DIGITODS, STATISTICAL MACHINE LEARNING ALGORITHMS, AND INTERNET COGNITION: SOCIOCULTURAL LEARNING THROUGH FAMILIAL MODELING AND MEDIATED EXCHANGES

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ABSTRACT
Digitods, Statistical Machine Learning Algorithms, and Internet Cognition:
Sociocultural Learning through Familial Modeling and Mediated Exchanges

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With ever-advancing technology and the ubiquity of smart devices, younger generations of children are growing up with access to smart mobile technology from birth. These digitally acculturated children ages 0-5, or digitods, are learning to make sense of the world in large part through sociocultural exchanges in the home. As these digital natives are habituated to mobile media, prevalent and accessible, they are also opened to data-mining and target-marketing as their online engagement signals algorithmic function. This study adds to our understanding of how digitods may be susceptible to algorithmic culture and strategic digital marketing, as familial modeling and mediated exchanges position them to be active media users. Looking through the lens of Vygotsky's Sociocultural Theory, that identifies children's cognitive development as a product of social interactions and collaborative dialogues, this study takes an inductive and reflexive qualitative approach, utilizing a series of in-depth interviews of parents, to examine dynamics in the home.

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DEDICATION

This thesis is dedicated to my family: my sweet, loving parents, Michael E. Foley and Sally Ann M. Foley; my siblings, Daisy K. Kim, Derek K. Foley, Wayland K. Foley, and Gavin P. Foley; and my son, Jordan A. Cordes. Without your unconditional love, support, and encouragement along the way, I might not have sought to finish what I started many years ago. Thank you for sharing in this special achievement and celebration with me.

PREFACE

As a mother, I have always been interested in media applications or topics that involve children. During my first graduate program in Communication Studies at UNLV in 2004 (before the big wave of smart media adoption), I chose to focus my thesis on television advertising aimed at children and notions of gender stereotypes as suggested by commercial content. I also examined to what extent production elements like camera work, transition type, edit pacing, etc., may have reinforced those notions. (In fact, during the times of analog, I can still recall having to capture toy and cereal commercials by programming my VHS system.) After returning to school many years later, post-pandemic, I found media topics surrounding children still interested me. Consistent with the times, however, my interests have shifted from a legacy and analog scope to that of new media and digital culture. While my son was born just outside the cultural bounds of digital natives (1999), issues concerning children and smart media use are especially interesting to me and are ever more prominent in society.

I was fascinated to learn during one of my core Media Studies classes not long ago that babies and toddlers were targeted as consumers. I could not fathom that. And the more I researched the topic, the more I was intrigued to understand how corporations were using algorithms to entice digitods. More importantly, considerations of children's digital and overall wellbeing struck a personal chord with me. I knew I wanted to center my thesis on this very topic. It is my hope that this field of research continues to expand, shedding more light on the phenomena that impact our young users.

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CHAPTER 1: INTRODUCTION

To streamline functionality, social media platforms must develop and maintain powerful artificial intelligence (AI) tools, like statistical machine learning algorithms, which are designed for specific tasks. These algorithms classify and organize content: they moderate and recommend material for feeds, scan for harmful themes, and selectively push and suppress posts based on notions of internal politics, commercial advertising considerations and other means of profitability, like expanding user-bases (Hallinan & Striphas, 2016; Cheney-Lippold, 2011). They are vital to the overall function of social media (Milan, 2015). What happens, however, when these algorithms begin to create or promote harmful conditions for their users—in both psychological and physical terms? They can create a downpour of negative effects on media users that snowball into varied aspects of social phenomena, like infant target-marketing, cyber harassment, low self-esteem, and a myriad of others.

These algorithms are kept opaque or hidden from the public—the true programming of which is not divulged because of corporate proprietary protection (Hallinan & Striphas, 2016). The user-base and public at large, however, are not privileged to understand how exactly that AI categorizes, filters, and pushes content. Additionally, a concern tandem to this corporate secrecy, is the inscrutability of these algorithms that enables social media platforms to escape public responsibility and accountability (Burrell, 2016; Dourish, 2016). “Algorithms are presented as fast, rather than slow; as automated, rather than hands-on; as machinic, rather than human. Each of these presents a series of problems when algorithms move into new domains” (Dourish, 2016, p. 6). This closed-sourced programming, then, prevents outside entities from objectively analyzing AI function and evaluating its base—and potentially harmful—impact on society.

Thus, big tech's unchecked agenda of profitability cloaks the ways in which individuals may be prompted and manipulated to engage in online activities. This is especially distressing as it applies to our youngest users—or "digitods"—digitally acculturated children ages 0-5 (Gold, 2015). On a larger scope, then, as Striphas (2015) says poignantly, "What is at stake in algorithmic culture is the gradual abandonment of culture's publicness and thus the emergence of a new breed of elite culture purporting to be its opposite" (p. 397). This has led to an overarching base of physical, cognitive, ethical, and legal concerns.

Algorithm culture manifests itself in the following negative ways:

- It targets digitods as consumers;
- in data-mining and privacy issues;
- as cyber bullying and harassment;
- in polarized recommendations and discourse;
- in digital inequality through inaccurate classification, favoring elite or celebrity content (however harmful);
- and a host of psychologically based dysfunctions—like depression and anxiety, eating disorders, a diminished sense of self-worth through social comparison, and even suicide (Wells, Horowitz & Seetharaman, 2021; Burroughs, 2017; Estes, 2017; Burrell, 2016; Hallinan & Striphas, 2016; Cheney-Lippold, 2011).

For example, approximately 1/10 of British and American adolescent users of Instagram have traced the onset of suicidal thoughts to the platform (Wells, Horwitz, & Seetharaman, 2021).

Hence, algorithmic culture and online social mediated engagement can indeed have severe real-world consequences. And since these smart apps and algorithms are frequently updated (Leaver, 2016), "never finished products … in a state of continual change," the potential for deepening degrees of perpetual impact, perhaps for generations to come, is thus ever present (p. 221).

Background

Ubiquity and Prevalence of Digital Media

Digital processes hold increasing meaning in our lives as they play an integral part in shaping our daily experiences, and this holds true for children as well. As mobile smart technologies become more ubiquitous in our western culture (cell phones, tablets, and laptops), especially in the home setting, youth are picking up digital cues from family members, as well as by accidental discovery and other automated processes, that habitualize them to mobile media (Burroughs, 2017). These mobile media, then, function as powerful stimuli commanding the sensory attention of little ones even from birth (Burroughs, 2017; Òlaffson, Livingstone & Haddon, 2014). Additionally, beyond digital acculturation, young children are gaining increased access to mobile media—access that begins as early as infancy—that compounds this dynamic. For example, one staggering statistic from 2016 reveals the prevalence of young viewership in a singular application, noting the "Kids and Family" genre from YouTube comprised half of its most-watched channels, with a combined total viewing of over 2.4 billion hits in one month alone (Marshall, 2016). In combination, the ubiquity, function, and accessibility of these digital cues in young children's social spheres primes and hooks them to become early consumers and heavy adopters of smart tech.

Legacy Media, Television Advertising, and Regulation

While culturally significant, these notions are certainly not foreign. Young children have been positioned as adopters and consumers of media for decades now (Coulter, 2008; Kunkel, 2010). This gives rise to discussions on susceptibility to mass media messages, stemming from the days of legacy media popularity—especially television—whose marketing reach was boosted by its strong visual component (Kunkel, 1988). Even 50 years ago, earlier research, examining how children were being opened to the persuasiveness of TV advertising, first began to punctuate the academic sphere (Kunkel, 2010). And although a sharp technological contrast to the smart tech and media of today, ramifications of legacy media marketing also posed the morality argument—children needed to be protected to some degree—even then.

Overviewing the base trajectory of these aggressive legacy media tactics, then, sheds light on the multi-generational scope of the phenomena. In the early 1970s, a public special interest organization, Action for Children's Television (ACT), began garnering support to press the government to exercise more regulatory control over TV advertising aimed at children, citing they were especially gullible, undiscerning, and susceptible to marketing messages (Montgomery, 1990). A triumph for those who felt TV advertising to children was immoral, the FCC, in 1974, began to regulate ad time to 12 minutes per hour on weekdays and 9.5 minutes on weekends, as well as to mandate separations between TV programming and advertising (Schor, 2005). This was to counter children's inability to identify and comprehend the intent to sell (Coulter, 2008). Later FCC reports would also ground the notion that "children's advertising was inherently unfair and deceptive" (Coulter, 2008, p. 150).

Under the subsequent Reagan Administration, the FCC deregulated its policies, canceling time limitations on TV advertising during children's programming, increasing ad exposure—in

favor of yielding to the marketplace to set commercial levels (Kunkel, 2001). Whereas the society of the 1970s by in large once thought children needed to be shielded from the campaigns of consumerism, the growing political climate of the 1980s positioned children as competent, savvy customers, partaking in the global cycle of commerce (Coulter, 2008; Kunkle, 2010).

Now, in a twenty-first century context, especially in the early 2000s, adolescents, young children, toddlers—even babies—were beginning to be commodified, fractioned out into lucrative niche markets by big corporations in more ways than ever (Coulter, 2008). And with ever advancing waves of smart technology and media available, notions of consumer awareness and media literacy have become even more significant as considerations of children's wellbeing becomes more prominent.

New Media Literacy

What does it mean to be media literate in the culture and climate of new media? Weimann et al. (2014) define this from a practical standpoint as "a set of cultural competencies and social skills, such as play, performance, simulation, appropriation, judgment, and multitasking, all of which are needed for full participation in a new media culture" (p. 806). Because this is a skill set, then, it is reasonable that over time and through experimentation, adults and children can become increasingly comfortable using mobile technologies and other smart- or social media applications, developing a deeper sense of competency. By comparison, however, young children do not yet have that cognitive awareness, development, or matured sensibility to interpret the presentation or impact of mediated cues. In a commercial application, they are unaware (as their parents may well be, too) that big tech businesses may be actively *targeting* infants, toddlers, and preschoolers as specific demographics of consumers (Burroughs,

2017; Nansen, 2015). Serious implications follow, regarding children's overall Internet cognition, their right to privacy, cyber-safety, and overall awareness.

Smart Features and Algorithmic Culture

One chief means of channeling advertisements to these digitods, for example, is through the "recommendation features" pushed by apps' algorithms (Burroughs, 2017; Holloway, Green, & Stevenson, 2015). Children are thus inclined, by virtue of pop-ups and dynamic touch-screen interfacing, to engage online to a deeper degree. While they are an integral part of app usage, understanding the nature of how these features function proves a difficult charge, since that information has traditionally been black boxed, or kept under proprietary corporate protection.

Once a realm for computer scientists and other highly skilled professionals, social scientists are now delving into notions of algorithm function/culture and the larger affect it may have on society and especially on digital natives that have had access to smart tech since birth (Prensky, 2001). While this study excludes discussion on the technical architecture and infrastructure of computer algorithms, it does focus particularly on the nature of one type of algorithm—the statistical machine learning (SML) algorithm. These smart programs construct data-driven identities for consumers that are not based on objective, observable facts. Rather, they assign digital meaning founded on incremental collections of data about usage preferences and patterns that help organize and classify users—to whatever degree of accuracy (Burrell, 2016; Hallinan & Striphas, 2016; Òlaffson, Livingston & Haddon, 2014; Cheney-Lippold, 2011). This means SML can be mining and leveraging data even from babies and toddlers as they engage online—data used to amass profiles of very young users based on ideas of gender, age, personalities, preferences, and more. Moreover, as these algorithms execute automatic features

that prompt digitods to continue to play, they also prime children for prolonged interactivity with smart devices that further enable the capture of more data. This media usage is cyclical—the data then informing and fueling more polarized types of content engagement (Burroughs, 2017; Hallinan & Striphas, 2016).

Digital Natives

Enter, the "digital native." There are now generations of tech users that have grown up solely in the age of digital information, who consume digital stimuli quickly and comfortably and who navigate their digital spheres quite intuitively. As such, *Gen Z'ers* (those born in the mid-to-late 90s) and *Alphas* (those born in the early-to-mid 2010s) are wired to think differently and process digital environments in ways uniquely distinct from those of older generations. A term first coined by Marc Prensky (2001), digital natives are accustomed to the forms of simultaneous multi-format media consumption, the immediacy of online responses, networking, and systems of frequent rewards, among other things. And because of this contemporary type of mediated sociocultural learning, their brains have been formed differently as their cognitive processes have developed. Subsequent generations of youth are introduced to ever-evolving digital technologies, and they often have increasing access to the Internet and other smart mobile devices via guardians situated both in and out of the home.

Thematic Statement

This thesis offers a qualitative reflexive thematic exploration and analysis of how digitods may be engaging with smart tech as a function of familial modeling and family mediated exchanges. Of particular interest here, is the valuation of the kinds of social interaction

that is happening in the home that may help prime infants and toddlers to become active smart media users and even digital consumers as their proficiency and awareness expands.

Through several personal, in-depth interviews with parents, this study aims to tap into their observations and impressions on how it is that these very young children may be learning the digital function of smart devices and developing their own sense of Internet cognition. In this way, the research seeks to identify how the undercurrent of algorithm culture may impact the curation of digital content feeds for these young ones.

This study acknowledges the limited collective understanding we have on how algorithm culture operates in targeting very young children. Thus, the aim is to build on work by Burrell (2016), Hallinan (2016), Striphas (2015), and Cheney-Lippold (2011), who ground the general discussion on algorithm culture and function but do not consider the demographic of digitods as a discrete user group.

Theoretical Framework

Vygotsky vs. Piaget – The importance of Cultural and Social Interaction

This study anchors notions of children's Internet cognition and development within the framework of Lev Vygotsky's (1978) Sociocultural Theory (SCT), wherein the theory is also used in grounding other studies in educational research (Anh & Marginson, 2012). The fundamental principles of SCT help to explain how it is children develop consciousness and begin to engage in complexive and conceptual thinking (Vygotsky, 1978). With roots established almost a century ago, SCT examines the base nature of how children learn, contrasting the noted research of Jean Piaget. Whereas Piaget's (1926) seminal work on cognitive development advances that children learn in distinctly different stages because of their own biology and

experiences with their immediate physical environments, Vygotsky (1978), whose work was translated from Russian, purports that children learn primarily through social interactions and tool mediation. In a Vygotskian sense, then, humans are active meaning-makers; and children are also "co-constructors" of meaning through these communicative and cultural exchanges with others (Mahn, 1999). "Human culture and nature [mental processes] were inextricably intertwined" in cognitive development, according to SCT (Mahn, 1999, p. 342). Piaget meanwhile believed young children develop a kind of sensorimotor intelligence as they explore the world and then come to expand cognition through thought processes about their physical surroundings (Erneling, 2014). Piagetian tenets also assert that learning is ultimately regimented and unimpacted by sociocultural influence or the expanded sociocultural context (Wartella, et al., 2014). Conversely, for Vygotsky, qualitative exchanges with others help to shape children's understanding of the world around them, namely using cultural tools (Vygotsky, 1978).

In this study, principles of SCT are updated and applied to new media use in a digital age—particularly, to mobile smart media use by digitods. Modernizing this application to twenty-first century digital culture, then, contemporary scholarship reassigns earlier notions of Vygotskian cultural tools—both "physical" and "cultural." Tool mediation in a contemporary sense, then, can be equated with interactive technology/appliances and mass media, respectively (Wartella, et al., 2016). New considerations emerge for the cognitive aspect of sociocultural applications in the digital age, especially as it applies to digitods making meaning.

Ruling Out the Uses and Gratification Theory

And why not apply a Uses and Gratification Theory (UGT) here? At first pass, this seems like it might be a practical fit for this study. However, the answer is more a pragmatic one:

Within this framework, as researchers Baran and Davis (2021) discuss, media users are fundamentally situated as active audience members that have a keen awareness of the motivations that underscore their media selections. Drawing from common knowledge, young children are often impulsive and reactionary, tending to do things without much forethought or reasoning. In this sense, although they may be participatory in smart media use to some extent, they are certainly not keen or savvy at this stage. Since digitods do not yet have a developed sense of media literacy, or a functional understanding of the range of available media options, (nor do they have the full agency to exact their choices), they cannot participate fully in determining what they want to do with media. They most likely would not have a nuanced sense of how a media choice "satisfies" them other to identify with the base idea of liking or not liking an activity.

While the body of UGT work has enjoyed a revival of sorts, with new applications to Internet use, it still seems like a misfit in this construct. Examining the dynamics of new media use, Sundar and Limperos (2013) contend that engagement with Internet-based apps demand an even higher level of conscious, active participation (than that of legacy media use) and thus yields new possibilities for unique gratifications through the process. Thus, applicability to this study in this contemporary sense certainly feels incompatible, as infants and toddlers do not yet have the depth of understanding alluded to by Sundar and Limperos. Thus, applying tenets of Sociocultural Theory to digitods' cognitive development, in this study, seems to be a more organic fit.

Significance of Study

Corporate conglomerates are actively using algorithmic digital marketing to target infant-to-preschool aged users as consumers—and by extension their parents (Leaver, 2016; Burroughs, 2017). Thus, examining some of the phenomena surrounding how digitods' process the world around them, and the digital culture to which they are exposed, may shed some light on understanding how it is young children are becoming a part of the larger cycle of consumerism. This hints to a need to better understand some of the sociocultural cues happening in the home that may play a role in a child's cognitive development. While families may wish to allow their children the intellectual leverage that being smart tech literate and savvy may provide for, it may also be worthwhile to discern what functions of smart tech engagement, or what kinds of familial mediated exchanges, may be positioning them as a consumer group that puts a metaphorical target on their backs. Findings may raise issues concerning online privacy/security and other notions of cyber safety and cyber wellbeing.

CHAPTER 2: LITERATURE REVIEW

The following review of relevant literature combines three distinct thematic contexts by which this study anchors its examination of digitods' sociocultural learning: 1) the scholarly contributions that allow for the applicability of Lev Vygotsky's Sociocultural Theory (SCT) principles to the modern-day digital environment; 2) incorporated aspects of algorithm culture and opacity; and 3) research that identifies young children, specifically, as prime targets of digital marketing. Materials examined follow a thematic organization. In providing the scholarship foundation for these phenomena, it is first important to review studies conducted by Wartella, et al. (2016), Edwards, et al. (2016), and Edwards (2014), who extend concepts of SCT to contemporary digital applications.

Sociocultural Theory and the Modern-Day Digital Environment

Expanding Vygotsky's theoretical construct, Wartella et al. (2016) discuss two key notions that take on new relevance as they apply to the use of new media and the shaping of meaning and understanding through cultural tools. Both these concepts are critical expressions of the sociocultural context that informs a child's cognition and development.

Dominant Activities

Dominant activities are defined as those that are "ubiquitous among children within a particular culture since they provide pertinent information about that culture (e.g., social values and behaviors)" (Wartella et al., 2016, pp. 14-15). In decades past, as with legacy media, a dominant childhood activity—like watching television with friends—could serve as the

sociocultural setting in which children processed the world around them. Interactions with friends, while engaged in screen watching could serve as a platform to develop higher learning and cognitive function. In a more advanced, contemporary setting, however, the researchers contend that interactive technologies and engagement with social media can now stand in as digital means of social interaction—qualifying as a dominant activity that helps shape children's understanding of cultural values and norms in these modern times.

Zone of Proximal Development

Vygotsky's (1978) notion of a child's *zone of proximal development* also weighs into sociocultural learning and new media applications. Conceptually, the idea can be regarded as the gap in knowledge between a child's level of understanding and what he/she may be capable of with support from other more experienced and knowledgeable individuals, like family members, teachers, or other caregivers. Wartella et al. (2016) extends and updates this application to include how media-based tools can bridge that gap in understanding by supporting children's learning. In this way, technological infrastructure can serve as a kind of proxy that helps scaffold, or reinforce, the learning process as it is known in the discipline. Research from Wartella et al. (2016), then, is relevant to this study in that its findings, while grounded in SCT, position new media and technology as integral parts of children's cognitive development.

Tool Mediation

Another aspect of SCT finds contemporary application in the realm of tool mediation. Vygotsky (1978) discusses how either physical or conceptual tools can be instrumental in a child's learning process through social interactions. Edwards et al. (2016) expand and update this

notion in identifying “touch screen technology” as one such physical tool, with which digitods (Gold, 2015), or children aged 0-5 who have grown up with mobile internet access since birth, can manually manipulate with their fingertips (e.g., swiping). So, in this sense, smart mobile technology and the tactile use of digital interfaces function as physical tool mediation. A contemporary example of a conceptual tool, as applied by Edwards et al. (2016), can be the digital footprint, either active or passive, left by parents or other individuals with whom the child interacts. Along these lines, infants, toddlers, and preschoolers can be acculturated to digital tech and are situated as active users, themselves. They are online in a multitude of ways, such as “via social media, the use of Internet-enabled apps, the consumption of digital media using on-demand streaming or social networking sites, and by participation in child-centered websites” (p. 322). Media and technology, then, distinctly affects the formation of a sociocultural learned sense of Internet cognition among children.

Socially Agentive Agents

One last consideration of SCT at work in today’s digital climate warrants discussion—the identification of children as “socially agentive agents” (Edwards et al. 2014). This follows in terms of an economic paradigm in terms of children’s potential involvement in selecting (however purposeful or accidental) memberships, subscriptions, and/or other online purchases. Limiting the theoretical application to consumer culture and play activities can lead to a better understanding of how children master higher concepts, as researcher, Susan Edwards (2014) finds, further expanding and updating Vygotsky’s framework. She recognizes children’s active role in engaging playfully with media and other technologies to form cultural connections, meaning, and understanding. In this narrowed sense, Edwards (2014) discusses the significance

and relevance of positioning children in a "digital consumerist context" as they become targets of direct digital marketing for products and other memberships or subscriptions. Because this dynamic is fluid and based on the ever-shifting practices and knowledge of emerging technologies, current contexts are continually being reshaped. Hence, playful experimentation with media and tech can heighten children's development and understanding of social situations.

Algorithm Culture and Opacity

The second thematic context—algorithm culture and opacity—are brought to light through the exploratory approaches of five researchers/teams. Among these five, Paul Dourish (2016), takes a more technically situated approach in examining algorithms themselves as organizing and classification tools, noting the significance of algorithm culture as it is embedded in a myriad of contemporary research topics. Primarily, Dourish discusses how three main forms of opacity function to shut out the public from auditing any proprietary programming: the protection of trade secrets, the high level of skill required to analyze the programming, and the SML algorithms that hold special cultural and social significance as they apply to statistical probabilities in shaping the flow of information and recommendations. This discussion is foundational in informing how it is the undercurrent of opaque corporate strategy may be functioning as a common denominator in the way digitods' learn through mediated exchanges.

Digital Inequality and Social Mobility

Also employing an exploratory approach, Jenna Burrell (2016) takes a socio-technical look at identifying how SML functions in social media to attract, especially, individuals inclined to *game* their online experiences. Her research also examines and lends support in discussing the

three areas of algorithm opacity. She expands the overall discussion to include notions of how digital (economic) inequality is created and how social mobility is affected through the "distribution of computational resources and skills" (p. 10). Along these lines, then, and beyond any psychological implications of digitods' sociocultural learning, Burrell's work informs the current study on how digital classification and digital meaning—through mobile smart technology use like touchscreen laptops, tablets, and cell phones—may affect real-world socio-economic opportunities.

Feedback Loops and Corporate Profitability

Taking a "historio-definitional" exploratory approach, Ted Striphas (2015), who traces the conceptual conditions that laid the groundwork for the development of SML algorithmic culture, focuses his examination on underlying motivations of corporate profitability. Through this, he advances discussion on how, in particular, "crowd wisdom and collaborative filtering" is leveraged to boost algorithmic recommendation patterns, and the determination of what is currently significant on the Web. This is important primarily in grounding an understanding of how digitods' feedback data (by virtue of manual manipulation of digital interfaces), however intentional or accidental, may function to curate their digital feeds.

Hallinan and Striphas (2016) go beyond their discussion of algorithm culture and opacity to examine how it is the recommendations programming of SML functions in a cyclical manner. They discuss how customer satisfaction and feedback create a dynamic that prompts more recommendations, and thus more customer satisfaction. Ultimately, Hallinan and Striphas note how this leads to notions of a "closed commercial loop," which, rather than confronting its users,

conforms to sociocultural norms. As with Striphas' (2015) findings, Hallinan and Striphas' (2016) conclusions may further factor into the understanding of how digitods curate their feeds.

Cybernetic Categorization

In examining how SML algorithms and their recommendations persuade "normalized behaviors," John Cheney-Lippold (2011) discusses algorithm culture in the sense of a power play. His notion of cybernetic-categorization provides a means for discussing algorithm culture as an elastic relationship through which users are subjected to digital assignments of data-based (digitally perceived) categories. These notions of power play, then, are especially important to this study as it examines the algorithmic undercurrents, the impressionable cognitive readiness, and the developing levels of media literacy of young children.

Children as Targets of Digital Marketing

These five researchers/teams all touch on the nature of algorithm culture as polarized recommendations and other discourse, as well as notions of "corporate secrecy" and algorithm opacity. However, one noteworthy source focuses these implications on digitods and on new technology, as these infants and toddlers are specifically positioned and targeted as a consumer group. The third and final thematic element in this literature review focuses on work by Benjamin Burroughs (2017). Adding to the overarching discussion, here, Burroughs notes the rise of mobile parenting, which has significant sociocultural bearing on this study. Burroughs also discusses an industry shift away from examining media effects and a move toward understanding media industries and the app economy, as it applies to digitods' everyday usage of smart mobile media and other communication technologies. Cumulatively, as kid-content

programming is becoming more commonplace in twenty-first century business models, these mobile video apps aim at increasing data usage and in turn increase data-mining. Burroughs also notes the utilization of kid "influencers," or other young children who may be compensated for the unboxing, reviewing, and pushing of merchandise as media content is now being integrated with traditional notions of advertising. Fundamentally, at the base of Burroughs' (2017) discussion, is the principle that infants are perceived as a viable market group like any other.

> Infants are seen as an untapped market that can grow up alongside brands and products at an impressionable age. Companies can cut through the digital clutter of modern Internet advertising and build a relationship with the very youngest of consumers. Unfortunately, along with that relationship also comes an accompanying data-driven profile literally from birth…[and] advertisers are paying to increase brand awareness and promote aspirational purchasing within this emergent target demographic. (p. 6)

Research Questions

These three thematic areas of consideration inform and ground the practical construct of this research design through which elements of digitods' sociocultural learning might be explored. The following research questions, then, stem from the relevant literature and also found the interview guide or script used in the data collection.

RQ$_1$ How are digitods learning to manipulate smart devices and utilize apps through familial modeling?

RQ_2 In what ways might family modeling of smart devices and media use impact digitods' Internet Cognition?

RQ_3 What features of Statistical Machine Learning Algorithms function to capture digitods' attention and hold their interests as active participants?

RQ_4 How might digitods be curating their own feeds by virtue of feedback loops?

Collectively, these research questions explore the ways family modeling and mediated exchanges function to foster sociocultural learning, as well as to examine the ways in which infants and toddlers may be exercising socially agentive agency.

CHAPTER 3: METHODOLOGY

In social science research, the observation and evaluation of children can be rife with ethical considerations and even more so for infant and toddler participants as they lack the autonomy that adolescents have. Further narrowed, in the budding field of research that examines children ages zero to five and their smart media use, scant methodology models exist that have not been the focus of larger funded-, longitudinal-, or otherwise perceivably intrusive endeavors outside educational and medical studies. Thus, to minimize any perceivable harm against young children, this research design excluded participant-observation and instead employed an accessible qualitative approach—a short series of in-depth interviews with the parents of digitods. This study sought to understand the experiences, perspectives, and feelings of the parents of digitods, and their own recollections of using smart tech with their children (ages 0-5), or in observing them play independently with smart devices and software apps. Appropriately so, the approach utilized here was an inductive, reflexive thematic analysis.

Sampling

Institutional Review Board Approval

First, approval was sought from the University of Nevada, Las Vegas' (UNLV) Institutional Review Board (IRB) to work with human subjects. Since interviewing adults along these lines proposed minimal contact with and risk to the participants, approval of the study was expedited, and the design of the research and the 62-item interview instrument were approved.

Also approved was the screening tool used in the recruitment process, as well as the informed consent that outlined the study's parameters and the expectations of the participants.

Screening and Recruitment

A screening tool was developed and used to qualify the pool of participants, which included 18+ adult, English-speaking parents or legal guardians of a child/children up to age 10. The rationale here was that while children ages 6-10 were outside the age range of the digitods of particular interest, parents or guardians of these older children would still plausibly have the memory recall necessary to participate fully in the interview process. Therefore, expanding the children's age range here was a function of easing the accessibility to qualified participants.

Potential respondents were approached from two separate spheres: 1) a few from the interviewer's personal social network (to be explained); and 2) a few UNLV students identified through the school of Journalism and Media Studies in which this study and thesis committee is rooted. Since randomized selection was not possible here, barring the need for respondents to meet certain qualifiers, this strategy was employed to connect with individuals from as varied backgrounds as was possible, more than only those students from UNLV. Again, utilizing a two-pronged approach for recruitment was also a function of increasing accessibility to the sampling pool. Selectivity was employed to get an equitable split of female and male participants in hopes of garnering a more robust range of responses.

For the second phase of recruitment, qualified participants were asked permission to have their contact information shared with the interviewer—as bridged by a UNLV faculty member and a member of this thesis committee. Upon the respondents' agreement, the interviewer followed up with an email invitation and a copy of the standardized university informed consent,

to be signed and returned. This included an introduction to the interviewer, the nature of the study, the time and content parameters, an “ask” for permission for anonymous inclusion in the culminating literary work, and an invitation to set an appointment for a recorded phone interview. All participants included in this study reviewed and submitted signed consent forms before the interviews.

Procedure

Phone interviews were chosen over in-person sessions to make respondents’ involvement more accessible and convenient while boosting their sense of anonymity. As agreed upon by the advisory committee, the goal was to capture 5-7 substantive and complete interviews, whereas participants answered in detail each of the 62 interview items and were engaged for a minimum of 60 minutes (and no more than 90 minutes). To better preserve anonymity, each respondent was issued a corresponding numerical value that took the place of any identifiers on the final transcript (further explained in a subsequent section).

Procedurally, once on the phone for each designated appointment, respondents were greeted and thanked for their time and reminded of their reported anonymity. A brief recap of the study was given, and participants were told they could, at any time and for any reason, exit the interview or later withdraw their consent. Upon final agreement, the interviewer began to record the sessions through her personal cell phone’s speaker function (no video component) with the aid of the Apple brand “voicememo” recording feature on a smart tablet nearby. This occurred each time in the privacy of the interviewer’s own home with no one else present. A paid subscription meeting app—"Grain”—which uses AI function for ease of transcribing from voice to text, was utilized to convert the audio files automatically and instantly.

Operational Definitions

An open-ended interview guide was utilized, primarily aimed at adding to our understanding of how digitods may be susceptible to algorithmic culture and marketing, as their interactions with family mediated exchanges position them to be active media users. To consistently identify instances of the phenomena, operational definitions must first be advanced. Thus, regarding sociocultural interactions within a digital framework, the operational definition for "mediated exchanges" used was modeled after concepts put forth by Wartella et al. (2016) in that it is any kind of sociocultural interaction that is enhanced through the use of new technology and new media. Akin to this is the examination of the occurrence of "familial modeling," which, for the purposes of this study, takes on a more common application: it is defined and limited here as behavior that is demonstrated or exhibited by family members within a household. Following Edward's et al.'s (2016) notions of how children manifest "Internet cognition," this study will operationally define the term as a base awareness of- or as "understandings of the Internet…from a sociocultural perspective" (p. 323). To address "feedback loops," the study identifies this common cycle—when the algorithm is trained by the user when he/she selects and offers input and new knowledge that further impacts the algorithms output. Lastly, to qualify what is meant by "smart mobile tech" the study recognizes any technological device that is portable and that also has the capability to "work with other networked technologies, and through this ability to allow automated or adaptive functionality as well as remote accessibility or operation from anywhere" ("What is 'Smart' Technology"). Examples of such smart devices that were included in the study are cell phones, tablets and e-readers, touch-screen laptops, and smart watches.

Interview Guide

A 62-item interview instrument posed open-ended base questions that examined the sociocultural learning aspect as modeled by family networks or other socially mediated interactions. The script's design garnered an understanding of the prevalence and accessibility of smart tech and media in the families' homes, while also capturing demographic information. Lastly, a segment of items was posed to address how algorithms may function to engage digitods. Utilizing the guide with each respondent helped to ensure the same topics were covered as uniformly as possible between the pool of respondents. The open-ended nature of some of the questions also allowed for outlying responses and an exploration of additional discussion points during the organic exchanges. At times, the interviewer would also ask follow-up questions, off-script, to either gain more clarity on an issue or to have the participant delve a little deeper into his/her recollections. The focus here was to better contextualize infant media culture and the undercurrent nature and promptings of SML algorithms, proposing digitods' Internet cognition as a function of familial modeling and other mediated exchanges—perhaps revealing generalizations applicable to a larger population of American digitods.

Coding Reliability and Appropriateness

Establishing coding reliability in a qualitative study of this nature is challenging, as journal articles often underreport this, especially in the case where a singular coder is conducting the analysis, or where resources may not be available to secure another coder or more to analyze the lengthy transcripts (Campbell et al., 2013). Unitization can also be problematic with a series of in-depth interviews in that each transcript may contain many units of analysis, and they may not all be apparent or readily identifiable. Krippendorff (2004) places importance on the

analyst's subject knowledge and experience in determining meaningful conceptual breaks in the reading of the texts for the purpose of identifying "units of meaning," as opposed to predetermined segments of the text. For the scope of this study, then, each transcript was broken down into individual units of meaning, or text centered on a singular theme, action, or concept.

While the approach relies on the researcher's interpretation, it is also acceptable in qualitative research and commonplace in analyzing semi-structured in-depth interviews (Campbell et al., 2013). To minimize any subjectivity and maintain consistency in analyzing the various texts, the interviewer utilized a reflexivity journal throughout the data analysis to improve overall reliability. Incorporating an operational definition from researchers, Olmos-Vega et al. (2022), "reflexivity in this sense is continuous, collaborative, and multifaceted practices through which researchers self-consciously critique, appraise, and evaluate how their subjectivity and context influence the research processes" (p. 242). This approach was instrumental in helping the interviewer to better revise and reorganize codes, themes, and larger categorizations across the data set. Having employed an inductive approach here allowed the responses to inform the varied spectrum of codes and the categories of larger thematic elements intrinsic to this process.

Data Collection

Inherent Challenges

While the screening and recruitment process began on December 16, 2022, at the conclusion of UNLV's Fall semester, the in-depth interviews (a total of seven) were scheduled and conducted between December 28, 2022, and February 6, 2023. Thus, this cycle took a total of 7+ weeks to facilitate. Several reasons may account for this period of data collection.

1. Screening and recruitment began at the onset of the university's winter break and the commencement of the holiday season when students and other participants may have been away on vacation or otherwise engaged with family events, which may have limited participants' free time or availability. This was necessary, however, as final approval from the university's IRB was still pending up till that point.
2. Data collection was also slow-moving because at several points, participants had to reschedule (sometimes multiple times) due to other time conflicts. And with the (then) approaching spring semester, students were possibly otherwise engaged, prepping for the new academic term, or busy meeting other work/family obligations.
3. A few qualifying individuals who were interested in participating ultimately declined because they later determined the interview was too lengthy to accommodate. The 60 to 90-minute engagement did not work for those participants' schedules, and/or possibly for their preferences. In these cases, the interviewer had to go back to her social network to qualify other potential respondents (following the same protocol).
4. Two pre-screened individuals who had agreed to be interviewed, and had also signed and returned the informed consents, had simply discontinued communication without warning or reason. In these cases, the interviewer found it prudent not to press for participation and instead chose to recruit others in their place. Again, protocol was followed here.

For these reasons, data collection in total took nearly two months. And in dealing with human subjects, the interviewer anticipated encountering differing belief systems, schedules, dispositions, idiosyncrasies, and decorum. However, barring these challenges, the interviewer was able to collect the seven personal in-depth interviews, as agreed upon by the thesis committee.

Participant Breakdown and Interview Dynamics

Four respondents were familiar to the interviewer, secured through her own social network in the manner discussed previously. In this sense, both the participants from Hawaii were first cousins of the researcher and were known to have children in the qualifying age range. The other two Nevada respondents that were familiar to the researcher were friends whom the interviewer knew previously by virtue of working together in the same musical industry/circuit. They were also known to have children in the qualifying age range. The three participants who were unfamiliar to the interviewer were UNLV students initially approached by a committee member on the interviewer's behalf. Five of the seven interviews were considered substantive and complete—the participants having addressed all interview items and having met the one-hour engagement minimum. However, two were incomplete for differing reasons. One interview with a female respondent was cut short, at 0:48:46. She was actively nursing her newborn while conducting the interview, and her toddler became inconsolable as she demanded her mother's attention as it was evening, and the child was likely tired and ready for bed. Although the respondent offered to conclude the remaining portion at a different time, she ultimately discontinued contact and no follow up was made. This certainly illustrates some of the inherent

complexities of the interview process itself as it should be noted the respondent tried to balance completing the session while managing the dynamics of her hungry infant, fussy toddler, and later her agitated husband who walked into the room and demanded she end the call.

The other session was purposefully stopped short by the interviewer, at 0:44:37, because the respondent revealed soon into the interview that he was not the primary caregiver, rather his wife was. Thus, he was often unable to answer questions substantively, if at all. Furthermore, it was suspected that the respondent was under the influence of a substance at the time the session was conducted which further convoluted the exchange. Again, this speaks to the kinds of challenges that arise in an interview setting, especially one that is designed to be at least an hour at length. In retrospect, the screening tool should have been narrowed a bit more to include only those parents/guardians that are full-time or primary caregivers, as they would likely have a greater recollection or command of how their children engage with smart media/tech and other family members in the home.

The shortest interview was 0:44:37, and the longest interview was 1:18:34, with an approximate average time of 1:04:00 for the interviews in the data set as a whole. Four participants were males (the children's fathers), and three participants were females (the children's mothers). The age range of respondents was 22 – 48. The youngest child (anecdotally) included in the study was two weeks old, and the eldest was nine years old. Incidentally, the number of qualifying children in the home ranged from one child to five children, all aged 10 or younger. Of other noted interest, one respondent had 5-year-old twins, one boy and one girl.

Data Analysis

Analyzing the interview transcripts transpired in many stages. First, backup copies were made of all audio recordings, in the order they were conducted, to ensure they were archived in the event of data loss. Then, the audio recordings were uploaded to the Grain app which automatically transcribed the speech to text within the application itself.

The interviewer made every attempt to employ rigor in the data analysis. Once all seven transcriptions were available, the interviewer reviewed each of the documents in their entirety, initially checking the transcription against the audio recordings for accuracy and making any necessary changes. Numerical identifiers were also assigned at this point to ensure the anonymity of the respondents throughout the transcripts. For instance, one such label is R5-M-39: the first value corresponded with "Respondent #5" (from the order participants were interviewed); the second value related to the respondent's gender (male in this example); and the third numerical value assigned was the respondent's age, or 39 in this case. Furthermore, any time another family member's name or the child's name was mentioned, the transcript was adjusted to reflect a generic reference (e.g., "my son," "my husband"). During this pass, notes were taken on the data set for any impactful impressions or stand-out trends.

With that in place, each transcript was poured over a second time, as the interviewer recorded more fine-tuned notes, and began to amass profiles of each respondent and his/her family dynamics and smart tech usage.

- On the third reading of the texts, each transcript was scrutinized, line by line, to determine the various units of meaning, and those were inductively indexed or coded for

various themes, actions, concepts, and attitudes that were recurrent, or that were pointed out as important by the respondent, or that otherwise stood out.

- For the fourth stage, codes deemed most prevalent were grouped into coding families, or categories, and the previous set of codes were reevaluated and edited for economy and applicability.
- In the fifth stage, categories were labeled according to the most relevant; then, connections were formed, and inter-relationships explored, including any kind of hierarchy present.

Although the information that comprised the four tables incorporated in the "Findings" chapter ultimately included some numerical data, the aim was more to give the reader a sense of the larger dynamics at work. This qualitative study did not focus on quantitative data—accounting for tallies of occurrences of each phenomenon. Rather, tabled data offered an overview, or larger impressions, of demographic info, the prevalence or accessibility to smart tech in the home, the quantification of digitods' weekly smart media use, and an indication of the respondents' individual parenting style.

CHAPTER 4: FINDINGS

This study employed a reflexive thematic analysis of seven in-depth personal interviews with parents of children ages zero to 10, in exploration of four driving research questions. The analysis of parents' observations and recollections of their children's smart tech use revealed how digitods learned to manipulate smart devices by virtue of familial modeling in the home and how modeled behavior impacted their notions of Internet cognition. Furthermore, the data illuminated what algorithmic features worked to entice digitods and how the children had a hand, in part, in curating their own content feeds.

As these digital natives are habituated to mobile media, they are also susceptible to data-mining and target-marketing as findings indicate the accessibility of smart tech and other social interactions in the home situate them as active participants in algorithmic feedback. While support for each of the four research questions was established, findings did not indicate that children younger than 16 months engaged actively in smart mobile media use.

Respondent Demographics

Interviews included a mix of respondents (see Table 1) of both males and females of varying ages and from various ethnic, occupational, and economic backgrounds, yielding a range of responses. The table illustrates the 26-year difference in the ages of respondents, ranging from 22 to 48, with the median age of 38. There was a cluster of respondents ages 37, 38, 39, and 41, which indicated most parents interviewed were on the cusp of what is considered middle-aged, or not young adults/parents.

Table 1

Respondent Demographics

	R - 1	R - 2	R - 3	R - 4	R - 5	R - 6	R - 7
Age	30	37	41	22	39	48	38
Gender	Female	Male	Male	Female	Male	Female	Male
Occupation	TV Media Specialist	Media Production	Musician	Homemaker/ Media Student	Musician	Manager Health Care	Accountant
State	NV	NV	NV	NV	NV	HI	HI
Primary Ethnicity	Hispanic	Filipino	Hispanic	Caucasian	Caucasian	Hawaiian	Chinese
Economic Status	Low Income	Middle Class	Middle Class	Middle Class	Middle Class	Middle Class	Middle Class
Household Dynamics	Multi Family	Multi Family	Single Family	Single Family	Single Family	Single Family	Single Family

Note. *R* = Respondent.

As previously mentioned in Chapter 3, three females and four males participated in the interview sessions, almost an even distribution in gender representation. Three of the respondents had media backgrounds, two were musicians, one was in healthcare, and one in finance. Five participants lived in Las Vegas, Nevada and two lived in Honolulu, Hawaii. In terms of primary ethnicity, two of the respondents were Caucasian, two were Hispanic, one was Filipino, one was Hawaiian, and one was of Chinese descent. One household reported a low-income status, and the other six reported being middle class (neither affluent nor in hardship). Also of note, the Filipino household and one of the Hispanic households discussed being in multi-family units, whereas they also lived with extended family relatives.

For a visual representation of the breakdown of each household, see Table 2, which outlines the total number of individuals in the home and the age range and gender of the children for each respondent's family. Breaking down this demographic information helps to better understand family dynamics, as will be discussed in more detail in Chapter 5.

As mentioned in Chapter 3, the youngest child included in the study was two weeks old, and the eldest was 9 years old, with a total of 14 qualifying children (seven boys and seven girls) as referenced in the data set.

Table 2

Household Breakdown

	R - 1	R - 2	R - 3	R - 4	R - 5	R - 6	R - 7
Total # of People Living in the Household	8	7	6	4	3	6	7
# of Adults Living in the Home	6	5	2	2	2	4	2
#/Gender of Digitods in the Home, Ages 0 - <2	- -	--	--	1 Boy 1 Girl	--	--	1 Girl
#/Gender of Digitods in the Home, Ages 2 - 5	--	--	1 Boy 1 Girl	--	1 Boy	--	1 Girl
#/Gender of Children in the Home, Ages 6 - 10	1 Boy	1 Boy 1 Girl	--	--	--	1 Boy	1 Boy 2 Girl
#/Gender of Children in the Home, Ages 11 - 17	1 Girl	--	1 Boy 1 Girl	--	--	--	--

Note. *R* = Respondent.

Three of the qualifying children were babies, or less than 24 months old. Outside of this dispersion, three older children/siblings, from two separate households, were considered to impact overall family dynamics and familial modeling in those respective accounts. Furthermore, one household included two adult children/siblings (ages 19 and 21). Of note, two households included only one child, three households included two children, one household had four children, and one had five children. The household size ranged from three to eight people living in the home.

Research Question 1- Manipulating Smart Devices

RQ_1 How are digitods learning to manipulate smart devices and utilize apps through familial modeling?

Analysis of the interview transcripts revealed support of *RQ_1*, indicating the primary ways in which digitods learn to operate smart devices and use media apps by virtue of sociocultural interactions in the home:

- Parental demonstration of operational functions;
- Proximity, or the child's subconscious absorption by virtue of being around family mediated exchanges;
- Purposeful observations, or the child's intake of others' mediated behavior; and
- Shared online activities between the child and other family members.

In these four main ways, family modeled behavior has been shown in all seven respondents' accounts (numerous instances relayed by each respondent), to have impacted how their child/children learned to work smart tech and use media. As reported by the group, some of the specific key functions digitods have learned in the ways mentioned above are: 1) accessing the Internet search bar; 2) answering/ending phone calls; 3) powering on/off devices; 4) manual manipulation (scrolling, swiping, zooming, pinching, tapping or selecting); and 5) voice-command of smart devices.[1] While locating/accessing the search bar was noted in many

[1] Respondents were asked specifically about the function of gesturing; however, no instances were reported.

instances, the function of digitods actively conducting Internet searches was not represented in the data set.

Thirteen of the 14 digitods referred to in the interviews engaged in parent-monitored online activity (except the newborn). To begin teaching their children how to navigate touch screen interfaces, all seven parents demonstrated, to some extent, how to manipulate cell phones and tablets.[2] Data indicated the younger the children were, the simpler the demonstrations of device functionality. Showing children how to navigate and cue videos on YouTube Kids, for example, is one expression of parental demonstration. In at least three households, parents taught their children how to engage with video streaming apps. Familial modeling in this sense, functioned to help shape how digitods learned to operate the devices.

The proximity of the child to other mediated behavior in the home was also found to impact children's ability to use smart tech and media. For example, the corporate healthcare manager from Hawaii, R6-F-48, shared a funny anecdote that shows "proximity" as applied to her child's subconscious absorption and/or "purposeful observation" in action.[3] She spoke about her then 4-year-old son who, unbeknownst to her, had noticed how to work the avatar text message feature on her iPhone. She said she caught him one day texting through the avatar since he couldn't yet read or type: "There's different animals…and you can even do an avatar. This is before I knew you could do this. He somehow figured it out, and then he texted it to grandma, and it was like this giraffe, but the giraffe speaks with his voice" (Participant Interview, January

[2] While indicated in the household count of total smart devices for some respondents, touch screen laptops and watches were not used by digitods in any case throughout the data set.

[3] Respondent identifiers are referenced as follow: as discussed in Chapter 3, the R# indicates the order of being interviewed; the letter F (or M) stands for the respondent's gender; and the numerical suffix expresses the respondent's age.

8, 2023). The respondent laughed as she recounted the story and was impressed that her preschooler figured that out by watching her husband do the very same thing.

Similarly, R4-F-22 relayed a telling story about her then 12-month-old. “Something that she did really early on was when I had an alarm go off on my phone, she would come up and then press the stop button when she was first beginning to walk. I was like, oh my goodness” (Participant Interview, January 6, 2023). The stay-at-home-mom shared how amazed she was at the thought of her daughter catching on to that simply by being in the same room while she got ready in the morning—and at only 1 years of age—another example of proximity and subconscious absorption” and/or “purposeful observation”. Along these lines, many of the parents used the same reference in describing how their children learned to work their devices and apps; they called them “sponges,” picking up things quickly and with great capacity. Although the examples throughout the seven texts are numerous in this regard (and in support of RQ_1), the two anecdotes shared here give the concept some depth and nuance.

The media production assistant, R2-M-37, alluded to this concept in an interesting way; he likened the phenomena to learning one’s native language (Participant Interview, January 4, 2023). He spoke about technical proficiency as a kind of fluency that children develop in the same way they begin to learn to speak: “they’re exposed to these devices…and it’s just so natural for them to pick it up. They’re not learning a second language. They’re learning a first language.”

Finally, the variable of “shared activities” was also prevalent in all seven interview accounts. One such unique example of this kind of familial modeling stands out. The same media specialist and student, R2-M-37, recounted how he and his daughter liked to go online together to look at footage of animals at zoos around the country and at preserve-habitats around the

world (Participant Interview, January 4, 2023). It is an activity they really enjoyed doing; and in searching for the web content and navigating the various online features together, he relayed his daughter's operational knowledge expanded. In like ways, other respondents spoke about creating family videos together, taking family selfies, looking for cupcake recipes (and much more), and how shared activities like these helped give children the technical basis to operate smart tech and media apps.

Most respondents noticed their children mimicked mediated behaviors they observed, which indicates the effectiveness of familial modeling and the kinds of social interactions happening in the home. For instance, the 41-year-old musician (RM-3-41) discussed how at age three, his twins, a boy and a girl, would walk around the house pretending playfully to talk to one another on cell phones (Participant Interview, January 4, 2023). They also pretended to take selfies, as they had seen their parents and older siblings do many times before. Examples like these, and others related by all seven respondents, reveal familial modeling at work.

Also of note, the data found that sociocultural mediated exchanges external to the home were also impactful. Although these dynamics were outside the scope of this study, interviews revealed parents felt their child's relevant knowledge was enhanced in similar ways. For instance, three of the respondents felt that the mediated exchanges and sociocultural interactions their digitods had with other children at daycare, preschool, or Kindergarten, served as opportunities for peer-modeling, engaging children in discourse about new apps and demonstrating to their friends the function of their own personal devices and their favorite apps.

Research Question 2 – Internet Cognition

RQ_2 In what ways might familial modeling of smart devices and media use impact digitods' Internet Cognition?

Support of RQ_2 was found in each of seven interview sessions, in numerous examples relayed by each respondent, in terms of how it was that family modeling and mediated exchanges impacted children's awareness and conceptual understanding of Internet functionality and other related aspects. The data revealed this was occurring in three main ways:

- Parental explanation of concepts and reasoning with the child;
- Sibling reinforcement of notions of digital culture; and
- Parental orientation to child's mediated behavior, where negative parental reinforcement conditioned the child to better grasp relevant principles.

First, and most prominently, the research found that parents felt explaining concepts, while using smart devices with their children, was instrumental in helping them learn about cyber safety, online security, and age-appropriate best practices. For instance, R7-M-38, the accountant from Hawaii, relayed in a participant interview that he felt "it's more impactful if you tell them why—good reasons and bad reasons why you would stay away from 'that' and do 'that'…and I think that helps the child or gives them [sic] a better chance of not getting into mischief or trouble by themselves [sic]—learning good habits" (February 6, 2023).

Second, sibling modeling of smart devices was found to be impactful here—how the older siblings help to show younger children in the home (in their understanding) what good Internet protocol is and what kinds of things to look out for or be cautious of. The same

respondent, for example, a father of five whose children were all under the age of 10, relayed how the older siblings would often help the younger ones understand what bad and good habits were—as in showing them on a tablet what things are a "no-no" (Participant Interview, February 6, 2023). He also recalled how the three older siblings (ages, 6, 7, and 9) would at different times walk the younger sisters (ages four and 16 months) over to mom or dad to ask permission before signing on to the family tablet, even though all his children except the baby knew the family password.[4] This is an example of how sibling modeling helps shape digitods' Internet cognition.

Third, across the data set, parents relayed that it was their orientation to their children's mediated behavior that was a strong variable in framing digitods' awareness of cyber issues and digital culture. As revealed in the interviews, most parents took away smart devices from their child (as punishment) if they broke a set rule designed to keep them monitored and safe. Parents relayed it was their follow up, or their "parental explanation," that helped their child build conceptual understanding. All seven parents interviewed also recollected that their child (at different times) was saddened by mom or dad's disapproval at a feature, function, or app he/she may have misused online. Stated another way, it was found parents felt their children were motivated to ask questions and better understand the digital climate, in response to their parents' disapproval, so they could behave more in ways that made their parents happy and ultimately helped them gain more screen time.

In terms of overall Internet cognition, parents noted children developed a sense of conceptual understanding through the three modes outlined above. Beyond this, and as applied to

[4] Although the children in this household knew the family password for smart device access, this was a singular occurrence; this was not the case in any of the other six households.

cyber issues, familial modeling helped digitods gain a fundamental grasp of these specific abstractions:

- Basic cyber safety;
- The purpose of the Internet;
- The need to take care of the smart device itself (so as not to break it);
- Notions of Wi-Fi, memory, buffering, and downloading; and
- Social media and app awareness.

All seven parents felt it was important to begin to teach their young children about basic parameters of cyber safety. One such respondent, media production assistant, R2-M-37, who had a seven-year-old son and a nine-year-old daughter, was impressed that his children, even as early as age three, had an intuitive sense that mom and dad were protecting them in certain ways. "They have an idea [of cyber safety]. I don't think they fully understand the concept…but I think they've realized that...we're looking out for them, and we're trying to…make sure that they're safe and their devices are safe" (Participant Interview, January 4, 2023). Forty-eight-year-old health care professional, R6-F-48, even talked to her digitod rather plainly about the "predators" that are out there that could harm little ones (Participant Interview, January 8, 2023).

Along these lines, all seven parents reported that their digitods seemed to have a rudimentary idea of what the Internet was for—that from their perspective, it was a media machine, good mainly for movies, games, and other apps. All seven parents also shared that through family modeling, they showed their child/children how to care for the device so it wouldn't break. In three cases (as with R2-M-37, R5-M-39, and R6-F-48), this was compounded

by the fact that their young toddlers, at the time, had broken either an expensive cell phone or tablet and experienced negative reinforcement from their parents.

Notions of Internet concepts of Wi-Fi, memory, buffering, and downloading were also discussed by the respondents as variables of children's Internet cognition. R5-M-39, a musician and bandleader dad, for example, relayed that his five-year-old has known or realized for quite some time (since the age of three) that the smart devices in his home will not fully function without Wi-Fi—although he also mentioned his son could not tell you what Wi-Fi was exactly. "He knows there's a *magical signal*. He knows he needs Wi-Fi to watch videos on YouTube [Kids]. He knows that he needs Wi-Fi to download games to his tablet. He knows he doesn't need Wi-Fi to read books" (Participant Interview, January 8, 2023). This exemplifies the kinds of Internet concepts and connections digitods are making through familial modeling. In terms of the notions of memory, buffering and downloading, five of the seven respondents reported their child had an intuitive sense about this—that mainly through parental explanation, the child came to understand that if too many items were "put- or placed" on their devices, it would cause the function to slow down, which often made the children fussy or impatient. Indicating that his children were accustomed to fast Internet service, musician and father of four, R3-M-41, said comically to this end, "they get impatient. They don't want to wait for it to load for milliseconds" (Participant Interview, January 4, 2023).

Social media and app awareness was also a topic all seven respondents commented on. The common feedback was that although they felt their digitods did not grasp the larger understanding of the purposes of social media, they also felt their children identified it as an online activity done with the family (e.g., watching the "memories" feature/feed with

grandparents, or trying out funny Snapchat filters with mom.[5] Also of note, six of the seven respondents felt their children perceived social media only as some form of entertainment, as something fun to do.[6]

Research Question 3 – SML at Work

RQ_3 What features/stimuli posed by Statistical Machine Learning algorithms function to capture digitods' attention and hold their interests as active participants?

Analyzing the data set, support for RQ_3 was found to be impactful. All seven respondents reported similar experiences in observing their children engaging with smart media. Parents accounted for two main ways in which they felt their digitods were enticed by algorithmic function.[7] They expressed that programming expanded their children's viewing exposure and utility by virtue of the following: 1) the amount of time spent lingering on pages or engaged with various app features; and 2) their active selection of options that either extended viewing/play time, or furthered the degree of involvement with an app. Findings identified these specific SML features or stimuli that captured digitods' interest and attention and likened the probability of their engagement with media:

- Sensory elements (bright colors, interesting/relatable icons, and sound effects, like "whooshes" and bell dings);

[5] All seven households were found to have at least one Facebook and/or Instagram account.

[6] The respondent who did not comment on this was R4-F-22, media student and mother of the newborn and the two-year-old. The interviewer suspected that may have been a function of the children being on the younger end of the spectrum.

[7] Algorithmic function in this sense refers to how the underlying data-driven programming collects feedback information to profile and reengage end-users.

- Recommendation tabs or buttons; and
- Pop-up ads that the child either liked or engaged with.[8]

Taken as a whole, all parents in the data set discussed how sensory elements were common stimuli that caught the attention of their digitods. This was found to appeal especially to those children who were first exposed to smart tech as babies, or at ages younger than 24 months—as related in interviews by two of the respondents, R4-F-22, the young homemaker and media student (Participant Interview, January 6, 2023), and R7-M-38, the father of five from Hawaii (Participant Interview, February 6, 2023).

Digitod engagement with recommendation tabs were represented in all seven interviews by virtue of accessibility. All parents installed video streaming apps (of one brand or another) on their mobile devices for their children's consumption, including Disney+, Netflix and Netflix Kids, Nickelodeon, and YouTube Kids. Ten of the 14 children whose data was included in the study were reported as active users in terms of either being able to select or opt out of recommended content on their own.[9] This interactivity with apps, in turn, functioned to prompt the algorithms to extend digitods' exposure to- and deepen engagement with online content. Although most respondents chose to purchase kid-friendly apps and games for their children, in order to bypass pop-up content, ads were reportedly still present during digitod usage in six of the seven households.

[8] Recommendation tabs and pop-up ads were found to be attended by toddlers only across the data set. Furthermore, respondents were asked specifically about the occurrence of tablet vibrations as an app stimulus cue; however, no instances were reported.

[9] Three of those 10 children also have/had occasional access to unmonitored time with smart devices.

Research Question 4 – Feed Curation

RQ_4 How might digitods be curating their own feeds by virtue of feedback loops?

Since algorithms function in cyclical ways (as discussed earlier in the introduction), any online activity with which digitods engage signals the program to some extent. This, in turn, impacts the algorithms' subsequent output. Data analysis along these lines addressed RQ_4 and revealed four of the specific ways in which digitods can affect (to some degree) this flow of digital information, in essence curating their own content feeds:

- Experimentation—curiously clicking on or selecting items;
- Accidental, mistaken, or unintentional input;
- Participation in teaser content; and
- Engaging in "calls to action" or promotional/marketing prompts (subscribing to a channel or making purchases).

As expressed by each of the parents, their digitods had a strong collective sense of curiosity. The data found that it was common for the children to experiment with selection options to see where programming would go, namely for older digitods, ages four and five. This ultimately was found to have an impact on shaping digitods' own content feeds, especially in terms of profiles for streaming apps. For example, thirty-year-old media specialist, R1-F-30, noted, that even though she had not consistently seen her son select programming on Netflix Kids, she could tell by the items that were continuing to populate her child's feed that it was "morphing into [more] of his likes" (Participant Interview, December 28, 2022). She continued, "I don't think he's consciously giving them [sic] feedback. I think it's just their [sic] algorithm trying to figure it

out." This suggested that her son was watching selected programming and thereby informing the algorithm.

Similarly, toddler-aged children were found to affect feedback loops in terms of accidental, mistaken, or unintentional input. This was not so commonplace across the data set but was still represented in two interview accounts by the media specialist (R1-F-30) and one of the musicians (F3-M-41).

Two of the respondents, the media production assistant (R2-M-37) and one of the musicians (R5-M-39), reported having observed their sons playing "teaser" games, wherein timed options of game-play were presented. In one example, the musician noted his child's feed would often offer this kind of prompt: "It'll let you play for like three minutes, and then it pops up with an ad for 30 seconds… It's a teaser of another game!" (Participant Interview, January 8, 2023). This respondent noted his son often played with many teaser games, even in a consecutive manner. In this way, digitods are enticed to take advantage of free play and ultimately signal the algorithm that the specific game is of interest to the user. The algorithm, then, recommends more of the same to varying degrees.

Engaging in promotional or marketing calls to action was noted in two of the seven interviews, where parents relayed instances of their children purchasing products advertised online. So, while the phenomenon was not found to be so widespread in this data set, it is indicative of the occurrence to some degree. In one case, as with musician R5-M-39, his son selected and purchased $140 worth of game apps while left unattended with a smart device (Participant Interview, January 8, 2023).[10] In a like manner, the healthcare manager, R6-F-48,

[10] This respondent, self-admittedly, noted a lenient parenting style and did not have all devices password-protected, while linked to his credit card information.

was surprised by a delivery to her door from Amazon for a product purchased by her then four-year-old son. It was a machine used to monitor ocean topography that retailed for over $500 (Participant Interview, January 8, 2023). She mentioned in the interview that her family did not own a boat, so she was confused by the delivery. She deduced she had left her tablet out while Christmas shopping recently on Amazon. She gathered her son must have been "tapping away" at pictures and selected something of interest to him. He enabled the purchase by clicking on the app's "Buy Now" button.[11] While the feed was the respondent's and not specifically the child's, this is indicative of how it is that digitods can execute a call to action with relative ease. According to the healthcare manager, she continued to get ads and prompts for other boating-related products for several days thereafter, which is telling of the fact that that input functioned as feedback, triggering the algorithm.

Beyond support for *RQ*$_4$, two other related trends emerged from the data set in terms of evaluating digitods' general areas of interest and content preferences. First, data analysis revealed that there was no gender-stereotypic attraction to certain kinds of media for digitods—those traditional notions of what interests boys and girls were operating. For example, in several instances, parents noted their sons were drawn to apps that allowed them to create art, which may traditionally be thought of as an online activity that appeals more to girls. Likewise, several girls, as discussed in the interviews, were interested in gaming, which may traditionally be thought of as an online activity that appeals more to boys. Both genders (as represented by the 14 children referenced in this study) were reported to be equally interested in music apps. Second, the

[11] The "Buy Now" button is Amazon's express purchase option, that expedites orders linked to credit card information previously saved to a customer's profile.

purchasing of tangible products or software apps by digitods is indeed happening; however, the same is not true for subscriptions to digital services or products.

Other Data Trends

The data analysis also indicated two other dominant themes that impacted family dynamics and mediated exchanges in the home: 1) the prevalence and accessibility of smart devices; and 2) digitods' media usage and the parenting style of their caregivers.

Prevalence and Accessibility of Smart Devices

Table 3 outlines the prevalence of smart tech in each of the respondent's homes—including the total number of smart devices, the number of smart *mobile* devices, and the number of smart *homebase* devices.[12]

[12] In comparison to smart mobile technology, smart homebase devices are defined here as technology that is either connected via cabling or considered non-portable.

Table 3

Smart Devices in the Home

		Smart Mobile Tech					Smart Homebase Tech		
	Total # of Devices	Cell Phone	Tablet	e-Reader	Laptop	Smart Watch	Gaming Console	TV	Virtual Assistant
R - 1	19	8	5	--	--	--	3	3	--
R - 2	15	7	1	--	2	2	--	3	--
R - 3	16	4	2	--	4	--	2	4	--
R - 4	7	2	--	--	2	--	1	--	2
R - 5	12	2	4	1	--	--	2	3	--
R - 6	13	5	3	--	--	--	1	3	1
R - 7	9	4	2	--	2	--	--	1	--

Note. *R* = Respondent.

Findings show that smart technology is prevalent in the respondents' homes, and thereby potentially accessible to digitods (either through purposeful or accidental use). Across the data set, the total number of smart devices in the homes ranges from seven to 19; and (as is the focus of this study) between four to 13 smart mobile devices. The median number of smart mobile devices in the home is eight, of which cell phones and tablets represent the majority. Median numbers indicate four cell phones and three tablets across the data set. Smart homebase tech was also represented, including gaming consoles, TVs, and virtual assistants.[13] Smart watches and e-readers, while present in a single household each, were not found as representative in mediated exchanges in the home.

[13] While smart homebase tech was not included in the data analysis, such devices were also found to impact mediated exchanges in the home, as reported by the majority of respondents.

Usage and Parenting Style

Findings indicated that in six of seven households, digitods were getting exposure (screen time) to smart devices, either with or without a guardian present. Digitods' smart mobile media usage, in addition to the parenting styles of their caregivers, has been found to impact mediated exchanges. Table 4 breaks down some of these dynamics.

Table 4

Digitods' Smart Mobile Tech Usage & Parenting Style

	Age at First Use	Average Time per Week on Devices	Monitored Yes / No	Alone Time Granted Yes / No	Password Protected Yes / No	Parenting Style
R - 1	4	7 hrs.	Yes	Yes	Yes	Lenient
R - 2	2	10.5 hrs.	Yes	No	Yes	Moderate
R - 3	3	7 hrs.	Yes	Unknown	Yes	Moderate[a]
R - 4	18 mos.	37.5 hrs.	Yes	No	Yes	Moderate
R - 5	3	18 hrs.	Yes	Yes	Yes	Lenient
R - 6	2	14 hrs.	Yes	Yes	Yes	Moderate
R - 7	16 mos.	1 hr.	Yes	No	Yes[b]	Strict

Note. *R* = Respondent.

[a]Parenting styles are divisive, and the respondent is not the primary caregiver.

[b]Children know the family passwords.

As represented by the data, the age range of digitods' first exposure to smart mobile media was 16 months to four years. Their average weekly usage ranged from a conservative one hour to a liberal 37.5 hours. All seven households monitored their digitods' media usage; however, three of the parents granted their child unsupervised time throughout the week. Also, each of the seven households reported they protected their devices with passwords. A variance was found in the self-reported parenting styles of the seven caregivers in the data set. One

respondent was strict, four had moderate orientations to media allowances, and two were lenient. Some of these finer dynamics are discussed in more detail in Chapter 5.

CHAPTER 5: DISCUSSION

Yes, phenomena like these are widespread and are occurring in the average, modern Western home. As this study supports, children as young as 16 months are actively operating and engaging with smart mobile tech and media, because young digitods are products of their environment. They absorb the cues of digital culture from other familial modeled behavior and the mediated exchanges that happen around them in the home.

This series of in-depth interviews with parents of digitods has yielded a rich and nuanced understanding of the sociocultural phenomena at work in the context of situating digitods as active users and consumers; and findings support each of the four research questions. Digitods are indeed learning through familial modeling and other mediated exchanges in the home. They are learning to operate and manipulate smart tech devices and media through demonstration, by virtue of proximity to mediated behaviors of others in the home, through observation, and through online activities shared with family members. Digitods are developing a sense of Internet cognition and digital culture through parental explanation, sibling reinforcement, and parental conditioning. Statistical Machine Learning algorithms are extending digitod exposure and engagement through sensory elements, recommendation tabs, and pop-up content. Finally, digitods come to participate in algorithmic function, in essence helping to curate their own feeds, by virtue of experimentation, accidental input, and by participation in teaser segments and other calls to action.

Accessibility and Digital Dependence

While this study did not examine the kinds of smart media/app content that attracted digitods' attention, evidence points to a growing culture of infant and toddler capability and consumption. The prevalence of smart mobile media in the average home, combined with digitods' average weekly usage of smart devices, is impactful. As indicated by the findings, it is rather commonplace for families to have several devices in the home—and varying kinds of smart tech at that—somewhat accessible to young hands all too eager to manipulate a touch-screen. Although parents may password-protect their settings and profiles and take steps to restrict content, digitods are still gaining access either through purposeful or accidental means. Most respondents shared multiple examples wherein they have left the room temporarily, with smart devices in activation, and have come back to see their child playing with their cell phone or tablet—still open to the adult settings but at pages other than how they left the device. As reported, digitods are also curious by nature and often seek to find and use devices (even without parental knowledge or consent) that may have been set in a thought-to-be secure place. Precocious children were found climbing onto chairs to reach countertops where touch-screen laptops were set. And as the interview respondents recounted in several instances, young children were also caught reaching into purses, backpacks, and drawers, looking to find a parent's or sibling's smart phone with which to play games. Moreover, the intuitive interface of touch-screen technology makes smart media use more conceptually accessible to developing minds. Icons and other pictorial cues are interesting and offer immediate access to apps and other digital functions that enable young digitods to participate in digital exchanges more readily.

Beyond the prevalence and accessibility of smart tech, these devices and their functions are integral in our daily routines. We have developed somewhat of a digital dependence on our

smart devices. As indicated by the respondents, they are the mobile offices, the banking centers, the household hub of productivity. They are used to perform administrative tasks for work and for life. Parents relayed that they are often tethered to their devices in the home, even after work ends. People are poised to be ever-connected in this way—observing newer conventions of digital socialization. It is now more uncommon to metaphorically "go off grid," power down, or to be disconnected for the weekend. As the parents have shared, they must schedule time to do that, as connectivity and smart utility has become so intertwined with their daily routines.

Beyond being productivity hubs for parents, smart mobile technology is also instrumental for children as a practical tool of education, as the respondents have shared. The interviews revealed parents acknowledge their children need to develop computer literacy and digital proficiency as that is now the culture of primary and secondary education. Parents realize that helping their young ones to acculturate digitally gives their children intellectual leverage. This is especially the case as more mainstream schools are teaching computer skills and other digital literacies, even to our youngest students. Said poignantly, the healthcare manager from Hawaii (R6-F-48), related that "they [schools] don't teach cursive anymore, they teach keyboarding" (Personal interview, January 8, 2023). Whereas it was once a luxury, parents now see that having smart media in the home is commonplace and necessary.

Aside from the educational aspect of smart mobile tech use, parents are primarily looking to their devices to entertain their young children, to distract or soothe fussy babies, or to occupy or pass time on road trips, at restaurants, or during lengthy social gatherings, as each of the respondents recalled. Parents are letting their children stream music on Spotify and watch a marathon of cartoons and other video programming on YouTube- and Netflix Kids, even for up to tens of hours each week. As discussed by the respondents, the entertainment value was

perhaps even more significant to their households than was the utility of smart mobile tech. Still, the data trend showed that for the majority of households, parents treated smart mobile media as a tool that served many functions, important to the families.

Parenting Style and Digital Allowance

As touched upon in Chapter 4, respondents' parenting styles were found to be linked to the digital allowance they granted their children. A liberal sense of digital allowance may be a manifestation of the respondents' (self-reported) lenient or moderate parenting styles; and a conservative sense of digital allowance may be a manifestation of a stricter parenting style. In this case, a lenient or moderate orientation presented as:

- Allowing children access to smart media use at younger ages;
- Allowing them daily smart media use
- Allowing them multiple hours of use in a given sitting; and/or
- Allowing them smart media use without a guardian present.

The converse of these actions, or the absence of such, was found to be true in one of seven households with a reported "strict" parenting style, with one exception. The accountant from Hawaii with five children (and one on the way)—acknowledged having quite restrictive household rules, as well as a conservative religious background (R7-M-38). In this case, children in the home were only allowed to be on their smart devices for 30-minutes on Saturdays and 30-minutes on Sundays (Participant Interview, February 6, 2023). And although the family's youngest child had access to smart mobile media at the age of 16-months (as early access was

more the case with lenient and moderate households) that was found to be a function of having multiple siblings (four) in a clustered age grouping. In line with the operational profile of a strict parenting style in this case, the accountant also noted neither he nor his wife gave any of the children unmonitored time with smart media.

The other six respondents, who were either moderately strict or even lenient, were all found to let their children use smart mobile media daily. Four of the respondents allowed their children early access—to use smart media from the age of two or younger. These same six parents had a liberal sense of digital allowance, too, in that they frequently granted their children time with smart media—for several hours a week and at least one-to-two hours daily. In one case (R4-F-22), the homemaker and media student told the interviewer she let her 2-year-old watch more than five hours of streaming programming every day to keep her occupied and entertained (Participant Interview, January 6, 2023).[14] This was supposed to be impacted by the fact that the respondent was also caring for a newborn around-the-clock and may have needed to keep her toddler more engaged.

Findings, then, suggest that there is a positive correlation between a respondent's self-reported degree of leniency and parenting style and the average amount of weekly time children in the home spent using smart media. The more lenient a parent was found to be, the higher the child's average hourly use of smart media per week. This was established in three of the six households where alone- or unmonitored time with smart mobile media was also granted.[15]

[14] This was found to be an outlying response that was more than doubled the average use of the household with the next highest weekly average.

[15] One respondent with a moderate parenting style did not know if his twin digitods used smart mobile media without a guardian present, as he was found to be the secondary caregiver and was unaware whether his significant other had a differing approach.

These findings dovetail into an overarching indication of parental digital allowance—that, culturally speaking, digitods are more likely than not to be granted early-, frequent-, and even independent access to smart mobile media.

Also as a function of digital allowance, all seven parents used smart mobile media as a conditioning tool. Each respondent said they often used the promise of screen time as a reward for good behavior. Some examples shared indicated that rewards were extended when children played nicely at day care, ate all the food on their plates, cooperated with household chores or tasks, or listened to a parent's directions. Smart media use, in the respondents' accounts, was also posed as an incentive of sorts to affect a more positive or agreeable mood, or to influence a child's behavior to a certain end. In this sense, screen time was found to be an effective and positive motivator for children. Conversely, the same was found to be true—that the promise of taking screen time away—was also such a motivator. This is indicative of how young children become acculturated and habituated to smart mobile tech and media and how they begin to assign cultural value to the activity.

The Pandemic and the Technological Push

The social conditions imposed on society to help contain the reach of the global pandemic set a new precedence for remote education, especially in the context of primary or elementary instruction for new 4- and 5-year-olds attending Kindergarten online, as shared by six of the seven respondents. For these fresh, young students—most of whom had not yet had formal instruction on the visual shapes of alphabet letters, or the precursory lessons on the sounding-out, forming-, or reading of simple words—now had to engage online through laptops and tablets. This new social convention was thrust upon them and their families. And for what may once

have been used occasionally for entertainment, smart mobile tech use took on new significance in the home. At this time, most Kindergarteners' days were spent operating smart tech—either with a guardian or by themselves. While schools and teachers expected parents to monitor these sessions, adults were also at home in quarantine, some of whom were working remotely themselves and often had to divide their attention. This created a new kind of cultural dynamic in the home that placed an immediate emphasis on developing digital capabilities.

Furthermore, if households did not have tablets, schools often provided them. If digitods had limited smart mobile tech exposure in their own homes up to this point, they were then situated to become early- and regular adopters, assisted, then, by their institutions. By virtue of being mandated to learn remotely from home on smart mobile tech, digitods' media literacies were accelerated. Furthermore, the culture of being in quarantine together created conditions where the degree of familial modeling and mediated exchanges in the home may have been heightened, thereby further impacting digitods' overall tech and media literacy and proficiency. A completely unexpected and unparalleled global event, the pandemic presented families with unique opportunities and ways to facilitate schooling and socialization with outside peers and extended family that catapulted these children's digital capabilities.

Kid-Influencers and Cultural Celebrity Status

Digitods are of an impressionable age, and their attention is often drawn by fantasy elements, heroic characters, feats of magnitude, unusual and dynamic stories, and, of course, by other relatable social icons, like "kid-influencers." These cultural celebrities of sorts present on social media and other streaming apps as popular personalities. Ryan Kaji, for instance, from "Ryan's Toy Review," and later of "Ryan's World," is admired immensely by young children

around the world, according to Wikipedia ("Ryan's World," n.d.).[1816] With a growing 33.9 million subscribers to his YouTube channel, and a mounting 53 billion views across the platform (also listed by Wikipedia), Ryan's cultural success is undeniably staggering. Icons like this prove to be strong external media models for digitods and older children, too, especially as notions of popularity amongst peers and monetization surface.

The58uccesss of posts or content like this shows digitods that there is cultural and economic value in being online and being seen, especially as these young children are beginning to socialize in more formal settings, like daycares, preschools, and Kindergarten. This encourages children to become content creators themselves (along with their families' help) in a new wave of potential social media stars, as evidenced by one girl in the study, who at the age of five wanted to demonstrate how to make her favorite snacks to a YouTube Kids audience (Personal Interview, January 4, 2023). Or her younger brother, almost four at the time, who wanted to feature his green plastic army figures online in an epic battle scene to other children he didn't know... And even if digitods are not interested in copying the presentational format, they are still interested in the content, intrigued by the products, and engaged by the characters and storylines in the posts. Kid-influencers are relatable, and they prompt digitods to interact more in the digital sphere. The end result is notable impact: this cultural celebrity status can be a strong motivating force, potentially inclining digitods to become more proficient with technology and smart mobile media conventions, as well as to engage with media to deeper degrees as they become more participatory in online kids' culture.

[16]In five of the seven respondent's interviews, "Ryan's World" was related as being a favorite character or program in the household. One respondent (R2-M-37) noted his 5-year-old daughter pressed him to help her create her own YouTube channel, modeled after Ryan Kaji's platform. Other children in the study mimicked Ryan's format offline in their families' homes.

The Selfie and the Egocentric Child

In a parallel way, the data also suggested that digitods were possibly primed to develop a personal, inflated sense of cultural importance, even status, by observing others in the home taking selfies and posting them online. In this way, social media interaction and the familial modeled behavior of adults and older children in the home may impact digitods' own growing sense of self and their developing egos. As data from all seven households indicated, these young digitods (13 of 14 children) loved to take selfie pictures and video clips, admire themselves, and also share the pictures with their parents, siblings, or other extended family members that might stop by to visit—so they, too, could admire the selfie content. Even the 16-month-old child of the Hawaii accountant was said to be acculturated to taking pictures with the forward-facing camera (Participant Interview, February 6, 2023). Sometimes they would be of her feet or her T-shirt, the respondent relayed, but he mentioned the family could tell what she doing while attempting to copy her big brother taking a selfie. Similarly, the musician and father of one, R5-M-39, laughed as he spoke about his five-year-old that had been "way too into selfies," he noted, since the age of three. He shared how the selfie content on his son's tablet was so great at one point that he had to reset it because "he bogged down the memory just taking videos of himself…he's a …narcissist…I can't even sugar coat it. This kid is obsessed with himself" (Participant Interview, January 8, 2023). Although the term "narcissist" was used comically in this sense, it is somewhat indicative of how digitods are not only learning how to operate and navigate smart tech and media by observing their families, but they are also picking up the kinds of social cues that signal a flair for self-admiration. Since each of the digitods studied here, aside from the newborn, was found to engage in this kind of fun-loving mode of self-capture, it is reasonable to

project that this may point toward a growing phenomenon in the mainstream or dominant collective culture.

Limitations of the Study

Data collection attempted to include a sample representative of the larger population, employing some selectivity to the recruitment stage. Inherent limitations with the breadth of this data set, however, may stem ultimately from material collected from only seven in-depth interviews. The sample size was limited; therefore so, too, may be the yield. Additionally, conducting a study that was not based on participant-observation of actual digitods and their organic behavior in this context, may have led to less substantive findings. That approach, however, was not possible within the scope of this research.

Further limitations may lie in the construct of the interview questions itself, which may have failed to account for unforeseen aspects of the phenomena. While follow-up questions left some margin to explore certain responses further, it is possible that the interview guide was not comprehensive enough in addressing the aims of each of the four research questions. Additionally, the original research questions themselves may have fallen short of identifying the full scope of the kinds of occurrent phenomena.

The degree of respondent participation could have potentially been a limitation in that interviewees may have only wished to engage the researcher on a superficial level so as not to extend the duration of the somewhat lengthy, uncompensated interviews. Also, personal reasons may have made respondents less inclined to answer questions fully.

In terms of inclusivity: while the sample size of digitods referenced in the data set represented an equitable dispersion of ages, only three of 14 children were less than two years-

old. This may have skewed results in terms of underrepresentation of that age grouping. Moreover, respondents' recollection of events from their children's younger childhood years, may have been incomplete; or, they may have forgotten examples of behavior that satisfied interview questions, thus making them less apt to offer substantive answers or feedback.

CHAPTER 6: CONCLUSION

This study discovered that children are being born into a new age of digital culture, and they are thriving. Even the two-week-old newborn (the youngest digitod included in the 14-child study), while not an active-user per se, was found to be at the center of a household with a high saturation of smart devices. This was his home environment. And digitods not much older than one-year are navigating touch screen interfaces and consuming smart mobile media with their family members and even by themselves. The technology is prevalent and integral to family life and people's daily routines; and because of this, digitods are being continually primed to learn the function of smart mobile tech and the conventions of smart media use. Whether by parental demonstration or explanation, sibling reinforcement, digitods' proximity to other mediated exchanges, or their purposeful observation, these children are gaining online command. Even more outstanding, it is these mediated exchanges in the home that are situating digitods as active media users, casting them ultimately into an economic paradigm as their participation with smart media feeds into the undercurrent of algorithmic data profiling. And the sensory stimuli and other immediate pop-up prompts of these programs grab and hold digitods' wavering attention spans.

While scant existing research confirms algorithmic targeting of digitods is indeed happening, this study adds to the growing discipline—indicating that these phenomena are not occurring in a vacuum or confined to households with (the supposed) more affluent means to acquire smart mobile technology. Demographic reports reveal this is in our mainstream culture: the tech is accessible at every economic stratum to some degree, because people assign it great cultural import. As the research indicated, every adult in the households that were represented,

and 13 of 14 young children, either had multiple smart mobile devices themselves or had access to at least one of several devices in the home. It is also in our primary educational institutions. Smart media use is a collective and solitary activity, alike—ever present. Chiong and Shuler (2010) echo this notion saying, "young children are using smart mobile devices: Many have access to them, they like them, and they are good at using them" (p. 28). With the ease of picking up a native tongue, they are adapting to their mediated environments especially by virtue of absorbing familial modeling in the home. It is through these social interactions with family members that children begin to make sense of the world around them. They are acculturated from birth and habitualized to live in a connected space—one that positions them to be on a global spectrum with great accessibility and immediacy. There is a principal inherent charge that goes along with that, however. As indicated by the results, parents interviewed also wished to help balance the digital and physical realms for their children, while they develop their own aptitudes and literacies, allowing them to cultivate activities both online and in the real world—like jumping on the trampoline in the yard, as the Hawaii healthcare worker added (Participant interview, January 8, 2023).

This study also supports previous research that found that babies and toddlers are playing active roles in the ways they begin to shape their online identities and as such are targeted by commercial conglomerates (Nansen, 2015; Burroughs 2017). Either through proxy, by virtue of mistaken or accidental input, or through the automaticity of online features, information is cycling through these data-driven algorithmic programs. Digitods are thrust into channels that position them as active and participatory end-users. Data from this study shows young children are raised in polymediated environments, wherein they register digital culture in the same ways in which they may process other ambient sensory cues around them. These cues are ever-present,

and they begin to make a cumulative impact on children's Internet cognition. Parents may not fully comprehend the extent to which smart mobile tech and media may prime their young ones, but they find evidence of these phenomena all around them in their daily experiences through their children's behavior.

Although findings did not reveal specifically *how* infants (12 months of age or younger) may be participating actively in smart mobile media use, these digitods on the younger end of the spectrum are indeed positioned in homes where the modern conveniences and conventions of smart technology abounds. Infants are also taking in visual and aural cues, and other social encounters, that help condition them for later participation in mediated exchanges. In this sense these social interactions act as fundamental exposure by which digital literacy will later begin to develop.

This study further finds support for cultural discussions on contemporary parenting practices as addressed by Burroughs (2017), who noted the rise of the "app economy" and "mobile parenting," as children's consumption of televisual content on mobile devices increased into the toddler years. Respondent R3-M-41, the musician with four children, said something telling, that touches on the notion of this contemporary mode of parenting: he relayed that smart tech is often the "A.I. babysitter" in the home (Participant Interview, January 4, 2023). All seven respondents agreed, having shared through numerous examples, that this was the case in their respective homes. They each spoke of the ways in which letting their children use smart mobile media offered parents a little break, or quiet time, or allowed them to take a moment for themselves to decompress. Self-reportedly, parents often gave in to apps that streamed material to entertain and engage their children for (sometimes) hours at a time.

As Benjamin Burroughs (2017) also asserts, because babies and toddlers are positioned as active users, big business is tailoring statistical machine learning algorithms to identify, capture, and entice the attention of growing digitods for the purpose of target-marketing. This study establishes only a relative common thread in this regard, indicating the commercialization of infant culture may be happening to an extent, but not to the end that this study can claim it. In this sense, the phenomena are only creeping into our collective cognizance, as parents interviewed alluded to detecting a heightened awareness of digital and sensory cues seemingly aimed at the preschool audience. While only two of the 14 digitods studied were reported to have purchased anything online; it is noteworthy to mention that in both cases, the children did so while on a parent's feed versus while on a kid-content channel. Thus, these findings cannot substantiate or prove with any confidence that babies are truly acting as consumers. However, perhaps if the study were replicated to include a wider, more representative sampling, findings would be more conclusive. The data trend shows, however, that they are engaging actively to increasing degrees as they near the ages of four and five. Beyond the digitod scope, the study indicates that children six through 10 have much more agency, autonomy, and online engagement.

Theoretical Implications

Weaving a discussion on contemporary SCT implications back into the fabric of this study helps ground the examination of these phenomena, as applied to new media and digital culture. The data set was laden with support for SCT principles at work, which, again, advances that young children learn about the world around them through qualitative communicative and cultural exchanges with others around them (Vygotsky, 1978). The subsequent points lay out how this study found contemporary examples of these principles. Furthermore, and contrary to

the initial scope, evidence of Uses and Gratifications Theory principles also factored into digitods' mediated learning experiences.

The Sociocultural Theory at Work in a Digital Setting

Support of four SCT principles were found applicable to this study's findings of how digitods' learn in the home through familial modeling and other mediated exchanges. First, digitods' *use* of smart mobile media constitutes as a "dominant activity," wherein as Wartella et al. (2016) assert—digital interactive technologies can serve as a platform upon which digitods can socialize, learn higher concepts, and make sense of cultural norms. For 13 of the 14 children studied (all except the newborn), this dominant activity proved to be effective in facilitating sociocultural learning in the home, prevalent in all seven households included in the analysis.

Second, the data evidenced notions of the "zone of proximal development" functioning, wherein Wartella et al. (2016) further discuss how the use of technological infrastructure also supports how digitods bridge gaps in their understanding. New media and tech, in this sense, was shown to be a part of digitods' cognitive development in a digital climate, standing in as a proxy for sociocultural exchanges with other knowledgeable adults when used without a guardian. Parents noted their children learned through self-experimentation with smart tech and media.

Third, Vygotsky's (1978) SCT discusses how tool mediation helps scaffold learning for young children. In a similar way, and as Edwards et al. (2016) advance, the principle can be applied to digital culture in that touch-screen interfaces and digital footprints function as physical and conceptual tools, respectively, that enhance children's cognitive development. In this study, digitods were found to use touch-screen interfaces to access online activities and other interactive apps that promoted their learning and helped them make sense of their environments.

Moreover, the digital footprints left by these young children, either actively or passively, were found to feed into cyclical algorithmic culture, as these feedback loops signaled these profiling, data-driven programs. In this sense, their tool mediation functioned as a way to assist in developing cognitive understanding.

Fourth, the data set indicated digitods were acting as "socially agentive agents," with the capacity to engage in consumer culture and play activities. As Edwards (2014) and Edwards et al. (2014) assert, digitods are forming cultural connections and meaning by engaging in consumer purchases and other play apps that prompt mastery of higher concepts and cognitive thinking. In combination, these four principles of SCT were represented by the data set and exemplified, in part, how these digitods learned through sociocultural and mediated interactions.

Revisiting the Uses and Gratifications Theory

Initially, the Uses and Gratification Theory was ruled out because it required not only active participation in evaluating, selecting, and using media, but it also required the user have a developed sense of media literacy and an elevated awareness of the range of options and uses in which one could indulge. Digitods, or children ages zero to five, did not seem to fit that profile readily. However, data analysis revealed that there is some applicability here in that for many of the 14 children studied, there was some engagement in self-directed media activities. Children were selecting which movies or cartoons to watch, depending on their moods. They were ranking their favorite streaming apps. They were selecting which games to ask their parents to buy and which art apps to use to create drawings, collages, and other elementary creative projects. They were experimenting with Snapchat filers. And they were downloading and playing their favorite songs to sing and dance to. This is indicative, then, that UGT principles are also operating here at

some cognitive level, even if the digitods' don't fully understand the range of options available to them. Although as Sundar and Limperos (2013) assert—that interaction with Internet-based apps and sites requires an even higher level of awareness—perhaps on some base level, digitods are beginning to assign cultural value to smart media use and thereby also *seeking* to develop the consumer savvy that enables media consumption to varying degrees.

Digital Fluency and SMLs

As growing digitods become more capable, and as their agency and smart media usage increases, so, too, can their digital fluency expand. A savvier, more socially agentive, young digital consumer can emerge on some level. And as these digital natives become more active users, they can (in theory) also become more discerning in how they engage online, ultimately "teaching" SML algorithms to better understand a truer digital profile. In doing so, they can better prompt these programs to create more equitable digital assignments in this ongoing cyclical, "elastic" relationship. Applying Burrell's (2016) notion of the "politics" of algorithms and how they make "socially consequential predictions," then, this expanded competency can only be favorable in terms of signaling more objective classifications as they potentially impact social mobility and real-world digital opportunities as digitods age (p. 3).

Recommendations for Future Research

While this study identified some of the practical means by which digitods are learning to operate smart mobile tech, cultivate smart media skillsets, develop Internet cognition, and curate their own content feeds, there is much left for social science research to discover. This study did employ rigor in the data collection and analysis and found credibility in the consistencies among

the seven families' reporting. Furthermore, the recurrent patterns established in the data set cast these trends as valid. From a methodological standpoint, however, replicating this study can incorporate the use of an additional coder/s to help bolster the reliability of the results. To this end, researchers may apply a quasi-inductive approach that may be enhanced with the development of a code book prior to data analysis.

Ongoing studies may seek to better understand how digitods curate their own digital feeds, considering the finer functions of feedback loops. Research methodology may also develop and incorporate less intrusive ways of evaluating digitods in their home environments to better examine phenomena at work, so as not to have to rely solely on parents' (perhaps partial) recollections of past events and behavior. Future endeavors might center specifically on infants and rudimentary touch-screen learning, useful in identifying the kinds of variables that shape and affect Internet cognition specifically for children ages zero to two. As aforementioned, subsequent studies may aim to collect data from a broader sample size that includes a higher count of infants to yield results that are more inclusive and representative of the younger end of the digitod spectrum.

It may also be prudent to include an expanded, developed analysis on the technical aspects of algorithmic structure in addition to algorithmic culture—*à la* Striphas (2015), Hallinan and Striphas (2016), Dourish (2016), and Burrell (2016)—in terms of better understanding the role it may play in digital predictions. While this study largely focused on the overarching fundamental function of SMLs, broadening the scope here may also help to underscore more clearly how the veil of "opacity" and corporate protection works in a commercial context.

Extended considerations of this study also implicate a need to evaluate how prolonged screen-time use and patterns of smart media consumption may affect digitods' attention span,

cognitive processing, and wellbeing. Furthermore, longitudinal behavioral research can further examine the larger ramifications of sociocultural learning in a digital sphere, especially in terms of identifying the ultimate impact of child data mining, privacy issues, and cyber safety.

APPENDIX I: TABLES

Table 1

Respondent Demographics

	R - 1	R - 2	R - 3	R - 4	R - 5	R - 6	R - 7
Age	30	37	41	22	39	48	38
Gender	Female	Male	Male	Female	Male	Female	Male
Occupation	TV Media Specialist	Media Production	Musician	Homemaker/ Media Student	Musician	Manager Health Care	Accountant
State	NV	NV	NV	NV	NV	HI	HI
Primary Ethnicity	Hispanic	Filipino	Hispanic	Caucasian	Caucasian	Hawaiian	Chinese
Economic Status	Low Income	Middle Class	Middle Class	Middle Class	Middle Class	Middle Class	Middle Class
Household Dynamics	Multi Family	Multi Family	Single Family	Single Family	Single Family	Single Family	Single Family

Note. *R* = Respondent.

Table 2

Household Breakdown

	R - 1	R - 2	R - 3	R - 4	R - 5	R - 6	R - 7
Total # of People Living in the Household	8	7	6	4	3	6	7
# of Adults Living in the Home	6	5	2	2	2	4	2
#/Gender of Digitods in the Home, Ages 0 - <2	- -	--	--	1 Boy 1 Girl	--	--	1 Girl
#/Gender of Digitods in the Home, Ages 2 - 5	--	--	1 Boy 1 Girl	--	1 Boy	--	1 Girl
#/Gender of Children in the Home, Ages 6 - 10	1 Boy	1 Boy 1 Girl	--	--	--	1 Boy	1 Boy 2 Girl
#/Gender of Children in the Home, Ages 11 - 17	1 Girl	--	1 Boy 1 Girl	--	--	--	--

Note. *R* = Respondent.

Table 3

Smart Devices in the Home

		Smart Mobile Tech					Smart Homebase Tech		
	Total # of Devices	Cell Phone	Tablet	e-Reader	Laptop	Smart Watch	Gaming Console	TV	Virtual Assistant
R - 1	19	8	5	--	--	--	3	3	--
R - 2	15	7	1	--	2	2	--	3	--
R - 3	16	4	2	--	4	--	2	4	--
R - 4	7	2	--	--	2	--	1	--	2
R - 5	12	2	4	1	--	--	2	3	--
R - 6	13	5	3	--	--	--	1	3	1
R - 7	9	4	2	--	2	--	--	1	--

Note. *R* = Respondent.

Table 4

Digitods' Smart Mobile Tech Usage & Parenting Style

	Age at First Use	Average Time per Week on Devices	Monitored Yes / No	Alone Time Granted Yes / No	Password Protected Yes / No	Parenting Style
R - 1	4	7 hrs.	Yes	Yes	Yes	Lenient
R - 2	2	10.5 hrs.	Yes	No	Yes	Moderate
R - 3	3	7 hrs.	Yes	Unknown	Yes	Moderate[a]
R - 4	18 mos.	37.5 hrs.	Yes	No	Yes	Moderate
R - 5	3	18 hrs.	Yes	Yes	Yes	Lenient
R - 6	2	14 hrs.	Yes	Yes	Yes	Moderate
R - 7	16 mos.	1 hr.	Yes	No	Yes[b]	Strict

Note. *R* = Respondent.

[a]Parenting styles are divisive, and the respondent is not the primary caregiver.

[b]Children know the family passwords.

APPENDIX II: IRB APPROVAL

Date: 3-10-2023

IRB #: UNLV-2022-550
Title: Digitods, Statistical Machine Learning Algorithms, and Internet Cognition: Sociocultural Learning through Familial Modeling and Mediated Exchanges
Creation Date: 11-3-2022
End Date:
Status: Approved
Principal Investigator: Gregory Borchard
Review Board: Social/Behavioral
Sponsor:

Study History

Submission Type Initial	**Review Type** Exempt	**Decision** Exempt

Key Study Contacts

Member Gregory Borchard	**Role** Principal Investigator	**Contact** gregory.borchard@univ.edu
Member Sina Foley	**Role** Primary Contact	**Contact** foleys@univ.nevada.edu

APPENDIX III: PARTICIPANT SCREENING TOOL

In-Depth Interview: Screening Tool for Potential Respondents
Abbreviated Title: Digitods' Mobile Smart Tech Use,
Sociocultural Learning, and Familial Modeling

Sina K. Foley
Master's Student
Hank Greenspun School of Journalism and Media Studies
November 2022

This study aims to add to our understanding of how digitods, or digitally acculturated children ages 0-5, may be susceptible to algorithmic culture and digital marketing, as their interactions with family mediated exchanges position them to be active media users. The sample size will be 8-10 respondents for interviewing, of which responses from 5-7 participants will be integrated in the analysis. Respondents must meet all the criteria below to be included the study.

- The respondent must be a parent or full-time legal guardian of one or more children, ages 0-10.
- That child/children must have had some exposure and experience in using smart tech (like touchscreen laptops, tablets, and/or mobile phones), either alone, or attended by an adult or older sibling.
- The respondent must speak English.
- The respondent must voluntarily be willing to devote 60-90 minutes of their time engaged in an audio-recorded online in-depth interview through a free app.
- The respondent must be willing to sign and submit an informed consent form.

APPENDIX IV: INFORMED CONSENT

UNLV

INFORMED CONSENT

Department of Journalism & Media Studies

ABBREVIATED TITLE OF STUDY: DIGITODS' MOBILE SMART TECH USE, SOCIOCULTURAL LEARNING, AND FAMILIAL MODELING

INVESTIGATOR(S): PRINCIPAL INVESTIGATOR – DR. GREGORY BORCHARD; STUDENT RESEARCHER – SINA K. FOLEY

For questions or concerns about the study, you may contact **Sina K. Foley at** foleys@unlv.nevada.edu **or at 702.336.4445.**

For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted, contact **the UNLV Office of Research Integrity – Human Subjects at 702-895-0020 or via email at IRB@unlv.edu.**

PURPOSE OF THE STUDY

You are invited to participate in a research study. The purpose of this study is to add to our understanding of how digitods, or digitally experienced children ages 0-5, may be susceptible to digital marketing, as their interactions with family and smart tech and media position them to be active media users.

PARTICIPANTS

You are being asked to participate in the study because you fit these criteria:

1. You must be a parent or full-time legal guardian of one or more children, ages 0-10.
2. Your child/children must have had some exposure and experience in using mobile smart tech (like touchscreen laptops, tablets, and/or mobile phones), either alone, or attended by an adult or older sibling.
3. You must speak English.
4. You must voluntarily be willing to devote 60-90 minutes engaged in an audio-recorded online in-depth interview and to later have the anonymous transcripts used in presentations and other written products.
5. You must be willing to sign and submit an informed consent form.

PROCEDURES

If you volunteer to participate in this study, you will be asked to do the following:

1. Set an appointment at a time and date that's convenient for you to engage with the researcher for 60-90 minutes in an (anonymous) online interview through the free app, Zoom.

2. Meet with the researcher, virtually, at the agreed upon time to facilitate the in-depth interview where you will answer a series of questions about your demographics and your recollections of your young child's use of smart tech/media, and other familial interactions in the home. You will have the opportunity to elaborate on interview-items or decline to answer any of them.

BENEFITS OF PARTICIPATION

There may not be direct benefits to you as a participant in this study. However, we hope to learn more about how children ages 0-5 learn to engage with smart tech/media through social interactions in the home, as well as how they may be purposefully or accidentally participating in consumerism.

RISKS OF PARTICIPATION

There are risks involved in all research studies. This study may include only minimal risks. For instance, you may become uncomfortable in discussing your demographics or in the recalling of family dynamics. Additionally, there may be a very small risk of breach of confidentiality as a 100% guarantee cannot be confirmed.

COST /COMPENSATION

There may not be financial cost to you to participate in this study. The study will take 60-90 minutes of your time. You will not be compensated for your time.

CONFIDENTIALITY

All information gathered in this study will be kept as confidential as possible. No reference will be made in written or oral materials that could link you to this study. All records will be stored in a locked facility at UNLV for one year after completion of the study. After the storage time the information gathered will be destroyed.

VOLUNTARY PARTICIPATION

Your participation in this study is voluntary. You may refuse to participate in this study or in any part of this study. You may withdraw at any time without prejudice to your relations with UNLV. You are encouraged to ask questions about this study at the beginning or any time during the research study.

PARTICIPANT CONSENT:

I have read the above information and agree to participate in this study. I have been able to ask questions about the research study. I am at least 18 years of age. A copy of this form has been given to me.

Signature of Participant _____ Date _____

Participant Name (Please Print) _____

**Audio Taping:
I agree to be audio-taped for the purpose of this research study and understand that an anonymous transcript of the interview may be used in various written scholarly products to some extent.

Signature of Participant _____ Date _____

Participant Name (Please Print) _____

APPENDIX V: INTERVIEW GUIDE

Respondent Identifier # _____

In-Depth Interview – Abbreviated Study Title:

Digitods' Smart Mobile Tech Use and Sociocultural Learning in the Home

Researcher Script

Thank You

I will begin the recording now. Thank you _(Respondent Identifier)_ for agreeing to do this interview and for taking the time to meet with me like this. Your responses are very important to this study, and I appreciate you being willing to talk about your child/children with me today. I want to assure you that your participation in this in-depth interview will remain anonymous.

Synopsis of Study

To recap what I emailed you earlier, this study will ask you to recall various interactions you have had *with* your child/children, ages 0-5, and their use of smart technology (touchscreen laptops, tablets, and/or mobile devices). You will also be asked to recall observations you've made of your child/children while using smart tech and apps alone. This study is geared at understanding how very young children, or digitods, learn through mediated social interactions in the home, and how they may be engaging with smart apps.

Directions

I will ask you a series of questions. I'd like you to answer each one as completely and descriptively as you can. Please, at any point, if you are uncomfortable, you may decline to do so. Now, do you have any questions for me before we begin?

(After answering any questions or addressing any concerns the respondent may have, the following interview script will be posed verbatim to each participant. These base interview questions will allow for expanded discussion and any relevant turn of topics. However, the researcher will mediate accordingly to keep the interview to task if discussions fall off-track. The researcher may also prompt the responder for deeper explanations or examples to capture a question-item more thoroughly. Lastly, questions will either be posed in terms of a single qualifying child in the home or more than one).

The first section touches on demographics.

1. How many children ages 0-5 do you have?
2. What is your child's current age?
3. Approximately how long has your child been using smart devices or apps?
4. What is your relation to the child?
5. How many individuals are there in your household?
6. Is there another parental or guardian figure in the home?
7. Aside from parents or guardians, what other individuals are living in your home?
8. What are the ages of other older siblings/individuals in the home?
9. What U.S. state do you live in?
10. What is your primary ethnicity?

11. What's your current occupation?
12. What would you say is your perceived socio-economic status: affluent, upper middle-class, middle-class, lower-middle class, or resource-constrained?
13. Approximately how long would you say you've been using smart tech yourself?

This next section touches on accessibility.

14. How many smart devices do you typically have in the home between all the family members? Touchscreen laptops, tablets, and/or mobile phones?
15. Is screen time or usage monitored in your home for any of your children? Talk a bit about that.
16. Does your child have the ability to access any smart devices without a guardian present? Please discuss.
17. Do other family members share or use smart devices with your child for play or other purposes? Talk a bit about that.
18. Does your child go to a daycare or preschool where they have computer access? Please talk a bit about that.
19. Have you ever observed your child using smart tech/media with a guest to your home? Please discuss.
20. Does your child have his/her own smart devices? If so, talk a little bit about that.

This next section centers on some of your earliest basic recollections.

21. How old was your child when he/she first experienced using smart tech?
22. And what was the device?

23. Describe your recollection of some of his/her first handling of smart devices?
24. Has your child ever come upon a device in the home by accident—perhaps it might have been left out—and tried to use it on his/her own? Talk a bit about that.

This next section asks about your child using smart devices unattended.

25. Is your child allowed to use a smart device unattended? Please elaborate.
26. Approximately how old was your child when he/she first used smart tech unattended? Can you provide any other details about this?
27. Is your child given smart devices to occupy his/her attention, or to pass the time? Please share a bit about that.
28. Is your child given smart devices for any other reasons?
29. What kinds of apps or features does/did your child like to engage with while using devices alone? Describe each, please.
30. Have you ever come to learn that your child took a smart device without your knowledge, trying to use it? Please discuss.
31. If so, what do you think he/she wanted to do with it?

This next section touches on the child's app usage – either alone or with a guardian.

32. What are your child's favorite activities to do with a smart device-either by use alone or with a guardian? Share a bit about that.
33. What are your child's favorite apps or features, and what are they like? Please describe them.

34. What kind of app features does your child like to respond to? For instance, funny sounds, pop-up buttons, certain icons, flashing lights, or vibrations from the device? Talk a bit about that. Any anecdotes?
35. How does your child seem to react to touchscreen interfaces in general? Please share a bit.
36. Has your child ever accidentally taken and/or sent selfies? Please discuss.
37. Has your child ever tried to purchase something online? If so, please describe.
38. Has your child ever brought you a smart device showing you something he/she wanted you to buy? Talk a bit about that.
39. Has your child ever brought you a smart device asking you to download other apps or games? Please discuss.
40. Does your child try to gesture or tap at the screen to select options? Please elaborate.
41. Have you known your child to tap on any recommendation features? Please discuss.
42. Has your child ever come to you to reset the screen if a pop-up prevented him/her from play? Talk a bit about that.
43. Has your child ever accidentally subscribed to something? Please share a bit more about that.
44. Does your child watch any video streaming apps? If so, which ones?
45. If your child watches video streaming apps, what is that experience typically like for him/her? Please discuss.
46. What kind of things might your child have been frustrated by in terms of working a device or an app? Talk a bit about that.

47. What's your child's favorite thing to do on a smart device? For instance, listen to music, talk to family or friends, take pictures, play games, read books… Talk a bit about that.
48. Approximately how much time do you think your child spends on smart devices or apps each day/week? Please discuss.
49. What do you think your child thinks about social media? Please discuss.
50. What are some experiences your child has had with social media?
51. Has your child ever effectively curated (selected preferred content) on a social media feed? Please discuss.

This next section touches on family modeling and Internet Cognition, or awareness.

52. Does your child copy any actions you or other individuals in the home do with smart tech and apps? Like gesture, click buttons, or swipe? Please share a bit more about that.
53. Do you ever notice your child trying to "swipe" or "touch" on other non-smart tech surfaces – like a TV or book. Please elaborate.
54. What are your favorite activities to do with your child online and why? Please discuss.
55. What is your child's reaction to some of these activities?
56. What people in the home may have taught your child about how to get onto the Internet and/or to use any of the apps? Talk a bit about that.
57. Who is your child's favorite person in the home to go to when he/she wants to use smart tech/media?
58. How did your child come to learn how to navigate the interface of the device or any of the apps? Please share.
59. Do you think your child has an idea of what cyber safety is? Please discuss.

60. Do you think your child understands some notion of Internet privacy? Please discuss.
61. Based on your observations of your child with smart tech and apps, what do you think he/she thinks the Internet is used for?
62. Has your child ever reacted negatively toward a smart device or app? Please elaborate on that and to what you think the reason might be.

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Primary Sources

Respondent 1, Female, 30

Application: Grain

Workspace: Digitods' Mobile Smart Tech Use: In-Depth Interviews

Date: December 28, 2022

Length: 1:10:43

Recording Link: https://grain.com/share/recording/ab8126fa-6327-4970-867a-0dcbd2374fec/1YmlcIPky5IoWhTOq9of9F2xQ7x8iYrXvIErSis4

Respondent 2, Male, 37

Application: Grain

Workspace: Digitods' Mobile Smart Tech Use: In-Depth Interviews

Date: January 4, 2023

Length: 1:14:51

Recording Link: https://grain.com/share/recording/68872710-812d-4c47-badf-7f668cb9b154/rS4FsKgg0xKjgdFsB7MfXAlEExoAgmBE1fjOGbdb

Respondent 3, Male, 41

Application: Grain

Workspace: Digitods' Mobile Smart Tech Use: In-Depth Interviews

Date: January 4, 2023

Length: 0:44:37

Recording Link: https://grain.com/share/recording/4805b1c0-8a53-42e3-8167-f439da89f3af/qLEWnthx1QFecOdHE1wX3It0HM2QMlJxFgonJDsA

Respondent 4, Female, 22

Application: Grain

Workspace: Digitods' Mobile Smart Tech Use: In-Depth Interviews

Date: January 6, 2023

Length: 0:48:46

Recording Link: https://grain.com/share/recording/a6df3ca1-0362-4835-990a-4c6ae9f840af/7DZiF1vW8kShWTvAGoN3GPhcHvNWB5SNslSGRkxR

Respondent 5, Male, 39

Application: Grain

Workspace: Digitods' Mobile Smart Tech Use: In-Depth Interviews

Date: January 8, 2023

Length: 1:08:52

Recording Link: https://grain.com/share/recording/7a3f7062-3500-43d4-802e-c8e8204af554/PCOczkayN9mnwLsnJscnaIcGNzcxTJkmCYNherZ0

Respondent 6, Female, 48

Application: Grain

Workspace: Digitods' Mobile Smart Tech Use: In-Depth Interviews

Date: January 8, 2023

Length: 1:18:34

Recording Link: https://grain.com/share/recording/228073c3-303e-406b-ac45-e79d74d7fc5a/3tzv3P7umsU20aEdP8GXoLlQMpzCAqqSPpXvMZxr

Respondent 7, Male, 38

Application: Grain

Workspace: Digitods' Mobile Smart Tech Use: In-Depth Interviews

Date: February 6, 2023

Length: 0:59:54

Recording Link: https://grain.com/share/recording/6c692eb2-f89c-48cd-af5e-3776a0b06af7/zB06SQsqNBQozwvSuE5wZ4LmZXOStVkOZRoLYuO7

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