"Unboxing" Toddlers and Technology: An Ethnographic Case Study

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"Unboxing" Toddlers and Technology: An Ethnographic Case Study

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Abstract

Through the observation of their four-year-old son's use of an iPad 2, the researcher and his wife attempted to better understand the perceptions, use, and motivations of young children both as parents and researchers, through an intrinsic, ethnographic case study. The study of this individual case may help parents and educators make informed decisions about technology use and the culture of young children who are digital, touch-screen natives. This case study should further help fill a void in the research base among younger children's use of touch-screen technology in a transparent and natural environment, the home. In general, the technology was seen as a tool of entertainment and was highly engaging to a fault. Content selection showed limitations due to content filters and marketing in addition to the limited control of written language and verbal articulation by the primary participant. Further questions for research include the following: What are the affects of intentional scaffolding, guided interaction, and direct instruction among toddlers and touch-screen technology? How does providing access to technology to children with demographic differences affect issues of social equality? How do Internet content filters influence content selection for populations with limited language command versus those with proficient language command?

Keywords: Digital Native, Touch-Screen Technology, Access, Child Development, Pre-School

Introduction

Not only has there been insufficient research in the area of preschool education regarding the influence of technology, but with the advent of touch-screen devices such as the popular iPad and iPhone devices from innovation technology giant Apple, Inc., a toddler's manipulation of and easy access to technology is a current and relevant topic for educators and parents of preschool aged children alike. According to Korbey (2013), with increasingly easy access to mobile technology, including many devices which offer mobile Internet access, there are varied parent and professional responses as to what level and duration of exposure to technology is appropriate for children at young ages, particularly those in pre-school. This advancement in technology has enabled many young children with access to devices such as iPads and Microsoft's Surface to experience an unprecedented level of information and entertainment without needing a keyboard or mouse. As one such example, Silcoff (2014) noted in the *New York Times* that a

growing trend on websites such as YouTube.com includes targeting toddlers with the appeal of opening presents on Christmas Day with what is commonly referred to as "unboxing" videos (p. 1). In fact, the most-viewed channel on YouTube.com exclusively produces such unboxing videos of Disney products and toys intentionally filmed from the point-of-view of the child, and Silcoff further noted that these videos clearly target toddlers in the two-to-five-year-old age range. As pioneers in research of pre-schooler interaction with Information and Communication Technology (ICT), McPake, Plowman, and Stephen (2013) similarly defined preschool as the two years of age between ages three and five. Consequently, this is the target age of this proposed case study, with the selected case being age four.

Apple, Inc., has dominated the touch-screen tablet industry since its release of the first generation iPad in April 2010 (Apple, 2010). With hundreds of millions of interactive tablets now in the market, the impact of technology on early childhood development is widely unknown and in need of further research. In multiple studies, even the dominating pioneers in this line of investigation failed to include tablets in their research, as the devices are relatively new, and as I have been unable to locate academic research on the topic, pre-schooler interaction with the devices is virtually unresearched. As more families gain access to this level of technology, determining what is reasonable and appropriate use for young children has lead to uncertainty with contradictory recommendations by leading childhood and educational associations (Korbey, 2013). Plowman and Stephen have repeatedly identified the need for further research in this area (2007; 2011; 2013), and the American Academy of Pediatrics plans on issuing updated guidelines for parents and educators later this year (Kamenetz 2016). Few studies have focused on the use of touch-screen technology, such as the popular iPad by the target case of this study, pre-school-aged toddlers, and few have focused their research in the United States (Huo and Lu, 2014; Neumann, 2014; Plowman and Stephen, 2007; Vorkapic et al., 2012).

Literature Review

In conducting this literature review, there are many topic editorials and opinions published in media such as health and technology publications; however, in the last decade there have only been approximately a dozen significant academic research studies conducted on the topic of toddlers and technology. Since 2003, a large share of this research was conducted by the research duo of Plowman and Stephen, hailing from the University of Stirling in the United Kingdom. Attempting an exhaustive yet scholarly search for this review, studies and research reports were limited to scholarly and peer reviewed journals, dissertations, and news articles. Key terms such as "toddler, pre-schooler, and young children" and "iPad, tablet, digital media, and touch-screen technology" were used to narrow the search. I later restricted inclusion of research articles involving participants older than age five and below age three in response to a gap in the literature regarding the pre-schooler age segment. Despite the growing expertise, I have identified three recurring gaps in the research with broad implications as follows:

- *Participants:* studies focused on K-12 school-aged children or perceptions of parents and teachers, not pre-school-aged toddlers (Kamenetz 2016; Tatalovic Vorkapic and Milavanovic 2012);

- *Technology:* studies focused on pre-schooler interaction with less-interactive technology, such as televisions, CD players, and desk-top computers, not touch-screen tablets (Plowman and Stephen, 2007; Plowman et al., 2011; McPake et al., 2013);
- *Contexts and Methods:* studies varied widely from early literacy development (Lee 2015; Neumann 2014), to policy initiatives aimed at providing access to low socio-economic families (Lee, 2015; Plowman, et al., 2011), to small-scale quantitative studies (Neumann 2014);

In response to these gaps, participants, technology type, and context, use of touch-screen technology by pre-school aged toddlers in the natural environment is the focus of this case study. While designing this study, Neumann (2014) was identified as the most recent and relevant research regarding the use of touch-screen tablets by pre-school children.

Through her work, Neumann (2014) identified that a majority of parents responded positively toward use of tablets by their children and believed that the tablets help to support early childhood literacy. Since then, researchers such as Lee (2015) have added to the body knowledge of pre-school-aged touch-screen use. As Berk (2012), Michael Cohen Group and the U. S. Department of Education (2011); Tahnk (2011) jointly described, tablets are viewed at an advantage to other ICTs because the "tactile nature of tablets allows toddlers in Piaget's sensorimotor stage with limited fine motor development to competently operate these devices directly with their fingers" (as cited in Neumann p. 110). This revelation is in stark contrast to the interaction between young children and traditional desktop computers with a mouse and keyboard. As Stake (1995) suggested for case study research, "we try not to disturb the ordinary activity of the case" (p. 12). Unfortunately, Neumann's and Lee's work was not completed in the natural environment, the home. Consequently, there is a need for further research in examining how access to and use of tablets in the home environment impacts early childhood development. As such, a focus on ordinary activity in a natural context, the home, is essential for furthering this body of research.

As knowledge regarding children's interaction with technology has increased, appropriate developmental supports such as Guided Interaction (Plowman and Stephen 2007); human interaction (Korbey, 2013); quality scaffolding techniques such as cognitive scaffolding, affective scaffolding, technical scaffolding (Neumann 2014); and continuity of education pre-K through grade 12 (Huo and Lu, 2014) have been identified. Additionally, intentionality of use has helped to inform the need for further research. Some studies focused on free play and exploration (Plowman and Stephen, 2007; Silcoff, 2014), while others were concerned with the impact of passive screen time (Korbey, 2013). Neumann (2014) suggested that it is not the quantity of time spent on tablets but rather the quality of child tablet interactions that supports early childhood literacy skills.

Even though it is beyond the scope of this case study, there are further calls for future research along these lines, the pursuit of which could span the length of a career. One example is further exploration of literacy development in children despite parent perceptions that tablets support early childhood literacy development (Neumann, 2014). Specifically, Neumann cited investigating a possible correlation between tablet access and letter sound and name writing skills. Goodwin further called for needing to provide recommendations for quality learning applications and evidence-based suggestions for how to best use tablets at home to support

learning (as cited in Neumann, 2014). McPeak et al (2013) suggested that parents record a 24-hour diary of a child's use of tablets and observes children in their homes using tablets, resulting in a more ecologically valid measure of the behaviors of children (as cited in Neumann 2014). Another key call for future research came from Plowman et al (2011), investigating the "assumption of causality: that access to technology leads to use, and that use leads to learning" (p. 367). Thus, further research is also needed regarding correlations between access to technology and developmental competencies of children. As such, this case study seeks to intimately observe the use of an iPad 2 by a 4-year-old in an unobstructed, natural environment, the home.

Theoretical Framework

Many definitions exist which describe the multiple meanings behind the use of ethnography (Crotty, 1998; Hammersley, 1990; Merriam, 2009; Ybema et al., 2010). Lauer (2006) describes ethnography as "a data-collection method in which information is collected about a group of individuals in their natural setting, primarily through observations" (p. 114). While observing toddler technology use in the natural setting while minimizing disruptions to ordinary activity was an important factor in the choice of this research design, gaining access to participants in this context could prove challenging for some researchers. After all, the mere introduction of the research observer could disrupt the natural setting and ordinary activity of the participants. As such, a case study was chosen for this research topic for the aforementioned reasons, and in part, because prior observations by this researcher had indicated that touch-screen technology was generally accessed by a single individual.

The overlap of case study research and ethnography presents another variety of the theoretical framework, ethnographic case study research. Commonalities among the multiple definitions of this theoretical perspective include the following: participant observation, the study of a culture or group, observation in the natural setting, observation over an extended period of time, and rich, thick descriptions of the observed phenomenon (Creswell 2013; Crotty 1998; Hammersley, 1990; Lauer, 2006; Merriam, 2009; Ybema etal., 2010). It also encompasses meaning making through a subjective, constructivist, and self-aware approach (Ybema, Yanow, Wels and Kamsteeg). Moreover, Merriam (2009) emphasizes the importance on the study of culture when attempting to understand how the group sees the world. Merriam maintains that the use of ethnography in case study is a focus on the behaviors of a culture, in this case, technology-using toddlers. The focus of using this single case to study the wider culture of pre-school tablet-users helps define this behavioral, ethnographic focus. According to (Van Maanen, 1982):

> The result of ethnographic inquiry is cultural description. It is, however, a description of the sort that can emerge only from a lengthy period of intimate study and residence in a given social setting. It calls for the language spoken in that setting, first-hand participation in some of the activities that take place there, and most critically, a deep reliance on intensive work with a few informants drawn from that setting. (As cited in Merriam, 2009, p. 28)

As such, I seek to use ethnography as a theoretical framework to observe and understand the participant and the observations of the parent and the researcher/observer regarding the following:

- The perceived purpose of the technology,
- The various ways the technology is used and manipulated, and
- The perceived motivation to select online content using the technology.

These results are detailed in the case study narrative.

In identifying ethnography at the theoretical framework for my intrinsic case study, Creswell (2013) suggested that ethnography is an appropriate research design if the research literature is deficient. With the introduction of touch-screen technology to the mainstream population and its accessibility to young children in recent years, ethnography is an appropriate research design. As stated above, this study is intrinsic in nature both due to my interest as a researcher and as a parent of a toddler with access to touch-screen technology. Pole (2007) described multiple ethnographic studies in which adults attempted to covertly observe children in their natural settings. These deceptive examples perhaps help present a more natural perspective, but at what cost? The inclusion of my four-year-old son in this intrinsic case study affords me not only access to the case but also a transparent and honest research opportunity without resorting to deceptive means. As Pole writes, "the position of the child as an active research participant rather than as a passive research object" is strengthened (p. 70). My son's active participation in the study of this relatively new phenomenon is relevant and appropriate to increase understanding. Ethnographic case study serves well to better understand the culture of technology-using toddlers in the 21st century. As such, I hope to leverage the use of this framework to help parents and other researchers increase their understanding of toddlers' knowledge of the technology, how it is used, and why it is so intriguing to young minds.

The purpose of this qualitative case study is to explore the perceptions and motivations of a four-year-old child's use of an iPad 2 and the Internet in the home environment. The primary research question is: How does access to technology impact a four-year-old? Additional sub-questions follow:

- How does a four-year-old with experience with an iPad 2 perceive the purpose of the technology?
- How and to what extent does a four-year-old use an iPad 2 with Internet connectivity?
- What motivates a four-year-old to select available content on an iPad 2?

Methodology
Participants

The participants were selected from a convenience sample (Merriam, 2009). Further, I have an intrinsic interest (Stake, 1995) in this research, as the main participant identified in this case study is my son Thomas (a pseudonym), a four-year-old, Caucasian male. He was selected because of his age, his routine and ordinary use of an iPad 2, and my researcher access to both him and his mother, Miranda (a pseudonym). This access also allowed me to regularly conduct observations of his technology use in the natural environment: the home. Being observed by someone familiar to the participant limited the natural disruptions inherent in observations, as well as the covert and deceptive means employed through other research methods. Although it

is not typical for researchers to include family members in the research process, it is not uncommon, as Jean Piaget made a significant contribution to the literature on curriculum and instruction through his study of his own children (Merriam, 1998). As such, access was gained through a formal informed consent process involving daily parental consent, and verbal participant assent in person. During this formal process, pseudonyms were selected to maximize confidentiality; however, during the data collection process, we agreed as a family unit that since it is not uncommon to research one's family, we would prefer the transparency of our relationship to be known as opposed to the awkwardness and perhaps inevitable disclosure of the participants' relationship to the researcher. Although we chose to disclose that I am studying my son's use of technology, we also elected to continue using pseudonyms.

As a researcher and parent of the participant, I purposefully included my wife in the research process to provide objective consent for Thomas' participation and to increase validity to the research process. Unexpectedly, my older son, Henry, was drawn into the research process during our observations of Thomas. Consequently, parent consent and participant assent was also obtained through a similar informed consent process. Henry was able to provide written assent. All participants were informed of the study by meeting face-to-face and clarifying the purpose and procedures and answering any questions prior to signing the consent forms or engaging in the research.

Data Collection

The primary data collection included three components: daily observations of the Thomas' interaction with the technology, accompanying field notes, and a reflective researcher's journal in a process of reflexivity (Merriam, 2009). Miranda also kept a reflective journal, noting observations of Thomas' use of the technology. The field notes were documented in narrative form daily after each observation (Merriam, 1998). Observations were conducted at our family home, in a location that was comfortable and convenient for Thomas. This most often occurred at the kitchen counter, living room, and home office. These locations are all on the main floor of our home and are generally where we spend most of our waking hours at home as a family. These informal observations were unstructured in nature, with general open-ended questions, accompanied by some deeper-probing unstructured follow up questions (Merriam, 2009). A daily observation protocol with sample questions was used to guide this process. Our plan for the duration of each daily observation was between 10-15 minutes; however, both Miranda and I frequently found that because the device and content was so engaging, 20-25 minutes could pass without anyone in the family noticing. The purpose of the observation and questions was to elicit perceptions and motivations regarding Thomas' use of the tablet. Miranda, Thomas, and Henry provided demographic information including age, educational level, gender, race and ethnicity. Miranda presents herself as thirty-six-year-old Caucasian female with a master's degree. She is highly interested in literacy and United States history, teaching both to eighth graders at a nearby public school in the Midwest. Thomas, cited no educational experience, although he, too, shows a growing interest in books and reading. He begs to be read to at bedtime, and both he and his brother frequently sleep with flashlights, staying up late at night to look at the pictures and text in their favorite books. Henry is a nine-year-old Caucasian male, who is in the fourth grade and

aspires to be a comic strip writer and artist. While Thomas is more physical out of necessity with an older brother, Henry prefers the indoors and the arts, particularly the piano.

Through the data collection process, Miranda recorded her own observations and reflections daily regarding Thomas' use of the technology. The reflective journal helped provide additional insights and facilitated triangulation of the collected data. Miranda was only given the direction to record her observations and based on how she perceived Thomas' perceptions, use and motivations regarding the iPad.

In my researcher role, daily observations were as a participant observer with open interaction with my family of participants (Creswell, 2013), with a cognitive focus on maintaining the ordinary activity of the case within its natural environment. Data collection occurred as follows:

(1) *Daily Participant Observations:* Miranda and I completed 10-15 minute informal observations, at a time and place of Thomas' choosing. These daily observations lasted two weeks, with three days that were avoided due to Thomas' refusal to be observed for the purpose of the case study.

(2) *Daily Field Notes:* I completed a daily narrative write-up after each Daily Participant Observation, documenting the observation in more depth.

(3) *Reflective Journal:* Miranda and I recorded six total personal reflections on the research process, throughout the two-week sequence of Daily Participant Observations.

Data Analysis

A triangulation of data (Creswell, 2013) was performed to identify trends and common themes between Thomas' perceptions, use, and motivations and Miranda's and my observations of him using the technology. Through this process, Miranda and I reviewed our observational field notes and reflective journals together, identifying emerging trends in our observations. Our joint review offered a deeper interpretation of the data and reassurance of the validity of our findings. After initially identifying a wide variety of commonalities, we decided to color code the data into three categories relating back to the research sub-questions: perceived purpose of the iPad, extent of use, and motivation for use. Uniqueness and particularities of the case were also noted as an optional fourth category, as we both noted interesting observations and reflections worth mentioning.

Data Interpretation

Thomas generally was the first to wake up in the Thompson household--this was sometimes as early as four o'clock a.m. but rarely as late as six in the morning. For about a year and a half prior to now, he has had free access to the iPad during these morning hours, mostly unsupervised. His parents' attempts to curb this growing addiction were often met with the trickery of sleep deprivation and conversing with our son in a dream state. Many mornings have transpired with the following: mom and dad are in a deep slumber, anticipating the bliss of remaining asleep for perhaps another hour on the heels of only four or five hours of sleep total. Thomas awakes and remains in his bedroom, dresses, and explores his books and toys. Inevitably, he makes his way to the master bedroom across the hallway from his room and inquires to his parents, "Can I play iPad?" The typical sleep-laden response is "No, go back to bed"; however,

time has taught him that repeated questioning often produces a positive result. "Okay" was often followed by "let me put the code in for you." I am not sure why our iPad even has a code. The idea of observing my son's interactions with the iPad was immediately appealing to both Miranda and me, as we, like many other parents used the iPad like a pacifier, keeping our son's morning cries at bay while we grasped at more moments of sleep before getting ready for the day relatively uninterrupted, thanks to the electronic Nuki: the iPad. Thank you, Apple.

Over the course of two weeks in late fall we had the opportunity to observe Thomas' use and interactions with the iPad as though we were seeing it for the first time. After a year or more of access to and interaction with the iPad, Thomas' proficiency on the tablet was impressive for someone who cannot tie his shoelaces and still begs his parents to feed him during mealtimes. Most of his learning to use the device has been by observation and experimentation. He has since memorized the four-digit pass code and can demonstrate number association, verbalizing the code while precisely tapping the numbers on the touch-screen. Similarly, he has transferred this understanding of pass code use to other digital technologies, recently stating, "Dad, the password for the microwave is two-three-o!" (the amount of time needed to nuke popcorn). Unlike his father, navigation was not achieved through the opening of an application and typing text or speaking to Siri, Apple's speech-to-text wizard. Thomas can follow multi-step applications to open programs such as Safari to access websites such as YouTube.com. He achieved this through scaffolds provided by his mother: on the home screen of the tablet is a file icon with Thomas' name under it. He appeared to recognize the first letter of his name, and thus, he associated ownership, referencing the file as his by saying "look--T," "me" or "mine."

Using some guided interaction, Thomas was able to request help from others when he got stuck on the device or when he wanted to perform a task to which he does not know the correct protocol. Instead, by calling on one of his parents or his brother, he can gain assistance to further his access. One day Miranda and I were astonished to find Thomas "feeding" a Furby, a furry electronic and intuitive toy that can be trained, and to young eyes, appears to be a living member of the family. Miranda and I were somewhat relieved to learn that Henry had assisted in the feeding by opening the Furby application, particularly because the Furby belongs to Henry, not Thomas. This use of the interactive application and Furby could have been disastrous otherwise.

Thomas' manipulation of the device includes "clicking" on pictures, icons, or numbers (sometimes in sequence) by tapping the screen in the location of the images, minimizing and closing programs by closing four or more fingers together along the screen, scrolling up or down on a webpage by tapping and dragging his finger, swiping in a similar right-to-left fashion. He also has mastered other control features such as volume, the on/off button, and the Home button. Thomas was also observed using other fine motor features such as "drawing" and "coloring" in an art application.

Thomas also saw the iPad as a toy for play. The iPad was used to feed Henry's toy Furby, but it provided ample access to online games such as the SnoopyCoaster, Angry Birds, Temple Run, Furby Boom!, and Shapes. Applications such as Storia, an interactive, video-embedded reading experience were also used, but with much less frequency. Thomas was not able to read or spell independently, and most of his interaction with that application was spent viewing the pictures and tapping on the short videos embedded amongst the text. Similarly, he showed less

interest in shapes, numbers, letters, and colors--content typically targeted toward his age group. Applications that weighed too extensively on Thomas' independent use of the device were passed by for applications such as YouTube, which for young users, was easily navigated by tapping on and selecting content through associated "thumbs," or small images, of the videos. Once a video was selected, YouTube's search algorithms recommended additional content based on previous selections. If a content consumer such as Thomas viewed a Sponge Bob cartoon, recommendations may have included additional Sponge Bob cartoons, videos including "Sponge Bob Squarepants" in its title, such as the theme song to the Sponge Bob cartoon or parodies of the theme song, and other Nickelodeon-produced content.

At the end of our two-week observation, we came to a distinct conclusion regarding Thomas' perceived purpose of the iPad: it was used exclusively for passive entertainment and play. In many ways, Miranda and Thomas used the iPad as a replacement for television. As we do not have cable television, any cartoons or videos are viewed either via Digital Video Disc (DVD) or through the Internet on our home computer or the iPad. This may have been due to the content recommended by Miranda in Thomas' file, however, including the link to YouTube.com. This revelation introduced us to the world of "unboxing" videos with favorites such as Disney Collector and Surprise Egg. Are you the kind of shopper who opens a packaged toy at the store to see how the product compares to the images on the packaging? Have you ever wanted to know how a toy works prior to buying it for your child? Well, then "unboxing" videos are for you! This relatively new phenomenon consumed the overwhelming majority of Thomas' iPad use. Most of these video producers describe the featured toy or product while "unboxing" it for the first time. What is the packaging like? What do the scented markers or colorful play dough varieties smell like? What is the mystery toy hidden within the popular Disney eggs? The thrill of unwrapping these imagined presents is a bit of a vicarious experience, and Thomas frequently would express his interest by saying, "Dad, can we get that?" Although Thomas could easily identify advertisements and was quick to repeatedly tap on "Skip Ad" as soon as the image flashed upon the screen, he appeared to be completely unaware of the consumer marketing that was occurring through these "unboxing" videos and targeted content recommendations. Independent content navigation occurred exclusively through this network of thumbs and algorithm-recommended content. Observing Thomas' unrestricted navigation prompted Miranda to reflect on the following in her notes: "I admit that I usually use [the iPad] much like parents who used the T.V. like a babysitter. I feel guilty for not monitoring devices better because sometimes Thomas gets on YouTube videos that have favorite cartoon characters with bad words."

Ironically, during one observation, the Internet proved so engaging that Miranda was unable to draw herself away to redirect Thomas' and Henry's use. The family was gathered in our home office, a comfortable room with wide French doors, a gas fireplace, and an over-stuffed brown, leather chair and ottoman which easily accommodated mother and brothers while mom was engaged in her iPhone and the boys in the iPad. Between bouncing a ball off the wall and the desk centered in the middle of the room, Henry assisted with Thomas' content selection, and the sound came from the device, "Round 1: Fight!"

Miranda: "What was that?"

Twenty seconds pass, "Round 2: Fight!"

Miranda: "What was that, boys?"

Henry responds without looking up, "I don't know."

A minute and a half passes and rounds 3, 4, and 5 are announced with equal vigor.

Miranda doesn't look up from her iPhone.

Miranda: "Okay, no more of that!" and she leans over to get a better look. "That's a bad one, too. Get off!"

Ten seconds pass, "Rated for everyone 10 and up."

Miranda: "Ten and up!?!"

Thomas and Henry continue to select similar content at the conclusion of the video.

"Round 1: Fight!"

"Can you turn that down, please?" Miranda states as she turns back to her device, not looking up. This interaction lasted for the duration of the 15-minute observation, and the boys never did change their line of content selection, and Miranda was no more motivated to leave her online content than she was to follow through with content enforcement with the boys. The engagement of the Internet was defeating.

One of the observed motivating factors regarding Thomas' use of the iPad involved power and control. This stemmed primarily by the number of iPads available: just one, which was typically shared between the four family members. The individual using the iPad had control over some personal content selection but also could choose music for the entire family to hear. This was further divided into shared control and independent versus assisted use of the device. Thomas clearly would become frustrated if he was unable to figure out how to navigate to certain content or to win a game. Shared control came into play when another's help was solicited and the device had to be physically handled by another. Thomas would prefer to hold the device or have one point to the correct icon or text to select, without actually touching the screen. Those who interacted with the device had the control. Independent use appeared to be valued as a measure of success and self-worth by both boys. Thomas' frequent need of assisted use, primarily due to lack of language command, was frustrating to him and encroached on his independence.

Another factor involving control with the iPad was in relation to engaging marketing ploys, such as the point of view experience of "unboxing" videos and the products that were featured. Other elements of control involved the hidden "big data" which is collected on content selection trends, purchasing habits, and frequented sites. The Internet search engine advertised local businesses and products related to our search habits. When a four-year-old is dependent on navigating solely on the choices provided, either by mom or by Google or YouTube, who is really in control? Although Thomas was observed to perceive having control, his limited and restricting content selections were evidence of not having the control of full access to information and content on the Internet. Developing command of language was restricting and at times detrimental.

Findings

Without intentional parental support and content selection, access to touch-screen technology by a four-year-old was used purely for entertainment purposes. Although the opportunity for more educational purposes existed, the iPad was routinely used as a pacifier similarly to television. The device could be used independently, with some limitations.

Independent use was scaffolded with supports such as setting up a separate folder with parent-selected links to websites and applications. Use of the device was learned through observation and experimentation. Basic actions for use, such as scrolling, tapping, and swiping were easily mastered. Motivation was hard to gauge, due to the difficulty of being unable to fully articulate desires and rationale for use. Frequent explanations included, "Because I like it," and "I just want to." Through observed use, content selection was based on identifying picture icons or "thumbs" of video content which were familiar or appealing. Competing interests for time and control of the one device between the case, his brother, and his mother were also motivating factors.

Future Recommendations

Questions others and myself may have include the following: What are the affects of intentional scaffolding, guided interaction, and direct instruction among toddlers and touch-screen technology? How does providing access to technology to children with demographic differences affect issues of social equality? How do Internet content filters influence content selection for populations with limited language command versus those with proficient language command?

Technology use by toddlers continues to be an emerging research area as more robust and engaging devices are introduced to the mainstream market. Increased access is inevitable as the price of this technology decreases and is thus more available to a wider demographic segment. As parents, we recently purchased the desired Nintendo 3DS for our nine-year old in addition to recently winning an iPad Mini for participating in a quality of life survey. Needless to say, our sons' access to touch-screen technology will triple in the coming weeks which has prompted mom and dad to delete the YouTube application from our device and seriously begin conversations on reasonable limits to screen time.

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