CHILDREN'S USAGE OF INDIVIDUAL TECHNOLOGY AND SCHOOL READINESS

A Dissertation By

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Abstract:
This quantitative study examines the link between a child's recreational usage of individual technology, such as tablets and smartphones, and their school readiness. The study surveyed the parents of transitional- kindergarten through first-grade students to determine children's recreational device usage and media consumption habits. The study matched these student's overall usage with their teachers' perceptions of their performance in 5 subcategories: General Cognitive Readiness, Reading Skills, Writing Skills, Math Skills, and Social Skills of the students. These categories were then combined to make indexes to determine the students' Academic Readiness and Social–emotional Readiness and their Overall School Readiness.

This study found significant findings in terms of the different subgroups and their school readiness. Students from traditionally disadvantaged subgroups (lower-income and less parent education) had a positive relationship between technology usage and Academic Readiness, Social-Emotional Readiness, and Overall Readiness for school. Students whose parents reported higher incomes and higher education levels experienced adverse effects in Academic Readiness, Social-Emotional Readiness, and Overall Readiness for school when their recreational individual device usage increase

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CHAPTER 1

INTRODUCTION

The purpose of this study was to identify if there is a relationship between technology usage from the age of 2 to 6 and children's social–emotional and cognitive readiness for school. Research conducted on related topics is covered in the literature review. There have been studies done about the use of technology regarding attention, aggression, and social connectedness. However, no comprehensive study on the aspects of technology regarding school readiness has been conducted before this study. This study was designed to look at the relationship between the displacement of a child's traditional developmental experiences and school readiness.

As of the early 2020s, over 95% of Americans own a cell phone. Seventy-Seven percent of Americans have a smartphone (Pew Research Center, 2018; Common Sense Media, 2017), and 53% of American adults own a tablet of some type (Pew Research Center, 2018). Research by Common Sense Media (2017) suggests that the percentage of families who own tablets is as high as 78%.

This technology is used not only by adults. In research conducted by Kabali et al. (2015), approximately 75% of children had their own individual device by the age of 4. Paudel et al. (2017) found that while children were exposed to this technology very early on, their usage of media expanded as their technology skills grew (Schoeppe et al., 2016). Paudel et al. (2017) found that parents' technology usage and access to technology influences their children's use of technology. When broken down by income, the numbers in the research differ somewhat. Common Sense Media (2017) found that 89% of U.S. families who make less than $30,000 annually have a smartphone, while Pew Research Center (2018) found that number to be 71%. In either case, this is a significant portion of the population, especially when considering that cost may be a hindering factor when purchasing a smartphone. Among families who earn more than $75,000 annually, the research was more consistent. Common Sense Media (2017) reported that 98% of these families owned a

smartphone, while Pew Research Center (2018) reported the number to be 95%. In both cases, this is very close to the total saturation of the population.

Americans use these devices for various activities, including accessing the internet, playing games, watching videos and movies, researching, and using social media. With the number of people using this technology and the variety of uses, these devices have certainly changed how we live. How has the usage of this technology changed how children interact with others? Additionally, how have these interactions affected the skills and knowledge that students have upon entering schools? These impacts are magnified when we look at young children who are just beginning to learn how to interact in the world.

Some studies have shown that 72% of children under the age of 4 have used these personal devices (Common Sense Media, 2017). This "almost universal exposure" to technology has undoubtedly changed how these children experience the world around them and interact with their environment. Caretakers' personal use of technology and the rules that they set for children's technology usage compounds the effects of technology on children (Hiniker et al., 2015; Schoeppe et al., 2016).

Background of the Problem

Learning is a function of interacting with the world around us. The more experiences we have, the more we know about our environment (Piaget, 1964). The more we know about our environment, the more we can predict our environment's expected outcomes. As we learn to predict these outcomes, we learn to change our actions to affect these outcomes.

Hirsh-Pasek et al. (2015) found that both the quality and quantity of input and parent sensitivity to language played a part in children's ability to learn a language. The frequency and quality of these interactions are crucial. If children do not have multiple opportunities to experience new ideas, language, and skills, they are less likely to learn.

With the introduction of individual technology, there has been a shift in the way children are spending their time. Holloway et al. (2013), Twenge and Campbell (2018), Mesch (2006), and

Vandewater et al. (2006) define this phenomenon as displacement. Children are spending an increasing amount of time using individual technology. This technology often supplants shared experiences with adults and peers alike (Radesky et al., 2015). Individual technology provides the learner a vastly different set of experiences than they would get through traditional play. By the time they enter elementary school, they have accumulated a great deal of screen time (Common Sense Media, 2017). Depending on how children use their technology, children will develop different knowledge bases, linguistic abilities, relationships with peers, and social connections.

Dewey defines the problem-solving method as consisting of five steps. The learner will consistently engage in these five steps and reevaluate their experiences to test their hypothesis (Gutek, 2014). The first step of this is facing a problematic situation; in this step, the individual will experience a problem in which some element is different that of from past experiences and therefore blocks their ability to meet their goals. The second step is defining the problem by defining the specific aspect of the environment that is different from past experiences. The definition of this deviation results in the learner clarifying the problem. At this point, the individual will systematically define all of the facets of the problem and materials and options for solving the problem. The fourth step of the complete act of thought is to construct a hypothesis to solve the problem. Constructing a hypothesis involves evaluating the probability of the success of the hypothesis and its likely consequences. Finally, the learner will test the hypothesis and determine if the hypothesis had the desired consequences. If the problem were not solved, the learner would try another hypothesis (Gutek, 2014).

Swiss psychologist Jean Piaget (1896–1980) built upon this theory by studying how the theory applied to children. Piaget (1964) proposed that children did not have fixed amounts of knowledge and that children were born with an innate set of schemas, but children were continually building upon these schemas. Piaget stated that as children experienced new problems that challenged their existing schemas, they would experience disequilibration. Understanding how these new problems

affect their different schemas allows children to change or modify their schemas to accommodate the problem. The continuous evolution of these schemas facilitate cognitive development.

American educator John Dewey (1859–1952) broke this learning process down to five points: (a) The learner is a living organism and is motivated by desires to sustain life. (b) The learner lives in a natural and social environment. (c) The learner is engaged continuously in both natural and social environments and is motivated by their personal drives. (d) Through interaction with the environment, the learner will experience problems in satisfying their desires. (e) Learning is the process of using past experiences to solve the problems that one experiences in their environment (Gutek, 2014). People work on these problems, both individually and socially, as people will relate their own experiences to others' challenges.

Piaget (1964) classified a child's cognitive development into four distinct stages: (1) the sensorimotor stage from birth to age 2, in which children learn object permanence. (2) The preoperational stage from age 2 to age 7, during which the child is labeling and classifying items. During this stage, the child will be able to make an object that represents something else. This representation may be a toy representing the actual object. For example, a toy airplane being used by the child to represent a real airplane. Through play, the child establishes, assimilates, and reinforces rules and schemas. (3) In the concrete operational stage the child transitions to operational or thinking through problems in their head rather than physically having to act them out. (4) Finally, around age 11, the child moves into the formal operational stage. It is at this time when children begin to think logically about abstract concepts and test their hypotheses. Of particular interest is the preoperational stage as it is a period when children are developing concepts about the world around them and testing these concepts. Moreover, while Piaget did not specifically address language, he stressed the importance of egocentric speech, which uses language to label the experiences of a child.

Soviet psychologist Lev Vygotsky (1896–1934) placed increased importance on language during this period in a child's development (Winter & Goldfield, 1991). Vygotsky proposed the social

development theory of learning in which children learn through interactions with other people. Through this social development learning theory, children learn from adults and other children with whom they interact. Through these interactions, children learn the way their culture views the world around them. Vygotsky (1969) refers to these as "shared activities." These shared activities take place in cooperation with other children or adults. A critical shared activity that children and adults may engage in is the classification of objects. For example, an adult might read a book about animals. By listening to the book, the child would learn of new animals, and exemplars and nonexemplars of these animals. This exercise serves multiple functions, it teaches the child new vocabulary, and it has helps the child understand the schema that society has attached to the category of animals. Through these repeated interactions, children learn the rules, labels, and categorization that society attaches to different items and events.

Vygotsky poses that as a child's language develops in complexity, so does their thinking. When new vocabulary is introduced to children, they can think of increasingly complex and intricate ways about those items. As they develop new language, and their understanding becomes more sophisticated. In the earlier example of animals, the child learn how to classify objects as animal or nonanimal. However, later they may revise these classifications to include mammals, reptiles, or invertebrates. Therefore, children's schemas become increasingly intricate as they develop language.

Complex mental processes begin as social activities. Through play with other children, children obtain new information. A child will develop schemas and rules and learn to interact with and negotiate situations with their peers. As a child repeats these interactions that the child builds an understanding of social patterns (DeVries, 1997). The child does not set out to think about classifying animals. Instead, a child may pretend to be "bears" with their friends. Through this play, the child will learn new rules to associate with objects. For example, while pretending they are bears, one child may correct another's understanding of what a bear will do by saying, "a bear does not walk on two legs; they walk on four legs." Through these social interactions, children gain new insights into the

world around them. Interactions during play can also promote social skills, problem-solving, and negotiation skills (Weisberg et al., 2013).

Children can perform more challenging tasks when assisted by a more knowledgeable other. Vygotsky (1969, 1978) states that children can perform tasks outside of their ability level when adults assist them. This phenomenon is known as the zone of proximal development. One representation of the zone of proximal development can be seen in language, when an adult uses a more complex sentence structure than a child would on their own. Through this “scaffolding,” the adult then has the opportunity to coach the child on what to say to build their language (Wasik & Jacobi-Vessels, 2017) .

According to Vygotsky (1978), cognitively challenging tasks for children promote maximum cognitive growth. By engaging in and accomplishing these increasingly cognitively demanding tasks, children can grow to their maximum potential. Vygotsky (1967) stated that if a child constantly plays with children that are developmentally more advanced, they would develop the ability to play at this level.

Upon entering school, children have strengths and areas of need that teachers do not fully understand. The traditional strategies used in the past to educate have become obsolete as children’s needs and abilities have changed. However, many teachers continue to instruct children assuming the same needs the teacher had when they were a student. Given this divide, it seems as though educators are speaking one language, and the children coming into schools are speaking a different language. It is the responsibility of educators to understand what abilities students have and develop a different set of skills to meet their needs.

Problem Statement

With the introduction and usage of digital technology, learners entering school have vastly different experiences and skill sets than they did before the introduction of personal touchscreen devices. Children spend large portions of their day and developmental years using individual devices (McDaniel, 2015). Device usage is replacing many traditional play and social experiences and vastly altering children's interactions (Holloway et al., 2013; Mesch, 2006; Twenge et al., 2018). These new

experiences will undoubtedly change how children experience the world around them and therefore change the skills they develop. In essence, the experiential inputs for learners have changed, which will change the way students learn. However, it is still unknown exactly how this device usage impacts children. Despite the change in children's behavior and society's behavior during this time, teaching strategies that schools use with their students have primarily remained the same.

Purpose of the Study

The purpose of this study is to determine the skills and weaknesses digitally native students bring to school. This study looked at the cognitive, linguistic, self-regulation, social development, and the social connectedness of kindergarten and first-grade students as factors of the students' overall readiness for school. Additionally, the study aimed to determine if there is a relationship between individual device usage before entering school and readiness for school.

Research Questions

In order to better understand the relationship between device usage and readiness, the researcher posed the following research questions to guide the quantitative study:

1. What are parents' perceptions of children's home device usage (platform, frequency, duration, times, range of application usage)? Does this vary by income/parent education?
2. How does individual device home usage affect students' cognitive readiness for school?
3. How does individual device home usage affect students' social–emotional readiness for school?
4. How does individual device home usage affect students' overall readiness for school?

There have been various research studies on how usage of individual technology may affect specific aspects of a child's life, such as attention, mood, and cognitive functioning. Research exists that indicates how device usage affects parenting styles and relationships between caregivers and children. The purpose of a substantial body of these studies is to isolate the different effects of technology. However, there has not been substantial research on how the combination of these effects play out in overall school readiness and the classroom setting. Additionally, the effects observed between different ethnic groups, different socio-economic groups, and children whose

parents have different educational levels may illustrate that there are differences in the manner and frequency of device usages.

Significance

Children's preschooling technology behaviors have dramatically changed as a result of these individual devices. These changes in behavior have altered the learners who are entering schools. Despite the change in children's behaviors, teachers are still teaching using the same methods they were using years earlier.

It is necessary to conduct research to help define and describe the type of learner coming into the classroom. We must find the strengths and weaknesses of the 21st-century learner to understand where their areas of need might be before they enter school. With this knowledge, it is equally vital that we find different ways to accentuate their skills. It is also important to look at the trends in usage among different socioeconomic and ethnic groups to understand if this phenomenon disproportionately favors one group.

This research is one of the first steps toward understanding the impacts that the technological revolution has on our children before entering the classroom. If teachers understand the type of learner entering their classroom, they will be better equipped to handle their students' changing needs. A complete understanding of students is necessary for teachers to build and implement an academic and socioemotional curriculum that will positively impact the students' academic careers.

Scope of the Study

This study will look at the preschooling and recreational device usage of kindergarten and first-grade students in one Southern California school district. The research focuses primarily on the usage of touchscreens and individual devices such as smartphones and tablet devices. This study measured parent views of their child's time on individual technology for recreational purposes; however, children's media usage on laptop devices is also included.

At the time of the study, children had increased technology usage to access the curriculum due to distance learning during the COVID-19 pandemic. The research excluded educational apps

explicitly used for distance learning, as the research focused on recreational usage instead of the focused instructional usage of the technology. The study focused on the types of recreational apps that kindergarten and first-grade students used according to parents.

Assumptions of the Study

One assumption made in this study is that children's device usage can be quantifiable in a survey. The study assumes that parents have a reasonably accurate understanding of the amount of time their child is on their device. The study also assumes that parents can articulate the duration and conditions under which their child uses the device through the survey or the individual interview.

The second assumption of this study was that parents who responded to the survey knew and understood the types of apps their child was using. Additionally, this study assumed that parents knew the frequency with which the child was using the device and that the parents were truthful in their responses. There is a likelihood that parents could misreport information unintentionally or even intentionally to present the idea that they are informed parents. This study also assumed that teachers were reporting their observations honestly and without bias toward a particular student or family.

Study Delimitations

The study does not include students who are in special education for reasons other than speech and language. The researcher chose not to include students in self-contained special education classrooms as these students will have significant differences in cognitive ability, language, self-control, and social development from their general education peers.

Study Limitations

This study had various limitations that were beyond the control of the researcher. Due to the demographics of the district that participated in the study, this study does not include student groups from various races and ethnicities.

Definition of Key Terms

Cognitive development. The changes that occur throughout childhood help develop the child's intelligence (Piaget, 1964).

Displacement of activities. The substitution of screen time for experiences children typically have by exploring their natural environments, such as interacting with peers and caregivers (Kirkorian et al., 2009; Radesky et al., 2015).

Emotional well-being. The combination of a person's life satisfaction, emotional stability, mental health, positive attitude, and fulfillment (Washor & Mojokowski, 2006).

Expressive language. The ability to use words and symbolic representations to convey one's thoughts, feelings, needs, and ideas to others.

Personal device. Any touchscreen tablet or phone that allows users to access the internet and use gaming or education applications.

Receptive language. The ability to understand the words and symbolic representations others use to convey their thoughts, feelings, needs, and ideas.

School readiness. A combination of cognitive ability, linguistic ability, social development, and social connectedness necessary for children to be ready to learn at school.

Screen time. The time in front of the TV, time researching on the computer, playing video games, or on a mobile device (Common Sense Media, 2017).

Self-regulation. Combining emotion, cognition, and behavior over time across a variety of different contexts. Self-regulation is composed of flexible attention, working memory, and inhibition control (Barkley, 1997; Calkins, 2004;)

Shared experiences. Interactions between parents and children in which the parent and the child observe or experience the same phenomena. During these interactions, parents serve as role models for a child's development.

Social connectedness. The degree to which one feels valued and cared for by others around them. (Eisenberg & Cole, 2012)

Social development. The appropriate interactions of a child with others in their environment.

Technoference. Interruptions to everyday personal interactions caused by digital devices and individual mobile technology (McDaniel, 2015; McDaniel & Radesky, 2018).

Organization of the Dissertation

The experiences and interactions that a child encounters have a tremendous impact on their cognitive, linguistic, social development. Given that mobile technology has become ubiquitous in our society, and the frequency, duration, and variety of ways in which children use this technology, it is vital to consider the idea that these devices are replacing traditional play opportunities. It is crucial to look at the impacts that these technologies are having on young children. These impacts should influence, and guide teaching strategies and school supports for children. This study looks at kindergarteners and first grader's home technology usage times and habits at home and school.

Chapter 1 provides a context regarding children's usage of personal devices and the potential for these devices to impact early schooling. Chapter 2 presents a critical review of relevant research pertaining to the research questions. Chapter 3 contains the research design, including data collection and analysis methods. Chapter 4 presents the results and findings of the study. Chapter 5 discusses my conclusions, interpretations, and recommendations for policy and practice.

CHAPTER 2

REVIEW OF THE LITERATURE

The introduction of technology has altered the way that we interact with our environment and with each other. Societal uses of technology include recreational and academic applications. While many adults grew up with more limited digital technology experiences, today's children are considered digital natives, having grown up knowing nothing but a world with the internet and having access to individual portable devices. Children are exposed to these smart devices as young as 6 months (Kabali et al., 2015), and by the time they have entered elementary school, they have had experiences with technology that are much more pervasive than that of some of the adults who are teaching them.

Vygotsky (1987) stated that humans learn from experiences and interactions with others around them. Children learn from problem-solving in their environment and their interactions and the feedback that they receive from others based on their actions. The introduction of technology into this equation has drastically changed the types of interactions that children are experiencing, the cognitive rigor of their experiences, and the type of feedback they are receiving (Dwyer, 2012; McDaniel, 2015; McDaniel et al, 2018; Topper, 2017) . Individual technology has shifted us away from interactions with others around us (Dwyer, 2012; Roberts & David, 2016). Instead of talking to each other while riding in the car on a road trip, it is not uncommon for children to be in the backseat watching videos or gaming on their individual devices. Instead of having downtime to think or observe the world around them, children experience increased stimulation from games and apps (Radesky et al., 2014). Instead of receiving verbal and visual feedback on their behaviors through peer interaction and environmental experiences through play, children are receiving visual and tactile feedback from their individual devices (Dwyer, 2012; McDaniel & Coyne, 2016).

This chapter presents a theoretical foundation which draws on the theories of Vygotsky and Piaget in order to understand the relationship between technology use and children's development. The chapter follows with a review of the empirical literature, which describes the benefits of shared

play on children's cognitive, linguistic, and social development. This description is followed by a discussion of the prevalence of technology in society, which describes how *technoference*, the displacement of personal interactions with technology, affects children's interactions with their world. The discussion of technoference is followed by a a look at the conceptual framework of how technology impacts our children's traditional experiences of cognitive, linguistic, and social development. Finally, the chapter outlines the skills and needs with which the new learners will enter the classrooms.

Theoretical Frameworks

This research looks at the development of children through a constructivist lens. This constructivist framework is based on the idea that children construct their knowledge of the world through their experiences. Children engage with the environment around them to explore and develop their own understanding of the world around them (Gutek, 2014). The two major constructivists that will be cited in this research will be Piaget and Vygotsky. These theorists have differing views of how children construct knowledge.

Phillips (1995) offers three dimensions by which to evaluate constructivist ideals. The first dimension has to do with the learner's active role in constructing knowledge. Constructivists, by definition, believe that the learner takes an active role in developing cognition. The next dimension proposed by Phillips (1995) is individual psychology versus public discipline. Piaget and Vygotsky differ somewhat in this area. Piaget theorized that the child has innate biological and psychological truths which the learner must discover, while Vygotsky focused on the social component of learning and the impacts of society on the child's development (Phillips, 1995). The final scale that Phillips (1995) focuses on is based on the question of whether humans create the rules that a child must learn or whether nature creates the knowledge that a child must learn. Piaget leans toward the former and Vygotsky would argue that the learners will be influenced by laws of nature. This research will focus more heavily on Vygotsky's social constructivist theory as it places emphasis on language development and interaction with others and it places importance on the impact that a child's

environment has on their development. This research is built on the foundation that social interaction is crucial for learning.

Vygotsky's social constructivist theory states that children learn from social interactions between the child and their parents. Vygotsky (1978) states that, while these interactions usually occur between parent and child, they can also occur between a more advanced peer and a child. Vygotsky (1987) argues that social interactions are the mechanism by which knowledge is constructed and internalized. These interactions help children cognitively prepare for school by acquiring background knowledge of the world and by developing and practicing linguistic abilities to communicate their knowledge to others. According to Piaget, children also develop social emotional skills by developing self-regulation skills and social skills that increase their connectedness to those around them (DeVries, 1997).

The first way that shared play helps children is by acquiring new knowledge, which leads to a child's cognitive development. Through interactions such as shared experiences and play, parents serve as models to their children (Piaget, 1964). An adult will express ideas through language, which helps the child learn new information about the world. The child will later test their new knowledge by expressing it through language during play (Vygotsky, 1978). The adult will either affirm the child's ideas or make corrections to the child's constructs to help them understand the concept (Wasik & Jacobi-Vessels, 2017). In this way, children are learning new information about their environment and applying it in context.

As children learn new information, they begin to speak to share their ideas of how they perceive the world. Through speaking with others, children acquire new information and pick up new vocabulary and language constructs from these interactions (Wasik & Jacobi-Vessels, 2017). The acquisition of language structure is usually implicit and not directly addressed; however, it can be explicit as well. As children build their linguistic abilities, they can understand and convey increasingly difficult emotions and concepts. Alves (2014) detailed that Vygotsky believed that the ability to convey complex ideas linguistically helps higher psychological functions. Children will learn self-regulation

skills through their interaction with others. According to Fernandez-Rio et al. (2017), children innately are driven toward interactions with others. These interactions help a child to relate and interact with others and take place in a variety of day-to-day routines. For example, this shared play creates social connectedness. The child builds bonds with parents and peers alike through these shared activities. Studies show that strong bonds with others can help students to feel happier and can ward off depression.

Children will also learn social norms through shared play, which includes turn-taking, sharing, and negotiation (Vygotsky, 1978). Through these repeated interactions, children engage in social development. As children interact with other children, they will often experience conflicting interests, such as whether or not to share a toy. These peer interactions cause conflict that children must work to resolve. Through play, children learn to negotiate conflict by conveying their ideas and coming up with a solution that satisfies both parties. Often one child will have to wait and will experience frustration that they do not have the toy. Through this, the child learns to delay gratification, and they learn to regulate their emotions. Through a child's interactions with mentors, peers, and the world around them, they develop social connectedness (Vygotsky 1967). Each interaction that they have is an opportunity to learn new information, practice what they have learned, and get feedback on the skills that they are practicing. These experiences can be between the child and their environment, a child and their peer, or a child and their caretaker. These experiences help children to cognitively prepare for school by acquiring background knowledge about the world and by developing and practicing their linguistic abilities to communicate their knowledge to others (Vygotsky,1967).

Additionally, children develop socially and emotionally before entering school, developing self-regulation skills, and developing social skills to increase their connectedness to those around them (Piaget, 1964; Vygotsky, 1978). Children are traditionally prepared cognitively and socially for school through shared experiences with their caretakers and peers as they progress toward kindergarten. These experiences take the form of play, conversations, and shared observations.

General Knowledge (Shared Play and Cognitive Development)

During the early years of a child's life, the child's brain goes through fundamental physical and chemical changes. Cognitive development occurs through interactions and adaptations between a child and the world around them (Huitt & Hummel, 2003). Piaget describes this adaptation as intelligence. Piaget divides a person's cognitive development into four parts: (a) the sensory-motor stage (age 0-2.); (b) the preoperational stage (age 2-7), which comprises the symbolic stage (age 2-4) and the intuitive stage (age 5-7); the concrete operational stage (age 8-11); and the formal operational stage (age 11 and up) (Malerstein & Ahern, 1979). For the purpose of this study, we will focus on the first two stages as those are the stages that a child will go through while preparing for and entering kindergarten and first grade.

The first stage is the sensorimotor stage which takes place from birth to age 2. In this stage, the child's world knowledge is limited due to a lack of world experiences. During this time children develop and enhance their reflexes and develop memory (object permanence), they will also develop their mobility and begin to understand the relationship between themselves and the world (cause and effect). With the development of object permanence, the child will perform operations aimed at understanding an object's properties in order to classify it, its qualities, and how it works (Piaget, 1964). While conducting these operations the child develops a practical understanding of the objects around them and their own relationship to the world.

Cognitive development can be influenced by genetics as well as the environment (Christakis et al., 2018). As a child experiences new events, these events stimulate the child's brain and facilitate the child's cognitive development. These experiences can take place through the interactions that children have with both their environment and other people within their environment. Environmental learning takes place through problem-solving and experiences that the child has during the day. Social learning takes place through the shared experiences that a child has with those around them. Social learning occurs when the participants in these shared experiences negotiate meanings that help the child to define the world. As the child builds language, they are able to participate in more

complex thinking and therefore develop a deeper and more robust understanding of his/her experiences.

The importance of a parent's role in the development of a child cannot be understated. Hart and Risley (2003) stated that during their first 3 years, those before schooling, children are dependent on their family for almost all of their experiences. This suggests that nearly everything that a child learns is dependent on their parents. The experiences that a child has will have an impact on the types of future experiences that a child will be likely to seek out (Hart & Risley, 2003). Thus, a more robust experience at home with their caretakers will lead to opportunities for more cognitively engaging experiences in the future and exponential cognitive growth.

Linguistic Development

The second stage that Piaget defines is the preoperational stage, which includes the beginnings of language (Piaget, 1964). During this stage, the child builds a symbolic representation of the world around them. With regard to language, a symbolic representation would be labeling the objects with their names; however, during this stage, the child is still learning about the more complex physical properties of these objects. For example, during this stage, a child learns about the conservation of objects, that is to say, if we pour water into a glass of a different shape it does not change the amount of water even though it may look like the volume changed because of the shape of the glass. It is important to note that linguistic development does not take place independently of cognitive development. They have a reciprocal relationship. The development of linguistic skills spurs the development of cognitive skills and vice versa. As a child continues to develop a schema for the world around them they must also learn to convey their ideas to those around them. This is done through language as a symbolic representation of the physical world around them.

There are two types of language: expressive language and receptive language. *Expressive language* is the ability to convey your thoughts, feelings, and needs to others around you, while the *receptive language* is the ability to receive and understand these messages from others. Children need to be versed in both expressive language and receptive language in order to be successful in

social and academic situations. Oral language is a two-way process in which individuals need to use both the expressive and receptive language to communicate. A person's abilities in these areas may not match, as it is typical for a person's receptive language to be stronger than their expressive language (Paul et al., C., 2018)

Stages of Linguistic Development

Luinge et al. (2006) have articulated the following speech milestones for children aged 12 through 72 months:

1. Comprehension of two-word sentences
2. Pointing at body parts
3. Production of 10 words
4. Comprehension of tasks involving three-word sentences
5. Production of two-word sentences
6. Production of three-word sentences
7. Production of three- to four-word sentences
8. About 50% intelligible
9. Spontaneous storytelling
10. Storytelling in response to pictures
11. About 75% intelligible
12. Production of compound sentences
13. About 100% intelligible
14. Adultlike language production

Language learning takes place in stages that can be divided into milestones. While children work on multiple milestones at the same time, the progression of the milestones is fairly static as they build upon one another. The child's level of mastery of these milestones helps the child to navigate the world around them and has effects on their social relationships with other children and their ability to express their emotions, and it can be a predictor of future academic success. Therefore, both the

rate at which children master these milestones and competence in each of the linguistic levels have a dramatic effect on the child as a whole. Luinge et al. (2006) have come up with 14 language milestones for children 12-72 months. These language milestones encompass both receptive and expressive language, and they follow a distinct order across sex, age, and geographic regions. While children may be working on mastering some of these skills at the same time, their development, progression, and mastery remain sequential.

Children begin with receptive language by learning to comprehend two-word sentences. This does not require any production on the part of the child. The child then begins pointing at body parts, which requires children to produce a nonverbal response to a given command. The child then moves on to the production of 10 words in isolation; this is the first expressive language that children have, although the language is not necessarily done with any context. The child then moves back to the area of receptive by mastering the comprehension of three-word commands. Again, the child is expected to respond to the language that they have received nonverbally. Next, the milestones switch to expressive language in which the child learns to produce two, three, and four-word sentences. After the child has learned this language, they work on mastering the speech portion of language until they reach about 50% intelligibility (Luinge et al., 2006). It is at this point that the child begins to tell spontaneous stories, followed by telling stories in response to pictures, which is more cognitively demanding. Eventually, they reach 75% intelligibility. After the 75% milestone, children begin to add complexity to their expressive language by producing compound sentences in conversation until they are 100% intelligible. The final stage of language production is “adultlike” language production (Luinge et al., 2006). The rapid progression of these foundational skills highlights the importance of the first few years of school to a child’s language development (Snow, 2014).

Language and Connection to Others

Children have an innate desire to communicate and connect with others. These tasks occur daily in routines between caregivers and children (Raman et al., J., 2017). The connections and verbal exchanges that caregivers have with their children are associated with a child’s cognitive

development (Siegel, 1981). In addition to the role of learning from parents, child–child interactions also play an important role in a child's development. Children require both conversational talk and imaginary play talk in which they can create made-up contexts to be able to build literacy and language skills (Beals & Smith, 1992). Pellegrini et al. (1998) refer to this imaginative play as "sociodramatic play," which requires children to develop a play frame (e.g., going to the store) and coconstruct the situation with their peers. Pellegrini et al. (1998) state that when children engage in sociodramatic play with peers that there is a need to negotiate roles with their peers and agree upon actions with their playmates, both of which require a different type of language from language that would be used in a conversation at the dinner table with an adult. Weisberg et al. (2013) state that play provides a wider range of motion and broader experiences than does the real-life activity. As a result of these cognitive demands, coconstructed play with other children helps to improve the child's expressive vocabulary (Han et al., 2010).

A child's effective command of language has wide-ranging effects. In a research study conducted by Bornstein et al. (2013), children who were more verbally competent had fewer problems with internal and external behaviors. Additionally, children with poorer language skills had a higher risk of being rejected by their peers (Menting et al., 2011). This linguistic development also has academic impacts in the classroom. Beals and Smith (1992) found that if children engage in pretend play and speaking with peers at 3 years of age they are more likely to have better story comprehension on average at age 5. The importance of a child engaging in linguistically rich experiences and receiving feedback on their efforts cannot be overstated Perryman et al. (2013). Tamis-LeMonda and Rodriguez (2008) found that parent linguistic responsiveness is a predictor of a child's receptive language growth. Both the quantity and quality of language that children are exposed to during their formative years play a role in the child's linguistic development. Beals and Smith (1992) found that the number of mealtime conversations that children had with their families had a positive impact on story comprehension. These mealtime conversations expose children to narratives and explanations of the day's events which were shown to build a child's ability for analysis and

discussion of word meanings in book readings (Beals & Smith, 1992). Developing this robust understanding requires adults to serve as language models to introduce vocabulary and model correct usage of language. It is also dependent upon peer-to-peer interactions that take place during play. Both types of interactions offer the child different, but complementary, linguistic opportunities and skills.

Quality of Linguistic Experiences

The Beals and Smith (1992) research demonstrated that the quality of language that children are exposed to has a positive effect on the child's ability to both comprehend and express ideas at age 4 and predicts a child's vocabulary at age 5. The interactions that children have with their parents can occur in a variety of contexts. Each of these contexts may serve different purposes with a variety of vocabulary and divergent sentence structures and purposes. Another context for parent–child interaction is during play. Ferrara et al. (2011) found that parents and children use different types of vocabulary when parents are engaged in shared play with their child than when the child plays alone.

Parent–child interaction is not limited to these two contexts. There are a number of chances for interactions between a parent and child during any given day. Each of these interactions is an opportunity to provide children with new vocabulary, modeling the purpose of language, and the creation of new experiences for children. Beals and Smith (1992) state that there is a relationship between language exposure prior to age 3 and literary tasks at age 5. Hart and Risley's (2003) findings suggest that vocabulary at age 3 can have even more long-range results. The researchers found that a child's vocabulary at age 3 was a predictor of language skills (listening, speaking, semantics, syntax, and receptive vocabulary) at age 10. Parents are the primary provider of new experiences for children under the age of 3. It becomes incumbent on the parents to provide a variety of linguistic experiences in a multitude of contexts to enhance their children's vocabulary and provide varying sentence structures and purposes.

Quantity of Linguistic Experiences

There is research that suggests that a child's vocabulary is dependent on the number of words that children are exposed to (Hirsh-Pasek et al., 2015). Children must repeatedly be exposed to a new language in a variety of situations. There can be a dramatic difference in the number of words that children are exposed to during the child's first three years of life. This repeated exposure will help children develop new vocabulary and contexts so that they may build background knowledge on the different variety of uses for the word as well as shades of meaning. Hart and Risley (2003) found that a child in a professional family is exposed to approximately 11.2 million words per year, while a child in a family on welfare is exposed to roughly 3.2 million words per year. Without exposure to language, children are less likely to be able to effectively convey their ideas, which can lead to a child's demonstrating negative social behaviors to other children. Inferior language skills at age 4 can impact a child's social development in the form of behavior problems up to 14 years of age (Bornstein et al., 2013). Therefore, social development is highly dependent on language, as people use language to communicate their emotions and ideas to others and as well as for understanding and receiving feedback from those around them.

Approaches to Learning (Self- Regulation and Social Development)

There is a considerable body of research that connects a child's ability to self-regulate with academic achievement and rewarding peer relationships. Self-regulation is crucial in order to be able to successfully interact with others. Self-regulation involves combining emotion, cognition, and behavior over time across a variety of different contexts (Calkins, 2004). Many of the tasks that children are asked to do in society and in the classroom depend on their ability to control themselves (Moffitt et al., 2011). Developing these skills is dependent on the different characteristics of the learner as well as the different aspects of the environment, including the teacher (Rimm-Kaufman & Pianta, 2000). This variability suggests that the development of these skills is dynamic and dependent on the experiences and abilities of the learner. This is true for individual interactions and relationships as well as interactions with groups of people like a child would experience in the classroom setting.

Early social interactions that children have with their caregivers and peers are integral to the formation of the child's social development. During the formative years of a child's development, children rely on their interactions with others in order to develop their higher order thinking skills, regulate emotions, focus on tasks, and control impulses (Council on Communications and Media, 2016). These skills are integral to the child's functioning according to social norms and interactions with others around them.

There are three separate parts that comprise self-regulation: flexible attention, working memory, and inhibitory control (Barkley, 1997). Flexible attention, also known as cognitive flexibility, is a skill that allows a person to focus on one task while ignoring other distractions that may be present in the environment (Barkley, 1997; Rothbart & Posner, 2015). This is an essential skill in the classroom environment as the number of children in the class and movement could create distractions that detract from the attention of the student while they are trying to work.

The second aspect of self-regulation is referred to as working memory. Working memory is the ability of a child to remember and follow multiple directions that are given to them. Included in this skill is the ability to plan and coordinate these tasks in order to problem solve (Gathercole et al., 2004). This would be evident in a classroom environment through teacher directions and classroom rules (McClelland et al., 2007). A student with better working memory would be able to prioritize their tasks and actions while simultaneously following the classroom rules.

The final component of self-regulation is inhibitory control. This portion of self-regulation involves the ability to stop oneself from acting upon impulses (Dowsett & Livesey, 2000). In a classroom environment, it may be a student refraining from taking supplies from the child next to them or shouting out in class. Children develop these self-control skills and the ability to delay gratification through turn-taking and negotiation during play. This can be seen when there are a number of children and there is only one toy. Children have to negotiate turn-taking and sharing of the toy in order to play with it. Therefore, there are times where an individual child will have to delay gratification while the other child has control of the toy or they will have to insert themselves in the

game in another way, such as playing with another toy that fits into the play scenario that was created.

Without this self-control, children struggle with both individual and group interactions and have externalized behaviors that lead to peer rejection (Menting et al., 2011). Students with poor self-regulation and impulse control in the classroom have more academic difficulty than their more highly self-regulated peers (Blair & Diamond, 2008). Studies have shown that these self-regulation skills can have longer lasting academic impacts as well. McClelland et al. (2007) found that 4-year-olds with self-regulation skills scored one standard deviation higher than average and were 44% more likely to graduate college by the age of 25.

Social–Emotional Development (Social Connectedness and Belongingness)

Social connectedness is related to a child's overall feeling of belonging. As part of Lee and Robbins's (1995) study, the researchers measured three factors that they found to make up a child's feeling of belonging. These factors are companionship, affiliation, and connectedness. Companionship refers to the feeling of closeness that a child has with another person, such as a sibling, parent, or a peer. According to Harach and Kuczynski (2005), this feeling of companionship encompasses enjoyment of shared time, mutual interests and respect, and mutual communication. Buhrmester (1990) found that children who had positive friendships were more compassionate, more sociable, less anxious, and less hostile. The second factor is affiliation with a group of peers. A variety of factors contribute to group affiliation in children including perceived popularity, behavioral similarity, and social dominance (Witvliet et al., 2010)

The final component of belongingness is social connectedness. Social connectedness is an individual's perception of themselves in relation to others around them (Lee & Robbins, 1995). This includes a child's interaction with their environment and their peers. Children who have trouble connecting with their peers feel distanced from others and different from their peers (Buhrmester, 1990). The child may struggle to accept social roles and may become frustrated or disappointed with peers who are unable to relate to them (Lee & Robbins, 1995).

Establishing and maintaining a variety of relationships is key to a child's sense of belonging. If a child is able to positively interact with their environment and their peers, then they benefit from this belongingness. Social belongingness with peers and engagement in learning have a reciprocal relationship, which points to a correlation between positive relationships and academic success (Cohen et al., 2013; Van Ryzin et al., 2009). This relational success, especially between children, and a child's ability to interact with others in their environment is linked to their higher order language skills, including making inferences, understanding sarcasm, understanding figures of speech, and identifying teasing. Van Ryzin et al. (2009) found that a child's sense of belonging and peer support had wide-ranging benefits and positively impacted a child's sense of hope. Conversely, a lack of belongingness in children can lead to bullying and rejection from peer groups (Buhrmester, 1990; Witvliet et al., 2010). This lack of belonging can also affect a child's mental well-being and lead to feelings of loneliness, depression, or bullying (Buhrmester, 1990; Lee & Robbins, 1995).

Scholarly Empirical Literature

Kindergarten Readiness

Kindergarten readiness is a topic that is discussed in many schools throughout the nation. kindergarten readiness involves a variety of both academic and nonacademic skills. Research differs on the specific skills that are required for kindergarten readiness. These skills range from cognitive abilities, language skills, literacy skills, math skills, social emotional readiness, attention, physical health, attention skills, learning behaviors, engagement, and other indicators (Halle et al. 2012; Okado et al., 2014; Keys et al., 2013). Although different studies have subdivided school readiness in different ways, Zaslow et al. (2000) divided it into five categories. These five categories are physical well-being and motor development, social and emotional development, approaches to learning, language development, and cognition and general knowledge (Zaslow et al., 2000). These skills can be built at home through parent interaction or through a more formalized preschool, such as a Head Start program (Halle et al., 2012; Zaslow et al., 2000).

While other literature divides school readiness in different ways, much of the research will fall into these categories. The first of these categories is physical well-being and motor development (Cappelloni, 2010; Halle et al., 2012; Zaslow et al., 2000) This includes gross motor skills and fine motor skills and overall growth and development of the student. These skills help students to move around the classroom without stumbling and allows them to care for themselves (Halle et al., 2012).

According to Zaslow et al. (2000) and Halle et. al. (2012), the second component of school readiness is cognition and general knowledge. This category includes general understanding of the properties of the world around students and being able to "look across objects, events or people for similarities, differences and associations" (Kagan et al., 1995; Zaslow et al., 2000, p. 6). This pattern-finding skill presents itself in the understanding of spatial relationships, number concepts, letter and sound matching, and societal conventions. Cognition and general knowledge presents itself in the classroom in a variety of ways in the classroom. Cognition is very closely tied to the ability to acquire new knowledge through the understanding of these patterns. Students who are strong in cognition are able to recognize patterns more easily, and they are able to problem solve and draw conclusions as a result.

Language development is an important area in school readiness and has also been shown to play a significant role in students' early academic success in school. Language development in students includes the range of language skills used (Keys et al., 2013). Measuring language development as it relates to school readiness also includes assessing the child's use of complex sentence structures and the length of the sentences that children use (Okado et al., 2014). Language skills are related to early literacy skills in children as these early literacy skills involve listening, speaking, print literacy. and story sense (Halle et al., 2012). Keys et al. (2013) found that quality preschool experiences were a predictor of language skills for children. This suggests that early experiences with preparatory language provided children advantages in language skills when it came to school readiness.

The fourth area of school readiness is the students' approach to learning. Halle et al. (2012) defined approaches to learning as on-task behavior in the classroom. The researchers included such behaviors as being able to concentrate, following rules, and enjoying learning and classroom behavior. Like social and emotional development, approaches to learning are behaviors that allow children to be successful in class and access the curriculum. However, Okado et al. (2014) separate attention and classroom engagement into separate categories that make up school readiness. Regardless of whether attention and engagement are combined or separate, they are both tied to overall school readiness in the literature.

The final category is the student's social and emotional development. Halle et al. (2012) defines a child's social and emotional development as their ability to interact socially with others and the child's perceptions of themselves. Zaslow et al. (2000) broadens this definition of social development to include a child's ability to take turns and to cooperate with others. Thompson and Lagattuta (2006) include the ability to pay attention and follow directions in this definition; however, this attention can also be seen in other research conducted by Halle et al. (2000) and Zaslow et al, (2000) as part of the learning behaviors skillset. Keys et al (2013) included externalizing problem behavior as an additional measure of social and emotional readiness. They also found that high-quality childcare for students was a predictor of social skills when entering school. Their findings suggest that the quality of early childhood experiences that children have has an impact students' social emotional readiness for school. Each of these studies considers social and emotional development as an important component of kindergarten readiness as they set the foundation for academic behaviors that allow children to engage with each other and to engage in the curriculum.

The literature points to all five of these areas making up school readiness. While they can be divided into smaller subcategories, these are the areas that have been researched to describe a child's readiness for formalized schooling.

Building Readiness Through Home Experiences

To build these school readiness characteristics, children have to have rigorous and developmentally appropriate experiences. While the most apparent type of rigor is academic rigor, Brown et al. (2015) broaden the definition of rigor to include motivational, cultural, social, and emotional components in their definition of rigor. The combination of these areas creates developmentally appropriate experiences for children. This broader definition aligns better with the definition of school readiness by addressing the idea that school is more than just an academic endeavor.

Throughout the day, we have multiple interactions with our environment and with other people. These interactions call on people to perform different tasks and use various skills. Rogoff (2014) suggests that many of a child's rigorous interactions take place through informal community contexts. She describes this as "learning by observing and pitching in," or LOPI. Rogoff (2014) contends that, before attending school, learners develop knowledge through immersion in their family and community.

Washor and Mojkowski (2006) have said that "a rigorous experience is reflective and intimate" (p. 85). During these rigorous experiences, children take ownership of their actions and they engage in challenging their previous assumptions. Levels of rigor are not fixed in a certain context and they are not the same for all learners. Brown et al. (2015) state that these developmentally appropriate experiences are meant to challenge a child's thinking while connecting children with the world around them. Rogoff (2014) says that it is the child's desire to contribute and connect with their community that powers their desire to learn and ties the act of learning information closely to the social ties that children have with those around them as well. Washor and Mojokowski (2006) echo this sentiment by suggesting that the rigor of an experience can be increased by connecting to the head and the heart at the same time. Children are willing to spend more time learning about subjects that they are passionate about and that have connections to their real-world contexts (Washor & Mojokowski, 2006).

Washor and Mojkowski (2006) suggest that rigor can also be increased by assessment and feedback on a child's learning. Piaget (1964) stated that humans are constantly in a state of testing hypotheses to learn about the environment around us. We perform an action and then ask ourselves, "Did this action give me the desired result?" Based on this result, we either make changes to our actions or further solidify that action as the correct way to do something. Error analysis is how we come to learn about our environment and our relationship to our environment. Without feedback, learning is impossible because no value is attached to one's actions. Rogoff (2014) added a community framework around the idea of appraisal and addressed the importance of assessment and appraisal of the work that a child has done by someone who has mastery in the area. It is this feedback that allows children to reflect on what they have done and make corrections in order to improve their contribution to their community. This feedback takes place in our daily lives on a very elaborate scale. Feedback in the real world is messy because scenarios and humans are not static; there are infinite combinations of outcomes.

Children develop the idea that learning is not a fixed event and is never complete through these developmentally appropriate experiences (Washor & Mojokowski, 2006). It is through participation in these experiences that children develop a readiness for school.

Technology

Prevalence of Technology Usage

The introduction of technology has fundamentally altered the way in which we interact with our environment and with each other. The introduction of technology into this equation has changed both the quality and the frequency of interactions. While we are all familiar with technology itself, the word *technology* is an extremely broad term. For the purposes of this paper, technology will include the television but will focus particularly on the use of the computer or smart device. Therefore, screen time can be the time spent watching TV, researching on the computer, playing video games, or using a mobile device (Common Sense Media, 2017). Each of these would have a different impact on a child's development as they all involve different levels of cognitive demand and rigor, and they

provide different types of social interactions. The context in which time in front of a screen is viewed also has an impact on the viewer. Streaming a movie alone is different from working collaboratively on a PowerPoint project in class. Livingstone et al. (2015) and Oleimat et al. (2018) found that, while individual devices can be used as tools for learning, most children use the devices mainly for entertainment. To truly understand how children are using digital technology, one has to evaluate whether the technology is being used as a social medium, the amount of time spent using technology, the level of cognitive rigor, and the level of collaboration.

Despite the numerous possible uses for touchscreen technology, a large percentage of students' time is spent viewing videos or movies (Common Sense Media, 2017; Oleimat et al., 2018). While viewing videos can benefit a child by exposing the child to new vocabulary, using applications such as Netflix or YouTube have low cognitive and physical demands, offer children low levels of rigor, and involve low social interaction. While it is not impossible to find informative content with high-level vocabulary on the internet or through entertainment applications such as Netflix, the majority of content on these platforms is designed for entertainment. Passive video viewing content may allow for cognitive development in that it can expose children to new information as well as to a high quantity of language; however, this viewing does not address many of the other areas discussed (Kirkorian et al., 2016). Children are not given an opportunity to practice their expressive language while viewing videos, nor are they required to show self-control. Most importantly, while viewing videos, children are provided very little feedback on their thoughts and actions, which limits learning.

Many children use tablets for gaming, which accounts for a large percentage of children’s time on technology. This time can range from approximately 20% to as high as 60% of the day (Common Sense Media, 2017; Oleimat et al., 2018). While there may be some variations among the gaming apps. There are mixed arguments regarding gaming in the area of cognitive development. Not surprisingly, most gaming apps are designed for entertainment, yet there is a growing number that are designed with learning in mind. Applications and games that are designed for entertainment are, not surprisingly, less cognitively demanding for the players. The applications that are designed with

learning in mind tend to be more cognitively demanding for the player and may teach a variety of skills from spatial reasoning, to problem-solving, to pattern recognition, and even reading skills. However, there is research to suggest that although these apps are designed for learning, they are designed by developers not trained in education and, therefore, may be less cognitively valuable than they appear at first glance. There is emerging research to suggest that video gaming may be helpful for children's social development. Livingston states that there is a growing number of people who use social gaming to communicate and connect with friends. This was magnified by the COVID-19 quarantine orders that took effect in 2020.

Electronic reading and homework on technology accounted for about 2% of time spent on technology for children up to 8 years of age (Common Sense Media, 2017). When compared to gaming and viewing, these activities are more cognitively demanding and rigorous. Depending on the activity, doing homework on technology can build spatial awareness, reading comprehension, or even use of expressive language. However, they still do not provide the same number of opportunities for active linguistic engagement as interaction with a peer or model. It could also be argued that doing homework online or online reading requires children to develop self-control; however, these activities are usually done individually and, therefore, offer limited opportunities for social development and social connectedness.

Parent Perceptions of Technology

Research has presented parent perceptions of technology to be somewhat of a mixed bag. Parents have mixed feelings about their usage and their child's usage of technology. Radesky et al. (2016) describe these as *tensions*. According to Radesky et al. (2016), these tensions fall into three areas: effects on the child, locus of control, and family stress. Many other researchers have found similar tensions, but the divisions that Radesky et al. (2016) describe provide strong classifications for the dichotomous feelings that parents have.

Many parents believe that personal devices can be used as tools for finding information and teaching their children (Ochoa, 2019). Parents feel that individual devices can enhance students'

understanding of math and reading and even help with language development. There are marketing claims that many products designed for young children are educational and can aid in cognitive development (Zimmerman et al., 2007). Parents reported feeling pressure to introduce their children to educational apps early so that their children can keep up with other children academically (Radesky et al., 2016; Zimmerman, et al., 2007). Radesky et al. (2016) reported that these beliefs were particularly high among low-income parents.

Locus of Control. Parents also struggle with setting limits with regard to technology due to the ever-evolving inherent attributes of technology and the unregulated nature of the internet (Radesky et al., 2016). Common Sense Media reports that, when looking at the parents of 5–8-year-olds, 44% say that their child spends too much time with the media. Within the same group of parents, 47% report that it is difficult to get their child to stop using media (Rideout & Robb, 2020). In many cases, parents understand that it is incumbent upon them to monitor and regulate their child's usage of technology and to monitor and filter the content that their child is consuming (Ochoa, 2019). Unfortunately, many parents, especially parents of lower socioeconomic status, report that they are not familiar enough with the technology to be able to restrict their child's usage of the technology (Radesky et al., 2016).

However, there are other factors at play with regard to monitoring a child's usage of technology. Parents' usage of technology has been shown to have an impact on their child's consumption of technology. Schoeppe et al. (2016) found that adults with < 2 hours of screen time per day are more likely to allow < 2 hours of screen time for their children. Parents do have concerns as to their own technology usage and their parenting time. Many parents feel that technology impacts their ability to supervise, be responsive, and act as a role model for their children (Hiniker et al., 2015). The same research pointed to the idea that, in many cases, these parents had trouble regulating their own use of technology during supervision and shared playtimes but felt that if they were using their phones to interact with their children (take pictures, etc.) that their usage was acceptable (Hiniker et al., 2015).

Family Stress. The final tension that was reported in managing children's behaviors was the use of individual technology itself. Wartella (2013) reported that up to 80% of parents report using media as a parenting tool by using the device to regulate behavior and to calm their children. Despite the potential to minimize behavior concerns, parents also expressed feelings that using these devices to regulate behavior could also have negative effects on family time or the emotions of their children, reporting the children to be "**zombielike**" (Radesky et al., 2016)

Again, parents' own usage habits were also a concern in this area. Researchers Hiniker et al. (2015) found that parents have mixed feelings on their own use of technology and that these parents fell into three distinct categories. They reported 28% of caregivers felt that using their mobile phone while supervising their child at a park was acceptable if their child was safe. Forty-four percent felt that they should decrease their own use of technology during these times, saying that they were *not as attentive* as they could be. These parents also reported that they had trouble limiting their own usage during supervision. The final 24% of users stated that they should not be using phones while supervising their child and were successful at doing so (Hiniker et al, 2015).

Ochoa (2019) found that adult mobile phone usage during mealtimes and play was associated with a lower quality interaction and caregiver's expression of positive emotions.

Disadvantaged Students

Research conducted by Snow (2014) indicates that socioeconomic status (SES) plays a large role in the overall amount of language to which children are exposed. Research regarding the amount of time children spend differs across gender, race, income, and parent education. Common Sense Media (Rideout & Robb, 2020) found a difference in the amount of screen time by gender. Boys averaged 2 hours and 40 minutes of screen time per day, while girls averaged 2 hours and 5 minutes per day. However, there are more stark contrasts when looking at race, income, and parent education.

Race. White children averaged 37 minutes per day on mobile devices, while Hispanic/Latino children spent 1 hour and 19 minutes per day. African American children spend an average of 1 hour

and 44 minutes on mobile devices (Rideout & Robb, 2020). Overall, screen time showed similar discrepancies. Children in White families spent an average of 1 hour and 52 minutes in front of a screen, while Hispanic and Latinx children averaged 3 hours and 3 minutes and Black children averaged 4 hours and 9 minutes in front of a screen (Rideout & Robb, 2020).

The difference in media consumption among races could be due to the beliefs surrounding the benefits of technology. Fifty percent of Black families reported that learning was a very important reason for their child's screen time compared to 37% of Hispanic/Latinx parents and only 31% of White parents (Rideout & Robb, 2020). Thirty-nine percent of Black families believed that screen media helped their child to learn a lot, compared to 32% of Hispanic/Latinx parents and only 19% of White parents (Rideout & Robb, 2020). The perceived educational value of digital media among different ethnicities is consistent with the media consumption of the respective groups of children.

Income. Similarly, there was a significant difference between children of lower income families (< $30,000 annually), who averaged 1 hour and 13 minutes daily, and children of higher income families (> $75,000), who spend an average of 37 minutes per day on these devices. The difference was just as stark when researchers compared children whose parents had a high school degree or less with children whose parents had earned a college degree. The children in the parent education level graduating from high school are spending 61 minutes per day compared with only 32 minutes for children whose parents graduated from college.

Education. Hart and Risley (2003) observed a linguistic gap between children in higher parent education families, working-class families, and low-SES families. The researchers stated that the average verbal exposure of a child in a professional family is approximately 215,000 words per week compared with 125,000 for a working-class family and 62,000 words for a child from a low-SES family (Hart & Risley, 2003). Hart and Risley (2003) stated that these words exposed children to a varied vocabulary and increased repetitions of new vocabulary in varied contexts.

Radesky et al. (2014) found that low-SES families are more likely to expose their children to TV because of a lack of other educational resources, and these parents described screen time as a

safe and comfortable activity for children. Additionally, the researchers noted that households of low English proficiency might emphasize television programming as a means to learn English.

Twenge and Campbell (2018) found that children and adolescents who spent more time using screen media had lower psychological well-being than their counterparts who consumed less screen time. The authors also found that adolescents with increased screen time were twice as likely to be diagnosed with depression or anxiety (Twenge & Campbell, 2018).

Technoference and Displacement of Activities

Historically, most of these interactions, especially the social–emotional interactions, have been dependent on the parent; however, with the introduction of individual and mobile devices, children have more access to technology than ever before (Bassiouni & Hackley, 2016). This access permeates all aspects of a child's day, replacing traditional interactions that the child might otherwise have with their world and their caregivers. This reduces the frequency of opportunities for shared play, shared conversations, and shared observations. Young children are dependent on these parent interactions for a majority of their learning experiences (Hart & Risley, 2003). This technological interruption in everyday relationships in a variety of settings is called *technoference* (McDaniel, 2015; McDaniel & Radesky, 2018)

Christakis et al. (2018) have stated that environmental factors play a role in cognitive development. However, the introduction of technology has altered the way we interact with our environment and with each other. Interactions with technology have replaced the typical experiences, social interactions, and relationships that a child might have had in past generations. The technological replacement of traditional experiences is called "displacement of activities" (Radesky et al., 2015). These shared interactions are replaced by interactions with an individual mobile device, and both the quality and the quantity of feedback children receive has changed as a result. The experiences and interactions that a child gets will affect both their cognitive and social development and therefore their readiness for school. Oleimat et al. (2018) found evidence to suggest that children are replacing traditional play-based activities with playing games on tablets. This displacement of

activities caused by technology affects the cognitive development of children both chemically and physically. Children are replacing context-rich, cognitively demanding activities with low-quality, low-complexity experiences. This can affect children's cognitive development in a variety of ways ranging from the amount of information that the child receives to the way that person solves problems, to the way that person's brain chemically processes information (Christakis et al., 2018; Radesky et al., 2014). All of these have dramatic effects on the way that a child sees and processes the world around them.

The introduction of technology will undoubtedly produce a different type of student coming into our schools. Technology is widely available to Americans and, specifically, children who are still developing their language skills (Pew Research Center, 2018). Therefore, access to technology, time on technology, and when and how children are using technology become significant because of technology's ability to enhance or supplant traditional shared experiences.

These questions are asked through the lens of gender, race, income level, and parent education. In order to evaluate how these experiences enhance or supplant these shared experiences, a framework is created for evaluating technology in relation to cognitive development. The four points for evaluating this technology are the cognitive and physical demands that are required of the child, the level of rigor of the task, impact on self-regulation, and the quality and quantity of social interactions. These frameworks serve as an important steppingstone to setting up the proposed research study.

Technoference and Cognitive Development

Technology has provided opportunities for the displacement of cognitively robust developmental experiences inherent in a child's environment (Zimmerman & Christakis, 2005). While technology can have a variety of applications, its impact on a child's cognitive development is dependent on the cognitive demands that are required to operate the technology or application (Hsin et al., 2014). Cognitive demands are the functions that are required of a technology user during any technological interaction. For example, if a child were to read an article on a tablet it would require a

different skill set than playing a video game. For reading, the child has to use decoding skills, fluency, and comprehension skills. Additionally, the child would have to give the reading context and relate the information to the child's world. For a videogame, the physical skills used would be of little use, but the child might use problem-solving skills, planning skills, and hand–eye coordination to construct something within the confines of the game. Thus, the type of application that a child uses can dramatically change the type of skills that they develop (Hsin et al., 2014).

Research conducted by Brown et al. (2015) showed that in-person interactions with parents are more effective for improving a child's problem-solving skills than learning the same skill from viewing a video. Barr (2013) also found evidence that video viewing did not provide the same hands-on exploration that is required for memory flexibility as did interactions with caregivers. This lack of memory flexibility has an impact on cognitive, language, sensorimotor, and socioemotional skills in very young children.

Technoference and Rigor

The introduction of individual technology can have impacts on children's language development. The use of technology displaces real-world experiences. Technology use tends to be more individualistic and, therefore, less language dependent. Many of the activities that children are participating in (watching videos, playing individual games) focus primarily on receptive language and do not allow children multiple opportunities to use expressive language with an opportunity for correction. Hirsh-Pasek et al. (2015) stated that, without a parent giving meaning to experiences, these "words might flow by like background noise, with no impact on child learning" (p. 1081). Additionally, technology usage prevents children from receiving meaningful linguistic feedback about their verbalizations. These opportunities for parent feedback are necessary to build a child's linguistic ability (Perryman et al., 2013; Tamis-LeMonda & Rodriguez, 2008).

Chonchaiya and Pruksananonda (2008) conducted research on children between 15 and 48 months of age and found that there was a negative association between television viewing in very young children and language development. Parents' responsiveness to their children have been

shown to play a major role in children's language development (Perryman et al., 2013; Tamis-LeMonda & Rodriguez, 2008). However, the introduction of personal devices into parent–child relationships can affect parent responsiveness and therefore language development (Hiniker et al., 2015; Perryman et al., 2013; Wartella, 2013). Chonchaiya and Pruksananonda (2008) found that children who had delayed language development tended to begin watching television earlier and spent more time watching television than the control group (Chonchaiya & Pruksananonda, 2008). Children in the control group had more caregiver-to-child interaction. Chonchaiya and Pruksananonda (2008) found that children who watched television alone were 8.47 times more likely to have a language delay than their counterparts who did not spend time alone with technology. The implication of this research is that the interaction between caregivers provides a more linguistically rich environment than an environment in which children spend more time with television.

Though much of this research pertained to television, the themes remain the same regarding children's use of technology and parent responsiveness: individual technology has the potential to compound concerns as tablets allow children increased access to technology, the ability to watch/interact with this technology on their own, and a reduction in interaction with their parents and peers.

Technoference and Approach to Learning (Self-Regulation)

Research on the impact of technology on self-regulation is mixed. Radesky et al. (2014) found that infants who demonstrated poor self-regulation and self-soothing were more likely to be given electronic devices as a means of controlling their behaviors. By opting for the use of technology instead of providing behavioral scaffolding on how to regulate emotions, parents are not offering children the tools to regulate behavior. The authors recognize these results may be a combination of technology and inconsistent parenting. Cliff et al. (2018) also addressed the relationship between screen time and self-regulating behavior.

The researchers found that children who had lower levels of exposure to media at age 2 had higher self-control scores at age 4. However, when looking at scores from ages 4 to 6, the study did

not find significant results. Instead, Cliff et al. (2018) discovered that children with self-regulation problems at age 4 were more likely to have increased viewing/gaming activity at age 6. Thus, a relationship is established but the directionality is difficult to determine.

Twenge and Campbell (2018) found that children who had high amounts of screen time were more likely to show poor emotional regulation. Additionally, the researchers found that these children had a harder time completing tasks and demonstrated lower curiosity. Both of these skills are important for student success in school.

When discussing the effects of digital media, it is important to look closely at the design of the program to evaluate for desired and undesired effects. There is a variety of research to suggest that digital activities do not mirror their analog counterparts when it comes to a child's development of self-regulation skills. Material developed for individual devices such as video games and apps is designed to be fast-paced. They are edited in brief segments that are attention grabbing and do not require prolonged attention in the way that activities in the classroom would demand prolonged attention (Nikkelenelen et al., 2014). A similar pattern can be found in ebooks. Takacs et al. (2015) found that some of these attention-grabbing features, such as lights and sounds, that are designed to keep a child's attention may actually serve as distractors for the child, decreasing their overall comprehension and shared parent and child engagement while reading. De Jong and Bus (2002) similarly found that reading online took children's attention away from the text regardless of the child's reading level and that children using electronic readings had fewer interactions overall with the text.

Much technology, like the tablet, is designed to personalize the individual experiences of the user, thereby eliminating the need to negotiate with others in order to share resources. These devices, including video games, are designed to give instant feedback to the child and release dopamine, which eventually amplifies ADHD symptoms (Weiss et al., 2011) and eliminates the need for the child to have self-control or wait to be gratified for their participation. Evidence points to the idea that children's self-regulation skills can be impacted by media and device usage. This occurs

both through the displacement of traditional methods of parental, behavioral scaffolding, and the design of the media itself.

Technoference and Social Development

Quality of Social Interactions. Developing social skills is dependent on the different aspects of the child's environment (Rimm-Kaufman & Pianta, 2000). During the formative years of a child's development, children rely on their interactions with others in order to develop their higher order thinking skills, regulate emotions, focus on tasks, and control impulses (Hill et al., 2016). However, technology has dramatically changed the types of interactions as well as the way that children interact with their peers.

The manner in which children use technology will affect the outcomes that a child experiences from the use of technology (Hsin et al., 2014). Kirkorian et al. (2016) divided children's use of technology into four basic categories: noninteractive video content (TV, DVD or digital video), playing video games (computer, video game console or individual device), using a digital reading device, and video chatting. Of these four categories there are two with the potential to contribute to a child's social development. Video chatting and playing video games have the potential to allow children to interact with each other.

In a video chat, a person may communicate with another person or group of people as they would in a phone call; however, the audio is also accompanied by a video stream linked to the other party. Kucirkova (2014) has stated that this type of video chat may help children to build and maintain relationships with family or friends who are far away. This type of chat is similar to a face-to-face interaction in which the child is able to look at the person with whom they are talking and engage in eye contact (Kucirkova, 2014). Thus, using technology in this way can create what Vygotsky (1978) refers to as shared experiences. These shared experiences are the building blocks for cognitive development.

A benefit of video chat is the face-to-face interactions. These interactions can have a varying level of rigor depending on who is participating in the conversation. For example, a college student

video chatting with a professor would have a different level of rigor than a young child would have with their grandmother. The level of cognitive rigor can also fluctuate within the conversation as well. For example, a child speaking might use a different level of language when talking with their grandmother about what they did at school that day than they would if they were talking about their favorite cookie. The change in the level of vocabulary and thought processes when talking about certain subjects can cause some parts of the conversation to be more demanding than others.

The second category identified by Kirkorian et al. (2016) was gaming. During gaming (including social gaming), there is the potential for participants to interact together in a virtual world; however, they also have the ability to talk (or occasionally video chat) with each other while playing the game (Livingstone et al., 2015). Examples of these technologies include games like Minecraft and Fortnight, as well as a variety of sporting and shooting video games. This use of technology varies from video chat in that communication is the secondary function of the technology. The primary function is for the user to play the video game; the communication component comes secondary (Livingstone et al., 2015). Similar to video chatting, participants are able to get real-time feedback to their input. Like video chats, the level of rigor can also vary in this arena depending on the participants and the conversation. Social gaming has many components of video chatting; however, it lacks the face to face interactions that Kucirkova (2014) noted.

The use of technology for social purposes provides a wide spectrum of uses. Video chatting and social gaming provide real-time feedback, however, there are different ways to communicate. social networking apps like Facebook, Snapchat, and Instagram are widely used types of social interactions that are far different from video chat (Anderson & Jiang, 2018). In these forums, participants might post a video, picture, or text and others may respond to the post either by using a reaction, like a thumbs up or smiley face, or posting a comment, or they may post a picture of their own. These types of interactions are also social interactions. They are similar to the letter writing process in that they require a person to read/view the content, process the information, and then convey their ideas back to the message sender. Email would also be in this category as it conveys

ideas that elicit a response from another person. One could also make a case for technology like YouTube being in this category as the user can create content to which others respond. These interactions are different from the video chat in that the feedback is often delayed or, in some cases, there is no feedback at all.

Like video chats and social gaming, the level of rigor and cognitive demands for the user can vary from one interaction to the next or within the same interaction. One key difference from the first two groups is that these types of interactions often do not provide auditory or visual cues. We have all read an email and been unable to interpret the tone because we were not able to see the person saying the message. The absence of these visual cues can affect which social skills the child will use and develop.

Quantity of Social Interactions. Technology use, when used in ways other than connecting with the family may interfere with relationships between family members (McDaniel & Coyne, 2016) These relationships may be the relationship between a caregiver and a child or between the caregivers themselves. Despite findings reported by Wartella (2013) in which 46% of parents stated that their household did not have conflicts related to negotiating media use, other research suggests that this technoference may be less apparent.

In the 2016 study by McDaniel and Coyne, the researchers found that, as a result of parental technology usage, mothers reported lower relationship satisfaction between themselves and their partner as well as a perception of lower coparenting quality. This study points to the idea that parenting quality is adversely affected by the parent's use of technology. Six in 10 mothers in the study admitted that smartphones interfere with their own interactions with their children (McDaniel & Coyne, 2016). Research indicates that parents understand this relationship between their parenting and technology. Ochoa, (2019) found that parents have the belief that individual devices can distract from their parenting and disrupt quality interactions between themselves and their child. Radesky et al. (2014) observed similar examples of this low-quality parenting, noting that caregivers often used technology as a pacifier for their child in an attempt to control their child's behavior. There is research

to suggest that device usage among children has less to do with a child's traits and more to do with parenting styles. Howe et al. (2017) found that parents who allow more screen time tend to be more "permissive" parents, while more "authoritarian" parents tend to allow less access to technology. When parents use technology to replace interactions, this technology often serves as a replacement for enriching child activities, keeping parents from providing valuable types of cognitive, linguistic and emotional development (Radesky et al., 2014).

In addition to using individual devices for their children, Radesky et al. (2014) found that parents often demonstrated over-use of the devices. At times the caregivers were observed in a state of "constant absorption" with their mobile technology often ignoring their child or giving repeated instructions to their child in a "robotic manner" (Radesky et al., 2014). The children would respond to this type of parenting by increasingly exhibiting limit-testing behaviors. Hiniker et al. (2015) found that parents often occupy themselves with a device while their children play. The researchers found that parents often exhibited this behavior because they believed that their child was "safe and occupied."

The researchers did observe cases of children and parents sharing technology in order to look up facts or pictures from their person-to-person conversation (Radesky et al., 2014). They found instances in which technology was used to enhance the conversation between caregivers and children. Examples of technology enhancing the conversation included using technology to demonstrate examples or by providing information with which the parent may not have had knowledge (Radesky et al., 2014). However, Wartella (2013) found that fewer than 40% of parents reported this type of coengagement occurs "all or most of the time". This suggests that these individual devices are more frequently replacing, rather than enhancing, interactions

Buhrmester (1990) found that children who were able to form friendships were more likely to show compassion and be more sociable in addition to showing less anxiety and hostility. An important building block to these friendships is having shared interactions with peers. However, another area in which our smartphones are also disrupting interactions is during face-to-face interactions (Radesky et al., 2014). This may be answering a text or checking a Facebook status while simultaneously talking

to a person. Twenge and Campbell (2018) reported that using smartphones in this manner can negatively affect face-to-face interactions and can affect well-being. The quality of the interactions has negative effects on both participants. Vanden et al. (2016) reported that social interactions were seen as lower in quality when participants were distracted by usage of individual technology during face-to-face interaction. During these interactions the mobile phone users were seen as impolite, and the researchers stated that the use of individual technology during in-person interactions may cause feelings of “rejection and ostracism” among their partners.

Gunnell et al. (2016) found the relationship between screen time and social well-being to be reciprocal, with each affecting the other. Similarly, Twenge and Campbell (2018) found a link between high amounts of screen time and lower psychological well-being. Furthermore, Lobe et al. (2007) offered an alternate perspective, illustrating that children do not draw a line between the physical and digital world; this allows them to develop their social skills in the digital world by building virtual relationships and engaging in other activities through social platforms.

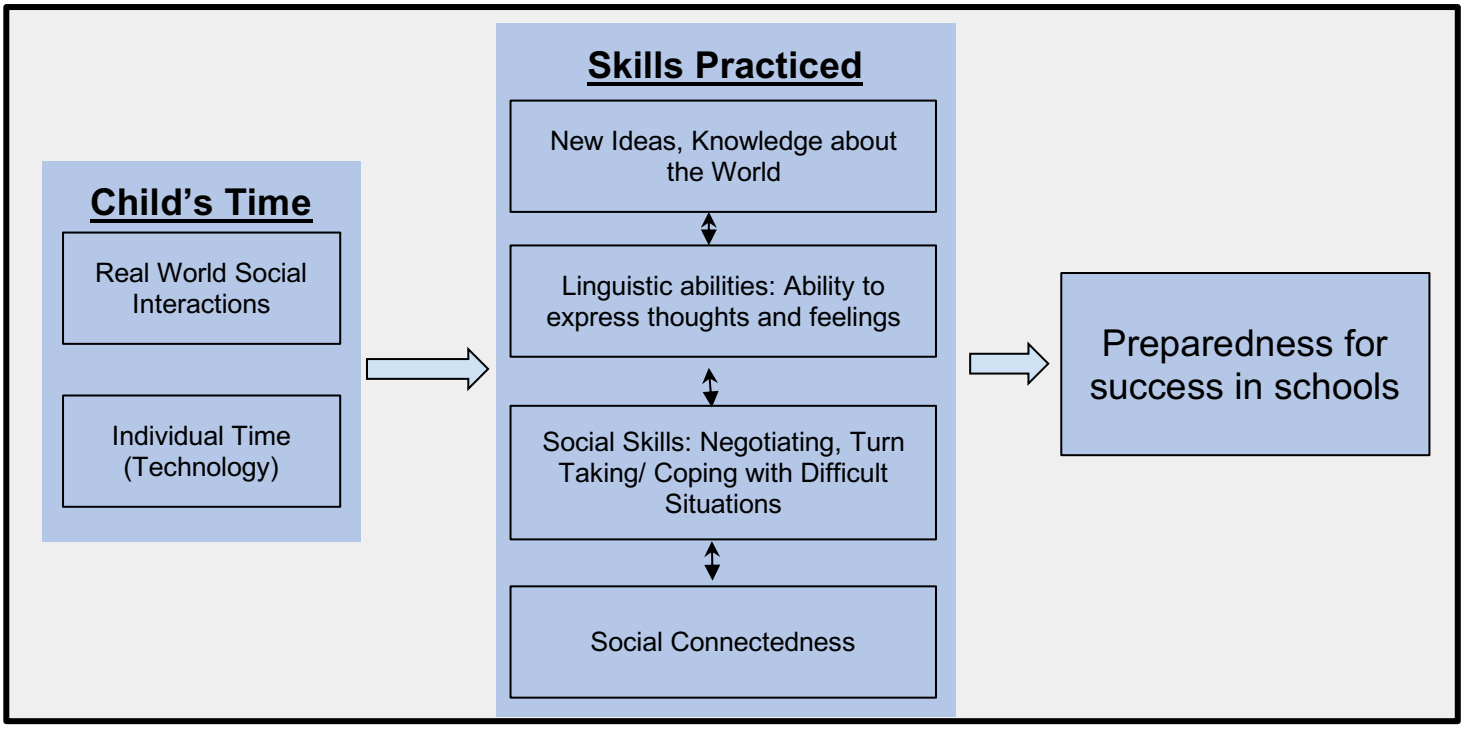


Figure 1. Skill development and school preparedness.

Conceptual Framework

Our interactions with people and our environment are what helps us learn and grow as human beings. These interactions are of the utmost importance in our formative years. The development of readiness for school consists of four areas that build upon each other. Children must be cognitively ready, linguistically ready, and have a degree of self-regulation to be socially ready to be able to develop social connectedness. These areas are somewhat hierarchical, although children will work on multiple areas at one time (Figure 2). Children do not enter schools fully competent in any of these areas, and they continue to build these skills as they participate in school.

Access to technology and the amount of time that children spend on technology is an area that needs to be addressed. Research has shown that many parents see technology as a tool to help their children develop skills and an opportunity for them to connect with others. Research suggests that, despite the best parental intentions, these devices are used in multiple capacities that are not limited to learning technology. Children see individual devices as a source of entertainment, and they spend the vast majority of their screen time using technology as a source of entertainment. In addition to children's perceptions of individual technology, parents are using technology as a parenting tool and a way to occupy children's time. Combining these two factors leads to usage that replaces higher quality environmental and personal interactions with lower quality interactions.

Research has shown that replacing these interactions can cause children to miss out on valuable experiences and opportunities to grow cognitively, linguistically, and socially (Vygotsky, 1978). These experiences are particularly crucial during the formative, pre-school years as they serve as the foundations for a child's schooling. The consequences of replacing these interactions build upon one another. Children who are not provided experiences do not have a foundational knowledge of the world around them and children who do not have foundational knowledge have less context within which to build language (Figure 2). Without language, children struggle to express themselves, and their wants and needs. This inability to express their needs can create negative interactions with their peers. These negative interactions turn into negative relationships and make it difficult for kids to

feel connected with others. Without connecting with others, children struggle to maintain social well-being.

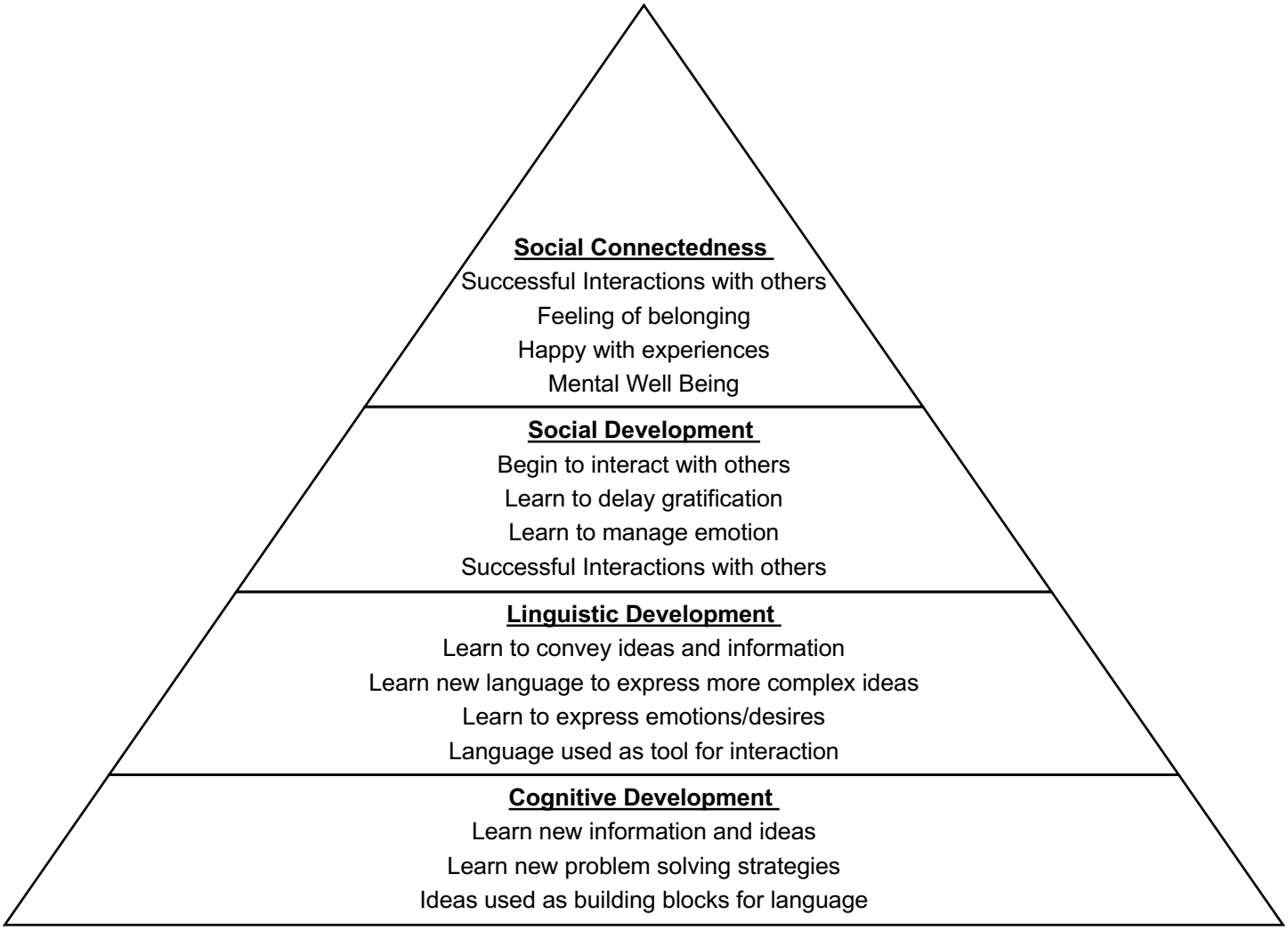


Figure 2. Developmental skills.

As displayed in Figure 2, this relationship is not one directional, each of the latter skills strengthens the previous skill as well. If children do not have mental well-being, then they struggle to develop relationships. Moreover, without these developed relationships with others, it is more challenging for them to have conversations and build linguistic skills (Vygotsky, 1978). If children cannot develop their language skills, it becomes difficult for them to develop abstract conceptual understandings of the world around them (Figure 2). A lack of conceptual understanding then limits a student's cognitive ability (Piaget, 1964) Thus, it is vital for teachers to understand the impacts of

technology used during the developmental years (and throughout a child's schooling) to support children in a helpful and relevant way.

Chapter Summary

The American schooling system requires students to have certain foundational skills when entering formalized schooling. The traditional schooling system is dependent on students' having some foundational skills in problem-solving, expressing their ideas, regulating their behavior, and interacting with peers (Cappelloni, 2010). While children develop these skills throughout schooling, they are crucial in the first few years of schooling. Many of these areas have reciprocal effects, and a child's proficiency in one area can help build proficiency in another area. Students who struggle with these foundational skills early experience less success in the classroom and often have a lower sense of emotional well-being.

Piaget (1964) found that a child's development is dependent on experiences during their formative years. To be prepared for school, students must practice problem-solving, self-expression, behavior regulation, and peer interaction informally at home. Informal opportunities to practice these skills traditionally arise in a child's play. Play provides children opportunities for cognitive development, linguistic development, and social development through interactions with more advanced role models. In recent years increased screen time has replaced these traditional, more cognitively demanding activities (McDaniel, 2015; McDaniel & Radesky, 2018).

There has been a great deal of research conducted regarding the amount of time children under the age of 5 spend on devices. Not surprisingly, this research has shown that children are using technology at increasingly younger ages and have increasing access and usage times (Common Sense Media, 2017; Rideout & Robb 2020). Additionally, the research addresses the effects of this usage on children's development and family dynamics (Radesky et al., 2014). However, there has been limited research regarding the manifestation of these effects in the classroom.

The replacement of interactions with role models has created a generation of children with different problem-solving skills, linguistic skills, and fewer experiences relating to peers. To further

understand how the effects of screen time and, specifically, individual devices, research needs to be conducted to see if the use of these devices is affecting children's performance in the classroom. This research will determine if there is a connection between individual mobile device usage and perceived classroom behaviors and performance.

CHAPTER 3

METHOD OF INQUIRY

While kindergarten may be a child's first schooling experience, it is not their first learning opportunity. Children are learning from birth by interacting with the world around them. However, all children are not presented with the same quality and quantity of rich, cognitive experiences. The introduction of individual mobile technology has created conditions in which less cognitively engaging experiences may replace these rich experiences (McDaniel& Radesky, 2018; Radesky et al., 2014; Radesky et al., 2015). Considering the prevalence of technology in society and the possibility that this technology could displace traditional learning experiences, this research aims to discover the relationship between home technology usage and teachers' perceptions of educational and social–emotional readiness.

The purpose of this study is to determine the skills and weaknesses digitally native students bring to school. This study looked at the cognitive, linguistic, self-regulation, and social development skills, as well as students' social connectedness as factors of the students' overall readiness for school. Additionally, the study aimed to determine if there is a relationship between individual device usage before entering school and readiness for school. The study aims to answer the following questions:

1. What are parents' perceptions of children's home device usage (platform, frequency, duration, times, range of application usage)? Does this vary by income/parent education?
2. How does individual device home usage affect students' cognitive readiness for school?
3. How does individual device home usage affect students' social–emotional readiness for school?
4. How does individual device home usage affect students' overall readiness for school?

Chapter 3 begins by outlining the study as a quantitative research method. Next, this chapter will outline the research design and limitations of this study. The chapter will then discuss the research methods used in the study, including the survey setting and the sample used in the survey. The chapter will then highlight the methods, instrumentation, and procedures used in data collection

and data management. Next, the chapter will discuss the data analysis and interpretation procedures used in the study. Finally, Chapter 3 will conclude with a summary of the points made in the chapter.

Quantitative Methods Research

"Quantitative research relies primarily on statistical relationships to demonstrate relationships between variables" (McEwan & McEwan, 2003, p. 47). True and quasiexperiments develop knowledge by applying qualitative research methods. Qualitative research methods are often useful in cause-and-effect thinking (Plano Clark & Creswell, 2015). Quantitative research often employs strategies that include surveys in hopes of collecting statistical data (Plano Clark & Creswell, 2015). The quantitative researcher's goal is to determine causal relationship variables using systematic and empirical investigation to analyze this data (Singh, 2006). Strengths of quantitative research include the reliability of the data and the ability to complete the research promptly, and it employs numerical data to demonstrate the degree of agreement/disagreement (Choy, 2014)

According to Neuman (2009), quantitative research begins with a general area of study and then narrows to develop a hypothesis. The narrowing of the area of study occurs as a result of a review of the available research. The researcher will use the literature review knowledge to develop a hypothesis around a social theory (Neuman, 2009). After developing the hypothesis, quantitative research aims to establish/disprove correlations between given variables and outcomes (Dudwick et al., 2006). The researcher will then decide the types of samples to be collected and build questionnaires to collect data. The quantitative researcher will choose an appropriate sample size based on the number of variables used in the study and the sampling approaches that are to be used (Choy, 2014).

After defining the variables, the instrument, and the sample population and size, the researcher will begin the data collection process (Choy, 2014). By choosing quantitative methods, the researcher will typically be able to collect large amounts of data. This data will be analyzed to interpret the results concerning the given hypothesis. Quantitative research allows the researcher to isolate specific variables and establish the relationship between the independent variable (IV) and the

dependent variable (DV). The research aims to establish a correlation between the recreational use of touchscreen technology and the development of academic readiness and social–emotional readiness skills.

Researcher Role and Positionality

The researcher is an administrator in a K-6 elementary school in Southern California. The researcher believes that a student's preschooling experiences are important to the development of school readiness. The researcher also believes that a child's family plays a critical role in developing the whole child. The researcher takes a postpositive approach to the research as the approach allows for the method of study to be applied based specifically on the research question being asked (Wildemuth, 1993). This approach allows each researcher to determine the most appropriate approach for the study. Knowing the researcher's views, the researcher will not allow personal beliefs and opinions to influence the development of the survey items nor the analysis of the results of the surveys.

Research Design

The researcher chose a quantitative approach for this study to establish a correlation between the use of touchscreen technology and the development of academic readiness and social–emotional readiness skills. Touchscreen device usage was defined as the study's independent variable. The independent variable consisted of an index of the child's overall technology as defined by parent perceptions.

This study aimed to test the effects of touchscreen device usage by a child (IV) and their academic readiness (DV), their social–emotional readiness (DV), and their overall readiness for school (DV). To test each of these variables, the researcher ran a series of linear regressions to determine if there was a correlation between the touchscreen usage (IV) and each of the three dependent variables (DV). The model controlled each of these variables for outside factors, including family income, English learner status, preschooling experience, and sex of the child.

Limitations

The first limitation of this study was the timing of the study. This study was conducted during the winter/spring of the 2020-2021 school year. The COVID-19 pandemic and the subsequent move to distance learning impacted the 2020-2021 school year. Students in this district were doing significant portions of their classroom instruction through the distance learning platform during this time. School closures were impactful because these school shutdowns could have dramatically changed children's device activity. There are several ways in which the device activity changed during and after this shutdown.

The first way that individual device usage was affected was that schools went to an online instructional format. This format required children to check in with their teachers virtually and to complete assignments online. In addition to distance learning affecting children's time on technology, the COVID-19 pandemic restrictions and the distance learning format impacted the types of applications used by children. Children's ability to participate in online class work undoubtedly affected parents' perceptions of how their children were using their devices. While the survey asked about recreational technology usage, children's participation in distance learning likely impacted parents' perceptions of their children's technological interactions. It is conceivable that parents overreported the amount of schoolwork that children were doing on their devices. It is also conceivable that parents possibly lowered the amount of reported recreational screen time of their students because they assumed that their child was doing classwork.

The second way device usage may have deviated had to do with overall access to the internet. Many schools provided internet access to families that did not have access. Before the COVID-19 pandemic, these families may have had fewer devices that were Wi-Fi enabled, and therefore, their overall access to the internet would be limited due to the availability of internet compatible devices. The introduction of hot spots into households allowed increased access to online activities and allowed for more overall time on devices and more time on internet-dependent apps. This new access

to technology undoubtedly changed the overall amount of time students were reportedly spending on devices.

Pandemic restrictions also changed the design of the study. Due to health concerns and lack of access to students and teachers, the research had to be conducted solely in a digital format instead of the mixed format originally planned. The digital format undoubtedly affected the return rates of the surveys. However, it is unclear if the overall response rate was lower due to lack of access to a paper and pencil version of the survey or higher because of families' newfound familiarity with technology and the ability to access and return the surveys at any time. There was a clear differentiation in the return rates that were seen by both income and education subgroups. There were substantially higher return rates among students whose parents had higher reported education levels and higher reported household incomes. The models were adjusted to account for both.

Research Methods

The Research Methods section describes the research methods used to apply the quantitative method to this study. This section includes a description of the setting, the sample, data collection methods, data analysis, and steps taken to ensure reliability.

Setting

This study was conducted in a Southern California School District. This district is located in the Los Angeles Area and has a 2020-2021 student population of 8,471 students, with 50.9% of students qualifying for free and reduced-price meals. Of the 8,471 students enrolled in the district, approximately 100 students were enrolled in transitional kindergarten classes, 667 were kindergarten students, and approximately 798 were first-grade students. District A has 815 English learners, which makes up approximately 9.6% of its population (California Department of Education, 2021). Eighty-four percent of District A's students are Hispanic/Latino, and about 10.1% of them identify as White (California Department of Education, 2021).

Sample

Stratified sampling was used to conduct this study as this survey was distributed to all of the transitional kindergarten, kindergarten, and first-grade parents in the school district. There were 113 parents who returned the survey, opting into at least some portion of the survey, and 100 of these surveys were matched with teacher surveys, which make up about 6.4% of the total population in these grades. The sample included in this study consisted of general and special education students in transitional kindergarten, kindergarten, and first grade in the selected district. Parents could then opt into the second half of the survey based on their response to the survey's final question. The survey was sent out to the teachers of the students whose families opted in.

Consistent with IRB requirements, this study abided by all of the ethical standards for conducting research. The researcher protected the participants' identities during the research. The researcher coded initial surveys so they could match the teacher and parent survey results. Once the results were obtained and matched, the linking records were destroyed so that the students and families could not be linked back to the scores or responses. All subjects' participation was voluntary, and the researcher obtained consent before using parent and teacher data.

Data Collection and Management

This section covers the instrumentation used for both the parent and the teacher portions of the study, the procedures used to collect data, and the strategies used to manage the data in this study.

Instrumentation

This research relied on two different instruments. The first instrument is a parent survey derived from a Toplines Media Use Survey developed by Common Sense Media (2017). This survey was tested for reliability by the researchers at Common Sense Media. Permission to use the survey was requested and received. Common Sense Media used earlier versions of this survey in 2011 and 2013. The 2017 survey had minor changes from the previous versions. The 2017 Toplines Media

Survey was an online survey given to 1,476 households. Of which, 1,454 of these were determined reliable and used in the final analysis (Common Sense Media, 2017).

The survey used in this study was developed as a 25-question survey. The first eight questions were demographic questions developed by the researcher and added to the survey. This survey was used to answer the first research question and to get a profile of children's home device usage. The Toplines Media Use Survey was also used to collect demographic data used to control for outside demographic variables while conducting the regressions. Questions 12-15 on this survey were used to create the index for home technology usage. This index was used as the independent variable for the linear regression for the research questions that measure home technology use with school readiness.

The survey consisted of 17 multiple-choice questions answered on a 5-point Likert scale in addition to the demographic questions. Questions that used the Likert scale asked parents to rate their child's frequency of touchscreen device usage. The Likert scale for the frequency of use was as follows 1 = *never*, 2 = *1-2 times per week*, 3 = *3-4 times per week*, 4 = *5-6 times per week*, 5 = *daily*. The study used Likert scales to determine the average time per day that children used the touchscreen devices for a variety of uses where 1 = *my child does not use this feature*, 2 = *Less than 30 minutes per day*, 3 = *30-60 minutes per day*, 4 = *1-2 hours per day*, 5 = *more than 2 hours per day*. Finally, parents were given statements and asked to gauge their agreement in which 1 = *strongly disagree*, 2 = *somewhat disagree*, 3 = *don't know*, 4 = *somewhat agree*, 5 = *strongly agree*.

If parents consented, a second survey was given to teachers and matched to the parent survey. This survey consisted of 21 questions that were divided into five subcategories. The survey was adapted from a similar survey conducted by Peter D. Hart Research Associates. This original survey was used to measure teachers' perceptions of preschool's effects on student knowledge/cognition and social development of kindergarten and first-grade students.

This survey was tested for reliability by Peter Hart Associates. Permission to use the survey was requested and received. For this study, the researcher used items 6-10 of the preschool survey

developed by Peter D. Hart Research Associates. This research was administered to kindergarten teachers throughout California to measure the effects of preschool attendance on the knowledge/cognition and social development of their students. Like the original survey, this study used an ordinal scale for each response in the teacher survey. However, instead of using Hart's 4-point Likert scale, a 5-point scale was used to determine if the student was performing above grade level, grade level, or below grade level. The wording for each category was changed slightly to accommodate the 5-point scale. The subcategories were General Readiness of the Student, Student's Reading Skills, Student's Writing Skills, Student's Math Skills, and Social Skills. Each of these questions required the teacher to respond to a 5-point Likert scale. The Likert scale for each of these areas was as follows 1 = *much less prepared than the average student*, 2 = *somewhat less prepared than the average student*, 3 = *prepared for school*, 4 = *somewhat better prepared than the average student*, 5 = *much better prepared than the average student.*

Questions 1-4 targeted the general readiness of the student. Questions 5-8 targeted the reading skills of the student. The second section, Questions 9-11, focused on the writing skills of the student. The next section, Questions 12-14, focused on the math skills of the student. The Reading, Writing, and Math sections (Questions 5-14) were combined to create an index for cognitive readiness. This index was labeled "Cognitive Readiness" and served as the DV to help answer the second research question about the effects of technology usage on children's cognitive readiness for school. This index served as the DV in order to answer the question, "How does individual device home usage affect students' cognitive readiness for school?"

Procedures

The researcher obtained permission to conduct the survey from the superintendent of the elementary school district. After IRB approval, emails were sent out to all kindergarten and first-grade parents to request participation in a survey. The survey was emailed to parents digitally using Qualtrics to increase parent participation and decrease reliance on traditional methods (such as face-

to-face interviews), which may be considered unsafe during the pandemic. A digital survey allowed the researcher to collect survey results if the schools were participating in hybrid or online formats.

Before beginning the study, the researcher sent each elementary school principal in the district an email introducing the researcher and explaining the goals and procedures of the study. The researcher then sent a similar email to transitional-kindergarten, kindergarten, and first-grade teachers explaining the survey's goals and procedures and asking for their participation. Attached to the email was a parent-friendly digital flyer containing the link to the parent survey. The researcher requested that teachers distribute the parent survey via their parents' normal digital communication channels in the email. Teachers received reminder emails every few days asking them to send out reminder notifications and redistribute the digital flyer to remind parents to participate. The parent survey closed at the end of two weeks, although late responses were allowed for parents who replied after the initial response period. As parents returned the survey, the researcher collected and organized all responses. To encourage teacher participation in survey distribution, teachers were entered into an opportunity drawing online for one of two $50 gift cards for each parent's response received.

As parents returned the surveys, the researcher organized responses and separated them based on their "opt-in" status to the survey's teacher portion. If there were families that granted the researcher permission, the researcher emailed the teacher survey to the teachers to complete. The researcher sent out the surveys using the Qualtrics system to the teachers. Reminder emails were sent out after three days and on the seventh day to encourage responses. As with the parent survey, the researcher accepted late surveys if necessary. Teachers were encouraged to participate in two ways for this portion of the survey. The first is that each teacher received a $5 digital Starbucks gift card for returning their first teacher survey. The second way the researcher encouraged participation in the survey was to enter teachers into an opportunity drawing for each of the surveys they completed. Teachers were entered into an opportunity drawing for one of two $50 gift cards, with

each completed survey serving as one entry into the opportunity drawing. Winners were selected randomly using a random number generator.

Data Management

Survey results were recorded into the IBM Statistical Product and Service Solutions (SPSS) system by the researcher to analyze the data. SPSS is a statistical software package designed to run descriptive statistics, *t* tests, ANOVA's, and regressions. If the parent returned the initial survey and consented, the researcher emailed a survey to the child's teacher. This second survey also used the Qualtrics system to collect the data. The researcher coded the interview data and put it into the SPSS system to analyze the collected data. After receiving the data from parents and teachers, the researcher reviewed and cleaned the data to code the surveys into the IBM SPSS system.

The parent survey results, and the teacher survey were kept separate and not shared with the respondents in the other group. The data collected were matched using a coding system that was only accessible to the researcher to ensure confidentiality. The names collected in the teacher survey were only used to match the teacher survey results with the parent survey results. Once the researcher matched the data, the researcher did not use students, teacher, or family names again. All electronic data was password protected and only accessible to the researcher. All physical data was kept in a secure and locked location to protect the participants' confidentiality.

Data Analysis and Interpretation

This section provides information regarding the analysis, reliability, and the researcher's role.

Data Analysis

The researcher used the IBM SPSS system to run a series of regression models to determine the relationship between a child's home technology usage and the independent variables. The researcher created three linear regression models.

The first research question asked, What are parents' perceptions of children's home device usage (platform, frequency, duration, times, range of application usage)? Does this vary by income/parent education?

The Toplines Media Survey (Common Sense Media, 2018) was used to measure the parent perceptions of children's device usage. Questions 1-4 were demographic questions that included questions about the students' sex, family income, parent educational level, student status as an English learner. Each of these questions served as controls for the research questions.

To determine parents' perceptions of children's mobile technology use, the study used an adaptation of the Toplines Media Survey (Common Sense Media, 2017). The researcher created a linear regression to determine the relationship between (DV) Parent perceptions of home device usage and (IV) Income and Parent Education and English learner status.

The data collected from the parent survey was compiled and input into the SPSS system. A multiple regression model was run to determine the results. The following equation was used in the research:

$$\alpha = b_0 + b_1S + b_2I + b_3E + b_4L \quad (1)$$

This equation was used to determine α= parent perception of children's tech usage. In order to do this the researcher controlled for confounding factors including S = sex of the child, I = household income, E = parental education, and L = English as a second language. Regression models were run to determine the Pearson correlation coefficient to determine if there is a positive or negative relationship between the IV and DV and the strength of this relationship. The researcher also ran the coefficient of determination (R^2) to determine how much variance was explained by the independent variable. All values were checked to ensure statistical significance of $p<.05$.

The second research question asked, How does individual device home usage affect students' cognitive readiness for School?

To determine whether home device usage (IV) affected students' cognitive readiness for school (DV), a linear regression formula was created that controlled for the child's sex, family income, parent education level, and English learner status and participation in a preschool program. The Toplines Media Survey (Common Sense Media, 2017) was used to determine the student's home device usage (IV).

Responses from the teacher perception survey determined cognitive readiness for school. Data was collected from questions 1-14 of the teacher survey. The information collected included data from the General Readiness, Reading Skills, Writing Skills, and Math Skills sections of the survey. The researcher coded the information on a 1-5 Likert scale, and an index was created. This index gave equal weight to each of the 14 questions. The data from these two surveys were merged for each student. The equation used to run the linear regression was coded in SPSS and calculated using the following formula:

$$C = b_0 + b_1U + b_2S + b_3I + b_4E + b_5L \quad (2)$$

In this equation C = cognitive readiness and U is device usage. In this equation, the variable k can be substituted for each question #12-19. Additionally, an index to determine overall device usage was created using questions #16-19. To create the overall device usage index, questions #16-19 were each coded on a scale ranging from 0 = (*My child does not use this feature*) to 4 (*Uses this feature more than 2 hours per day*). These scores were then averaged and an index was calculated. Averages between 0-1 were classified as “rare,” averages between 1.01-2 were “low device usage,” 2.01-3 were classified as “medium device usage,” and 3.01-4 were considered “high device usage.”

This data was controlled for sex of the student (S), parents income (I), parents education and (E), English learner status. Regression models were run to determine if there was a positive or negative relationship between the IV and DV as well strength of the relationship. The coefficient of determination (R^2) was run to determine if variance could be explained by the independent variable. All values were checked to ensure statistical significance of $p < .05$.

The third research question asked, How does individual device home usage affect students’ social emotional readiness for school?

The third research question sought to determine if home device usage (IV) affected students’ social–emotional readiness for school (DV), using a linear regression formula with the same control factors as in the first two questions (child’s sex, the family income, the parent education level, English learner status, and participation in a pre-school program).

Again, cognitive readiness for school was determined by responses from the teacher perception survey. For Research Question 3, the researcher collected data using questions 15-21 of the teacher survey. These items comprised the “Social Skills” section of the survey. The social skills index gave these seven questions equal weight. The data from the parent and the teacher surveys were merged for each student. The data was coded in SPSS and calculated using the following formula:

$$\hat{Y} = b_0 + b_1U + b_2S + b_3I + b_4E + b_5L \quad (3)$$

In this equation $\hat{Y}$= social emotional readiness and U was used for device usage. Again, the variable k was substituted for each question #12-19 as well as the overall device usage index created with questions #16-19. To ensure validity, the data was again controlled for sex of the student (S), parents’ income (I), parents’ education (E), and English learner status (L). Regression models were run to find tthe relationship between the IV and DV, as well strength of the relationship between the variables. The coefficient of determination (R^2) was run to determine if variance could be explained by the independent variable. All values were checked to ensure statistical significance of $p < .05$. children’s home device usage (IV) on cognitive readiness for school (DV), controlling for parent education level, socioeconomic level, and English learner status.

The fourth research question asked, How does individual device home usage affect students’ overall readiness for school?

Finally, this research sought to answer if there is a relationship between device usage (IV) and overall readiness for school (DV). A third index was created to answer this question. This index is the “Overall Readiness” for school. For this index, the “Cognitive Readiness” and “Social-Emotional Readiness” were combined. “Cognitive Readiness” and “Social-Emotional Readiness” were given equal weight and combined to create the “Overall Readiness” of the student. For Research Question 4, “Overall Readiness” was used as the DV.

All responses from the teacher perception survey were combined to create the metric for overall readiness. The researcher merged questions from all five sections to create this index. The

data from the parent and the teacher surveys were merged on each student. The data was coded in SPSS and calculated using the following formula:

$$R = b_0 + b_1U + b_2S + b_3I + b_4E + b_5L \quad (4)$$

To ensure reliability, the data was again controlled for sex of the student (S), parent's income (I), parents' education (E), English learner status, and participation in a preschooling program (P) in order to determine the overall readiness (R) of the student. The variable k was substituted for each question #12-19 as well as the overall device usage index created with questions #16-19. Regression models were run to find the relationship between the IV and DV as well strength of the relationship between the variables. The coefficient of determination (R^2) was run to determine if variance could be explained by the independent variable. All values were checked to ensure statistical significance of $p < .05$. children's home device usage (IV) on cognitive readiness for school (DV).

Ensuring Validity

The instrumentation used in research must be determined to be reliable and valid. Validity is the extent to which an idea is accurately measured by the research tools (Heale & Twycross, 2015). To ensure this research survey validity, the researcher adapted an existing survey validated by the Common Sense Media Survey (2018). The adapted survey was pilot-tested and revised. The researcher conducted Cronbach's alpha test to measure the reliability of the scale. A factor loading of .7 or greater is considered acceptable. The researcher adapted a similar teacher survey used in research conducted by Larcinese (2016). Larcinese (2016) pilot tested the survey to ensure validity and the survey achieved a test/retest reliability coefficient of .96.

Chapter Summary

Previous studies have been conducted to measure the amount of time that children are using technology. However, this study attempts to establish a relationship between technology usage and children's cognitive readiness, social readiness, and overall readiness for school. This study's results can inform teachers about the skills that students have when entering the classrooms. The research

will also provide insight into how using this touchscreen technology positively or negatively affects academic readiness, social readiness, and overall school readiness.

CHAPTER 4

FINDINGS

The study took place over a period of approximately 2 weeks in a school district in Southern California of roughly 8,100 students. The study was conducted with parents and teachers in transitional kindergarten through first-grade classrooms. This research took place during a time of distance learning, and the entire process was conducted virtually. The goal of this study was to survey parents to get their perception of children's home individual device usage and match it with a teacher survey in order to determine if there was a correlation between device usage, academic achievement, and in-school behaviors.

The researcher sent out an email to the administration in each of the 10 elementary schools in the district informing them of the research that would occur in the district. The researcher then sent out an email to the teachers along with a digital flyer with a link to a parent survey. The teachers were asked to send out this flyer, along with the link, to parents through their established classroom communication methods. As parent surveys were collected and permission was granted, teachers were asked to complete the surveys regarding the student's academic progress and virtual classroom behaviors. The surveys were then matched to the student and data analysis was run.

Chapter 4 begins with a description of the data collected and how it relates to the population as a whole. The chapter proceeds to answer the four research questions posed by the researcher. The first question will focus on frequencies and descriptive statistics to create a snapshot of how technology is being used by children in their homes: the types of applications, times of day children are using the technology, and total amount of time that children spend using technology. The chapter will then discuss the other three questions using linear regression models and bivariate correlational models to discuss the findings. The chapter will conclude with a summary of the chapter, which will discuss the most significant findings from the research.

Sample Description

A total of 113 out of 1,570 eligible families returned surveys (7.2% participation rate). Of the 113 parent surveys that were returned, 106 allowed permission for the researcher to send a survey to their child's teacher (93.8% participation rate). Surveys were emailed to 80 transitional kindergarten, kindergarten, and first-grade teachers in the school district after parents allowed permission for the researcher to do so. Twenty-four of the 80 eligible teachers (30% participation rate) in the district participated in the survey portion of the research. Of the 106 kindergarten and first-grade surveys that were emailed to teachers, 100 were returned (94.3% participation rate).

The surveys that were returned by parents included 55 female students and 58 male students, roughly 48.7% and 51.3% of the survey population, respectively. English learners comprised 38.9% of the students in the study, and 56.6% of the students were designated as English only. The remaining percentage of parents were unsure of their child's status.

Four transitional kindergarten students (3.5% of the survey population), 31 kindergarten students (27.4% of the survey population), and 78 first-grade students (69% of the survey population) were represented in the sample. The percentages of the survey population by grade level were not representative of the total population in the district. The district makeup by grade level was roughly 6.7% transitional kindergarten students, 42.5% kindergarten students, and 50.8% first graders.

Another discrepancy between the overall population and the sample population occurred in the parent education reported in the survey and that of the overall population in the area. There was a higher percentage of respondents in the study who had a college degree (61.9%) than in the area overall (22%). The participants who reported a high school diploma as their highest level of education was 36.3%, while 68% of people in the community reported themselves to be in this group. Finally, 1.8% of respondents in the survey stated that they had less than a high school diploma, and the community as a whole reported 10% of people to be in this category. See Table 1.

Table 1. Parent Education

Total family income	Sample frequency	Survey percentage	Community percentage*
Less than high school diploma	2	2	10
High school diploma	9	9	68
Some college	27	27	Not reported
College degree or higher	62	62	22

*Adapted from www.towncharts.com/California/Income/Whittier-city-CA-Income-data

There was a difference in the distribution of income between participants in the survey and the community. There was a negatively skewed distribution of income that was reported in the study. This was most noticeable in the percentage of the population that reported an income over $100,000. 53.9% of participants claimed that their household income was over $100,000, which is significantly higher than the 11.2% reported in the area as a whole. See Table 2.

Table 2. Parent Income

Total family income	Sample frequency	Survey percentage	Community percentage*
< $25,000	12	10.6	26
$25,000-$49,999	12	10.6	31.1
$50,000-$74,999	15	13.3	20.9
$75,000-$99,999	13	11.5	10.9
100,000-149,999	24	21.2	11.2
>150,000	37	32.7	Not reported
Total	113	100	100

*Adapted from www.towncharts.com/California/Income/Whittier-city-CA-Income-data

First Research Question

The first question asked, What are parents' perceptions of children's home device usage (platform, frequency, duration, times, range of application usage)? Does this vary by income/parent education?

Most of the parent survey consisted of questions to get a profile of how children in the study are using technology in the home. The survey asked parents to detail their views on device usage,

times that children were using technology, applications their children are using while on individual technology, and their views on possible benefits of technology. Linear regressions were run to determine if children from different incomes, parent education levels, and English learner status, displayed different individual technology usage patterns.

Parent Views on Overall Device Usage

After running linear regressions to determine the relationship between parent income, parent education, and student English learner status, the data showed no significant relationship between the subgroups and how students accessed technology. Similarly, there was no significant difference between these subgroups regarding the overall time children were on technology. See Table 3.

Table 3. How Children Access Individual Technology by Annual Household Income

How children access individual technology	Less than $25,000	$25,000-49,999	$50,000-74,999	$75,000-99,999	$100,000 - 149,999	$150,000 or more	Total
They only uses a parent's device	2	0	5	1	4	7	19
Shares a device with sibling/siblings	3	2	0	1	5	6	17
Has access to their own cell phone/tablet	5	9	9	9	12	17	61
Does not have access to individual tech.	0	0	0	0	1	2	3
Total	10	11	14	11	22	32	100

Overall, parents had negative perceptions of technology's impact on children. Among the parents who returned the survey, 58% agreed or strongly agreed with the statement, "In general, the less time kids spend with an individual technology device the better off they are." This trend repeated itself when parents were asked about technology use in relation to their child's social development in specific areas. A majority of parents believed that the use of technology hurt their child's focus (54%), behavior (50.4%), and physical activity (65.7%). A majority of parents did believe that individual technology helped their child's learning (57.6%) and creativity (57.6%). A large percentage (45%) of

parents in this survey believed that their children were spending too much time on technology while 4.5% felt that their children were not spending enough time on technology. See Table 4.

Table 4. Parents Perception on the Impacts of Technology

	Percentage of sample		
Area	Hurts development	Neither hurts nor helps	Helps development
Social skills	34.2	33.3	32.4
Learning	22.5	19.8	57.6
Ability to focus	54	24.3	21.6
Behavior	50.4	32.4	17.1
Physical activity	65.7	24.3	9.9
Creativity	26.1	16.2	57.6

Although there were not significant findings on how students access data, there were significant findings in other areas. Linear regressions revealed a significant relationship between children designated English learners by the district and the number of days children used technology during the week. The English learner group tended to use the devices fewer days per week than their English learner counterparts. When using the scale weighted for parent income, the standardized coefficient beta = -.166 ($p < .01$) and when weighted for parent education the standardized coefficient beta = -.165 ($p < .01$). English learners had a less positive view of individual technology benefits for their children. When using the scale weighted for parent income, the standardized coefficient beta = -.127 ($p < .05$), and when the model was weighted for parent education, the standardized coefficient beta = -.163 ($p < .01$). See Table 5.

When weighted for parent education levels, the data indicated that all three subgroups demonstrated a correlation with the belief that children were spending more time on technology. However, the parents with higher income and higher education tended to think that their children were spending too much time on technology, and parents of English learners were more satisfied with their child's technology usage. This category was done on a 3-point Likert scale ranging from 1 (*spends too little time with an individual technology device*) to 3 (*spends too much time with an individual technology device*). When linear regressions were run to determine the relationships between the IV

and the DV, the data indicated that parent income had a significant ($p < .01$) positive relationship (ß = .157) with the belief that children were spending more time on technology. A similar positive relationship (ß = .115, $p < .05$) could be seen with parent education and parent views on how much children are using technology. The English learners group had a negative view of technology. Parents of English learners showed statistically significant negative correlations in both models. The income model indicated a negative relationship (ß = -.127, $p < .05$), and the education model had similar results (ß = -.163, $p < .01$).

Table 5. Parents Perception on Children's Overall Device Usage

	Parent perceptions			
Demographic	How many days per week children use technology	Amount their child was on technology	Overall benefit of technology	Child's usage for entertainment
Parent income				
Income model	.54	.92	.23	.107
Education model	.075	.157**	.047	.129*
Parent education				
Income model	-.07	.062	.086	.148**
Education model	.021	.115*	.092	.168**
English learner status				
Income model	-.166**	-.099*	-.127*	-.031
Education model	-.165**	-.145**	-.163**	-.069

Note. The table shows the results of the income weighted model and the education weighted model. The data in the columns shows the strength and directionality of the relationship as the independent variable increases. *$p < .05$. ** $p < .01$.

Finally, a relationship could be seen between parent income and parent education and the belief that children were using their devices for entertainment. When a linear regression, weighted for parent education, was conducted, there was a positive relationship (ß = .129) between parent income and the belief that children were using their devices for entertainment purposes. This relationship was statistically significant ($p < .05$). Similarly, there was a significant statistical relationship ($p < .01$) between parent education and the belief that children were using individual devices for entertainment purposes. This relationship had a standardized coefficient beta of .148 in the model weighted for

income, and a standardized coefficient beta of .168 in the model weighted for education. Nonsignificant results were returned for the English learner group in this area.

The data did not show any statistically significant evidence of a relationship between any of the subgroups and parents' satisfaction with the quality of educational media available.

Parent Perceptions of Times of Use

The next area that the researcher studied were traditional family times that may be displaced by technology. The four categories were "during mealtimes," "while eating at a restaurant," "while in a vehicle," and "before bedtime." Most families (53%) stated that their children "never" used technology during the surveyed family times, and 34% said that their children only participated in the activities one or two times per week. Only 2% of the respondents stated that their child participated in one of the activities daily. See Table 6.

Table 6. Device Usage During Family Time

Demographic	Meal times	At restaurants	In vehicles	Before bedtime
Parent income				
Income model	-.091	-.007	-.099*	.095
Education model	-.045	-.007	-.079	.132*
Parent education				
Income model	-.006	.035	-.113*	.59
Education model	.048	.065	-.063	.112*
English learner status				
Income model	-.119*	-.111*	-.137**	-.115*
Education model	-.139*	-.111*	-.166**	-.124*

Note. The table shows the results of the income weighted model and the education weighted model. The data in the columns shows the strength and directionality of the relationship as the independent variable increases. *$p < .05$. **$p < .01$.

When linear regressions were conducted, the data produced several statistically significant results. Students in the English learner group were less likely to use technology in all four areas. Each area was statistically significant (p 05). Students identified as English learners were less likely

to use individual technology at mealtimes (ß= -.139, $p < .05$), in restaurants (ß= -.111, $p < .05$), and in transportation than their English-only counterparts.

When looking at the relationship with using individual technology in the car/on transportation, students in the English learners group had a statistically significant ($p < .01$) negative correlation. The data showed a negative relationship of -.137 in the model weighted for income and a negative relationship of -.166 in the model weighted for education. In the parent income model, both family income and parent education had a statistically significant ($p < .05$) negative correlation with individual technology usage in the car/on transportation. Parent income had a negative relationship, with a standardized beta coefficient of -.099, and parent education had a negative relationship, with a standardized beta of -.113.

When looking at usage before bedtime, both parent income and parent education showed a statistically significant relationship ($p < .05$) in the parent education weighted model. Families with higher incomes were more likely to have children use technology before bedtime (ß = .132). Children with higher family incomes were also more likely to use technology before bedtime (ß = .112). Conversely, the data showed that students considered English learners were less likely to use technology before bedtime (ß= -.124, $p < .05$) when using the same model.

Parent Perceptions of Their Child's Application Usage

Next, parents reported on the types of applications that children were using. Parents were asked if their child used educational, gaming, video streaming, and communication applications. The most frequently used applications were video streaming applications, with 93% of respondents stating that their child used video streaming applications for some time each day, and 72% of respondents stated that their child used the applications over 30 minutes per day. The least frequently used type of application was the communication applications (phone, text, video chat). Only 26% of parents reported their children using that feature during the day, with only 3% using it for longer than 30 minutes. Educational apps and gaming apps were both fairly similar, with 83% of the children using educational apps when they used devices (49% using it for more than a half hour). In comparison,

78% used recreational gaming applications when they used devices, and 54% used the device over a half hour per day. See Table 7.

Table 7. Child's Application Usage (in percent)

Type of application	Does not use feature	< 30 min. per day	30-60 min. per day	1-2 hours per day	> 2 hours per day
Educational	17	34	35	13	1
Gaming	22	26	27	15	10
Video streaming	7	21	32	27	13
Communication	74	23	1	1	1
Total percentage of the surveyed population	30	26	24	14	6

The equation used to determine application usage where α = parent perception of children's tech usage controlled for confounding factors including S = sex of the child, I = household income, E = parental education, and L = English as a second language. Controlling for the confounding factors allowed the researcher to determine the relationship between technology usage and application usage. See Table 8.

Table 8. Parents Perception on their Child's Application Usage

Demographic	Educational	Gaming	Video streaming	Communication
Parent income				
Weighted by income	-.026	.059	.049	.120*
Weighted by parent education level	-.083	.101	.086	.054
Parent education				
Weighted by income	-.146**	-.170	.082	.171**
Weighted by parent education level	-.170**	.065	.126*	.176**
English learner status				
Weighted by income	.039	-.080	-.032	-.152**
Weighted by parent education level	.016	-.126	-.088	-.136*

Note. The table shows the results of the income weighted model and the education weighted model. The data in the columns shows the strength and directionality of the relationship as the independent variable increases. *$p < .05$. ** $p < .01$

Some trends emerged when broken down into subgroups. Parents with higher educations were statistically less likely to report their children using educational apps ($p < .01$). The negative correlation had a coefficient beta of -.146 in the income weighted model and -.170 in the education weighted model. These parents were more likely to report higher usage in their child's communication usage ($p < .05$ in the standard model; $p < .01$ in the weighted models). The standardized coefficients beta ranged from .171 in the income weighted model to .176 in the education model. The data from the income weighted model also showed that parent income played a statistically significant factor ($p < .05$) in communication, showing a positive correlation between the dependent variable and the independent variable (ß = .120). For communication, English learner status showed a negative relationship ($p < .01$) in which the relationship was ß = -.152 (income model) and ß = -.136, $p < .05$ (education model).

The reported gaming app and video streaming app usage did not significantly correlate when broken down by parent income, education, or English learner status except for parent education regarding video streaming. Parents' education levels showed a positive relationship (ß = .126, $p < .05$).

Parent Perceptions of the Benefits of Technology

The research also looked at parents' perceptions of the potential benefits of their child using technology. Linear regressions were run for each subgroup to determine if there was a relationship between parent income, parent education, or English learner status and perceptions on benefits in each of six areas. These areas were the children's social skills, learning, focus, behavior, physical activity, and creativity. See Table 9.

Social Skills

Linear regressions returned statistically significant results for all three subgroups. Parent income had a negative relationship with perception of social skills. The relationship was statistically significant ($p <.01$) in both models. Parent education negatively impacted perceptions of technology's impacts on children's social skills. The strongest relationship was in the education weighted model

with a standardized coefficient beta of -.292. Likewise, the parent education showed a negative correlation (ß = -.174) with perceptions on technology's benefits to children's social skills. The English learner group was the only group to demonstrate a statistically significant ($p < .01$) positive relationship (ß = .157) in the model weighted for parent income. This relationship indicated that parents of English learners had a more positive perception of technology's social benefits.

Table 9. Parents Perception on the Benefits of Technology

Demographic	Social skills	Learning	Focus	Behavior	Physical activity	Creativity
Parent income						
Weighted by income	-.282**	-.94	-.176**	-.143**	-.170**	-.225**
Weighted by parent education level	-.292**	-.93	-.166**	-.141**	-.204**	-.254**
Parent education						
Weighted by income	-.083	-.120*	-.125*	-.118*	-.03	-.035
Weighted by parent education level	-.174**	-.132*	-.206**	-.184**	-.128*	-.68
English learner status						
Weighted by income	.157**	-.072	-.105*	.031	.064	.110*
Weighted by parent education level	.115	-.099	-.107*	.026	.053	.062

Note. The table shows the results of the income weighted model and the education weighted model. The data in the columns shows the strength and directionality of the relationship as the independent variable increases. *$p < .05$. ** $p < .01$

Learning

Parent perceptions of technology's impact on learning only showed a statistically significant relationship when looking at parent education. Parent education showed a statistically significant ($p < .05$) negative correlation in both the models weighted by income and by parent education. The strongest relationship between education and perceived learning effects demonstrated a beta value of -.132. Neither household education nor English learner status significantly affected parents perceptions of technology's benefits on learning.

Focus

All three subgroups returned statistically significant results for the relationship between the independent variable and student focus. As parent income rose, there was a negative relationship

with their views on technology's impact on their child's focus. Both models showed statistically significant results ($p < .05$). The most substantial relationship between income and parent perceptions was noted in the parent education weighted model, which returned a beta value of -.176.

Parent education level also had a statistically significant relationship in the income weighted model ($p < .05$) and in the weighted parent education model ($p < .01$). The strongest of these relationships was observed in the education model, which returned a beta value of -.206. This beta value suggests that as parent education rose, their perception of technology's role on their child's focus declined.

Finally, there was a significant relationship ($p < .05$) between English learner status and parent perceptions regarding their child's focus. The parents of English learners showed the weakest correlation to their perceptions on student focus (ß = -.105 and ß= -.107) in the income model and the education model, respectively.

Behavior

Statistically significant data was observed in both the reported family income subgroup and the parent education subgroup. The results from both the income weighted model and the education weighted model show that parent income was negatively related to parent perceptions of the role of technology on their child's behavior. The strongest of these relationships was -.143, which was observed in the income weighted model. However, both models returned significant results ($p < .01$).

When looking at parent educations' effect on parent perceptions on the role of technology on their child's behavior, the strongest relationship (ß = -.184) was in the education model. These results were significant ($p < .01$).

The data did not show a significant relationship between the dependent variable and the parents of English learners or the parents of English-only students.

Physical Activity

The household income and parent education groups returned statistically significant results for parents' beliefs on how technology affects their child's physical activity. As the level of parent income

rose the data showed a negative impact on parents' views regarding technology's benefits for their child's physical activity. The most substantial relationship was observed in the parent education model with a beta of -.204 ($p < .01$). Both models returned similar negative relationships with $p < .01$. Parent education only affected parents' perceptions of their child's physical activity in the weighted parent education model. The weighted model showed a negative relationship of -.128 with $p < .05$. There was no significant relationship between a child's English learner status and their parents' views of the benefits of individual devices on their child's physical activity.

Creativity

When linear regressions were run to see if there was any relationship between the three subgroups and creativity, the parent income subgroup and the English learner group returned significant results. Parent income showed a negative correlation between individual devices and technology. These results were observed in both models ($p < .01$). The beta values for these models ranged from -.225 to -.254. The strongest relationship was found in the model weighted for parent education. Finally, the English learner subgroup showed a statistically significant positive relationship ($p < .05$) in the income weighted model (ß = .110).

Second Research Question

The second research question asked, How does individual device home usage affect students' cognitive readiness for school?

For this study, students' cognitive readiness for school was measured by the academic readiness index. The academic readiness Index measured students' cognitive abilities in multiple areas. The index consisted of scores on the general cognitive readiness, reading, writing, and math portions of the teacher survey. Linear regressions were run using both the income weighted model and the education weighted model.

The income weighted model used for this research question was

C = -.14 (time) + -.17 (sex) + .09 (income) + .05 (education) - .18 (English learner) (5)

The education weighted model used for this research question was

C = -.10 (time) + -.17 (sex) + .04 (income) + .11 (education) - .16 (English learner) (6)

The equation used for Research Question 2 was used to determine the relationship between time on individual devices and cognitive readiness (C). Again, the equation controlled for confounding factors including I = household income, E = parental education, and L = English as a second language.

When these linear regressions were run on each of the subsections in the academic readiness index the income model returned significant results in three out of the four subsections. The education weighted model did not return significant results.

Table 10 shows the results of the linear regression conducted in each of the subsections. The strongest correlation was found between time on technology and general cognitive readiness. The income weighted model demonstrated a negative correlation of -.162 ($p < .001$). Negative correlations were also found in the reading and mathematics subsections. The reading subsection showed a -.103 relationship ($p < .05$) and the math subsection showed a relationship of -.106 ($p < .05$). Using this model, the overall academic readiness index also showed a negative relationship (ß = -.123, $p < .05$).

Table 10. Time on Technology and Academic Readiness by Subject Area (Income Model)

Academic subsection	Standardized coefficient beta
General cognitive readiness	-.162***
Reading	-.103*
Writing	-.084
Math	-.106*
Academic readiness index	-.123*

Note. *$p < .05$. **$p < .01$ ***$p < .001$

Linear regressions were run using the total time on technology index as the independent variable and the overall cognitive readiness index as the dependent variable. The overall cognitive readiness index of students was created by using an index that was a combination of the general cognitive readiness index, the reading skills index, the writing skills index, and the math skills index. Linear regressions were run using parent education as a weighted variable and again using parent

income as a weighted variable for each of the subgroups in both the parent education and the parent income categories to determine if total time on technology had an effect on the overall cognitive readiness of students.

Parent Education and Cognitive Readiness

Weighted linear regressions were run for each of the four levels of parent education used in the survey. These regressions indicated a negative relationship between a student's time on technology and overall cognitive readiness in both models. This relationship was statistically significant in multiple subgroups ($p < 0.05$). See Table 11.

Table 11. Overall Academic Readiness by Parent Education Subgroup

	Income weighted model	Education weighted model
Highest level of education	Standardized coefficient beta	Standardized coefficient beta
All education levels	-.085	-.056
Less than a college degree	.265**	.261**
Less than a high school diploma	Not a significant subset	Not a significant subset
High school diploma	-.045	.102
Some college	.246*	.289*
College degree or higher	-.209***	-.186**

Note. "Less that a high school diploma" was not a significant subset of the overall population ($n = 2$). Therefore, the data could not be reported. *$p < .05$. **$p < .01$. ***$p < .001$.

The researcher ran the data in the SPSS program using the four educational subgroups in the study ("less than high school," "high school diploma," "some college," and "college degree or higher"). The sample size for the "less than high school" group ($n = 2$) prevented the linear regression for the relationship between total time on technology and overall cognitive readiness of students. Thus, the two variables had no significant relationship. When looking at the families in which the highest level of education was a high school diploma, the results were not statistically significant ($p = .124$).

SPSS returned statistically significant results for families that listed "some college." There was a statistically significant relationship ($p < .05$) for families that listed "some college" as their highest level of education. The data showed a positive relationship between the time on technology and the

student's cognitive readiness for school (ß = 0.289). The data was then expanded to include the families that listed "less than a high school diploma" and "high school diploma." The combination of the "less than a high school diploma," "high school diploma," and "some college" was labeled "less than a college degree" in Table 11. This regression also returned a statistically significant ($p < .01$) positive correlation (ß = 0.265).

There was an inverse relationship between time on technology and students' overall cognitive readiness (-0.209) was observed when the researcher ran the regression using families whose highest education level was a college degree or higher. This relationship was statistically significant ($p < .001$).

Parent Income and Cognitive Readiness

A regression was run to determine if there was a significant relationship between total time on technology and overall school readiness using a model weighted for family income. This model returned a negative relationship between students' time on technology and their overall cognitive readiness for school (ß = -0.123) that was statistically significant ($p < .05$). See Table 12.

Table 12. Overall Academic Readiness by Income Level

	Income weighted model	Education weighted model
Total family income	Standardized coefficient beta	Standardized coefficient beta
All income categories	-.123*	-.068
< $25,000	.596	.728***
$25,000-$49,999	.417	.475**
$50,000-$74,999	.299	.211
$75,000-$99,999	-.243	-.269
$100,000-149,999	-.318***	-.298**
>$150,000	-.179*	-.206*

Note. *$p < .05$. ** $p < .01$. ***$p < .001$.

As with parent education, the researcher ran a weighted linear regression model for each of the income subgroups. The education model data showed a positive relationship between technology

usage and cognitive readiness (ß = .597) for families whose family income was less than $49,999. The model showed that this relationship was statistically significant ($p < 0.001$). See Table 13.

Table 13. Overall Academic Readiness by Income Range

	Income weighted model	Education weighted model
Total family income	Standardized coefficient beta	Standardized coefficient beta
$0-$49,999	.482**	.597***
$50,000-$99,999	-.038	-.071
>$100,000	-.179*	-.23***

Note. *$p < .05$. ** $p < .01$. ***$p < .001$.

The data returned significant relationships for the families whose income was between $100,000 and $149,999 ($p < 0.001$; Table 12), as well as families whose reported income was $150,000 and over ($p = 0.05$). Both groups showed a negative relationship between time on technology and overall cognitive readiness. The families whose income was between $100,000 and $149,999 showed a standardized beta coefficient of -.318, while the highest income group ($150,000 and over) had a standardized beta coefficient of -.206. The combined groups showed a negative correlation (ß = -.23; Table 13) had a p value of $p = < 0.001$.

Third Research Question

The third research question asked, How does individual device home usage affect students' social–emotional readiness for school?

The data was also run using a linear regression to see if there was a relationship between the individual technology usage that parents reported for their children and their social–emotional readiness as reported by teachers. Two indices were used for this regression: The "time on technology" index served as the independent variable and was created using the four questions in the "app usage" section of the parent survey; the "social-emotional readiness" index was created using seven questions from the teacher survey. Again, this data was run in the SPSS program using a weighted model for reported parent education and reported family income. To determine social–

emotional readiness ($\hat{Y}$), it was necessary to control for confounding factors including I = household income, E = parental education, and L = English as a second language.

The Income Weighted formula used for this research question was

$$\hat{Y} = -.09 \text{ (time)} + -.13 \text{ (sex)} + .14 \text{ (income)} + .01 \text{ (education)} - .12 \text{ (English learner)} \quad (7)$$

The education weighted formula used for this research question was

$$\hat{Y} = -.06 \text{ (time)} + -.11 \text{ (sex)} + .15 \text{ (income)} - .03 \text{ (education)} - .12 \text{ (English learner)} \quad (8)$$

Parent Education and Social-Emotional Readiness

When broken down into subgroups ("less than high school," "high school diploma," "some college," and "college degree or higher"), the data showed similar results to the data on overall cognitive readiness (Table 14). Significant results were not reported for the "less than high school" and "high school diploma" cohorts. In the income model, the "some college" group showed a significant positive correlation ($p = 0.01$) between time on technology and social–emotional readiness (ß = 0.295). When all three groups without a college degree were combined, the data indicated a positive relationship. The strongest relationship was seen in the parent education model (ß = .351). This result was statistically significant where $p < .001$.

However, when the same model was calculated for the "college degree or higher" group, there were inverse results. The data for the "college degree or higher" group showed a significant ($p < 0.001$) but negative correlation (ß = -.219) between the two variables. This data suggests that the more children in this group use technology, the less socially emotionally ready they are for school.

When the weighted linear regression was run to determine if there was a correlation between a child's time on technology and social–emotional readiness, the data indicated that there was a significant relationship between the two variables ($p = 0.05$). The data indicated that this was a negative correlation (ß = -0.123).

Table 14. Technology's Effect on Social Emotional Readiness by Education

	Income weighted model	Education weighted model
Highest level of education	Standardized coefficient beta	Standardized coefficient beta
All education levels	-.123*	-.068
Less than a college degree	.303***	.351***
Less than a high school diploma	Not a significant subset	Not a significant subset
High school diploma	.366	.518*
Some college	.295**	.289**
College degree or higher	-.281***	-.219***

Note. The “less that a high school diploma” was not a significant subset of the overall population (n = 2). Therefore, the data could not be reported. *p <..05. **p < .01. ***p < .001.

Parent Income and Social Emotional Readiness

Next, the researcher looked at the relationship between children’s recreational time on technology and their reported social–emotional readiness as reported by the students’ teachers. Again, this linear regression was weighted by income and separated into six separate categories (families that earn < $24,999, families that earn $25,000-$49,999, families that earn $50,000-$74,999, families that earn $75,000-$99,999, families that earn $100,000-$149,999, and families that make $150,000 and over). Regression analysis was run for each of these variables individually in addition to grouping variables. See Tables 15 and 16.

Table 15. Technology's Effect on Social–Emotional Readiness by Income Level

	Income weighted model	Education weighted model
Total family income	Standardized coefficient beta	Standardized coefficient beta
All Income Categories	-.085	-.056
< $25,000	.298	.445*
$25,000-$49,999	.281	.29
$50,000-$74,999	-.051	-.061
$75,000-$99,999	.152	.141
$100,000-149,999	-.348***	-.375***
>$150,000	-.091	-.117

Note. *p < .05. **p < .01. ***p < .001.

Table 16. Technology's Effect on Social Emotional Readiness Combined Income Range

	Income weighted model	Education weighted model
Total family income	Standardized coefficient beta	Standardized coefficient beta
$0-$49,999	.285	.357**
$50,000-$99,999	.078	.058
>$100,000	-.091*	-.202**

Note. *$p < .05$. ** $p < .01$. ***$p < .001$.

In the income weighted model, the data did not show a relationship between time on technology and social–emotional readiness except in the case of families who earned $100,000-$149,999 ($p < 0.001$). The data indicated a negative relationship (ß = -0.348) between time on technology and children's social–emotional readiness.

The education model produced similar results for families who earned $100,000-$149,999 ($p < 0.001$). Again, these families experienced a negative relationship between time on technology and social–emotional readiness (ß = -.375). Interestingly, this model showed a moderately strong positive relationship for the families in the lowest income group (<$25,000). This positive relationship had a standardized beta coefficient of ß =.445, ($p < .05$). This indicates that technology is having an inverse effect on these two groups.

This inverse relationship can also be noted when the groups are combined. Families that make less than $50,000 showed a statistically significant positive relationship in the education model (ß = .372, p<.01). Meanwhile, families that reported an income of over $100,000 showed statistically significant negative relationship in both the income model (ß = -091, p <.05) and the education model (ß = -.202, p<.01)

Fourth Research Question

The fourth research question asked, How does individual device home usage affect overall readiness for school?

The final linear regression was conducted to determine if there was a significant relationship between children's technology use and their overall readiness for school. The overall school

readiness index was created by combining the overall cognitive readiness index (general cognitive readiness index, reading index, writing index, and math index) and the social skills index. The researcher gave equal weight to the overall cognitive readiness index and the social–emotional readiness index when creating the model for the overall school readiness index.

The income weighted linear regression used for this research question was

R = -.14 (time) + -.17 (sex) + .13 (income) + .03 (education) - .18 (English learner) (9)

The education weighted linear regression used for this research question was

R = -.10 (time) + -.17 (sex) + .04 (income) - .12 (education) - .16 (English learner) (10)

Weighted linear regressions that controlled for S= sex of the child, I = household income, E = parental education, and L = English as a second language were run to determine if there was a significant relationship between children's time on technology and their overall readiness for school. Again, the research looked through the lens of parent education and family income.

Parent Education and Overall School Readiness

The data indicated a significant relationship in the income weighted model ($p = 0.05$) between children's time on technology and their overall school readiness. Across all education levels, this relationship was negative and had a standardized coefficient beta of -0.123. This coefficient indicates that the more time children spend on technology, the less academically and emotionally ready they are for school.

Table 17. Technology's Effect on Overall School Readiness by Education

	Income weighted model	Education weighted model
Highest level of education	Standardized coefficient beta	Standardized coefficient beta
All education levels	-.123*	-.073
Less than a college degree	.315***	.340***
Less than a high school diploma	Not a significant subset	Not a significant subset
High school diploma	.261	.389
Some college	.292**	.301**
College degree or higher	-.257***	-.243***

Note. The "less that a high school diploma" was not a significant subset of the overall population ($n = 2$). Therefore, the data could not be reported. *$p < .05$. **$p < .01$. ***$p < .001$.

The researcher looked at the relationship between time on technology and overall school readiness across the four educational subgroups. Statistically significant (p = 0.001) results were returned when looking at the group that reported having a “college degree.” There was a negative relationship (ß = -0.257; income weighted model) between a child’s use of technology and their overall school readiness.

There was an inverse relationship when looking at the three groups reporting less than a college diploma as their highest education level. While statistically significant results were not reported for the families that reported the highest education level as having obtained a “high school diploma.” the group that reported “some college” as the highest level of education had a statistically significant (p < 0.01) relationship between time on technology and overall school readiness. This group showed a positive correlation between the independent and dependent variables (ß = 0.301) in the education weighted model.

When the three groups who reported less than a college degree were grouped, the education model data showed a positive relationship (ß = 0.340) between the children’s screen time and their overall school readiness. This relationship was considered statistically significant (p < 0.001).

Parent Income and Overall School Readiness

Individually, none of the groups of families with reported incomes under $100,000 returned statistically significant results. However, when the researcher grouped all of the families who earned under $50,000, the data showed statistically significant results (p < 0.001). The data showed that for students in this group, overall school readiness benefited from the use of technology (ß = 0.546). Statistically significant (p < 0.001) results were also observed when looking at the families' results who earned over $100,000. The data showed negative relationship (ß = 0.429) when isolating this group. See Tables 18 and 19.

Table 18. Technology's Effect on Overall School Readiness by Income Level

	Standardized coefficient beta	Standardized coefficient beta
Total family income	Income model	Education model
All income categories	-.123*	-.073
< $25,000	.497	.625***
$25,000-$49,999	.412	.461**
$50,000-$74,999	.166	.101
$75,000-$99,999	-.103	-.133
$100,000-149,999	-.367***	-.367***
>$150,000	-.164	-.196*

Note. *p < .05. **p < .01. ***p < .001.

Table 19.Technology's Effect on Overall School Readiness by Combined Income Range

	Income weighted model	Education weighted model
Total family income	Standardized coefficient beta	Standardized coefficient beta
$0-$49,999	.439	.546***
$50,000-$99,999	.013	-.019
>$100,000	-.164*	-.252***

Note. *p < .05. **p<.01. ***p<.001.

A weighted linear regression was conducted to determine the relationship between children's recreational device usage and overall school readiness. The data indicated that these two variables had a statistically significant relationship in the income model (p < .05). The income model indicated a negative relationship (ß = -0.123) between device usage and overall school readiness.

The education model indicated that families with a reported income of over $150,000 showed a statistically significant (p < 0.05) negative relationship between technology usage and overall school readiness (ß = -0.196). A similar relationship was observed between the variables when looking at the families with a reported income of $100,000 to $149,999. Within this group, a negative relationship of ß = -0.367 was reported. This relationship was considered statistically significant (p < 0.001).

Chapter Summary

The data from the survey illustrates a few different themes. While there were no significant differences between the significant subgroups (income, education level, and language status) in terms of usage time or how children physically access the technology, the data points to divisions in behaviors, attitudes, and academic and social benefits in all three of the subgroups studied. There were differences in the children's behaviors while on the device in terms of app usage. Additionally, parents with higher incomes, parents with a college degree, and parents of English-only students tended to show a more negative view of technology's effects on their child than those in other subgroups.

This negative view paralleled the results found when matching the parents' survey with the teachers' survey to determine cognitive, social–emotional, and overall readiness for school. In each of these three categories, students whose parents reported lower income levels, or did not have a college degree, tended to benefit from the use of technology in terms of school readiness. Students whose parents reported higher income levels or had earned a college degree tended to experience negative results from technology compared to their counterparts with lower usage. These themes were observed in cognitive, social–emotional, and overall school readiness.

CHAPTER 5

DISCUSSION

Technology has made a dramatic impact on our society. The introduction of touchscreen devices has had a significant impact on how people communicate with each other and how children spend their free time. This study attempted to understand the way young children are using technology. The goal was to understand the types of applications they are using and determine if these devices are displacing their traditional learning activities and affecting their cognitive development.

The first question posed in this research focused on parents' perceptions of children's home device usage (platform, frequency, duration, times, and range of application usage) and how this varies by income and parent education. This question aimed to determine how much time children spend using electronic device technology and how this time is spent. Furthermore, this question looked at the differences among subgroups to determine if trends disproportionately affected some groups more than others.

The second question the research addressed was how individual device home usage affected students' cognitive readiness for school. The purpose of this question was to address the idea that the amount of time that children spend could potentially displace other learning opportunities. This displacement of traditional, cognitively developmental activities could have an impact on children's cognitive development. This study addressed the idea that a child's use of technology could positively or negatively impact a child's academic readiness for school.

The third research question posed in this research attempted to investigate how individual device home usage affected students' social–emotional readiness for school. Like the previous question, the idea was to see if the socially enriching activities that children displaced with technology impacted their social and emotional readiness for school.

The final research question looked at how cognitive development and social development combined to create overall readiness for school. This question explored the idea that school

readiness is more than just academic readiness. It comes from the foundation that to be ready for school, a student must not only have the ability to handle the academic concepts presented in school, but they must also be able to engage in the activities that are necessary for a learner to continue to build and refine new skills.

Chapter 5 will begin by discussing the interpretation of the data presented in Chapter 4, including conclusions that can be drawn from the data. The chapter will then discuss the implications these conclusions have on educational policy, practice, and theory, as well as directions for future research. The researcher will then discuss broader recommendations for policy and practice as it related to the research. Finally, Chapter 5 will end with a summary of the entire dissertation.

Interpretations/Conclusions

Several themes emerged from analysis of the data, including the way that children were using technology and the perceptions that parents had about technology's value, as well as the academic and the social–emotional impacts of technology.

Technology Usage Among Children

The data showed that children in the study used technology for similar amounts of time in regression models run for income, education, and English learner status. These models all returned insignificant results ($p > .05$) for a relationship between each of the subgroups and total time spent on technology. Similarly, shared family times in which children were allowed to use technology did not differ significantly among groups.

There were, however, a few notable exceptions to this rule. Students considered to be English learners reported using technology at lower rates while eating at restaurants and while driving in cars or taking public transportation. These differences were statistically significant ($p < .05$) in both models. These differences can be explained by cultural differences in the importance of shared family time or a child's perceived role in family dynamics. These differences could also be due to differences in the total number of opportunities available to children. It is conceivable that English learners' families

spend less time at restaurants or driving overall than English-only students. Therefore, this group may have reported lower instances of technology use during these times.

Despite these differences, children in this study did not use technology in dramatically different ways. Nor were there significant differences in the amount of time children used individual technology devices.

Academic Readiness

The data showed statistically significant differences in the effects that technology usage had on students' academic readiness. The data in both the education- and income-weighted surveys positively correlated time on technology and academic readiness for lower income students. The model weighted for income showed that this correlation is as strong as ß = .482 for families that reported annual incomes of less than $50,000. There was an inverse relationship when observing the top two groups represented in the survey (>$100,000 annually). This group had a ß= -.179 in the income weighted study.

A similar trend emerged when looking at academic readiness when observing the stratified education subgroups. Individual technology positively correlated with academic readiness when looking at parents with less than a bachelor's degree. In the education-weighted model, families whose parents had less than a bachelor's degree had a positive relationship (ß = .261). However, when looking at the students whose parents had earned bachelor's degrees, there was a negative relationship (ß = -.186).

These findings show evidence that similar technology usage can have inverse effects depending on parental education. One possible explanation for this phenomenon may be in the types of activities that are being displaced. Children in the high-income and the high-education levels are traditionally seen as having access to more diverse experiences than their counterparts.

Both the education- and income-weighted models show that individual technology usage is beneficial for families in the lower income brackets. These benefits can be contrasted with the detrimental effect that students with higher incomes experienced in this study. One possible

explanation for this phenomenon is the idea of displacement of a child's activities (Holloway et al., 2013; Mesch, 2006; Twenge et al., 2018; Vandewater et al., 2006).

Displacement means that children are making choices between real-world recreational activities and screen time. This study shows that kids are spending, on average, between 30 minutes and 2 hours on technology per day. This time is similar to times reported by Rideout and Robb (2020). However, Rideout and Robb's (2020) study noted differences in time among different income levels. This study showed that 70% of the students used individual technology recreationally an average of five to seven times per week. This data is similar to the data presented by Pew Research Center (2018). Multiple hours per day on individual technology, 5-7 days per week, suggests that children in this study are displacing many traditional activities with technology-based activities.

This displacement of activities raises a question: If all the students are displacing similar amounts of time with the same technological activities, why do some students experience positive readiness effects and others experience adverse readiness effects? The answer to this question may lie in the activities that are being displaced. Income differences and parent education levels allow access to different opportunities and experiences for children.

One example of this can be seen in Hart and Risley's (2003) work in which the researchers found a difference of 153,000 words per week used in higher parent education families as opposed to welfare families. It is possible that the use of individual technology supplements children's experiences in lower income families by exposing them to language that they otherwise may not encounter in the home. Research conducted by Radesky et al. (2014) suggests that this may be an intentional replacement strategy. Radesky et al. (2014) found that parents of English learners use screen time as a means for children to learn English. Similarly, children in these families may be able to supplement activities that their family may not afford by experiencing it through a screen.

Conversely, children with higher parent education levels or income may be doing the exact opposite with their technology usage. These children may be experiencing a loss of language skills or experiences resulting from replacing interactions with their environment with individual devices.

Social Emotional Readiness

With regard to social–emotional readiness, both the income and education weighted models showed significant negative results for the families with the highest incomes and education levels. Conversely, the data demonstrated significant positive results for the students with the lower incomes and lower income levels. As with academic readiness, it is plausible that these differences have to do with the quality of activities that technology is displacing.

McDaniel (2015) specifically talked about this displacement of activities to replace personal interactions with technology. He referred to this replacement of activities as technoference, or technology interrupting family relationships. The underlying theme in much of the research regarding technology disrupting person-to-person interactions was that this disruption had overwhelmingly negative effects. Radesky et al. (2014) said that technology's disruption of face-to-face interactions caused parents to have "robotic" responses. Dwyer (2012) reported that these interactions negatively affected the well-being of the users. Vanden Abeele et al. (2016) reported that these interactions caused people to feel rejection and ostracism.

When viewing the data presented in this study, at first glance, it would seem that, in terms of social–emotional readiness, that this disruption of family interactions can be beneficial for children's social–emotional readiness in lower socioeconomic families and children with less-educated parents. However, this would be a much too simplistic way to view the data. Additionally, it discounts a child's desire to contribute to their community and the value that people draw from informal interactions with their families (Rogoff, 2014).

It is important to note that, when discussing this data, not to look at technology displacement as absolute. This means that technology does not replace 100 percent of a child's interactions. Individual technology can replace face-to-face interactions in some occurrences. In other occurrences, individual technology can replace other activities with lower amounts of rigor.

It is also possible that distance learning colored the results of teacher observations. As Kucirkova (2014) suggested, interactions via technology, even video media, are not the same as in-

person interactions, even though they mirror face-to-face interaction. This study asked teachers to report on children's ability to do the following: listen attentively to the teacher or peers, follow classroom and school rules, display turn-taking skills, show courtesy and respect to others, display good communication skills, work cooperatively with others, and maintain ties to family, school, and community.

It is possible that teachers had difficulty reporting on some aspects of this scale via video conferencing technology. Teachers may have instead been reporting on a combination of children's social readiness and their technological ability to demonstrate these qualities. If teachers were unable to make this distinction, it might explain why overall time on technology would improve social readiness scores. Teachers may have been reporting on children's ability to demonstrate their social skills via technology. In this case, the familiarity caused by time on technology would help a student to be able to demonstrate these skills, thus giving them a higher score in the social readiness index.

Parent Perceptions of Technology's Impacts

The study spotlighted a few trends with parent perceptions as well. Overall, parents had a negative view of technology and its impacts, with a few notable exceptions. The first of these is that as household income went up, the general view of technology's benefits went down. Parents with higher incomes showed a statistically significant negative view of technology's impacts on their child's social skills, focus, behavior, physical activity, and creativity.

These views also align themselves with the results found in this study. This study's multiple models showed negative effects between individual technology usage and academic and social–emotional readiness in the upper income subgroups. Parents are likely to see these effects with their children and therefore report technology usage as a negative factor in their children's school readiness. Conversely, parents with lower incomes had more positive views of technology in these areas. They may see the positive school readiness results noted in this study. This data seems to corroborate findings by Radesky et al. (2014) that found low-SES families are more likely to expose their children to TV because of a lack of other educational resources.

The second trend observed in parent perceptions was that families with higher educations viewed technology differently than did other groups. In both the Education-weighted and income-weighted models, parents with higher educations were more likely to report their children using technology primarily for entertainment purposes. This difference was reflected in the students' usage patterns as well. Parents who reported higher education levels in their household reported that their students were less likely to use educational applications (ß = -.146 and ß = -.170, $p < .01$). Instead, this group reported higher communication applications among their children (ß = .171 and ß = .176, $p < .01$).

One possible explanation for children in the lower parent education group showing gains in academic readiness is the type of applications that the children are using. These students are using different applications than their counterparts while using their devices. The data in this survey indicated that the parents with higher education and incomes reported that their children were using their devices primarily for entertainment. These parents with higher levels of education reported that their children used fewer educational applications and instead used their devices to communicate ($p < .01$). These findings are similar tothose of Radesky et al. (2014), who found that parents with lower income levels view screen time as an educational resource.

The directionality of this relationship is unclear. It is possible that the parents with higher reported education levels do not see individual technology as a tool and instead see it as a recreational activity. It is also possible that the parents observe the negative effects on academic and social readiness noted in the study and, as a result, designate individual devices as recreational devices and not educational devices.

Implications

Implications for Practice

The information gleaned from this study will affect practice in several ways. Most importantly, it shows that technology is one possible way to close the gap created through discrepancies in income and parent education. It is important to note that not all groups benefited from increased access to

technology. This lack of uniform benefit is important because it points to the need for strategic and targeted use of technology to help students. Targeted technology usage will be important for early education professionals to help construct differentiated grouping or remediation activities in the classroom.

Implications for Policy

Knowing that technology usage can positively or negatively impact children's readiness for school creates the need for responsible technology integration into our classrooms and the children's homes. Policymakers at all levels are responsible for determining the scope and sequence for teaching children how to use technology as tools. To accomplish this, both teachers and parents will need to receive training on how to use technology effectively so that teachers can use these tools. It is not acceptable for educators to argue that children are "digital natives" and count on students to know how to use individual technology as a tool. This is especially true in the early years in education where children are still learning how to learn formally in a classroom setting. Individual technology can be effective when students and teachers are given guidance and are given appropriate boundaries for its use as an instructional tool. Additionally, individually technology can be effective if it is used to individualize instruction instead of replace instruction.

Implications for Theory

This study sheds new light on children's technology usage, including potential benefits for early childhood technology usage. Chapter 2 discussed a constructivist view of learning based on the work of Piaget and Vygotsky. Piaget (1964) stated that children learn through shared experience and play with more advanced models providing scaffolding for learning. Vygotsky (1978) furthered this theory by adding that social interactions were an important component of knowledge construction. Chapter 2 also discussed how technology could displace traditional play activities, especially social interactions with family and peers (McDaniel, 2015; McDaniel and Radesky, 2018; Radesky et al., 2014; Radesky et al., 2015).

This research attempted to answer Radesky and McDaniels' questions as to how technological displacement of social interactions, or technoference, affects children. The results of this research indicate that there is not a uniform answer to this question. Technology appears to be just one component of a child's experiences. This is to say that technology's cognitive rigor falls on the continuum of cognitive rigor and is more enriching for children than some tasks and less beneficial than others. This research study appears to be in line with Piaget's work and, to some degree, Vygotsky in that technology can include cognitively challenging tasks that promote cognitive development. Individual technology can be more cognitively enriching than a lack of experiences but may also lack the cognitive rigor of other real-world experiences.

The findings of this study fit in with the argument in McDaniels and Radesky's work that these technological interactions should not totally replace a child's interactions with peers and caretakers. Instead, individual technology can supplement interactions with others by parents and children coviewing material together (Radesky et al., 2015).

Implications for Future Research

More research must be conducted in this area to extend the findings of this study. This research study was conducted during a time of enforced distance learning, which possibly had two major effects on this study. The first is the possibility that parents' perceptions of the time that their children spent on individual devices for "distance learning" classes and the time that children were using the devices "recreationally" may have been skewed. Another study could determine different reported usage patterns among children when distance learning is not taking place. It is entirely possible that the overall reported usage would have been lower if there were in-person instruction. There may have been greater differences between the subgroups due to the access (or lack of access) to other non-technology-related activities that the pandemic restrictions may have limited.

The second possibility is that distance learning may have skewed how teachers can view children's in-class performance. Distance learning may have affected the academic ratings that teachers gave students and almost certainly affected children's social behaviors. It is possible that, if

repeated with an in-person class, this study may have seen more significant results in the area of social–emotional learning specifically.

Future research into exactly which genres of applications and possibly even which individual applications are beneficial to young children is still needed. This study did not provide an understanding of how individual applications might affect children differently. To get a more accurate profile of usage, research would have to extensively record which applications children were using over a period of time to understand the exact amount of time that they are interacting with technology daily. Understanding daily technology usage would help gain insight into which types of usage were the most beneficial and which types of apps could be detrimental to school readiness. This understanding could guide educators as to how to use technology more effectively in the classroom setting.

Recommendations

Technology is intertwined with society. Children are using individual devices from the time they are younger than 6 months through adulthood. Adult models directly teach children multitudes of lessons such as how to cross the street, how to tie their shoes, and how to read. Yet, in many cases, children are left alone to figure out how to use one of the most powerful tools in the world. One reason for this lack of specific instruction is that these groups' parents did not grow up with the same type of technology that is available today. Another reason might be that the parents do not understand the possible effects of the use, or misuse, of individual technology.

This research illustrates how individual technology impacts our children both cognitively and social–emotionally. Educators must play a role in helping students and families to understand the importance of responsible technology usage. Additionally, educators should play a role in shaping how students use technology and their perceptions of technology itself. The following are some recommendations for how educators and administrators can play a role in this process.

Work to Increase Internet Connectivity for Underserved Populations

Technology is no longer a luxury in education today. Schools use emails, texts, and social media to communicate information on school events and children's academic records to parents. Educational agencies send student assessment data to parents through electronic accounts. Technology is a tool for learning and a medium for accessing knowledge about the community and the educational system. Access to technology is access to the educational system for students and families.

The data from this study demonstrates that individual technology usage could increase academic readiness for low-income students, families with less education, and traditionally underserved populations. Educational games and videos can provide language access and provide children with additional practice in foundational educational skills. Access to technology is access to opportunities for children. The need for access to connectivity was brought to light during the early days of distance learning. Some schools made the transition to online education quickly, while others took weeks or months to make sure that their students could connect.

Knowing this, schools and communities need to work proactively to ensure that students and families have internet connectivity. Schools can begin this outreach as early as pre-school. Schools should seek out families in need of assistance in accessing the internet and ensuring that resources are available to families by distributing hot spots and connecting families with outside community agencies to assist with necessary resources. Connecting families to the internet connects students with additional academic experiences that increase academic readiness. Additionally, access to technology connects families to the school system and includes parents as partners in their children's schooling experiences.

Create Healthy Technology Habits for Children

Parent and community outreach needs to be done to educate families, especially those with young children, on developing healthy technology habits that will last into adulthood. These healthy

habits should include cybersafety, evaluating content/media, and moderating usage times for children.

Parents and educators need to be made aware of cybersafety techniques. Cybersafety includes knowing how to set restrictions and limits on young children's applications and ensuring that parents know how to update and review these restrictions. Additionally, parents and educators should understand how and when to teach their children about "stranger danger" in a digital format. Finally, parents and educators should understand their role in helping a child to create a healthy digital footprint.

Parents of young children should understand how to evaluate media and applications for appropriateness and educational value. Evaluating media includes evaluating streaming content, such as Netflix and YouTube. Parents should understand exactly what qualities an educational application should have to be beneficial to avoid the belief that all applications marked as educational are equally beneficial. The educational system should continue to instruct students on how to evaluate online media for reliability and appropriateness.

Finally, parents should understand what a healthy balance of technology looks like for children. This healthy balance includes limiting overall usage times and creating a balance between responsibilities and free time (both virtual and real world).

Extend Technology Curriculum

The final recommendation based on this research is to develop and implement a comprehensive technology curriculum beginning with preschool classes. This curriculum should be explicitly taught in isolation, in addition to integrating technology into core subjects.

In 2017, the U.S. Department of Education released a report titled *Reimagining the Role of Technology in Education: 2017 National Education Technology Plan Update* that outlines steps that communities, teachers, and administrators can take to improve technology education in the United States. States are beginning to follow the recommendations of this plan as well. In 2018, California became the first state to adopt computer science standards in K-12 (Lambert, 2018). These

standards represent a movement toward creating an overarching K-12 curriculum. However, these standards are still optional.

Summary of the Dissertation

According to the research, 77% of Americans own a smartphone and children are being introduced to individual technology as early as 6 months (Pew Research Center, 2018; Common Sense Media, 2017). It is important to understand how these technologies impact our children. This study represents one step in the process of understanding how the nearly constant exposure to individual device technology is affecting children's development. This study demonstrates that children's usage of individual devices affects their social and academic readiness for school. Furthermore, this relationship between technology is not the same for all children, and the relationship varies by parent education level and family income. Further research needs to be conducted to determine the extent of this relationship and which specific individual technology habits contribute to school readiness. This research will help direct educational policy concerning technology and help determine the classroom and recreational uses for technology that will contribute to children's academic success.

APPENDIX A

PARENT SURVEY

Home Device Usage Survey

The goal of this survey is to get an idea of how children in Kindergarten use individual technology devices during their FREE (not distance learning) time at home. When responding to this survey please think about your **transitional kindergarten through first-grade** student's use of these technologies and do not include any other children in your household.

An **individual technology device** refers to any smartphone, tablet, or personal gaming device (Android, Galaxy, Kindle Fire, iPhone, iPad, portable gaming device, etc)

The first three questions in this survey will only be used to match your survey to the teacher survey. This data **will not be reported**.

Demographic Information

Please select your child's grade:

Transitional-Kindergarten

- ❑ Kindergarten
- ❑ First Grade

1. Please write your child's teacher's name:

2. Please select your child's school:
   - ❑ Ceres
   - ❑ Evergreen
   - ❑ La Colima
   - ❑ Laurel
   - ❑ Leffingwell
   - ❑ Mulberry
   - ❑ Murphy Ranch
   - ❑ Ocean View
   - ❑ Orchard Dale
3. Scott Avenue'My child is:
   - ❑ Female
   - ❑ Male

4. Our Family Income:
   - ❑ Less than 25,000
   - ❑ 25,000 - 49,999
   - ❑ 50,000 - 74,999
   - ❑ 75,000 - 99,999
   - ❑ 100,000 - 149,999
   - ❑ 150,000 or more

5. The highest education level in our household is:
   - ❑ Less than high school
   - ❑ High School Diploma
   - ❑ Some College
   - ❑ College Degree or Higher

6. Is your child considered an English Learner (EL) at his/her school?
   - ❑ Yes
   - ❑ No
   - ❑ I Don't Know

7. Did your child attend a Pre-School, Pre-Kindergarten, or Head Start program prior to entering Kindergarten?
   - ❑ Yes
   - ❑ No'

Technology Information

8. Which of these describes your child's individual technology usage?
   - ❑ He/she only uses a parent's device
   - ❑ Shares a device with sibling/siblings
   - ❑ Has access to his/her own cell phone/tablet
   - ❑ Does not have access to individual technology device

9. How many days in the last week did your child use an individual technology device?
   - ❑ 0 Days
   - ❑ 1-2 Days
   - ❑ 3-4 Days
   - ❑ 5-6 Days
   - ❑ 7 Days

10. Thinking about how much time your child spends with screen media, which of the following statements comes closest to your view?
   - ❑ My child spends too LITTLE time with an individual technology device.
   - ❑ My child spends the RIGHT amount of time with an individual technology device.
   - ❑ My child spends too MUCH time with an individual technology device

Home Device Usage Survey

The goal of this survey is to get an idea of how children in transitional kindergarten through first grades use individual technology devices during their FREE time at home (not distance learning or homework time). When responding to this survey please think about your **transitional kindergarten through first grades** student's use of these technologies and do not include any other children in your household.

An individual technology device refers to any smartphone, tablet, or personal gaming device (Android, Galaxy, Kindle Fire, iPhone, iPad, portable gaming device, etc)

Parent Views

For the next few questions, please think of your child's usage during their **FREE** time (not distance learning or homework).

Do you agree or disagree with the following statements about screen media (smartphones, tablets, gaming apps)

	Strongly Disagree	**Somewhat Disagree**	**Neither Agree nor Disagree**	**Somewhat Agree**	**Strongly Agree**
In general, the less time kids spend with an individual technology device the better off they are					
0 **My child** uses his/her device primarily for entertainment					
1 I am satisfied with the amount and quality of educational screen media available for my child					

Times of Use

For the next few questions, please think of your child's usage during their **FREE** time (not distance learning or homework).

Below are some common instances in which children use tables. How often does your child participate in each of the following activities?

	Never	**1-2 times** per week	**3-4 times** per week	**5-6 times** per week	**Daily**
2 Uses an individual technology device when he/she eats at home					
3 Use an individual technology device when the family eats at a restaurant					
4 Use a mobile device when he/she is in a car or on public transportation					
5 Uses an individual technology device the hour before bedtime					

App Usage

For the next few questions, please think of your child's usage during their **FREE** time (not distance learning or homework).

On an average day, how much does your child use each of the following apps?

	M y child **does not** use this feature	U **ses this feature/Less than 30 minutes** per day	U **ses this feature/30-60 minutes** per day	U **ses this feature/1-2 hours** per day	U **ses this feature/More than 2 hours** per day
6	Educational apps (ex. ABC Mouse, Spelling City, Class Dojo)				
7	Gaming apps (ex. Minecraft, Pokemon Go)				
8	Video streaming apps (ex. Disney+ , Hulu, Netflix, Youtube)				
9	Communication (ex. text, phone, videochat)				

Parent Perceptions of Benefits

For the next few questions, please think of your child's usage during their **FREE** time (not distance learning or homework).

Do you think your child's use of individual technology helps, hurts, or makes no difference to the following options?

	H **urts a lot**	H **urts a little**	M **akes no difference**	H **elps a little**	H **elps a lot**
0	Social Skills				
1	Learning				
2	Ability to focus				
3	Behavior				
4	Physical Activity				
5	Creativity				

YES, you may ask my child's teacher to complete the questionnaire regarding my child's abilities/readiness for school.

NO, you may **NOT** ask my child's teacher to complete the questionnaire regarding my child's abilities/readiness for school.

Name (Printed): _____ Signature:_____

If you answered YES , please write your student's name so the researcher can send a survey to the teacher.

Student Name (Printed): _____

APPENDIX B

PARENT SURVEY (SPANISH)

Encuesta Sobre Niños Kindergarten y Uso De Aparatos Electrónicos En Casa

La meta de esta encuesta es obtener una idea de cómo los niños en **kindergarten de transición a primer grado** usan un aparato electrónico individual durante su tiempo LIBRE (no durante clases online) en casa. Cuando responda a esta encuesta, por favor piense en el niño que forma parte de **kindergarten de transición a primer grado** junto con su uso de aparatos electrónicos en casa y no incluya a ningún otro niño que sea parte de su casa.

Un **aparato electrónico individual** se refiere a cualquier smartphone, tablet, o juego de video personal (Android, Galaxy, Kindle Fire, iPhone, iPad, portable gaming device, etc)

Información Demográfica

❑

Seleccione el grado de su hijo:
Kindergarten de transición

- ❑ Kindergarten
- ❑ Primer grado

1. Escriba el nombre del maestro de su hijo:

2. Seleccione la escuela de su hijo:
   - ❑ Ceres
   - ❑ Evergreen
   - ❑ La Colima
   - ❑ Laurel
   - ❑ Leffingwell
   - ❑ Mulberry
   - ❑ Murphy Ranch
   - ❑ Ocean View
   - ❑ Orchard Dale
   - ❑ Scott Avenue

3. Mi hijo/a es:
   - ❑ Mujer
   - ❑ Hombre

4. Nuestros ingresos familiares son:
   - ❑ Menos de 25,000
   - ❑ 25,000- 49,999
   - ❑ 50,000- 74,999
   - ❑ 75,000- 99,999
   - ❑ 100,000 to 149,999
   - ❑ 150,000 o mas

5. El nivel más alto de educación en nuestra casa es:
   - ❑ Menos que escuela secundaria
   - ❑ Diploma de escuela secundaria
   - ❑ Algo de universidad

- ❑ Diploma de universidad o más

6. ¿Es su hijo/a considerado un estudiante de inglés (EL) en su escuela?
   - ❑ Si
   - ❑ No
   - ❑ No lo se

7. Su hijo/a atendio Pre-School, Pre-Kindergarten, o un programa Head Start antes de entrar a Kindergarten?
   - ❑ Si
   - ❑ No

Información Sobre Tecnología

8. ¿Cuál de estas describe el uso del aparato electrónico individual en su hijo/a?
   - ❑ El/ella solo usa el aparato personal de sus padres
   - ❑ Comparte aparato electrónico con hermano/hermanos
   - ❑ Tiene accesos a su aparato electrónico individual (celular/tablet)
   - ❑ No tiene acceso a ningun aparato electronico individual

9. ¿Cuántos días de la semana pasada su hijo/a utilizó un aparato electrónico individual?
   - ❑ 0 Días
   - ❑ 1-2 Días
   - ❑ 3-4 Días
   - ❑ 5-6 Días
   - ❑ 7 Días

10. Pensando en el tiempo que su hijo/a pasa frente a su aparato electrónico individual, cuál de las siguientes afirmaciones cree que es la correcta de acuerdo a su punto de vista?
    - ❑ Mi hijo/a pasa muy POCO tiempo con un aparato electrónico individual.
    - ❑ Mi hijo/a pasa un tiempo NORMAL con un aparato electrónico individual. .
    - ❑ Mi hijo/a pasa MUCHO tiempo con un aparato electrónico individual.

Uso De Aparatos Electrónicos En Casa

La meta de esta encuesta es obtener una idea de cómo los niños en **kindergarten de transición a primer grado** usan un aparato electrónico individual durante su tiempo LIBRE (no durante clases online) en casa. Cuando responda a esta encuesta, por favor piense en el niño/a que forma parte de **kindergarten de transición a primer grado** junto con su uso de aparatos electrónicos en casa y no incluya a ningún otro niño que sea parte de su casa.

Un aparato electrónico individual se refiere a cualquier smartphone, tablet, o juego de video personal (Android, Galaxy, Kindle Fire, iPhone, iPad, portable gaming device, etc)

Punto de Vista de Padres

Para las siguientes preguntas, por favor piense en su hijo/a y el uso de aparatos electronicos individuales durante su tiempo **LIBRE** (no durante clases en linea o tarea).

Usted esta de acuerdo o en desacuerdo con las siguientes afirmaciones sobre el uso de aparatos electrónico (smartphones, tablets, gaming apps)

	Totalmente en desacuerdo	**Algo en desacuerdo**	**No estoy de acuerdo o ni en desacuerdo**	**Algo en acuerdo**	**Totalmente de acuerdo**
En general, el menos tiempo que un nino pase con un aparato electrónicos, mejor sera para ellos					
0 **Mi hijo/a** usa su aparato electronico principalmente para entretenimiento					
1 Estoy satisfecho con la cantidad de tiempo y calidad educativa que mi hijo/a tiene disponible					

y encuentra en sus aparatos electrónico

Tiempo de Uso

Para las siguientes preguntas, por favor piense en su hijo/a y el uso de aparatos electronicos individuales durante su tiempo **LIBRE** (no durante clases en linea o tarea).

Las siguientes son situaciones comunes en las que los ninos usan aparatos electrónico. Que tan seguido su hijo/a participa en las siguientes actividades?

	Nunca	**1-2 veces** por semana	**3-4 veces** por semana	**5-6 veces** por semana	**Todos los dias**
2 Usa un aparato electrónico individual cuando el/ella come en casa					
3 Usa un aparato electrónico individual cuando esta comiendo en un restaurante con la familia					
4 Usa un aparato electrónico individual mientras esta en el carro o transporte publico					
5 Usa un aparato electrónico inidividual antes de dormir					

Uso de Apps

Para las siguientes preguntas, por favor piense en su hijo/a y el uso de aparatos electronicos individuales durante su tiempo **LIBRE** (no durante clases en linea o tarea).

En general, que tanto usa su hijo/a las siguientes apps?

	Mi hijo **no utiliza** estas apps	**Menos de 30 minutos** por dia	**30-60 minutos** por dia	**1-2 horas** por dia	**Mas de 2 horas** por dia
6	Apps Educativas (ex. ABC Mouse, Spelling City, Class Dojo)				
7	Apps de Juegos (ex. Minecraft, Pokemon Go)				
8	Apps de Videos (ex. Disney+ , Hulu, Netflix, Youtube)				
9	Apps para comunicarse (ex. text, phone, videochat)				

Punto de Vista de Padres Sobre Los Beneficios

Para las siguientes preguntas, por favor piense en su hijo/a y el uso de aparatos electronicos individuales durante su tiempo **LIBRE** (no durante clases en linea o tarea).

Piensa que el uso de aparatos electrónicos individuales en su hijo/a ayuda, hiere, o hace no diferencia en las siguientes opciones?

	Hiere mucho	**Hiere un poco**	**Hace no diferencia**	**Ayuda un poco**	**Ayuda mucho**
0	Habilidades sociales				
1	Aprendizaje				
2	Abilidad para concentrarse				
3	Comportamiento				
4	Actividad Fisica				
5	Creatividad				

SI, doy permiso de que el profesor complete el questionario basado en las abilidades/preparaciones de mi hijo/a para escuela

NO, **NO** doy permiso de que el profesor complete el questionario basado en las abilidades/preparaciones de mi hijo/a para escuela

Nombre (Escrito): _____ Firma : _____

Si respondió **SÍ**, escriba el nombre de su estudiante para que el investigador pueda enviar una encuesta al maestro.

Nombre del estudiante (Escrito): _____

APPENDIX C

TEACHER SCHOOL READINESS SURVEY

School Readiness Survey

The first four questions in this survey will only be used to match your survey to the student survey and for entries into the opportunity drawing. This data **will not be reported**.

. Please select your school from the list:

. Please select the grade that you teach. Transitional Kindergarten | Kindergarten | First Grade

. Please type your last name: _____

. Please type in the student's name: _____

Thank you for agreeing to take this survey. Please take a moment to reflect upon the skills of the student mentioned in the email. Please rate his/her abilities in each of the following areas:

General Cognitive Readiness of the Student

	Much less prepared than the average student	**Somewhat less** prepared than the average student	**As prepared** for Kindergarten as the average student	**Somewhat better** prepared than the average student	**Much better** prepared than the average student
Recognizes basic colors					
Recognizes color words					
Recognizes first and last name					
Demonstrates appropriate fine motor skills					

Reading Skills of the Student

	Much less prepared than the average student	**Somewhat less** prepared than the average student	**As prepared** for Kindergarten as the average student	**Somewhat better** prepared than the average student	**Much better** prepared than the average student
Associates sounds with letters presented					
Recognizes sight words					
Blends sounds to read basic words					
Identifies rhyming words					

Writing Skills of the Student

		Much **less** prepared than the average student	Somew **hat less** prepared than the average student	As **prepared** for Kindergarten as the average student	Somew **hat better** prepared than the average student	Much **better** prepared than the average student
	Prints numerals					
0	Prints capitals and lower case letters					
1	Prints first and last name					

Math Skills of the Student

		Much **less** prepared than the average student	Somew **hat less** prepared than the average student	As **prepared** for Kindergarten as the average student	Somew **hat better** prepared than the average student	Much **better** prepared than the average student
2	Identifies numerals					
3	Counts objects					
4	Sorts objects					

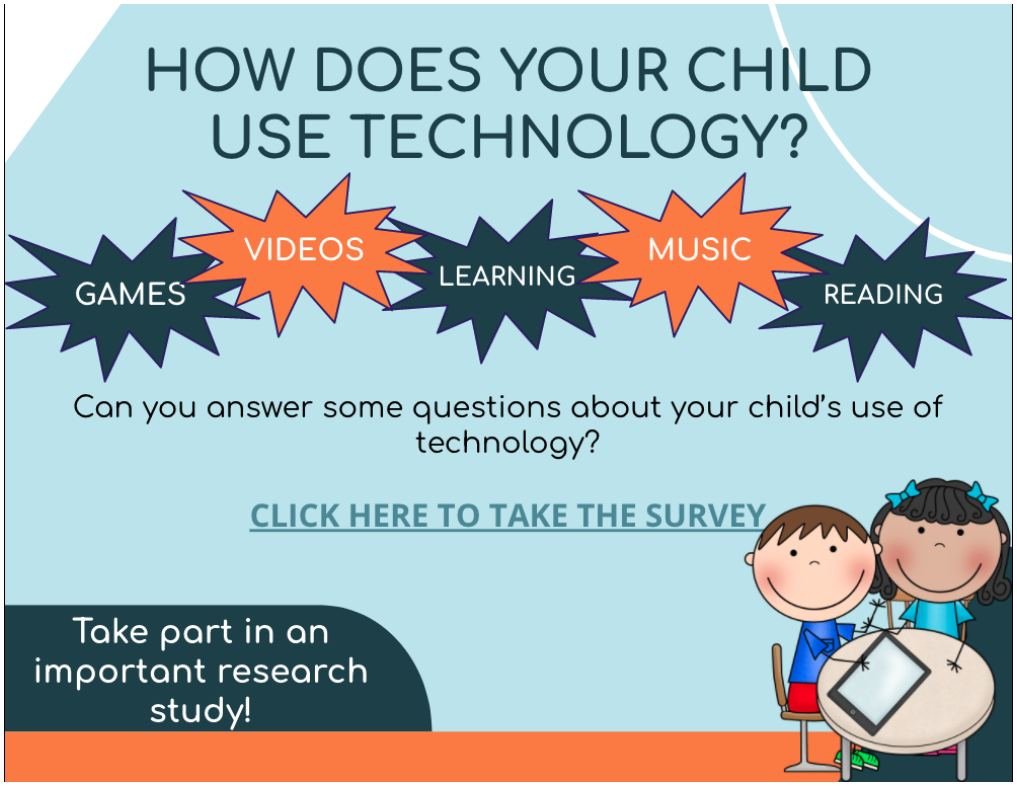
Social Skills of the Student

		Much **less** prepared than the average student	Somew **hat less** prepared than the average student	As **prepared** for Kindergarten as the average student	Somew **hat better** prepared than the average student	Much **better** prepared than the average student
5	Listens attentively to teacher or peers					
6	Follows classroom and school rules					
7	Displays turn taking skills					
8	Shows courtesy and respect to others					
9	Displays good communication skills					
0	Works/plays cooperatively with others					
1	Have strong ties to family, school and community					

Survey adapeted from Peter Hart Research (2005) with permission from Peter Hart Research.

APPENDIX D

PARENT RESEARCH FLYER



Dear Parent,

My name is Shane Muetzel. I am a doctoral student at California State University, Fullerton in the Educational Leadership Program under the advisement of Dr. Marc Ecker. I am also a former teacher and administrator in the East Whittier City School District and my children attended Laurel and East Whittier. I am requesting your participation in a doctoral research study entitled Individual Technology (iPads, tablets, smartphones) and School Readiness.

This research is important in beginning to identify the strengths or gaps in abilities/behaviors that the use of individual technology has on students in the early years of education.

The study involves completing a survey that consists of basic demographic questions and multiple-choice questions. The estimated time to take the survey is (5-10 minutes).

Your participation is entirely voluntary, and you may discontinue your participation at any time. The survey is confidential and will not report personally identifiable information such as your name, your child's name, address, e-mail address, phone number. Responses will be coded and will not be linked back to you except by the researcher. **Teachers will NOT receive the results of your surveys.**

If you would like to participate in the study, please read the Informed Consent Letter. To begin the study, click the link for the Informed Consent Letter.

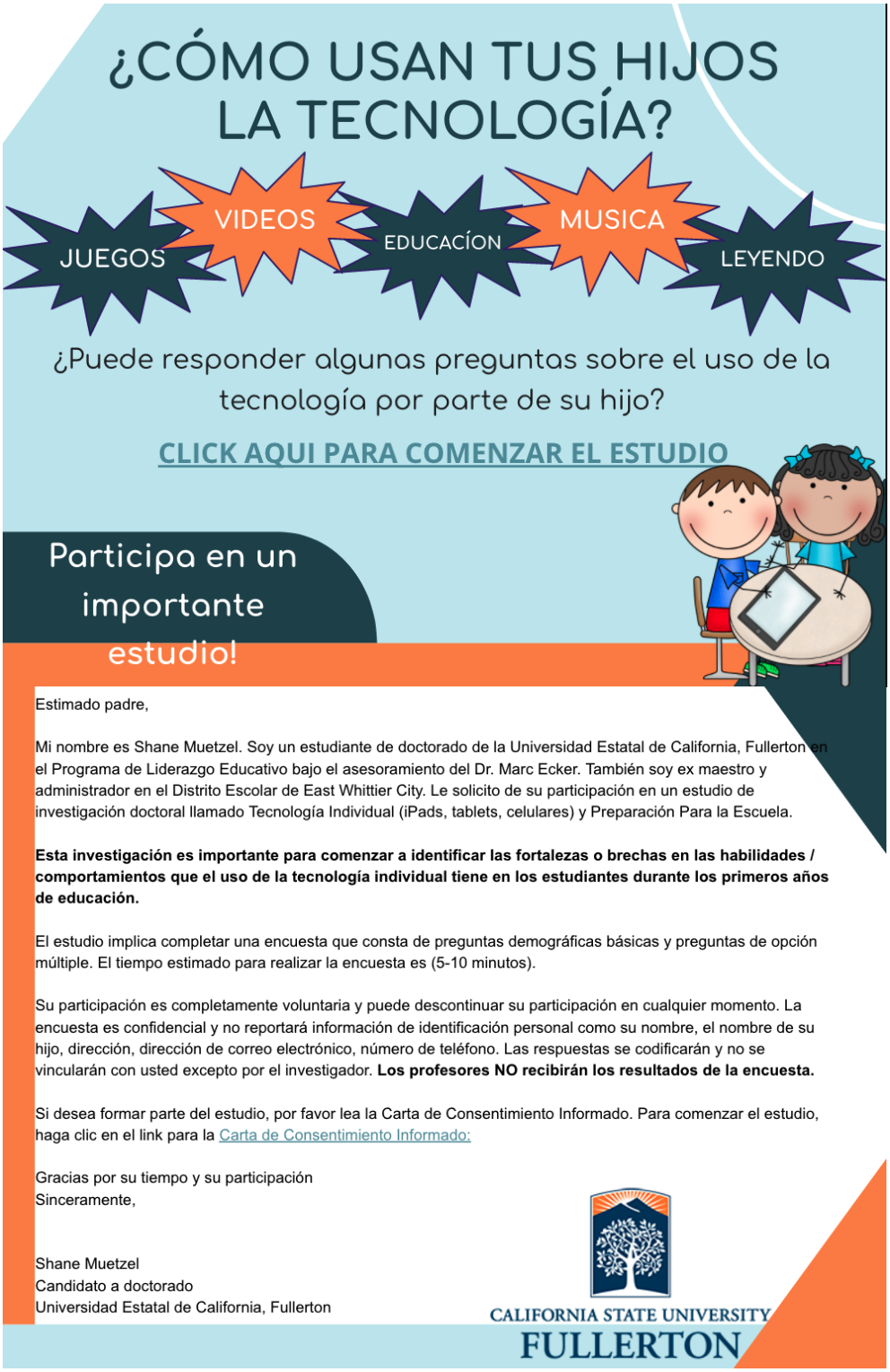
Thank you for your time and participation
Sincerely,

Shane Muetzel
Doctoral Candidate
California State University, Fullerton

CALIFORNIA STATE UNIVERSITY
FULLERTON

APPENDIX E

PARENT RESEARCH FLYER (SPANISH)



APPENDIX F

CALIFORNIA STATE UNIVERSITY, FULLERTON RESEARCH STUDY CONSENT FORM

Study Title: Individual Technology and School Readiness

Protocol Number: HSR-19-21-10

Researchers: Shane Muetzel

You are being asked to take part in a research study carried out by Shane Muetzel a doctoral student in the department of education under the advisement of Dr. Marc Ecker. This consent form explains the research study and your part in it if you decide to join the study. Please read the form carefully, taking as much time as you need. Ask the researcher to explain anything you don't understand. You can decide not to join the study. If you join the study, you can change your mind later and leave the study at any time. There will be no penalty or loss of services or benefits if you decide to not take part in the study.

What is this study about?

This research study is being conducted to determine parents' perceptions of children's home individual technology usage and the effects that this usage has on the student's socio-emotional and cognitive readiness for school.

You are being asked to take part because you have a child that attends pre-kindergarten through first grade, who attends school in the public education system and is a user of individual technology.

Taking part in the study will take approximately 5-10 minutes.

You cannot take part in this study if you are under 18 or do not have a child in pre-kindergarten through first grade in the public education system.

What will I be asked to do if I am in this study?

If you take part in the study, you will be asked to:

- Submit a questionnaire regarding demographic information questions pertaining to your child's usage of individual technology. (approximately 5-10 minutes)
- If you opt in to the second portion of the survey, allow the researcher to survey your child's teacher to get teacher perceptions on classroom performance. regarding your child's technology usage and schooling experiences.
    - The participant may refuse to answer any question on the questionnaire.
    - At any time the participant may choose to opt-out of the questionnaire.

Are there any benefits to me if I am in this study?

The potential benefits to you for taking part in this study are: There is no direct benefit to you from being in this study. This study will help educators in the field to understand the factors that influence student behavior and help students in the learning process.

Are there any risks to me if I am in this study?

The potential risks from taking part in this study are….

- Possible risk of loss of confidentiality. (All data will be coded and kept separate from data results. Names will not be used in the final presentation of results.)
- Some of the questions may contain sensitive information which may create discomfort. (Participants may opt-out of questions or revoke consent at any time.)
- Under the Child Abuse and Neglect Reporting Act (CARNA) pursuant to Penal Codes 11164 through 11174.3 This California law requires people in positions of authority over children to report known or suspected abuse or neglect. I must report instances of child abuse or neglect if they are made known to me during the interview process.

Will my information be kept anonymous or confidential?

The data for this study will be kept confidential to the extent allowed by law. No published results will identify you, your name, or your child's name. Neither your name, or your child's name will be associated with the findings. Under certain circumstances, information that identifies you may be released for internal and external reviews of this project.

- Key data will be coded and a key will be maintained separately so that data from the initial survey will not be linked back to the participant except by the researcher.
- Data will be stored in a locked cabinet in a secure location and/or a password-protected computer and will only be accessible by the researcher.
- The participant's name will not be reported by the researcher.
- Under the Child Abuse and Neglect Reporting Act (CARNA) pursuant to Penal Codes 11164 through 11174.3 This California law requires people in positions of authority over children to report known or suspected abuse or neglect. I must report instances of child abuse or neglect if they are made known to me during the interview process.

The results of this study may be published or presented at professional meetings, but the identities of all research participants will remain confidential.

The data for this study will be kept for 3 years.

Are there any costs or payments for being in this study?

There are no costs or payments associated with participation in this study.

There will be no costs to you for taking part in this study.

You will not receive money or any other form of compensation for taking part in this study.

Who can I talk to if I have questions?

If you have questions about this study or the information in this form, please contact the researcher, Shane Muetzel by emailing him at SMuetzel@csu.fullerton.edu. If you have questions about your rights as a research participant or would like to report a concern or complaint about this study, please contact the Institutional Review Board at (657) 278-7719 or e-mail irb@fullerton.edu

What are my rights as a research study volunteer?

Your participation in this research study is completely voluntary. You may choose not to be a part of this study. There will be no penalty to you if you choose not to take part. You may choose not to answer specific questions or to stop participating at any time.

What does my digital consent on this form mean?

Your digital consent on this form means that:

- You understand the information given to you in this form
- You have been able to ask the researcher questions and state any concerns
- The researcher has responded to your questions and concerns
- You believe you understand the research study and the potential benefits and risks that are involved.

Statement of Consent

I have carefully read and/or I have had the terms used in this consent form and their significance explained to me. By selecting YES, I agree that I am at least 18 years of age and agree to participate in this project.

APPENDIX G

PARENT INFORMED CONSENT FORM (SPANISH)

California State University, Fullerton Research Study Consent Form

Título del estudio: Individual Technology and School Readiness

Numero de Protocolo: HSR-19-21-10

Investigador: Shane Muetzel

Se le solicita que participe en un estudio de investigación realizado por Shane Muetzel, estudiante de doctorado en el departamento de educación bajo el asesoramiento del Dr. Marc Ecker. Este formulario de consentimiento explica el estudio de investigación y su participación en él si decide unirse al estudio. Por favor lea el formulario detenidamente y tómese todo el tiempo que necesite. Pídale al investigador que le explique cualquier cosa que no entienda. Puede decidir no unirse al estudio. Si se une al estudio, puede cambiar de opinión más tarde y abandonar el estudio en cualquier momento. No habrá penalización ni pérdida de servicios o beneficios si decide no participar en el estudio.

¿De qué se trata este estudio?

Este estudio de investigación se está llevando a cabo para determinar las percepciones de los padres sobre los niños utilizando aparatos electrónicos individuales y los efectos que este uso tiene en la preparación socioemocional y cognitiva del estudiante para la escuela.

Se le pide que participe porque tiene un hijo que asiste al jardín de infantes hasta el primer grado, que asiste a la escuela en el sistema de educación pública y es un usuario de tecnología individual.

La participación en el estudio llevará aproximadamente de 5 a 10 minutos.

No puede participar en este estudio si es menor de 18 años o no tiene un niño desde el jardín de infantes hasta el primer grado en el sistema de educación pública.

¿Qué se me pedirá que haga si participo en este estudio?

Si participa en el estudio, se le pedirá que:
Envíe un cuestionario sobre preguntas de información demográfica relacionadas con el uso de tecnología individual por parte de su hijo. (aproximadamente 5-10 minutos)
Si opta por participar en la segunda parte de la encuesta, permita que el investigador haga una encuesta al maestro de su hijo para conocer sus percepciones sobre el desempeño en el aula. sobre el uso de la tecnología y las experiencias escolares de su hijo.
El participante puede negarse a responder a cualquier pregunta del cuestionario.
En cualquier momento, el participante puede optar por no participar en el cuestionario.

¿Hay algún beneficio para mí si participo en este estudio?

Los posibles beneficios para usted por participar en este estudio son: No hay ningún beneficio directo para usted por participar en este estudio. Este estudio ayudará a los educadores en el campo

a comprender los factores que influyen en el comportamiento de los estudiantes y ayudar a los estudiantes en el proceso de aprendizaje.

¿Existe algún riesgo para mí si participo en este estudio?

Los riesgos potenciales de participar en este estudio son….

- Posible riesgo de pérdida de confidencialidad. (Todos los datos se codificarán y se mantendrán separados de los resultados de los datos. Los nombres no se utilizarán en la presentación final de los resultados).
- Algunas de las preguntas pueden contener información sensible que puede generar incomodidad. (Los participantes pueden optar por no recibir preguntas o revocar el consentimiento en cualquier momento).
- Bajo la Ley de Denuncias de Abuso y Negligencia Infantil (CARNA) de conformidad con los Códigos Penales 11164 a 11174.3 Esta ley de California requiere que las personas en posiciones de autoridad sobre los niños denuncien abuso o negligencia conocida o sospechada. Debo denunciar casos de abuso o negligencia infantil si se me informan durante el proceso de entrevista.

¿Mi información se mantendrá anónima o confidencial?

Los datos para este estudio se mantendrán confidenciales en la medida en que lo permita la ley. Ningún resultado publicado lo identificará a usted, su nombre o el nombre de su hijo. Ni usted, su nombre o el nombre de su hijo se asociarán con los hallazgos. Bajo ciertas circunstancias, la información que lo identifica puede ser divulgada para revisiones internas y externas de este proyecto.

- Los datos clave se codificarán y se mantendrá una clave por separado para que los datos de la encuesta inicial no se vinculen con el participante excepto por el investigador.
- Los datos se almacenarán en un armario cerrado con llave en un lugar seguro y / o en una computadora protegida con contraseña y solo el investigador podrá acceder a ellos.
- El nombre del participante no será informado por el investigador.
- Bajo la Ley de Denuncias de Abuso y Negligencia Infantil (CARNA) de conformidad con los Códigos Penales 11164 a 11174.3 Esta ley de California requiere que las personas en posiciones de autoridad sobre los niños denuncien abuso o negligencia conocida o sospechada. Debo denunciar casos de abuso o negligencia infantil si se me informan durante el proceso de entrevista.

Los resultados de este estudio pueden publicarse o presentarse en reuniones profesionales, pero la identidad de todos los participantes de la investigación permanecerá confidencial.

Los datos de este estudio se conservarán durante 3 años.

¿Hay algún costo o pago por participar en este estudio?

No hay costos ni pagos asociados con la participación en este estudio.

No habrá ningún costo para usted por participar en este estudio.

No recibirá dinero ni ninguna otra forma de compensación por participar en este estudio.

¿Con quién puedo hablar si tengo preguntas?

Si tiene preguntas sobre este estudio o la información en este formulario, comuníquese con el investigador, Shane Muetzel, enviándole un correo electrónico a SMuetzel@csu.fullerton.edu. Si tiene preguntas sobre sus derechos como participante de una investigación o si desea informar una inquietud o queja sobre este estudio, comuníquese con la Junta de Revisión Institucional al (657) 278-7719 o envíe un correo electrónico a irb@fullerton.edu

¿Cuáles son mis derechos como voluntario de un estudio de investigación?

Su participación en este estudio de investigación es completamente voluntaria. Puede optar por no ser parte de este estudio. No se le aplicará ninguna sanción si decide no participar. Puede optar por no responder preguntas específicas o dejar de participar en cualquier momento.

¿Qué significa mi consentimiento digital en este formulario?

Su consentimiento digital en este formulario significa que:
Entiende la información que se le proporciona en este formulario
Ha podido hacerle preguntas al investigador y expresar cualquier inquietud.
El investigador ha respondido a sus preguntas e inquietudes.
Cree que comprende el estudio de investigación y los posibles beneficios y riesgos que conlleva.

Declaración de consentimiento

He leído detenidamente y / o me han explicado los términos utilizados en este formulario de consentimiento y su significado. Al seleccionar SÍ, acepto que tengo al menos 18 años de edad y acepto participar en este proyecto.

APPENDIX H

RECRUITMENT EMAIL TO PARENTS

Dear parent,

My name is Shane Muetzel. I am a doctoral student at California State University, Fullerton in the Educational Leadership Program under the advisement of Dr. Marc Ecker. I am also a former teacher and administrator in the East Whittier City School District and my children attended Laurel and East Whittier. I am requesting your participation in a doctoral research study entitled Individual Technology (iPads, tablets, smartphones) and School Readiness.

This research is important in beginning to identify the strengths or gaps in abilities/behaviors that the use of individual technology has on students in the early years of education.

The study involves completing a survey that consists of basic demographic questions and multiple-choice questions. The estimated time to take the survey is (5-10 minutes).

Your participation is entirely voluntary, and you may discontinue your participation at any time. The survey is confidential and will not report personally identifiable information such as your name, your child's name, address, e-mail address, phone number. Responses will be coded and will not be linked back to you except by the researcher. **Teachers will NOT receive the results of your surveys.**

If you would like to participate in the study, please read the Informed Consent Letter. To begin the study, click the link for the Informed Consent Letter.

Thank you for your time and participation
Sincerely,

Shane Muetzel
Doctoral Candidate
California State University, Fullerton

APPENDIX I

CORREO ELECTRÓNICO DE RECLUTAMIENTO PARA PADRES

Estimado padre,

Mi nombre es Shane Muetzel. Soy un estudiante de doctorado de la Universidad Estatal de California, Fullerton en el Programa de Liderazgo Educativo bajo el asesoramiento del Dr. Marc Ecker. También soy ex maestro y administrador en el Distrito Escolar de East Whittier City. Le solicito de su participación en un estudio de investigación doctoral llamado Tecnología Individual (iPads, tablets, celulares) y Preparación Para la Escuela.

Esta investigación es importante para comenzar a identificar las fortalezas o brechas en las habilidades / comportamientos que el uso de la tecnología individual tiene en los estudiantes durante los primeros años de educación.

El estudio implica completar una encuesta que consta de preguntas demográficas básicas y preguntas de opción múltiple. El tiempo estimado para realizar la encuesta es (5-10 minutos).

Su participación es completamente voluntaria y puede descontinuar su participación en cualquier momento. La encuesta es confidencial y no reportará información de identificación personal como su nombre, el nombre de su hijo, dirección, dirección de correo electrónico, número de teléfono. Las respuestas se codificarán y no se vincularán con usted excepto por el investigador. **Los profesores NO recibirán los resultados de la encuesta.**

Si desea formar parte del estudio, por favor lea la Carta de Consentimiento Informado. Para comenzar el estudio, haga clic en el link para la Carta de Consentimiento Informado:

Gracias por su tiempo y su participación
Sinceramente,

Shane Muetzel
Candidato a doctorado
Universidad Estatal de California, Fullerton

APPENDIX J

RECRUITMENT EMAIL TO TEACHERS

Dear teacher,

My name is Shane Muetzel. I am a doctoral student at California State University, Fullerton in the Educational Leadership Program under the advisement of Dr. Marc Ecker. I am also a former teacher and administrator in the East Whittier City School District and my children were students at Laurel and East Whittier. I am requesting your participation in a doctoral research study entitled Individual Technology (iPads, tablets, smartphones) and School Readiness.

This research is important in beginning to identify the gaps in abilities/behaviors that the use of individual technology has on students in the early years of education.

The study involves two components:

1. A **parent survey** regarding a child's home usage of individual technology.
2. A possible (if the parent opts in) **teacher survey** on the child's in-class performance.

I am asking for your participation in both portions:

1. Parent survey- I am asking you to please **distribute the survey link** via the attached pdf document (English/Spanish) to the parents in your classroom by posting the link and/or pdf flyer in your regular classroom communication on a **Monday and again Wednesday or Thursday** of the same week. For each of your parents that participate in the survey, you will be entered in an opportunity drawing for one of two **$50 dollar gift cards** to Amazon, Teachers Pay Teachers, or Target.
2. Teacher survey - If the parent opts in, you will be asked to complete a multiple-choice survey on specific individual students in your classroom (Less than 5 minutes). **For completing and returning your first teacher survey you will receive a $5 Starbucks gift card**. Additionally, for each of the teacher surveys that you complete, you will be entered into a separate opportunity drawing for one of two additional **$50 dollar gift cards** to Amazon, Teachers Pay Teachers, or Target.

Your participation is entirely voluntary, and you may discontinue your participation at any time. The survey is confidential and will not report personally identifiable information such as your name, address, e-mail address, phone number. Responses will be coded and will not be linked back to you except by the researcher. **Parents will NOT receive the results of your surveys.**

If you would like to participate in the study, please read the Informed Consent Letter. To consent to participation in the study, click the link for the Informed Consent Letter.

Thank you for your time and participation.

Sincerely,

Shane Muetzel
Doctoral Candidate
California State University, Fullerton

APPENDIX K

TEACHER REMINDER TO POST LINK TO DIGITAL CLASSROOM

Dear Teacher,

Thank you for helping with the survey. Your efforts are appreciated. I am moving toward my goal of ___ surveys returned but I am not quite there yet. I am asking you to please **distribute the survey link for the second time** via the attached pdf document (English/Spanish) to the parents in your classroom by posting the link and/or pdf flyer in your regular classroom communication.

As a reminder, for each of your parents that participate in the survey, you will be entered in an opportunity drawing for one of two **$50 dollar gift cards** to Amazon, Teachers Pay Teachers, or Target. If the parent opts in, you will be asked to complete a multiple-choice survey on specific individual students in your classroom (Less than 5 minutes). **For completing and returning your first teacher survey you will receive a $5 Starbucks gift card**. Additionally, for each of the teacher surveys that you complete, you will be entered into a separate opportunity drawing for one of two additional **$50 dollar gift cards** to Amazon, Teachers Pay Teachers, or Target.

Once again, your participation is entirely voluntary, and you may discontinue your participation at any time. The survey is confidential and will not report personally identifiable information such as your name, address, e-mail address, phone number. Responses will be coded and will not be linked back to you except by the researcher. **Parents will NOT receive the results of your surveys.**

If you would like to participate in the study, please read the Informed Consent Letter. To begin the study, click the link for the Informed Consent Letter.

Thank you for your time and participation.

Thank you again for your help.
Sincerely,
Shane Muetzel
Doctoral Candidate
California State University, Fullerton.

APPENDIX L

PERMISSION EMAIL (COMMON SENSE MEDIA)

3/21/2021 Mail - Muetzel, Shane - Outlook

Re: Permission to use portions of survey 2017, 2020 surveys

Michael

1 attachments (85 KB)

KnowledgePanel Representativeness_May 2016.pdf;

Good morning. You have our permission to use or adapt any of the questions from our surveys. Just be sure to cite us appropriately. You can see additional info about representativeness attached here.

On Sun, Dec 13, 2020 at 343 PM Muetzel, Shane

wrote: To Whom It May Concern,

My name is Shane Muetzel and I am a doctoral student through California State University, Fullerton. I am currently working on my dissertation. My topic is the impact of individual technology on students' kindergarten readiness. The study is a causal-comparative study that will compare parent perceptions of their child's individual device usage and kindergarten readiness through questionnaires given to both the parent and the child's kindergarten teacher. I am considering using portions of the survey from Zero to Eight: Children's Media Use in America, 2017 and 2020. I have read through the 2011, 2013, 2017, 2020 editions. The survey listed in the Toplines section of your report would work well in my study. Is it possible to have permission to use portions of the 2017 and 2020 survey in my research study? I also need to support my instruments with validity and reliability from testing. Do you have additional reports that you could send to me that support the survey?

I look forward to hearing back from you.

Shane Muetzel
Doctoral Candidate
Cal State Fullerton

APPENDIX M

PERMISSION EMAIL (PETER HART ASSOCIATES)

RE: Permission to use a survey for research

1 attachments (23 KB)

Kindergarten teacher pre-k survey questionnaire.docx;

I cannot speak to a survey in PA, that was not conducted by my firm. The only survey of K teachers we conducted in 2005 was in California. The questionnaire we administered is attached, you are welcome to draw from it as you compile your own survey.

Thanks,
Jay

From: Muetzel, Shane
Sent: Monday, December 14, 2020 5:31 PM
To: Jay
Subject: Re: Permission to use a survey for research

I came across this survey in a doctoral dissertation by Amy Larcinese published in 2016. It looks like the survey was given in Pennsylvania. The version of the survey in her dissertation has 20 questions. However, I'm not sure if these were adapted or if they are directly from your survey as I do not have a copy of the original. I hope this helps.

Thank you,
Shane

Hello, Shane. The email you sent below was forwarded to me, I helped conduct the survey you reference in your email. Could you please tell me how you came to be aware of that survey and what materials from it you have already seen?

Thank you,
Jay

From: Shane Muetzel
Subject: Permission to use a survey for research

Message Body:

To Whom It May Concern:

My name is Shane Muetzel and I am a doctoral student through California State University, Fullerton. I am currently working on my dissertation. My topic is the impact of individual technology on students' kindergarten readiness. The study is a causal-comparative study that will study the correlation between children's usage of individual technology and school readiness will compare parent perceptions of their child's individual device usage and kindergarten readiness through questionnaires given to both the parent and the child's kindergarten teacher. I am considering using portions of your 2005 Kindergarten Teacher Survey to measure the teacher's perceptions of pre-school effectiveness for the teacher portion of my research. This survey would work well in my study. Is it possible to have permission to use portions of the survey in my research study? I also need to support my instruments with validity and reliability from testing. Do you have additional reports that you could send to me that support the survey? I look forward to hearing back from you.

Shane Muetzel
Doctoral Candidate
Cal State Fullerton

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