
<td>7</td>
<td>7.75 hr</td>
<td>1.11 hr/day</td>
</tr>
<tr>
<td>Music/dance</td>
<td>5</td>
<td>3.00 hr</td>
<td>.60 hr/day</td>
</tr>
<tr>
<td>Play with family/friend/pet</td>
<td>4</td>
<td>9.75 hr</td>
<td>2.44 hr/day</td>
</tr>
<tr>
<td>Legos</td>
<td>4</td>
<td>4.25 hr</td>
<td>1.06 hr/day</td>
</tr>
<tr>
<td>Dolls/action figures</td>
<td>2</td>
<td>.50 hr</td>
<td>.25 hr/day</td>
</tr>
<tr>
<td>Chuck E. Cheese</td>
<td>1</td>
<td>1.50 hr</td>
<td>1.50 hr/day</td>
</tr>
<tr>
<td>Swimming</td>
<td>1</td>
<td>1.00 hr</td>
<td>1.00 hr/day</td>
</tr>
</tbody>
</table>

*Note:* 8.00 hr activity reported but not disclosed; and, free play and play with friends reported but time undisclosed and not included in above table.
Lastly, weekend outdoor play was higher than the amount reported on the weekday, but lower than the weekend technology and non-technology play. N=9 parents reported that their child played at the park or with playground equipment such as a sandbox (see Table 10). While this was the most common outdoor activity, free play accounted for the most amount of time at 20.50 hours in which the children played an average of 2.93 hours per day on the weekend. Upon examination of the average amount of time spent on outdoor activities both on a weekday and on a weekend day, results show that children average more time on outdoor activities compared to either technology or non-technology. The least amount of time spent on a weekend outdoor activity on average was .75 hours per day (walk/hike) and .81 hours per day (free play) was spent on weekday outdoor activity. Meanwhile, the activities with the lowest weekday technology and non-technology and weekend technology and non-technology averages were .40, .38, .25, and .25 hours per day, respectively. Likewise, the highest averages per day comprised outdoor activities. This may suggest that outdoor play is either more engaging or more time consuming because of the nature of the activity.
Table 10

*Weekend Outdoor Play*

<table>
<thead>
<tr>
<th>Activity</th>
<th>n</th>
<th>Amount</th>
<th>Average Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Playground/park/sandbox</td>
<td>n=9</td>
<td>12.00 hr</td>
<td>1.33 hr/day</td>
</tr>
<tr>
<td>Outdoor free play/toys</td>
<td>n=7</td>
<td>20.50 hr</td>
<td>2.93 hr/day</td>
</tr>
<tr>
<td>Bike/4-wheeler/scooter</td>
<td>n=7</td>
<td>9.75 hr</td>
<td>1.39 hr/day</td>
</tr>
<tr>
<td>Zoo/Farmers Market</td>
<td>n=3</td>
<td>5.00 hr</td>
<td>1.67 hr/day</td>
</tr>
<tr>
<td>Soccer</td>
<td>n=3</td>
<td>4.25 hr</td>
<td>1.42 hr/day</td>
</tr>
<tr>
<td>Leaves/acorns/yard work</td>
<td>n=3</td>
<td>3.25 hr</td>
<td>1.08 hr/day</td>
</tr>
<tr>
<td>Walk/hike</td>
<td>n=3</td>
<td>2.25 hr</td>
<td>.75 hr/day</td>
</tr>
<tr>
<td>Snow</td>
<td>n=2</td>
<td>2.50 hr</td>
<td>1.25 hr/day</td>
</tr>
<tr>
<td>Bounce House/trampoline</td>
<td>n=2</td>
<td>2.00 hr</td>
<td>1.00 hr/day</td>
</tr>
</tbody>
</table>

*Note:* 4.50 hr activity reported but not disclosed; and, outdoor play was listed but the time was undisclosed and is not included in the above table.

**Parent Interviews**
N=6 parents completed the in-person interview. These were completed over three different days and each lasted approximately 20 minutes. Participants included one male and five female parents in which they provided responses for four female children and two male children. No other demographic information was collected to maintain privacy.

The researcher began by asking each to think of their preschool child between the ages of 3 and 5. Parents were asked nine open-ended questions. To start the interview, the researcher asked what they considered play. 66.7% (n=4) parents provided examples of traditional forms of play only while 33.3% (n=2) gave activities that included both traditional forms of play and technology. The only technology play mentioned was the iPad and both parents 1 and 3 discussed how their child plays with a tablet. More specifically, they reported that one utilizes educational games on the device and watches Netflix, and the other child plays various apps. There were commonalities in the traditional forms of play given as well. For example, n=3 parents described play as using the imagination and playing make-believe. And, n=2 parents discussed outdoor activities like swimming, soccer, and a swing set. It is important to note that parent 1 explained her reasoning for how her preschooler plays. She stated, “We like play to be with objects and not all technology.” She continued that they try to limit the technology because it is everywhere and her child is capable of accessing technology by himself.

Next, parents were asked to discuss the different ways they see their preschool child playing. Again, 66.7% (n=4) parents only provided traditional forms of play in their explanation, but this was a different group than the four who parents who provided only traditional examples in question one. 33.3% (n=2) gave examples of both technology and traditional play in their response, although just one of the latter two parents also listed
technology and traditional play in the first question. Responses to this question overlapped somewhat with question one. As an example, parents responded with outdoor activities, playing pretend, and the iPad.

In question three, the researcher asked parents how much time their child played outdoors on a typical day, and what types of things they played. 83.3% (n=5) prefaced their answer by rationalizing the amount of time based on the weather. Parent 3 explained, “If it’s sunny, at least two hours per day.” On average, the parents reported that their child spends two hours per day outside (see Table 11). Of all the outdoor play discussed by the parents, the majority of activities required a large open space or an outside environment. Examples included swing-sets, sports, sidewalk chalk, and fishing. Only parents 5 and 6 reported an activity involving technology: a motorized John Deere tractor and Jeep.
Table 11

*Interview Question: Outdoor Activities*

<table>
<thead>
<tr>
<th>Parent</th>
<th>Time Playing Outdoors</th>
<th>Outdoor Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1-1.5 hr/day</td>
<td>Ride on car</td>
</tr>
<tr>
<td>2</td>
<td>2 hr/day</td>
<td>Swing-set, dolls, bike riding, water toys, snow</td>
</tr>
<tr>
<td>3</td>
<td>2 hr/day</td>
<td>Riding bike, swing-set, slides, t-ball, swimming, waterpark</td>
</tr>
<tr>
<td>4</td>
<td>2 hr/day</td>
<td>Swings, scooter, big-wheel, sand, bike carrier, grocery</td>
</tr>
<tr>
<td>5</td>
<td>2 hr/day</td>
<td>Swing-set, sports, swimming, John Deere</td>
</tr>
<tr>
<td>6</td>
<td>2-3 hr/day</td>
<td>Riding bike, running, chalk, swings, Jeep, fishing</td>
</tr>
</tbody>
</table>

Following the discussion of outdoor play, parents were asked how much time their child played indoors and what types of things they played. The amount of time reported varied greatly among the interviewees (see Table 12). Parent 1 said that aside of the one or one and a half hours spent outdoors, her child spent the rest of the day playing inside and parent 4 responded that her child spent the remaining 12 hours a day “destroying the house”. Parent 1 responded to the question with only examples of
technology activities while parents 2 and 4 reported only traditional forms of play.
Parents 3, 5, and 6 described activities that included both traditional play and technology.

Table 12

*Interview Questions: Indoor Activities*

<table>
<thead>
<tr>
<th>Parent</th>
<th>Time Playing Indoors</th>
<th>Indoor Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(The rest of time)</td>
<td>Star Wars/Minecraft games, computer, PlayStation, iPad</td>
</tr>
<tr>
<td>2</td>
<td>4-6 hr/day</td>
<td>Pretend, kitchen, cooking, dolls, books, Legos</td>
</tr>
<tr>
<td>3</td>
<td>2-5 hr/day</td>
<td>Movies, puzzles, crayons, watercolor, flashcards, iPad</td>
</tr>
<tr>
<td>4</td>
<td>12 hr/day</td>
<td>Puzzles, Legos, kitchen, cleaning, laundry</td>
</tr>
<tr>
<td>5</td>
<td>3 hr/day</td>
<td>Basketball, board games, puzzles, books, math, technology</td>
</tr>
<tr>
<td>6</td>
<td>3 hr/day</td>
<td>Dolls, dress-up, doctor set, movies, cars, puzzles, LeapPad</td>
</tr>
</tbody>
</table>

In the next question, the researcher asked parents how much time their child played with technology and what types of things they played. The amount of time ranged
from .25 hours to 2-4 hours (see Table 13). Each parent interviewed said that their child played with a tablet device and 83.3% (n=5) named the iPad. This was the most common technology activity. Only 50.0% (n=3) of parents replied that their child watched television or movies. Parents 1 and 5 explained that they place limits on the amount of technology played. Parent 1 said that they limit any screen time like TV and the iPad while parent 5 said that she limits the technology but Dad does not. She has a rule that her child has to do Raz-Kids, an educational reading program, and a puzzle before he can do technology in the summer.

Table 13

*Interview Question: Technology Activities*

<table>
<thead>
<tr>
<th>Parent</th>
<th>Time Playing Technology</th>
<th>Technology Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1-1.5 hr/day</td>
<td>Netflix, TV, iPad, Minecraft, computer</td>
</tr>
<tr>
<td>2</td>
<td>2-4 hr/day</td>
<td>TV, Kindle</td>
</tr>
<tr>
<td>3</td>
<td>1 hr/day</td>
<td>Skype, digital toys, Z-Tech, LeapFrog, cell phone, iPad</td>
</tr>
<tr>
<td>4</td>
<td>.25 hr/day</td>
<td>iPad, alphabet toy</td>
</tr>
<tr>
<td>5</td>
<td>2.5 hr/day</td>
<td>iPad, Kindle, iPod, Xbox, cell phone, Wii, Raz-Kids</td>
</tr>
<tr>
<td>6</td>
<td>2 hr/day</td>
<td>Movies, iPad, LeapPad, cell phones</td>
</tr>
</tbody>
</table>
After parents discussed how their child engaged in technology play, the researcher asked interviewees how they felt technology should be used by a preschooler. Parents 1 and 2 both said that technology should be limited and each indicated that it should be supervised or monitored. 66.7% (n=4) parents responded that technology is positive for reasons such as exposure, learning, and education. Parent 3 said she thinks that children should use technology to get used to a keyboard and because her child will use it in college and grade school. She indicated that technology helps her child know where the letters are on the keyboard and the preschool utilizes an iPad and desktop computer. Parent 4 believes that the iPad “might be good for learning sequence of events” and that technology provided good learning tools. Additionally, parent 6 feels that technology is beneficial for education and gets children excited about learning.

Although parent 2 felt that technology should be used by a preschooler “for exposure and educational games,” she felt that it should be used in moderation and in a limited way. This interviewee also felt that technology needs to be monitored. Similarly, parent 1 had concerns about the amount of technology used by her preschooler. She said that her child “gets crazy” if they say no and he “gets very engrossed.” Further, with their second child, “technology was a lifesaver” to occupy their older son; but now that the younger child is older, they are trying to pull back technology and “limit it more” with their son.

To understand which technology activities preschoolers most enjoy, the researcher asked parents about their child’s favorite things to do with technology. Responses can be found in Table 14. Tablet apps and electronic games were the most popular activities in which 100% (n=6) of parents stated their child enjoyed these the
most. At least 66.7% (n=4) of parents included an educationally based activity. Parents 1 and 5, who each responded for their preschool boy, both reported video games as a favorite activity. Only n=2 parents listed television or movies as one of their child’s favorite types of technology.

Table 14

*Interview Question: Favorite Technology*

<table>
<thead>
<tr>
<th>Parent</th>
<th>Favorite Technology Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Minecraft game, Netflix, educational/ Cartoon-based shows, Discovery channel</td>
</tr>
<tr>
<td>2</td>
<td>Looking at pictures on cell phones, Kindle ABC and 123 games</td>
</tr>
<tr>
<td>3</td>
<td>A-Z, counting, singing, Wheels on the Bus, Kids on the Bus, and Monkey apps</td>
</tr>
<tr>
<td>4</td>
<td>Five Little Monkeys and Mr. Potato Head apps</td>
</tr>
<tr>
<td>5</td>
<td>Xbox, iPod music, iPad apps, sports-based technology, Raz-Kids, Township app</td>
</tr>
<tr>
<td>6</td>
<td>Electronic books, iPad games, movies</td>
</tr>
</tbody>
</table>

Next, interviewees were asked to think about their preschooler and explain what they feel are the advantages and disadvantages of technology. 83.3% (n=5) of parents believed that technology use by their preschooler was beneficial for learning. Parent 5
stated, “Technology advances him.” Parent 6 said that technology is advantageous because it provides “more learning when we don’t have time.”

Aside from the learning aspect, interviewees also explained that technology will be useful to prepare their children for what to expect in school. Parent 1 commented that her child will be using more technology once he enters school and that “everything is more technology based.” She added that a lot of classrooms use technology and her child is going to see it more. Parent 4 told the researcher, “The whole world has technology so the more advanced, the better they’ll be” and so they are not afraid of it. And, parent 5 explained that the advantage of technology is that her child “can use it all when he enters school.” Further, she said that technology will help with testing since all of the tests are electronic now, and this parent believes that her child will be ahead of the kids in this sense.

All of the interviewees were able to identify disadvantages to technology use as well. Both parents 1 and 5, who have a preschool son, described a problem with breaking their child away from technology. Parent 1 explained, “You need to focus and get in his face. It’s hard to transition him away.” Similarly, parent 5 said, “He’s addicted to it. He craves technology” and gets obsessed. In addition to the addictive nature, parent 1 expressed concern about her child’s eyes as did parent 5. Parent 1 also worries about her child sitting around and being inactive. She thinks that he is better focused when he gets out and gets exercise. Parent 3 also said that she wants her child “to be active and do other things and get exercise.”

The other interviewees described other ways that they considered disadvantages of technology. 50.0% (n=3) of parents indicated that they felt technology could be time
consuming and were concerned with the amount of time that their child spent on technology. Parents 1 and 2 were worried that technology limited social interaction. Further, parent 2 said technology caused a “lack of exposure to other learning things.” Parent 4 said that a disadvantage of technology by her preschooler is that “there’s stuff they could get into.” She also told the researcher, “I’m not sure how much it stimulates imagination and creativity. I want them to play pretend.” Lastly, parent 6 was concerned that his child was not really reading with electronic books, just listening. He added that with paper, meaning the traditional hardcopy format of a book, she was “trying to learn” how to read the words opposed to simply following along.

In the last question of the interview, the researcher asked parents what they felt the most important skills were for a child who was entering kindergarten to possess. 83.3% (n=5) of parents each said that knowing the alphabet or letters, colors, pre-reading or knowing some words, and recognizing numbers were among the most important skills (see Figure 4). 66.7% (n=4) of parents thought that a preschooler should know personal information like his or her name and have social skills. 50.0% (n=3) of parents identified shapes, following rules, and communication or vocabulary as one of the most important skills a preschool child should possess. N=1 parent indicated that learning some Spanish was significant. And, n=1 parent thought that knowing how to write was important. Of all the skills, technology was not mentioned by any of the parents.
Figure 4. Perceived Skills of Importance

Results of the questionnaire, diary, and interviews reveal overlap in the types of activities in which children engage and parental beliefs about their children’s play and technology use. Children in this study spent almost as much time with technology as traditional play activities and this was consistent from weekday to the weekend. However, there was conflict between the amount of outdoor time reported in the diary and the outdoor amount expressed by parents in the interview. Data also showed that preschoolers do not engage in more than one activity while using media except for eating.

A distinct role of technology emerged. Parents discussed its educational benefits and explained that their children played with technology for entertainment. Advantages of technology centered on learning and exposure to various media tools. Meanwhile, common disadvantages that surfaced were concerns about overuse, addiction, harm to the eyes, and inappropriate content. Within the questionnaires and interviews, parents described a need for balance between technology and traditional play.
Chapter Five

Discussion

Technology Versus Traditional Play

This study was conducted to determine what activities children partake in during a weekday and weekend day. Results of the research show that preschool children are spending almost as much time with technology as they are with traditional forms of play, especially during the week. As expected, the number of hours that children spent playing across all categories on the weekend increased from the amount reported for weekday play. Also taking into account the variability in seasons when surveys were completed, it is not surprising that outdoor play accounted for the overall lowest number of hours.

Although little research exists on the activities in which preschool children engage, data from this study reflect the findings of other researchers. Frost (2008) notes that children today are playing with more technology, and according to Hofferth (2010), children are using media on a daily basis. Yelland (2011) reports that children spend approximately two hours of screen time per day which is comparable to the weekday and weekend averages of technology use found in this study.

Data Overlap

There was an overlap in the activities in which preschool children engaged based on the diary data and parent interviews. In the technology category, these included television, tablets, cell phones, iPods, video games, computers, and electronic toys. For non-technology play, action figures, Legos, dolls, books, puzzles, board games, imaginative play, dress-up, art/drawing, songs, dancing, playing with others, and toys in general were both discussed by parents and recorded in the diaries. Lastly, the overlap in
outdoor play included sports like soccer, swings, sandboxes, bikes, scooters, tractors, walks, and play in natural elements relevant to the season such as leaves and snow. This match between the examples that parents referred to in the interviews and the actual play recorded in the diaries suggests that the aforementioned activities may be characteristic of how preschoolers play, at least among preschoolers from higher socioeconomic backgrounds.

Diary results showed that preschoolers in this study spent the most amount of time playing with non-technology based activities followed by technology and then outdoor play. In the interviews, parents were asked how much time their child spent playing with technology as well as outdoors. Responses somewhat conflicted with the results obtained from the diary information. Most of the parents who were interviewed indicated that their child spent less time engaged with technology than playing outside. The majority (n=4) said that their child spent two hours per day outside. The difference between perceived and actual time may be due to the timing of the interviews versus when the diaries were completed. Parent interviews were completed at the beginning of June when temperatures were warm, providing more opportunity for outdoor play. Or, perhaps parents’ responses reflected how they preferred to balance their preschoolers’ activities. Several had mentioned that they felt the need to limit their child’s time with technology and some discussed balancing traditional play with digital devices. Parents may also provide different answers in an interview setting than they would anonymously on paper.

One Activity at a Time
My third research question related to whether children engaged in other activities while using technology. The original intent was to determine if preschool children were capable of focusing on two activities, such as two different forms of technology, simultaneously. Data showed that preschoolers really do not engage in more than one thing at a time unless it involves play and eating. For those parents who indicated that their child did partake in some other activity while using media, most cited eating while watching television. In the survey, 27.3% (n=9) of parents said that their child ate while using technology whereas 21.2% (n=7) of parents recorded in the diaries that their child ate while watching television or using a tablet. Diary data also showed that a low percentage of children (n=3) read stories while eating. As a result, a new question emerges; is there a relationship between preschoolers’ technology use and eating? Arthur (2010) and Levin (2010) discuss concerns about the impact of technology on children’s health. With the alarming percentage of children who are overweight in the United States and with the increased exposure to technology, it is important to consider if there is a possible connection. However, a different study with a much larger sample would be necessary to determine if there is any relationship between media use and eating.

**Parental Beliefs**

In my fourth research question I asked what parents believed about technology use by their preschooler. Interviewees were asked to comment on the advantages and disadvantages of technology. Parent 1 emphasized an increase in the availability and use of technology. She felt as though media was everywhere and stressed a more, more, more mentality as to the abundance, use, and dependence upon it. Parent 4 also made mention of the wide use of media and felt it was beneficial for her child to learn. Parent 6 felt that
technology provided more opportunities for learning, offered more detail, and made
concepts easier to comprehend. Parents 4 and 5 both felt as though technology advanced
their child. In general, advantages centered on exposure to or familiarity with mainstream
media and how technology can be used as a tool to help children to learn.

It is important to note that the data in this study reflect a shift in parental thinking.
Many parents included examples of technology in their definition of play. These data
represent a societal shift from thinking about play in terms of outdoor experiences to the
ways in which children primarily engage in activities indoors. According to Vygotsky,
children learn through social and cultural contexts (Gestwicki, 2013). Technological
devices have become a cultural norm in the United States. As such, technology is being
introduced by parents, and like the children in this study, most preschoolers are
experimenting with various forms of media at home on a regular basis.

In light of the fact that technology is everywhere and has become the norm, many
parents in this study had reservations about its use and some felt that technology should
be limited. While Parent 1 felt that it was an advantage for her son to be using the
technology that will be employed at school, she also disclosed in the interview that her
son “gets very engrossed” and “gets crazy” if they withhold technology from him.
Similarly, Parent 5 said that her son is “addicted to it,” “craves technology,” and “gets
obsessed.” This suggests that technology can have an addictive effect on a preschooler
and this topic should be explored further in future research. We might consider what
constitutes a craving for media and if gender depends on whether or not a child becomes
addicted to technology. Or, is there a relationship between child’s age and an obsession
with technology?
Parents 1 and 5 expressed concern that technology was not good for their children’s eyes. Parent 4 felt that there may be inappropriate content and that technology could be overused. Above all, the most common concern among all of the parents in this study regarded setting limits on technology. They felt that their children should spend time engaging in other types of play and worried about the negative impact of technology: harm to the eyes, its addictive nature, and safety concerns regarding the content itself. Parents seemed to be conflicted about how much time quantifies an appropriate amount. Researchers like Wartella et al. (2005) explain that very little is known about the impact of technology on children. Unfortunately, this may often result in a population of parents who lack the information to make data-driven decisions about what kind of limits are appropriate to place on their child’s media use.

A prominent question then is how much technology should a preschooler use and to what capacity? Plowman (2013) found that parents thought a balance between play and technology was necessary, and Johnson and Christie (2009) noted the need for parents to balance media time and play. In this study, the parents referred to a balance between technology and traditional forms of play but did not explicitly state a number that they felt represented too much technology. The role of technology, however, did emerge and seemed to be twofold. First, it served for entertainment purposes. Examples of this include television and movies, tablet applications, computer games, video games, and electronic toys. Second, technology took the form of supplemental learning material. Parents reported that children were accessing educational games and learning on digital devices. Overall, parents indicated that their children like to use the apps and play games, and the parents emphasized that the format of the technology was educational. This
coupling of fun and learning makes technology a crowd pleaser among all ages because
digital devices keep the children’s attention and provide new, exciting opportunities
while parents feel as though their children are benefiting educationally. It is a win-win
situation.

Although the parents alluded to a connection between technology skills and
educational preparedness, it is very interesting that they did not cite technology as one of
the skills needed for kindergarten readiness. Parents thought technology was very
important for their child to use and based on diary entries, the majority provided
opportunities for their child to utilize various digital devices. However, not one parent
mentioned that technology proficiency was one of the most important skills for
kindergarten readiness. Responses targeted knowledge of letters, colors, numbers, shapes,
social skills, etc. Perhaps the parents do not recognize technology as a skill, but rather, a
method of learning and developing academic knowledge.

Parents indicated that their children enjoyed playing with technology. One stated
that it was difficult to pull her child away from the device when he was playing. I
presume that technology is so appealing because of the novelty factor. There are new
opportunities unveiled all the time and that is one of the driving causes of what makes
children and adults alike so excited about technology. Portability is an added feature as it
provides for convenience especially with busy lifestyles. However, it is not the format,
the shape, or size of the gadget that makes it so popular. Rather, it is the capability of the
device to provide new experiences for the user over successive interactions. This
potential is what gives technology an important edge in education and it can become an
important tool to supplement learning at any age. Parents are aware of their children’s
preferences but have educators considered how to incorporate these types of activities into early childhood classroom lessons?

**Technology for Learning**

Technology can provide countless opportunities for children to learn and has far reaching benefits in the field of education (Clements, 2002; Edwards, 2005; Hofferth, 2010; Plowman, 2013; and Prensky, 2001). Researchers point to the importance of technology for multi-literacy (Yelland, 2011) and recommend that schools offer technology experiences that children are exposed to outside of school (Johnson & Christie, 2009). As Developmentally Appropriate Practice suggests, educators should develop curriculum that is developmentally, individually, and culturally appropriate (Gestwicki, 2013). This study shows that many preschoolers are using technology on a regular basis and have incorporated it into their play routines. Therefore, it is important to look at how technology can supplement early childhood curriculum to meet the needs of each child. Lessons should be tailored for each child based on his or her experiences. With the amount of technology being used by preschoolers and the possibilities that it can provide, educators should be aware of how to implement technology for engagement and differentiation.

**Limitations**

Parents who participated in the study were instructed to record activities in which their child engaged while at home. Play that occurred at preschool was not reported. While this research examined how children play at home, it should be noted that the averages for technology play may go down as children may be engaging in more traditional forms of play and more outdoor play in their preschool settings. As a result,
traditional and outdoor play averages may be higher if preschool experiences are included.

Data may have also been impacted by the format of the interview or questionnaire. The researcher attempted to reduce bias as much as possible. However, parents may have responded differently on paper than in the face to face interview session. For instance it is plausible that parents during the interview may provide more socially acceptable responses than parents on a questionnaire since there is no social interaction and no connection to a real person when responding. It is unknown whether socioeconomic status contributed to those who did or did not complete the questionnaire. The majority of children in this study are from a high socioeconomic background. This study should be repeated with participants from a lower socioeconomic background to determine if this factor affects how 3 to 5 year-old children typically play and how much time is devoted to technology, non-technology, and outdoor activities.

Another limitation of this research pertains to the number of participants. The study sample of n=33 parents was very small. Therefore, results from this study cannot be generalized across the population of preschool children. A larger sample is required to determine if any relationships among the variables are statistically significant.

**Future Research**

Future research should investigate why parents feel it is necessary to limit the amount of time that their preschool child spends playing with digital devices. A much larger sample with children from diverse socioeconomic backgrounds may provide data that would potentially be transferable across the population. Parents were unsure about the impact of technology and felt a balance was necessary but did not elaborate on how to
accomplish this. Hence, future studies could further explore the types of limitations placed on preschoolers’ home technology use, how this is accomplished, and why the parents feel this way.

Another finding was that some parents documented their child eating while playing with technology. It would be interesting to focus on quantifiable measures of technology use and eating to determine if there is a positive correlation. Future research could explore the amount of time spent on media and the amount of food that a child consumes. Or perhaps research could focus on the different forms of media to understand if they have an impact on eating habits.

Finally, the notion of a preschoolers’ addiction to technology surfaced in this study. Additional research should investigate how parents identify an obsession and if boys and girls alike display this type of behavior. Future studies should examine preschoolers’ use of different forms of technology to understand if particular features of media impact children’s play patterns and preferences including the amount of time spent on the activity.

**Conclusion**

In this study, data suggest that preschool children are using digital media on a regular basis. Educators should build on this set of information to incorporate activities that utilize multiple platforms for learning. Technology can be a useful tool that provides children with numerous opportunities to learn about concepts. School instruction should be modified to create learning goals for each student based on his or her experiences. Implementation of technology can assist teachers in differentiating instruction and meeting the needs of all children. Future research is needed to better understand the
technologies that preschool children already use for learning and to develop early childhood curriculum that matches their interests and builds off their previous experiences with technology.
References


Levin, D. (2010). Remote control childhood: Combating the hazards of media culture in


Please answer the following questions by writing in the answer or checking the appropriate box.

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<td>1</td>
<td>Child’s age in months:</td>
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<td>Child’s gender: ☐ Male ☐ Female</td>
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<td>3</td>
<td>Child’s preschool attendance: ☐ Part-time ☐ Full-time</td>
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<td>4</td>
<td>Child’s ethnicity: ☐ Hispanic or Latino ☐ Not Hispanic or Latino</td>
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| 5 | Child’s race: ☐ American Indian or Alaska Native  
☐ Asian  
☐ Black or African American  
☐ Native Hawaiian or Other Pacific Islander  
☐ White |
| 6 | Family structure: ☐ 1 parent ☐ 2 parents ☐ Other  
*If you checked Other, please describe relationship below:* |
<p>| 7 | Please complete the table below for each child in the household: |</p>
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<th>Child’s Gender</th>
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8. Mother’s highest level of education completed:  
- □ Less than High School  
- □ High School/GED  
- □ Some College  
- □ 2-Year College Degree  
- □ 4-Year College Degree  
- □ Master’s Degree  
- □ Doctoral Degree  
- □ Professional Degree

9. Mother’s occupation:

10. Mother’s employment:  
- □ Not Employed  
- □ Part-time  
- □ Full-time

11. Father’s highest level of education completed:  
- □ Less than High School  
- □ High School/GED  
- □ Some College  
- □ 2-Year Degree  
- □ 4-Year Degree  
- □ Master’s Degree  
- □ Doctoral Degree  
- □ Professional Degree

12. Father’s occupation:

13. Father’s employment:  
- □ Not Employed  
- □ Part-time  
- □ Full-time

14. Total family income:  
- □ Less than $30,000  
- □ $30,000-$52,499  
- □ $52,500-$74,999  
- □ Over $75,000
Please use the space provided to respond to the following questions.

1. List activities that your child engages in that you pay for him/her to participate in—sports, Chuck E. Cheese’s, swim lessons, dance, gymnastics, etc. How many hours per week does your child spend in these activities?

2. Describe all technology-based activities your child engages in (TV, computer, cell phone, iPad, video games, etc.).

3. How many hours per week does your child engage in technology use?

4. How many hours per week does your child engage in non-technology indoor play?

5. How many hours per week does your child engage in outdoor play?

6. If given a choice which type of play would you prefer your child spend the most time doing (technology play, indoor play, or outdoor play)? Circle the response below:

   Technology play   Indoor play   Outdoor play
7. List all locations where your child normally uses technology (home, in the car, neighbor's house, library, etc.).

8. Is your child required to obtain parent permission before using technology?

9. How do you monitor technology use?

10. Do you limit the time your child spends using technology? Why or why not?

11. When your child uses technology, what types of specific things are they doing: Webkinz, learning math facts, reading, playing games, etc.?
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<tr>
<th>Question</th>
<th>Answer</th>
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<td>12. What other tasks or activities does your child take part in at the same time they are using technology?</td>
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<td>13. Do you think the use of technology benefits your child? Explain why or why not.</td>
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<td>14. Do you think technology impacts your child’s school readiness? Please explain.</td>
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</table>
Choose a typical weekday and record your child’s activities in the log below. Please refer to the following example. You may include arrows if an activity occurs over two or more time periods (i.e., child ate dinner from 6:30-7:00 PM). If your child was at preschool, it is not necessary to list any activities; simply list “Preschool” with an arrow designating the timeframe.

<table>
<thead>
<tr>
<th>Time</th>
<th>Describe Technology Play</th>
<th>Describe Non Technology Play</th>
<th>Describe Outdoor Play</th>
<th>Describe Non Play Related Activities (eating, napping, museum)</th>
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<tr>
<td>6:00-6:15 PM</td>
<td>iPad</td>
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<td>6:15-6:30 PM</td>
<td>Played with matchbox cars with brother</td>
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<td>6:30-6:45 PM</td>
<td>Dinner</td>
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<td>6:45-7:00 PM</td>
<td>Watched Spongebob</td>
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<td>7:00-7:15 PM</td>
<td>Played with soccer ball in front yard</td>
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**WEEKDAY Activities**

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</table>
Choose a typical weekend day and record your child’s activities in the log below.

**WEEKEND Activities**

<table>
<thead>
<tr>
<th>Time</th>
<th>Technology Play</th>
<th>Non Technology Play</th>
<th>Outdoor Play</th>
<th>Non Play Related Activities</th>
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Appendix B

Interview Questions

1. What do you consider play?

2. Discuss the different ways you see your preschool child playing.

3. On a typical day, how much time do you estimate your child plays outdoors?
   What types of things does he/she play?

4. On a typical day, how much time does your child play indoors? What types of things does he/she play?

5. On a typical day, how much time does your child play with technology? What types of things does he/she play?

6. How should technology be used by a preschooler?

7. What are your preschooler’s favorite things to do with technology?

8. Thinking about your preschooler, what are the advantages and disadvantages of technology?

9. For a child entering kindergarten, what are the most important skills that he or she should possess?
## appendix c

### Demographic Data

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