

## Kids Closer Up: Playing, Learning, and Growing with Digital Media

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**Abstract**

While large-scale surveys have documented the types of media to which 5–9-year-olds are devoting increasing amounts of time, we know less about how and why they are using these media and what they might be learning as a result. This research provides rich details on the processes, relationships, and contexts that larger-scale studies on children’s media use cannot by examining two 8-year-old girls’ engagement with video games, the Web, mobile devices, and other emerging technologies against the backdrop of family life. What roles are parents and others playing in their digital media experiences? And how is their engagement with digital media related to family values, relationships with peers and siblings, and what they are doing at school? Ethnographic methods and ecological perspectives on learning were used to craft these portraits. The case studies illustrate how young children’s access to and interest in technology are shaped by cultural, institutional, interpersonal, and developmental forces and, in turn, how access and interest shape individual learning. Findings build upon other fine-grained studies of young children’s digital media use and learning, bringing to bear the particularities of the era, locale, and culture of the two individuals I studied to refine our collective and ever-evolving portrait of the 21st-century child.

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## Introduction

Until now, adolescents have received most of the attention as far as video game, Internet, and cell phone use are concerned, from both the press and the research community. But digital engagement begins well before adolescence. When and where are children first being introduced to digital media, by whom, and why? What roles are parents, siblings, and other family members playing in shaping children's early interactions with media? And what about these interactions do kids find so endlessly amusing?

Young children today are surrounded by digital media. U.S. households with kids ages 4–14 own, on average, 11 consumer electronic devices (NPD Group 2009), which means they are spending a good chunk of their waking hours texting friends from mobile phones, playing video games, grooving to their iPods, and hanging out on websites like [Club Penguin](#) and [Webkinz](#). A study sponsored by the Kaiser Family Foundation (KFF) found that youth ages 8–18 were spending 7 hours and 38 minutes with media in 2009—an hour more than they were in 2004 (when they spent 6.5 hours). And kids' new media use is not replacing the time they spend with older media, like television and music. Youth are instead *media multitasking*, or squeezing the extra hours of media use—for a total of 10 hours and 45 minutes of media exposure—into 7.5 hours of the out-of-school portion of their days (Rideout, Foehr, and Roberts 2010).

This and other large-scale surveys (e.g., Common Sense Media 2011; Lenhart and Madden 2005; Lenhart et al. 2007; Nielsen Company 2009; Gutnick et al. 2010) provide valuable snapshots of the amount of time children are spending with what types of media. Yet they tell us little about how and why kids are using these media or what, if anything, they might be learning as a result.

## Background: The Myth of the Digital Generation

In the past decade, a host of newspaper and magazine articles, TV news features, and books have attempted to characterize the *digital generation* (e.g., Tapscott 1998, 2009; Prensky 2001; Howe and Strauss 2008; Palfrey and Gasser 2008; *Frontline* 2010) and have presented a polarized view of what young people are doing online, behind closed bedroom doors. Headlines vacillate between “Violent video games linked to child aggression” (Harding 2008) and “Can video-game companies revolutionize teaching in

the 21st century?” (Green 2007). Parents are either alarmed or excited by what the Internet, video games, and cell phones can do to—or for—their children. The telephone, radio, and television evoked similar sentiments among previous generations of parents (Wartella and Jennings 2000), but some assert that today's technologies are fundamentally transforming the way children play, think, and learn. Journalists and scholars alike say that digital media support creative expression and peer collaboration; foster technical troubleshooting and computational thinking; and inspire civic engagement, global awareness, and environmental stewardship (e.g., Jenkins et al. 2006; Markus 2009; Weigel et al. 2009). As a result, today's “digital natives” and members of the “Net Generation” are, according to authors like Prensky (2001) and Tapscott (2009), more innovative, more enterprising, and more fluent with information technologies than the generations before them.

However, critics charge techno-enthusiasts like Prensky as being overly optimistic and basing this optimism on anecdotal rather than empirical evidence (e.g., Bennett, Maton, and Kervin 2008; Buckingham 2008). Children are indeed being born into a digital world: consumer electronics are now accessible to populations that a decade ago could not afford them. Yet the digital divide persists. Most children in the United States now have access to computers at home and at school, but according to Warschauer and Matuchniak,

Today the digital divide resides in differential ability to use new media to critically evaluate information, analyze, and interpret data, attack complex problems, test innovative solutions, manage multifaceted projects, collaborate with others in knowledge production, and communicate effectively to diverse audiences—in essence, to carry out the kinds of expert thinking and complex communication that are at the heart of the new economy. (Warschauer and Matuchniak 2010, p. 213)

Lenhart and Madden (2005) have confirmed these disparities empirically, finding that of all U.S. 12–17-year-olds who go online, only 57% have built a blog or webpage; posted original art, photos, stories, or videos; and/or remixed online content. This figure hardly reflects an entire generation of technology-savvy individuals.

Recent ethnographic work has begun to paint a more complex picture of the digital lives of American youth. The multi-institution Digital Youth Project, the most extensive ethnographic study of youth media use in the United States to date, sought the perspectives of an economically diverse set of 12–18-year-olds on what they are playing, communicating, and creating with new media, endeavoring to understand how these practices are embedded in the broader social and cultural ecology. What they discovered is that teens are using online media to extend real world relationships, explore interests, express identities, and expand their independence and that they are practicing new technical and social skills along the way (Ito et al. 2009). Contrary to the digital natives argument, however, fewer youth use new media in “interest-driven” practices to acquire information or cultivate skills beyond what is available to them at school or in their local communities. A minority of youth are “messaging around”—experimenting with new tools and developing technical skills along the way. Even fewer are “geeking out” by participating in online communities to improve their craft and gain the respect of online peers.

### Kids Closer Up: Purpose of This Research

As electronic gadgets continue to fall in price, parents are increasingly inclined to purchase them for their elementary school-age children and even for their preschoolers and toddlers. The average age at which children begin to use these devices dropped from 8.1 years in 2005 to 6.7 years in 2007 (NPD Group 2007). And while younger children may play with the same gadgets as their teenage counterparts, developmental perspectives suggest that these gadgets serve a different set of functions in their lives. Whether many 5–9-year-olds are “hanging out,” “messaging around,” or “geeking out”—as the Digital Youth Project has documented their adolescent counterparts to be doing (Ito et al. 2009)—is doubtful.

What we do know is that during the critical middle childhood years—the 5–9-year-old age range implied when I refer to “young children” in this article—kids are developing the basic skills and dispositions that will serve as the foundation for later success both in and out of school. Commentators such as Jenkins and colleagues (2006) and Tapscott (2009) argue that digital media offer youth opportunities to develop fundamental competencies—such as the ability to

read, write, and communicate—as well as the skills (technical, collaboration, analysis), ways of thinking (scientific, design, critical), and dispositions (adaptability, entrepreneurialism, curiosity) needed to successfully negotiate life and work in the 21st century (Leu et al. 2009). But are young children taking advantage of these opportunities? How might gender, socioeconomic status (SES), family values, and cultural identity intersect with their access to and interest in digital media-based experiences, practices, and tools?

The current work employs in-depth case studies of two 8-year-old girls to illustrate how young children’s access to and interest in technology are shaped by cultural, institutional, interpersonal, and developmental forces (Barron 2004; Plowman, McPake, and Stephen 2008; Horst 2009) and, in turn, how access and interest shape individual learning (Barron 2006). This proposition, if true, would suggest that children experience digital media differently from the get-go (Neuman and Celano 2006) and that trajectories of learning with digital media diverge from a young age (Taylor and Mounfield 1994; Kersteen et al. 1998; Warschauer and Matuchniak 2010). Along this line of reasoning, digital natives are made, not born.

Findings from the current set of case studies build upon these and other fine-grained studies of young children’s digital media use and learning, bringing to bear the particularities of the era, locale, and culture of the two individuals I studied to refine our collective and ever-evolving portrait of the 21st-century child.

### Ecological Perspectives on Learning: Conceptual Framework and Earlier Research

This research assumes a generally sociocultural perspective, which posits that learning is a function of the activity, context, and culture in which it occurs, or is *situated*, in one’s external world (Vygotsky 1978; Lave 1988; Engeström 1999). Lave and Wenger (1991) argue that learning is marked by increasing participation in the practices of a community, which necessarily involves the appropriation of the community’s physical, symbolic, and cultural tools (Brown, Collins, and Duguid 1989). Writing in the English language, for instance, involves the appropriation of a set of symbolic tools, texting on a cell phone involves the appropriation of a physical tool, and practicing proper texting etiquette calls for the appropriation of a cultural tool. In mastering these tools, one develops a

sense of self, or identity, in relation to his or her community (Lave and Wenger 1991; Greeno 2006).

Traditional school models of learning, by contrast, view knowledge as portable rather than situated, and consequently schools all too often deliver content to students out of context. In general, sociocultural perspectives contend that deeper learning occurs through authentic activity *outside* of the classroom: at home, at work, and at play. This is the reason for a case study approach to what children are doing in their out-of-school lives versus what they might be doing in school with digital media on a more formal basis. This is not to say that what children do in school is irrelevant. The case studies consider the entire ecology of the developing child, including the immediate settings in which she interacts with digital media, the other settings she frequents, plus the larger social contexts in which these settings are situated. According to Bronfenbrenner, who proposed this broader approach to studying human development, “[E]nvironmental structures, and the processes taking place within and between them, must be viewed as interdependent and must be analyzed in systems terms” (Bronfenbrenner 1977, p. 518). As such, what a child does in school inevitably shapes what she does at home and vice versa. Moreover, her cultural heritage and what her parents do for a living bear strongly on her learning and leisure activities across all settings.

Barron (2004, 2006) further articulates Bronfenbrenner’s (1977) ecological perspective with respect to children’s participation in digital media activities. She employs a *learning ecologies* framework to track how adolescents develop technological interest and expertise across time and space, as well as the social and material supports that enable this development. Some of the children she studied were first turned on to technology by primary school or earlier by building robots or websites at home with their parents. They further developed their skills in middle school by enrolling in the computing electives offered there or at a summer technology camp. For other children, middle school tech electives are what ignited their interests, which they subsequently sustained in home-based tech hobbies. Although these examples reveal the “boundary-crossing” nature of interest-inspired learning, if opportunities to extend these interests do not present themselves across multiple settings of a child’s life, the child may have difficulty sustaining these passions (Barron 2004).

A large body of research describes how parents regulate their children’s media consumption—commonly referred to as “parental mediation”—especially around television but increasingly in relation to digital media, including the Internet, mobile devices, and video games (see Clark 2011 for a review). The diversity of new platforms presents parents with added challenges as well as new opportunities to shape how their children experience media at home. Recent research has paid particular attention to the latter. Barron et al. (2009), for example, conducted in-depth case studies of a dozen technologically prolific Silicon Valley adolescents to identify the various supports and events in their histories that could explain their current involvement in digital media production. The authors studied the function that parents played in their children’s technological upbringing, defining seven distinct roles in the process: teacher, learner, collaborator, nontechnical consultant, resource provider, learning broker, and employer. The current study considers this taxonomy in its cross-case analyses.

Plowman, McPake, and Stephen (2008) studied 3–5-year-olds’ technology learning at home and how family members—including grandparents and siblings—are contributing to this learning. In their survey of 346 families and deeper case studies of 24, the authors discovered that although adult members of a household limited how much explicit instruction they offered their preschool-age children, they also unwittingly modeled technical practices in front of them (e.g., logging on to the computer, using the remote control). Three-quarters of the case study adults believed that their children were “just picking it up,” perhaps because they associated learning with direct teaching and telling, as opposed to showing. Horst (2009) examined the ways in which parents mediate their children’s access to digital media through their structuring of spatial arrangements, routines, and family identity. For example, parents often place computers in kitchens, hallways, and other common spaces where they can easily monitor what their kids are doing. Institutional factors also bear strongly on how children experience media at home. In some of the lower-income households Horst visited, tighter living quarters seem to force parents and children to spend more time watching TV shows together.

The present study also examines children’s broadening *media ecology* (Horst, Herr-Stephenson, and Robinson 2009) and the ways in which parents,

Table 1 Case study children at a glance

	Katie	Victoria
Child age at time of study	8 years, 0 months	8 years, 9 months
Ethnicity	Mexican/Japanese American	Armenian American
SES	Low-middle	Middle-high
Siblings	1 step-brother (infant)	3 older siblings (17, 20, 21)
Home setting characteristics	Shared custody at grandparents' house	Grandparents and relatives live on same block
Parent age	20s and 30s	40s
Home/school technology access	Mid/low	High/low
Rules around tech use	None	Moderate

siblings, peers, and other learning partners assist or restrict the establishment of additional communities, both real and virtual, in which preadolescent children can play, socialize, communicate, and learn. The study captures two children's budding interests in new communities—specifically those involving or revolving around digital media use—and how activity in one may reinforce learning in another.

### The Case Studies

Because I was interested in understanding how young children today access and develop interest in digital media and how, in turn, this may determine the nature and extent of their learning, I employed a case study methodology. The purpose of this approach is not to provide causal explanations of the relations between engagement with digital media and 21st-century skill development and/or particular forms of familial or social support. Rather, the power of this method lies in the opportunity to

- showcase the complexity of children's digital media use in ways that experiments or surveys cannot;
- unearth unexpected issues surrounding children's digital media use, thereby offering researchers ideas for further investigation in larger-scale empirical studies; and
- build upon as well as challenge theories forwarded by other researchers.

I conducted case studies of four girls: three 8-year-olds and one 7-year-old, all residents of the greater Los Angeles area. They were somewhat ordinary as far as their digital media use is concerned. None were budding moviemakers, prodigy programmers,

or avid gamers. Their parents were not engineers or professors of education or the type to buy their children robotics kits. But all used computers, video game consoles, and/or handheld devices on a regular basis at home and for fun, which was a primary selection criterion for this study. I intentionally passed over children who demonstrated exceptionally high levels of technological engagement for their age, because they tend to be overrepresented in research and journalistic accounts of "kids today," skewing popular conceptions of the new normalcy of youth digital media use (Buckingham 2008; Warschauer and Matuchniak 2010).

I also intentionally chose children of about age 8 because this seems to be when their interest in and consequently the time they spend with digital media increases (Gutnick et al. 2010). Finally, I decided not to include boys because masculine images of gamers and hackers still dominate media portrayals of the digital native, and much is yet to be understood about girls' relationships with technology. Table 1 displays demographic data on the featured families as well as information such as sibling counts and parental experience with technology.

From December 2008 to March 2009, I spent anywhere from two to seven days following the case study children around as they went about their ordinary after school or weekend routines—to witness what they actually did instead of relying solely on what the children and their parents *said* they did in interviews. This also gave me a sense of the proportion of time spent on digital media versus other activities (e.g., homework, outdoor playtime) and traditional forms of media (e.g., television, music, radio). I videotaped and took field notes and photographed the settings I visited along with relevant artifacts. These observations

offer firsthand glimpses of the children's interactions with particular digital tools, yielding more accurate portrayals of early access and interest development than interview data alone. My home visits did not always coincide with the girls' spontaneous use of technology, and in some cases the girls and their parents set up special play sessions with the intention of giving the camera something of interest to capture. I am aware of the extent to which my presence may have altered the families' ordinary routines but believe the activities themselves were minimally impacted by these scheduling adjustments. Finally, this research focuses on learning outside of schools, because kids in this age range spend most of their technology time at home. Many public elementary schools in the United States prohibit students from bringing cell phones and other handheld electronics to campus and/or allow students to visit the computer lab just once a week.

In the interest of space, this article features just two of the case study children, Katie and Victoria,<sup>1</sup> who also happen to be best friends. The portraits that follow are cobbled together from observational and interview data and describe the home setting, including family members, the old and new forms of media to which the child has access, and the household routines and values that surround her. The portraits also describe each child's digital media activities, why she enjoys them, and how various influences mediate her engagement and learning. A cross-case analysis compares and contrasts Katie's and Victoria's current situation and future trajectories and is followed by a discussion of the implications of this research.

Katie Yamato

**INT:** Are there certain people that you feel like you learn the most about computers from?

I would say my dad. 'Cause I'm always with him and he's always on the computer. And I always follow him around. So I would look for him, but then he's always on the computer so then I stay there with him and wait for him.—*Katie, age 8*

Katie is *hapa*, a Japanese term for half Japanese, half something else, which in Katie's case is Mexican. Most everything about her appearance—thick brown hair, dark olive complexion—signals Katie's Latina genes. But she has her dad's eyebrows and eyes that suggest something Asian. And like both her parents,

Katie is 100 percent born and bred in Southern California. She is tiny—the smallest child in her third-grade class—but her spunk and sassiness more than compensate for her size.

Grandma and Grandpa Yamato's three-bedroom, one-and-a-half bath, ranch-style home is located in a quiet suburb of Los Angeles nestled in the foothills of the San Gabriel Mountains, just a quarter mile from the public elementary school Katie attends. By court order, she stays Wednesday nights and every other weekend at her grandparents' house, where her father Chad (age 30), a full-time student working on his associate's degree in air-conditioning repair, and his pregnant wife, Aileen (age 25), a registered nurse, also live. Katie spends the rest of the time with her mother, Janea Perez (27), in an affordable housing complex located about three miles away. This section primarily describes Katie's time at the Yamato house because this is where she most frequently engages with digital media and because the custody situation between her natural parents complicated my ability to interview her mother.

#### *The Family and Home Setting*

The adults in Katie's life vary in their abilities and comfort level with technology. Her father started playing video games at age 4 on the Atari 2600, the system credited with popularizing console-based video games back in the early 1980s. Now, at age 30, Chad is still gaming, but only occasionally on the Nintendo GameCube he bought for Katie and himself back in 2004. His trade-tech courses do not require computers, yet he reports spending four to five hours per day on the family PC, downloading music and some of the movies his family watches together. Napster got him hooked on downloading media about a decade ago, and he recently learned to pirate first-run movies from the Internet and burn them onto DVDs. This is Chad's latest hobby, and an illegal one at that. But it allows him and his family to watch theater-run films at home now instead of paying \$11 per ticket or waiting for the official DVD release. The only time the family visits the local cineplex is to see children's films of Katie's choosing.

Like Chad, Aileen played video games as a young child in the Philippines, first on her older brother's computer and then on the family's Nintendo system. Now Aileen regularly fills lab orders and updates protocols on the hospital computers; outside of work, she occasionally uses Chad's computer to check

email, to look up health information, or to shop online. Katie's grandmother Yuko is not confident about her technical skills and, now retired, uses the family computer primarily to play online solitaire and mah-jongg and to email friends and family in Hawaii. Yuko's husband, George, on the other hand, has been using computers since graduate school in the 1960s. But these days, in his retirement, Grandpa's favorite digital pastime is online sports betting.

Television is a popular medium in the Yamato house. The family has five TV sets: one in the lanai, one in each of the three bedrooms, and one in the kitchen. Other than overnight and when nobody is home, at least one TV is usually on, regardless of whether anyone is actively watching it. George and Yuko are both retired and pass much of the day watching TV in their own separate spaces: the widescreen TV in the lanai is George's domain, and Yuko moves back and forth between the TV in their bedroom and the one in the kitchen. Chad and Aileen watch the set in their bedroom—usually together in the evenings—or the widescreen in the lanai when George is not around. Katie is the only one who watches TV on any set in the house, including the one in the spare bedroom, which has her dad's video game console hooked up to it.

TV may have a constant and ubiquitous presence in the Yamato household, but the Internet has been gaining in popularity. Grandpa has a desktop PC in his garage office but spends more time on the laptop that's permanently parked on the dining room table. The 5-year-old Windows-based desktop that Katie, her father, stepmom, and grandmother share connects to the Internet via DSL, is plagued with spyware, and crashes frequently; it sits in a cluttered office—the remotest of rooms in a house that is otherwise too small to provide much seclusion—that doubles as a storage space for all of her dad's and grandma's unused and broken stuff.

#### *Parental Discretion*

On a typical day at her grandparents' house, Katie, rather than sitting inside in front of the computer, is more likely to be found playing in the backyard with her three toy Yorkshire terriers (Chad breeds Yorkies as an extra source of income), shooting baskets with her dad, or keeping Grandpa company while he works on the yard. Because Katie spends just five days every two weeks with her dad and stepmom, on visitation

days the family opts for activities that allow for more face-to-face than side-by-side interaction—so board games before online games, and basketball before the GameCube.

Raising Katie to be digitally adept is not high on Chad and Aileen's list of parental priorities. They believe this is her destiny, whether they work on developing her technological fluency now, later, or not at all. For now, her parents want to raise a balanced child, one who possesses basic communication and social skills and basic human values and sensibilities. Although Katie and her dad mix music on the computer and play video games together, the family activities that Chad and Aileen treasure most include the more traditional ones, like eating meals together, watching TV, playing board games, and engaging in outdoor sports such as basketball, football, and baseball. Chad is especially insistent about turning Katie into an athlete. In general, they encourage their daughter to be outside for the exercise.

Chad taught Katie at age 6 how to set herself up on the computer—launch Internet Explorer, type the first few letters of the URL, and select the desired address on the autocomplete drop-down—so that she could play games online on her own. But Chad's influence on Katie's engagement with digital media began much earlier than that. From the time she was a toddler, Chad would keep her on his lap or within sight as he downloaded music, installed software, repaired hardware, or fussed around with his iPod. Because she spends so little time with her father under the current custody arrangement, Katie enjoys being near him, even when he is otherwise occupied with his digital hobbies. This may explain Katie's current ease with and affinity for computers, video games, DVD players, and other gadgets. Aileen attests, "You know, she sees him doing, setting stuff up. So she wants to do it, too. And then she just automatically just learns it, right? Absorbs how to do that stuff so she can do it on her own later." The 8-year-old knows exactly which cables to plug into what ports to swap the DVD player out and the GameCube into the TV set (and vice versa) and can do it in a flash. Just like her dad.

Katie said she plays online games about once a week, when she is at her dad's house. She rarely plays at her mom's house, "'Cause she's always on the computer. She makes a lot of music. So she makes music like every day." Since her best friend, Victoria, began alerting Katie, a year or so ago, to the fun to be found at [GirlsGoGames.com](http://GirlsGoGames.com), [MyScene.com](http://MyScene.com), and the

[Disney Channel website](#), Katie has taken an interest in the Internet. Katie goes online by herself about half the time. She asks for either Chad's or Aileen's permission, and they set her up by turning the computer on and logging her in before leaving her in the back office to pick up whatever they were doing before the request.

Katie enjoys beauty and fashion games most, which may have something to do with her mom being the manager of a beauty supply store and a newly licensed aesthetician. But Katie also states a fondness for any game that allows her to "be creative." Katie said she can spend hours alone painting nails and designing outfits online but prefers drawing pictures on real paper using the real crayons, paints, and pens she has stashed at her dad's house. Taking out and putting away the art supplies may be a bigger pain than just launching a website, but with the real pictures she makes, "I don't have to throw it away." Several pieces of her art are posted on the walls of her dad's house.

Yuko, a retired elementary school library coordinator, does not mind her granddaughter's new fascination with the digital but believes in the importance of developing Katie's early interest in reading. So whenever the school has a book fair or she is at a bookstore, Yuko buys Katie a book. Consequently, Katie has amassed quite a collection at her grandmother's house. She has also amassed a comparable collection of DVDs that her grandmother hopes will inspire her to read, including almost every film Disney has released in recent years, plus film versions of such literary classics as *Charlotte's Web* and *The Lion, the Witch, and the Wardrobe*.

#### *Cost Considerations*

While Grandma purchases media for Katie with her literacy development in mind, her parents consider other criteria. They are a single-income family, with only Aileen's salary as a nurse to support them. They save on rent by living with Chad's parents, but cost is always a consideration when making decisions about what to buy their daughter. For her eighth birthday, Katie asked for an iPod—her friend Victoria has one and loves it. Chad bought her a \$20 MP3 player from Sears instead, and Katie has been satisfied with the pink "no name" player ever since. Chad downloads and fills it with the songs Katie likes, including the latest from the Cheetah Girls, Hannah Montana, and

the Jonas Brothers—the same preteen celebrities Katie watches on TV and whose games she plays online.

Other than the MP3 player, much of the entertainment media that Chad purchases is enjoyed by the whole family, not just Katie. Board games fall into this category, and *Monopoly* is Katie's favorite. Moreover, Chad bought the GameCube for himself as much as for his daughter. Chad said, "I buy the games that I want to play"—e.g., *Capcom vs. SNK 2 EO*, *Need for Speed: Underground*, and *SSX Tricky* (a snowboarding game)—and father and daughter play together. The GameCube is several years old now, so Chad calls it "worn out": games are no longer being produced for it, and it fails to hold the appeal of newer consoles such as the Wii. That is what he next wants to buy for Aileen and himself. Katie already has one at her mother's house—Janea gave her a Wii last year because "my report card was all Es." Katie also owns a Nintendo DS, a Christmas gift from her mother's boyfriend. But because Katie goes to her father's house on Wednesday and Friday afternoons and is prohibited from bringing the device to campus, I never saw the pink DS. Adults in both households have contributed to Katie's DS collection of games featuring her favorite characters; namely, Hannah Montana, the Cheetah Girls, and SpongeBob.

Katie said she enjoys snowboarding and street fighting with her dad on the old GameCube more than playing the Wii at her mom's house. This may have something to do with the fact that at her mom's house she does not have a consistent gaming partner and no one to play with who is better than she is. Janea never plays the Wii, and although Katie's cousin Rolando is a regular partner, he is only five. Katie said he also has a way of always making the Wii freeze up. Chad, meanwhile, shows his daughter no mercy on the GameCube. He is willing to demonstrate how it is done and to field any questions on how to improve her game, but he does so as if he were playing with someone his own age, trash talk included.

Regardless of whether it means doing kid stuff or adult stuff, Katie just wants to spend time with her father. She enjoys keeping her dad company when he is downloading or mixing music in the cramped office, and she is intrigued by his deejaying. So lately Chad has been showing her around his NuMark Q software, demonstrating how to mix two songs together. To keep it interesting for father and daughter, they take turns mixing samples of the music he likes and samples of the music she likes.

Chad said he has just one rule surrounding his daughter's media use: "Just don't keep pushing buttons." I asked Katie in a separate conversation whether she was aware of any rules, and she listed three: (1) "Don't break it"; (2) "Don't lose 'em"; and (3) "When he says, 'Get off,' I have to get off." Katie's first two statements are linked to her father's one rule, which involves the protection of his property. A fourth rule that I observed Katie follow was finishing her homework before going online. But this rule also applied to going outside, drawing in her sketchpad, or any other playtime activity.

### *Together Time*

Chad is not the only one Katie seeks out as a playmate. Aileen plays video games with her stepdaughter whenever she gets pulled into the office to do the "whole makeup thing together" on Girls-GoGames.com. As the resident expert on games like *Dazzling Nails* and *Shopping Spree*, Katie "tells me how to maneuver around that," Aileen said. The 8-year-old also enlists her grandmother to play these beauty and fashion-themed games with her. More often, though, Katie joins Grandma Yamato when she is already on the computer playing the video games that she enjoys, such as the online solitaire game *Freecell*. They do not compete but take turns and watch each other play:

**INT:** So does she learn strategy from you? Or do you, how do you . . .

Oh no! I learn from her. [Laughs.] She showed me how to move a whole stack to another, um, what do you call that, column.—*Grandma Yamato*

What Yuko enjoys doing most with Katie are jigsaw puzzles. She believes puzzles are good for Katie's spatial development but also buys them because she herself enjoys the challenge of solving a tough one, not to mention the face-to-face time she gets with her granddaughter. Grandpa Yamato spends time with Katie, too, but usually this takes the form of conversation or watching TV together.

Chad, Aileen, and Katie watch a lot of TV together, but this is part of their regular evening routine—the precursor to bedtime—and talk always accompanies their viewing. The trio usually enjoys movies and TV shows selected by Chad and Aileen, and as often as not these are R-rated or of an adult na-

ture. This is inevitable: the three of them share a bedroom, and the family TV is in the bedroom. According to Aileen, "If there's a scene that's like, you know, nude, or not appropriate, that we didn't know was coming, then we tell her, we talk to her about that. 'It's just a movie. It's not right. Forget about it.'" On a typical weekend night, father, daughter, and stepmom settle into their bedroom to spend the evening watching one of Chad's pirated first-release films from their beds—Katie's twin bed sits just inches apart from her parents' double. Katie ends up dozing off well before the movie ends, and her parents turn the volume down and finish the movie.

### Victoria Sarkissian

When my DS was frozen, I went on the computer and I put my DS on the charger, and then I looked up on the computer how to make it, um, how to fix it. And it said, "Charge it."—*Victoria, age 8*

Victoria Sarkissian has a sweet, calm demeanor and carries herself with a maturity that belies her mere eight years of age. She is a big girl—notably so when standing beside classmate Katie—with long, dark blond hair she wears pulled back in a ponytail and hazel eyes framed by an impossibly thick set of dark eyelashes. Victoria lives a few blocks away in a different, more affluent subdivision than Katie's father. Her parents, Janet and Ara, now in their late 40s, had three kids in the span of four years—daughter Cecilia, who is now 21 and living at college an hour away, and sons Henry, 20, and Todd, 17, both still living at home. Victoria was born nine years after Todd, giving her parents a second bout of child rearing. Janet works the overnight shift for her family's ice cream manufacturing business and is home during the day to take care of Victoria after school. Ara was an auto mechanic for most of his career, but a recent shoulder injury has taken him out of the shop. Now he works in the transportation department at the nearby city college.

Although neither Janet nor Ara grew up using computers, both are comfortable using digital technologies for their everyday communication, coordination, and entertainment activities. Janet embraces the conveniences of the digital age: she owns a laptop and an iPod, listens to music and podcasts, and uses [Facebook](#) to keep in touch with family and friends. She admits to being unable to function without her Palm Centro, the smartphone/PDA she uses

to manage her busy career and household of six. But technology has not always fit so seamlessly into family life. According to Janet, “I think it *used* to interrupt our family time. And I think we’ve adjusted to making it. . . . Oh yah, ‘cause the kids used to go up to their room with their laptops and then we put a ‘No laptops in the bedrooms.’” Now the rule is no longer necessary. The household norm is to work on one’s laptop downstairs in the presence of others. Thus, even with their portable technologies, family members are not scattering to the far reaches of their spacious home to entertain themselves in isolation. After dinner around the table, parents and kids regularly retreat to the family room, where each takes his or her usual spot around the TV, personal devices set up in front of them. Mom checks Facebook on her laptop, Dad scans the news on his, and Henry splits his attention between the TV and his latest tech project. Todd and Victoria mostly watch the show.

*“This Is Really Educational”*

From the start, Janet and Ara have been purchasing for their youngest daughter technologies with educational objectives. When she was two and a half, they bought Victoria “her own kid computer,” an updated version of the play computer each of her siblings got as a toddler. Victoria’s model had a typing program plus number and letter games that could be leveled according to the child’s age. More recently her parents bought her a Nintendo DS. Like Katie’s, it is pink. And of the six DS games Victoria owned at the time of my visit—*Brain Age 2*, *Imagine: Rock Star*, *Imagine: Fashion Designer New York*, *Arctic Tale*, *Picross*, and *Hello Kitty Daily*—all engage players in purportedly educational or productive activity. As Janet told me with a chuckle, “I don’t believe in play games.”

*Hello Kitty Daily* is Victoria’s favorite DS game, which may reflect her mother’s affection for her Palm Centro. Victoria said that she used to have to memorize friends’ phone numbers and count on Mom to remind her when homework assignments were due. Now she can keep track of these things on her own “personal assistant”—as Victoria likes to call it. And, indeed, it has many of the same functions that her mom’s Centro does. *Hello Kitty Daily* is also helping Victoria manage her money more wisely. With the game’s budget tool, she can calculate whether she will have enough money left over after a purchase to buy something else. Now she finds that she is

buying “smaller” items so that she can purchase more of them.

Several times throughout the interviews, I heard Victoria echo her mother’s sentiments on the productive and educational—versus purely entertainment—purposes of several of the tools she plays with. A few years ago, Janet bought her daughter a Webkinz toy and introduced Victoria to her first virtual world. Her parents now pay for subscriptions to Club Penguin and Barbie Girls, too, but Webkinz remains Victoria’s favorite for a few reasons. First, she likes the fact that unlike Club Penguin it features more than just one kind of animal. Second, she likes how the three stuffed animals in her bedroom—Brownie the Dog, Brian the Frog, and Powder Puff the Cat—are alive online in Webkinz World. Finally, Victoria volunteered, “This is really educational. Because there’s Quizzy Corner. There are age groups for math. I’ve learned a lot of stuff here,” including, she reports, responsibility in the form of having a job, taking care of a pet, and nurturing a garden.

Victoria also believes she is learning how to cook on the DS. During my visits, she was borrowing *Cooking Mama*, a food preparation simulation game, from her 12-year-old cousin Andrea. All of *Cooking Mama’s* 76 menu items are popular dishes in Japan, with some Western-style ones that American kids would recognize, like meatballs and pizza. To make sweet tofu sushi, for instance, Victoria has to read the directions on the DS’s top screen and execute them on the bottom screen, quickly and with precision. This entails stewing the tofu pockets in soy sauce, sugar, and cooking wine, washing the rice, fanning it once cooked, and stuffing it into the pockets using the DS’s stylus, buttons, and microphone to manipulate these actions on screen. She has not made any of *Cooking Mama’s* recipes in real life but said she remembers all the ingredients and steps for making dishes like “Rice and Omelet” and “Shumai Wonton.”

Victoria aspires to become a fashion designer and reports using *Imagine: Fashion Designer New York* to develop her skills. The DS game “lets me explore all the different steps you can do [and] draw out designs and color them in.” Before she got her DS, Victoria would sketch her designs on paper and play dress-up games similar to those featured on *Fashion Designer* on the GirlsGoGames.com website. Now she is not limited to practicing her design skills at home. She can take her DS with her to a friend’s house or

“when I’m going to the airport or doing something long-term.”

In general, Janet and Ara are willing to purchase digital media and tools that lead to personal enrichment—as Victoria’s collection of DS games supposedly does—or promise to facilitate family communication and coordination. As an example of the latter, they gave Cecilia, Henry, and Todd cell phones as seventh grade Christmas presents “because they would walk home from school,” explained Janet, “and I wanted to make sure they actually would.” Even Victoria has a cell phone—a hand-me-down from an older sibling—though it was not activated at the time of my visit.

Not all media in the Sarkissian home are geared toward learning. Janet and Ara also appreciate the value of fun. Everyone in the family owns an iPod, including Victoria, who plugs into hers while she studies, because it “makes me focus more because it blocks out all the other noises from the outside area and you can focus on your [homework].” However, she admits having a harder time concentrating on math than reading with music in the background. The Sarkissian kids also have a PlayStation 2 (PS2), which is hooked up to an older TV set that is used exclusively for console gaming. But Victoria is not big into the PS2. She said her brothers have to remind her to play. What she really wants is a Wii. To get one, though, her parents said she would have to use the money she would soon be getting for her birthday to pay for half the cost of the new console.

#### *“No Fear”*

Everyone in the family has his or her own laptop, except the two youngest family members. Victoria shares with Todd the desktop PC parked in the highly trafficked hallway that connects the front entryway and family room. Because of the machine’s physical placement, anyone passing through can see what Victoria is doing on the computer. Victoria logs on when she pleases—about every day—and is free to use the Internet and any of the programs on the hard drive. She plays until she tires of the activity and then logs off. Victoria takes advantage of this freedom to explore available applications (e.g., “I’ve been trying to get the writing process on my computer”) and regularly uses [Google](#) to troubleshoot problems (e.g., “When my computer froze, I went on my mom’s computer and I figured it out”).

Victoria’s oldest brother is the one who showed her how to use Google to troubleshoot. Once, when her DS “got stuck,” Henry, instead of just repairing it himself, told her to Google “how to fix a frozen DS.” This is how she discovered that she had let the battery run too low. Now the search engine is her first stop for solving any tech problems she encounters. The 20-year-old is currently helping Victoria learn Microsoft Word so she can type assignments and print them out for her teacher. Henry is the resident expert on all things digital. According to Janet, “He’s just the guy that if there’s anything that you need, he does it. He takes phones apart and puts them back together again”—to which Victoria added, “for no reason.”

Victoria is too young to have reached Henry’s level of confidence or proficiency with technology, but Janet sees the same “no fear” spirit emerging in her youngest daughter. Victoria will fiddle with something herself and then “if she does something wrong, you know, okay, big deal,” move on. But she is likely to have learned something along the way. Being around someone like Henry, who demonstrates ingenuity and a desire to look under the hood, may also explain how Victoria discovered the Paint application that came bundled on the PC and decided to learn how use it to draw her fashion designs. Although she often finds Paint more convenient than pulling out her paper and pens—which she would have to put away afterward—sometimes Victoria prefers drawing on paper because “on the paper you draw for . . . with a pen or a pencil or crayon. But on the computer, it’s a little bit harder because you’re not drawing completely by yourself. You’re drawing with a mouse.” Victoria never saves the files of the pictures she draws “because it takes up too much space.” She uses Paint more for messing around than for keeping a catalog of her designs.

#### *Bridled Freedom*

For the most part, Victoria sets her own learning goals and pulls in her parents and older siblings to help her achieve these goals in a just-in-time—rather than planned-out—fashion. She is comfortable enough to figure out new tools and software on her own, but her father and especially Henry still help her get started. With Paint, for instance, “My dad and my brother had to show me how to get on there and sometimes they watched me to see that I didn’t mess anything

up.” Unlike Katie, who only visits (or cares to visit) GirlsGoGames.com, MyScene.com, and the Disney Channel, Victoria surfs the Web for information about fashion design (e.g., the [Project Runway](#) site on Bravo network’s [website](#)), the breed of miniature rabbits she keeps as pets, and anything else that strikes her fancy.

Well, *almost* anything. For the most part, Janet and Ara trust Victoria’s judgment, but they did express concern about her online privacy and safety: “We’ve had the discussion that you only talk online with people that you know. Because anybody can say that they’re an 8-year-old boy.” This is why Janet and Ara set up the parental controls feature on the desktop so that Victoria can access her favorite Internet haunts—e.g., Webkinz, Club Penguin, [YouTube](#), and Google—but the system blocks her from any unrecognized websites. Victoria has to ask either her father or Henry to type in the password if they approve of the site. With this setup, Victoria can only really surf the Web if one of them is around, and in this way the adults in the house are always aware of the websites she is visiting.

Janet said she feels no need to restrict her 8-year-old’s time on the computer, playing video games, or even watching TV, because Victoria’s routine and other factors—such as having to share the PC with her brother—naturally limit the frequency and duration of these sessions. When Victoria gets home from school, she has to finish her homework before she can do anything else, technology related or not. And throughout the week she has plenty of non-tech activities to keep her occupied, such as soccer and volleyball, cleaning the bunny cages, play dates with friends, and visiting relatives near and far. Consequently, Victoria’s lifestyle is relatively balanced: “She gets her exercise. She gets her homework done. She, you know, she’s got a wide variety of interests.” Besides, Janet added, “After four kids, you kind of, you know, lessen up on restrictions, I mean, from everything.” As parents they have learned their lessons over the years, including what is worth the effort and what is not.

Being surrounded by more-capable family members may explain why Victoria said, “I’m pretty good [with computers], but I’m still learning,” even though she exhibits more ease and proficiency than most kids her age. When asked what she is hoping to learn next, technology-wise, Victoria did not just name a new DS game or computer application. She instead answered,

“I would want to learn how to reset [the computer] and all the technology in it.”

### Cross-Case Discussion

Individual case studies may not be generalizable to populations, but they can be used to expand theory (Yin 2003; Flyvbjerg 2006). As such, the point of this cross-case analysis is (1) to use the findings of other researchers, including those who have worked with larger populations or studied older children, in order to ground and contextualize Katie’s and Victoria’s experiences with digital media; and (2) to highlight findings that larger-scale studies have thus far failed to reveal, suggesting avenues for future research. To organize this analysis, I draw particular attention to the places where Katie’s and Victoria’s experiences overlap or diverge in significant ways with respect to their access to, interest in, and learning and development with digital media.

### Access

#### *Home as the Hub of Digital Media Engagement*

In their large-scale ethnographic study of youth media use, Ito et al. (2009) found that 12–18-year-olds use virtual spaces to explore and define their individual and social selves, often depending on peers rather than adults to learn to use digital media. But Katie and Victoria have not yet reached adolescence—the age when children seek separation from parents and connection to friends—and they remain strongly connected to what is going on at home. Both girls admit they enjoy one-on-one activities with their parents, and digital media provide numerous opportunities for such engagement. The two girls also have meaningful interactions with their brothers, grandparents, cousins, and aunts. But in a few years, this is likely to change. Katie and Victoria will unfasten somewhat from family to explore other identities and craft new selves. For now, though, parents and family—or, in a physical sense, *home*—are the hub of engagement with digital media for the two girls.

School, on the other hand, is not a place where they use digital media much. The third-grade classmates visit the school’s computer lab once a week, if that. Katie said that their second-grade teacher took them to the lab more often than their third-grade teacher, who limits their computing activities to playing *Fast Math*, a math facts game. Katie’s least

favorite subject in school is math, and the games she plays during class time and at her after school tutoring program make memorizing the facts she will need to know to perform well on the spring CAT/6<sup>2</sup> tests a bit more bearable. However, a disturbing analysis conducted by Wenglinsky (2005) on National Assessment of Educational Progress data from 1996, 1998, and 2000 reveals a negative relationship between instructional use of the drill-and-practice games favored in low-SES schools and students' math achievement scores, suggesting that the effect these types of games have on learning may be opposite of what was intended.

School rules also prohibit Katie and Victoria from bringing digital devices such as MP3 players, cell phones, and the Nintendo DS to campus. So other than chatting with friends during recess about the video games they play at home, school is not an important locale in the girls' technological development. School personnel and policies may actually minimize in students' minds the utility of technology in their present and future lives: "Sometimes," said Victoria, "like as a reward we go to Mavis Beacon and we play the games on there."

From a learning ecologies perspective, the relegation of the girls' engagement with digital media to more or less a single physical setting—the home—limits opportunities for boundary crossing, or extending an interest into a context different from the one in which it was first ignited (Barron 2006). In new contexts, interests may be explored within a different community and through a different set of resources, perspectives, and rewards.

#### *Surrounded by Media, New and Old*

The 2010 KFF report on youth and media says that in 2009—the same year I visited the four case families—the average 8–10-year-old child was exposed to 7 hours and 51 minutes of media per day (Rideout, Foehr, and Roberts 2010), representing an increase of about an hour since baseline measures were taken a decade ago (Roberts, Foehr, and Rideout 1999). Katie and Victoria live media-saturated lives, but the details of their case studies shed light on how kids their age squeeze nearly eight hours of media exposure into a 24-hour period.

*Television rules.* Television stubbornly holds its ground as America's favorite medium, despite the infiltration of newer media into the home (Gutnick

et al. 2010). According to 2009 KFF data, 8–10-year-olds are watching a lot of TV—on average, 3 hours and 41 minutes per day (Rideout, Foehr, and Roberts 2010). This figure takes into consideration all forms of television content, including live TV, TV delivered through the Internet and mobile devices (e.g., YouTube), DVDs, and prerecorded TV (e.g., DVRs and TiVo). Katie and Victoria spend more time watching TV than playing video games, listening to music, surfing the Internet, or reading books on a typical weekday. Sometimes their exposure to television is intentional: in both families, viewing DVDs or primetime programs together is a cherished routine. In other situations, especially Katie's, a set is always on in some room in the house, which allows her to tune in and out to whatever is on throughout the day. Taken together, these planned and unplanned bouts of TV viewing account for a significant chunk of the girls' out-of-school time.

*Personal electronics.* A decade ago, a minority of children in lower- to middle-SES groups was using laptop computers, digital cameras, personal music players, or cell phones, even though these devices existed back then. The most obvious reason for electronic gadgets reaching the hands of younger and younger children is the falling cost of computing power: as electronics drop in price, parents worry less about little fingers breaking them.<sup>3</sup> So while Victoria's upper-middle-class parents can afford to give her an iPod Shuffle—still not an insignificant investment at \$59—Katie's father, even on his student budget, can also afford to buy his daughter a \$20 "no name" MP3 player. The relatively low cost of electronics also enables parents to more frequently upgrade their devices and, consequently, hand the older ones down to their kids, as in the case of Victoria's cell phone.

Cell phones, MP3 players, and handheld gaming devices represent another technological advancement that can account for increases in children's media use. Their *portability* allows Katie to listen to the Cheetah Girls on car rides between her parents' homes, and Victoria can play with her Nintendo DS outside by the swimming pool, locales where young children 10 years ago were not spending time consuming media.

#### *Parents as Gatekeepers*

*Providers.* Katie and Victoria can take only partial credit for their immersion. Unlike adolescents, who often learn from friends what technology is available,

preadolescents depend more on parents and other family members to introduce them to digital media. Barron and colleagues (2009) identify two ways in which parents are “resource providers” in this regard: they *buy* items specifically for their children’s use, such as Victoria’s Webkinz account, or *lend* use of their property, such as the family TV set or Chad’s GameCube system. As such, “[P]arents are important gatekeepers in their children’s access to the tools required to spark an interest in technology-based activities” (Barron et al. 2009, p. 67). Grandparents are, too: Yuko Yamato buys media she hopes Katie will learn from—books, book-related DVDs, and jigsaw puzzles—because she knows that Katie’s father is not providing these resources.

*Monitors.* While Katie may not have access to the platforms and software that Victoria’s more affluent parents can afford, she is allowed to visit and view content that Victoria cannot. Chad is philosophically opposed to censoring media and trusts Katie to make smart choices on her own. The Sarkissians, on the other hand, are more vigilant about Victoria’s media consumption, with parent controls set on the computer and siblings around to keep an eye on what she is doing. Past research has associated higher levels of parental mediation with higher family income (Warren 2005) and parent age (Tapscott 2009), findings that are consistent with what I observed in the Sarkissian (higher SES) and Yamato (younger parent) households. Despite differing mediation styles, neither Katie’s nor Victoria’s parents believe their girls are overdosing on media. Katie and Victoria still enjoy playing outside, so their parents have not yet felt a need to peel them away from the TV or computer to get fresh air or exercise. But the case study parents may also be unaware of just how much media their daughters consume on a daily basis, because MP3 players and the Nintendo DS tend to be used in the outer reaches of the home, where parents cannot always see what their children are doing or for how long.

*Backdoor providers.* Other family members act as media gatekeepers by sharing favorite websites and purchasing gadgets and games as gifts. Victoria’s older siblings—especially Henry—regularly expose her to technological trends they see as young adults in contact with the wider world. Katie’s uncle Efrain gave her his old Sidekick with an activated line even though her dad and stepmom think she is too young to own a cell phone. Katie had it for about a week before

her mother decided to take it away. These accounts suggest that parents of young children do not hold complete control over the media they have access to. Other family members are likely allowing unapproved content and gadgets in through the back door.

## Interest

### *Play Preferences*

Katie and Victoria, 8-year-old girls with similar levels of developmental maturity, have had *predictably* similar experiences with digital media. Their preferences for toys and play experiences that involve tangible objects, female themes, and social interaction have been documented in developmental psychology, education, gender studies, computer science, and other fields (e.g., Turkle 1988; Honey et al. 1991; Kafai 1996; Subrahmanyam and Greenfield 1998; Sherry and Dibble 2009). However, how these preferences emerged among the case studies is worth discussing because of the implications these predilections have for the girls’ ongoing and future engagement with digital media.

*The touchable.* Both girls prefer real objects or people over their virtual counterparts—Victoria taking care of her real bunnies as opposed to her Webkinz pets, and Katie playing sports in the backyard with her dad rather than inside, online. They also both prefer drawing with crayons on paper to virtual coloring books because the online drawing tools are limited in what they can render and because in their current situations hard copies are easier to store and circulate. Katie also likes hanging her drawings on the refrigerator door and giving them as gifts to her aunts.

*Girl stuff.* Also to be expected for girls in this age range, Katie and Victoria exhibit strong preferences for female-gendered toys and activities and express their gendered loyalties in the digital realm, too, when possible. Besides the girl-focused areas of the Disney Channel website, which the two regularly visit, Katie spends time at GirlsGoGames.com painting virtual nails, and Victoria’s favorite DS game is *Hello Kitty Daily*—neither activity is challenging to the intellect. While a growing body of evidence shows that certain genres of video games (e.g., quest, simulation, action-adventure) offer opportunities for players to develop spatial, collaboration, communication, hypothesis testing, strategy, and problem-solving skills (e.g., Subrahmanyam and Greenfield 1994; Squire 2002; Gee 2003; Green and Bavelier 2003; Lieberman 2006),

girls and children from poorer families are less likely to play these empowering types of games than their male and higher-SES counterparts (Andrews 2008; Sherry and Dibble 2009). Game designers may fulfill female play preferences with nail painting and dress-up activities, but what might girls be missing by not playing the same kinds of games as boys?

The case study girls' preferences for tangible and female-gendered activities are also worth discussing in light of trends detected by the 2009 KFF study. Rideout, Foehr, and Roberts (2010) found that girls spend less time playing computer-based video games as they grow older, going from 12 minutes per day for 8–10-year-olds to 3 minutes per day for 15–18-year-olds. The study also found that girls spend more time with social media (e.g., Facebook) as they mature, but video games somehow fail to hold older girls' interests, which again suggests that girls are missing out on opportunities to develop the cognitive skills that male-targeted games have been shown to cultivate. Victoria does hang out at Webkinz, an environment intentionally designed to be gender neutral, and Katie chooses female avatars when playing male-targeted games like *Capcom vs. SNK 2 EO* and *SSX Tricky* with her father. But are the gaming options available to girls diverse and challenging enough to keep them playing through their adolescence, alongside their male peers? And how might the girl games Katie and Victoria enjoy promote unrealistic images of feminine beauty and transmit stereotypical values about gender roles (Dickey 2006; Willett 2008)? These questions fall beyond the scope of this article but are worth acknowledging because of the power that cultural and market forces have in shaping young girls' experiences and relationships with digital media now and into adolescence and adulthood (Weber and Dixon 2007; Willett 2008).

### *Sustaining Interests*

In both cases, parents sparked their toddlers' interest in technology by exposing them to new platforms and activities. But the Yamatos and Sarkissians have managed to sustain Katie's and Victoria's engagement with digital media well into their middle childhood years, particularly as playmates and role models to their daughters.

*Playmates.* Katie sees her father just a few days per week and has discovered she can spend more time with him if she participates in his digital deejaying

and downloading hobbies. And though she knows how to set up the GameCube by herself, she will do so only if Chad is around to play. Victoria's play partners, meanwhile, are more often her older brothers than her parents. The playmate is perhaps the developmental correlate to the "collaborator" role that Barron and colleagues (2009) assign to parents who participate in mutually enriching, technology-based projects with their adolescent children. Although play may not be seen to be as "productive" as collaborating, the same study found that parents who played video games with their young children continued to support their technological pursuits through adolescence.

*Role models.* In the Yamato and Sarkissian families, parents and older siblings sometimes intentionally and often unwittingly model tech-based behaviors and attitudes that the girls end up enacting or adopting themselves. Plowman, McPake, and Stephen (2008) describe preschoolers "picking up" basic technical skills by observing older family members. But as 8-year-olds, Katie and Victoria more consciously select which behaviors they want to emulate as part of defining who they are. Victoria's fixation with *Hello Kitty Daily* on her DS is a nod to her mom's Palm Centro, and her stated desire to "learn how to reset [the computer] and all the technology in it" is inspired by Henry's technical expertise.

Unlike teenagers, who use new media to extend their social networks and establish independence from their families (Ito et al. 2009), preadolescent children still seek connection to parents and other family members (Centers for Disease Control and Prevention 2011). The case studies suggest that a window of opportunity might open during middle childhood—when children have begun to define who they are but before they seek detachment from family—that parents can take advantage of to motivate their children's interests not only in technology per se but in using technology to learn more about the topics that interest them. Testing this window with a larger population is worthy of future investigation.

### Learning and Development

#### *Consuming or Creating*

One way that digital media differ from earlier forms of media, such as books, radio, and television, is that they offer users greater control over how they experience delivered content. This control can come in

the form of selecting what to watch on YouTube, navigating one's way through a virtual world, posting an online review of a product, or creating a blog to chronicle one's cooking successes and failures. Digital media offer a range of interactivity, with some forms requiring more thought, skill, human interaction, or initiative than others. And, as observed in the cases of Katie and Victoria, children can differ in how they take advantage of this interactivity.

Both Katie and Victoria plan to become fashion designers when they grow up, which is why they enjoy the makeover games on GirlsGoGames.com. They select outfits for their models, along with makeup, hairstyles, and accessories to match, all from a set of predefined menus. While this virtual version of paper dolls allows players to express their fashion preferences in a visible, sharable way, it requires little imagination or technical know-how compared with Victoria's other medium for practicing her fashion design skills—the Paint application on the family PC. Although the drawing tools in Paint are too crude—even for professional graphic designers—to sketch outfits that resemble the cute styles on GirlsGoGames.com, Victoria still uses them with the belief that she will eventually improve her drafting skills. Tools that support constructive forms of participation are, for the most part, inappropriate for 8-year-olds. Many were simply not designed with young kids' cognitive or motor skills in mind. Microsoft Word, for instance—another application that Victoria is learning to use—almost necessitates assistance from more capable users to scaffold a child's use of its tools. Victoria is fortunate to have her brother Henry around to show her Word's many useful but not necessarily intuitive features.

These same social supports may not be offered or otherwise available to Katie to learn more sophisticated software programs. She spends much of her time on the family computer playing alone in a back office where other family members rarely pass through to notice what she is doing. Nor are other family members able to help out on an as-needed basis. Neither her father nor grandmother—Katie's primary learning partners in the household—are familiar with programs like Microsoft Word and Paint. Even if Katie did manage to discover software programs to develop her drafting and design skills, her father is unlikely to purchase them because of his limited income and inclination to buy digital media for his own use. So for now Katie visits GirlsGoGames.com,

MyScene.com, and Disney—three websites plastered with advertisements for junk food, toys, and TV shows<sup>4</sup>—to do her fashion makeovers, because it is what she knows and can do.

If Katie continues to pursue her fashion design interests in limited environments such as GirlsGoGames.com, while Victoria graduates from Paint to more sophisticated drafting applications (e.g., Adobe Illustrator), who will be better prepared for a career in fashion design by the time they are young adults? Fostering professional artists aside, Jenkins et al. argue,

The creative process is valuable on its own; every child deserves the chance to express him- or herself through words, sounds, and images, even if most will never write, perform, or draw professionally. Having these experiences, we believe, changes the way youth think about themselves and alters the way they look at work created by others. (Jenkins et al. 2006, p. 7)

Eight-year-olds are still too young to effectively appropriate many of the digital tools and resources available for creative expression and computation. Trajectories toward future participation are not determined by age 8, but how Katie and Victoria use digital media to pursue topics of interest to them now will shape what they know, what they can do, and how they see themselves by age 13. Their identities as 13-year-olds, in turn, will influence what they set their minds on doing through adolescence and into early adulthood.

#### *In-Game or Real World Skills and Knowledge*

According to some scholars (e.g., Prensky 2001; Jenkins et al. 2006; Shore 2008; Tapscott 2009), digital media provide young people with the tools, spaces, and communities to develop the knowledge, skills, dispositions, and social practices needed for full participation in contemporary society as consumers, producers, and civic actors (Weigel et al. 2009). Surely all children can learn *something* through their use of digital media. But some of these lessons hold greater value to their present and future lives than others. Marsh argues that virtual worlds like Club Penguin and Webkinz can “offer young children a wide range of opportunities to decode, respond to and create multimodal texts in a playful space, significant activities in a new media age” (Marsh 2008, p. 1). She postulates

that reading Club Penguin's newspaper, for example, can help foster children's reading comprehension skills and that its chat feature provides a fun context for children to practice writing and use text to negotiate, collaborate, and evaluate. If and when more work, play, and learning activities are embedded in virtual worlds, as many predict they will be, current young members of Club Penguin and Webkinz will be prepared to navigate these spaces and communicate as members of online communities. However, whether they actually become better readers and writers—or just fall victim to the commercialized practices that operate across online and offline worlds (Grimes 2008; Black 2010)—has yet to be seen.<sup>5</sup>

Still, Victoria is convinced of the educational value of Webkinz. Logging on every day increases her exposure to the invisible advertising in Webkinz World and may explain why Victoria owns not just one but three Webkinz plush toys. Her high regard for the website is probably the result of how the website markets itself to players and their parents. Statements like "Webkinz is a great place to learn and play!" and "Your child can learn about money in Webkinz World; by earning KinzCash, your child learns how to save and spend money" plaster the site's [Parent's Area](#). Whether Victoria is learning anything from Webkinz that she can usefully apply to her duty as primary caretaker of two live miniature rabbits is questionable. Cotton and Gem never came up in our conversation about her virtual pets.

Victoria believes she is learning from *Cooking Mama* too. One initially learns the game's cooking techniques and levels up by following the text-delivered instructions. But the instructions are simple and require that players follow them to a T—no critical thinking needed here. Victoria also said she is learning how to cook Japanese dishes by playing, but she had not actually made any of the recipes yet. The best example I observed of digital media encouraging deeper forms of engagement with texts was when Victoria ordered and read a Hannah Montana paperback in order to find the answer to a mystery posed on the Disney Channel website.

Katie's online learning experiences are, for the most part, confined to the video games she plays. She said she is learning how to paint fingernails and apply makeup—skills that her mother is learning at aesthetician school—on GirlsGoGames.com. But the verisimilitude of these games to their real world counterparts can be misleading. They require

none of the physical or even color coordination that characterizes an aesthetician's practice. Nor do they offer incentives to improve at nail painting or makeup application, so players are not motivated to learn new strategies. Finally, because Katie typically plays these games alone—she does not play video games with her mother—she does not have the chance to discuss how these online activities connect to her mother's occupational expertise. And so while the games might offer the potential for Katie to make meaningful connections between her "in-game" and "in-world" activities and interests (Stevens, Satwicz, and McCarthy 2008) by way of her mother, that potential remains unrealized as a result of family play arrangements.

The real educational value in Katie's and Victoria's game play may be found not in the content of the websites they are visiting but in the self-discovery and identity work these places make possible. For better or for worse, they are exploring what it means to be a girl by visiting gender-specific websites (e.g., GirlsGoGames.com) and playing gender-specific video games (e.g., *Hannah Montana: The Movie for the DS*). Although neither would say that technology plays a central role in her life—the girls were selected for this study on the basis of their average technological know-how—both report using digital media in ways to further define who they are. Thus, art is central to the person that Katie believes she is, which explains the appeal of the paper-cutting game on GirlsGoGames.com: "It's creative to me, and I like playing this because I can get creative." The girls are also using digital media to envision their future selves. The online dress-up sites, along with Victoria's *Fashion Designer New York DS* game, provide virtual spaces in which they can, if not actually practice, at least imagine themselves as designers.

## Implications

### The Reality of the Digital Generation

One important contribution of this work to the scholarship on digital media and learning is the questions and issues the case studies raise around the intersection of media use and the development of young children. As 8-year-olds, Katie's and Victoria's play preferences, relationships with family and peers, cognitive abilities, nascent identities, and future aspirations differ from those of preschoolers and adolescents, not to mention 7- and 9-year-olds. However, as the two case studies reveal, these characteristics are not determined

by age alone. Environmental factors—for example, parenting practices, cultural norms, market forces, and school policies—shape the girls’ access to and interest in digital media. Access and interest, in turn, shape individual learning.

Katie is an ace at hooking the GameCube up to the TV, and Victoria knows how to Google her way to a Nintendo DS fix. But both girls admitted to falling for the ads they see on the Disney Channel website—Katie for Hannah Montana fruit rollups and Victoria for Jonas Brothers concert tickets—and succeeding in getting their parents to pay for these items. However, neither child is, for example, making movies and posting them to YouTube. These girls may exhibit technological confidence, but they are hardly technologically fluent. Yet generalizations about an entire generation of techno-whiz kids prevail in the popular media (e.g., Markus 2009; Stone 2010), fueling enthusiasm for the introduction of new technologies and teaching practices into classrooms that better fit the learning styles of digital-age youth (Prensky 2001). If teachers are led to assume that all kids are skilled in and motivated about technology, they may fail to meet the needs of a significant percentage of their students.

From a developmental perspective, the fact that Katie is not a budding moviemaker is perhaps understandable, as is the fact that Victoria is not designing outfits on Photoshop and then uploading her creations to share with other young fashion designers online. They are just eight. Is it even realistic to expect girls of this age to participate in the artistic expression and civic engagement activities that proponents of digital media (e.g., Jenkins et al. 2006; Ito et al. 2009; Weigel et al. 2009) say these tools support? Do developmental reasons argue against postponing these expectations until adolescence, when the user interface of sophisticated programs like Photoshop and iMovie will make more sense, when parents are more willing to allow their children to participate in online communities, and when youth have developed better judgment about content, audience, and online safety? What about encouraging 8-year-olds to play outside with friends, siblings, and pets to develop physical coordination with real objects, rather than with virtual ones inside?

Creative expression and civic engagement using digital media may be eventual goals, but, as the two cases illustrate, technology holds a different set of opportunities for young children than it does for teenagers. In Katie’s and Victoria’s cases, I did not

observe cell phones, video games, mobile devices, and online virtual worlds providing the vehicles and spaces for them to meaningfully communicate, coordinate, and negotiate with peers and relatives—at least not in the same ways these platforms are being appropriated by teenagers (Ito et al. 2009). What I did witness, however, is how digital media are giving Katie and Victoria opportunities to develop identities as autonomous learners and technologically capable individuals and to try on various versions of their future selves, as fashion designers, aestheticians, and PDA-toting career women. I also got a glimpse of how Victoria uses digital tools at home to practice skills that may later serve her academically, such as reading onscreen instructions and newspapers, searching for information on the Internet, and word processing.

The two case studies illustrate that mere access to digital resources is not enough to guarantee that children will use those resources in productive and enriching ways. Parents and other family members largely shape the quality of the girls’ experiences, through deliberate acts of providing and regulating and through less conscious modeling of behaviors and attitudes that may stoke their daughters’ interests. But inequities exist. Katie, for example, is not receiving as much adult encouragement to visit websites with more onscreen text or to make use of productivity software as her best friend Victoria is. But do current disparities matter? When the girls reach age 16, will it have made any difference that when they were 8 Victoria dabbled in Microsoft Word and Windows Paint and Katie did not? Is there a reason to encourage children this young to engage with digital media in deeper ways than playing simple games alone? Or will other factors, such as school courses and adolescent sociality, level the playing field when youth reach the age at which technological fluency will have more immediate bearing on their academic success and future career choices?

#### Directions for Future Research

##### *Longitudinal Designs*

Previous research suggests that the quality of early experiences with digital media does count. Barron (2006; Barron et al. 2009) found that, among the Silicon Valley adolescents she studied, individuals who as very young children took up more sophisticated tech-based hobbies, such as robotics, with heavy support from their parents ended up developing

higher levels of technological fluency (e.g., programming, graphic design, website development) by the time they reached middle school. What happens between preschool and adolescence? More direct linkages between early engagement and later participation with digital media—that is, more direct than those offered by Barron’s retrospective accounts and the current study’s prospective accounts—must be made through studies that track development over the middle childhood years. Longitudinal designs would shed light on the interplay between children’s cognitive, socioemotional, and motor development and their engagement with digital technologies across this age range and would help disentangle developmental characteristics from environmental factors. Because of the expense and time demands of longitudinal field research, large-scale studies of this type are rare. But even small-scale longitudinal studies that chart young people’s digital media use over a period of years, including those by Weber (2007;  $n = 1$ ) and Barron et al. (2010;  $n = 9$ ), offer valuable insights into the forces that shape interest and learning with digital media. More longitudinal research employing deep ethnographic, diary, survey, and other methods are needed to better understand children’s media use from a developmental perspective.

### *Siblings*

In this research, siblings and other relatives emerged as important influences in Katie’s and Victoria’s technological development. Past studies have documented how siblings teach one another new skills and knowledge around digital media (e.g., Plowman, McPake, and Stephen 2008; Stevens, Satwicz, and McCarthy 2008), but scant research exists on the other functions they may serve, such as the backdoor supplier and role model described in this article, along with others yet to be identified. Survey research with larger populations could determine how common these roles are and bring attention to siblings as key learning partners. And what about birth order? As the youngest in her family, Victoria is not as beset with restrictions around screen time as her older siblings were when they were her age. Her parents are more lax with their fourth child on most issues because they realize the measures they put in place to protect Cecilia, Henry, and Todd from the unknowns of the Internet were, in the end, unnecessary. Brothers and sisters, grandparents, aunts, uncles, and cousins are often more present

during the waking hours of a child’s life than his or her parents are. Therefore, the involvement of siblings and other relatives in a child’s technological upbringing should be studied with the same attention and rigor with which parents have been studied.

### *An Ever-Evolving Portrait of the Digital Kid*

What can we learn from the case studies of two little girls? Katie’s and Victoria’s family situations and cultural heritages are unique. However, most American children resemble Katie and Victoria in two regards. First, children are increasingly surrounded by, engaging with, and embracing media in both old and new forms. Katie and Victoria—like generations of little girls before them—still draw and play outside, do homework and chores, and spend time with family and friends, unmediated by screens of any sort. Rather than replacing or eliminating activities, digital media represent an additional *layer* of their everyday lives. Technology is part of the fabric of both homes, used by all family members for entertainment, information seeking, communication, and expression. In this way, the girls are not singled out as digital natives within a family of immigrants. Second, any child’s particular relationship with these technologies is shaped by the people around them—parents, siblings, teachers, friends, neighbors, and so on. And these interactions are, in turn, influenced by individual maturity, family values, institutional policies, cultural norms, or a television network’s bottom line. The ecological perspectives offered by Katie’s and Victoria’s stories have made this latter point clear.

Because young children tend to engage with digital media at home, this research has focused primarily on what they are doing in this particular setting with family members. However, as Katie’s and Victoria’s stories suggest, by age 8, peers are also emerging as powerful influences—as is school, if not by providing Katie and Victoria with opportunities to learn with digital media, then through its institutional attitudes toward digital media. Other learning resources not explored in depth here—namely, books, after school and community settings, and online social networking and virtual worlds—are also important locales of interest development (Lim and Clark 2010; Herr-Stephenson et al. 2011). Just as important is understanding how a child’s interests cross these boundaries and are strengthened and sustained over time (Barron 2004).

According to Rosen (2010), the most recent technology trends (e.g., iPads, texting, Twitter, Facebook) are being widely adopted by consumers within a matter of years—if not months. In comparison, the telephone, radio, and television each took decades. Because of this rapid penetration rate, children born just years apart demonstrate distinct patterns of media consumption, communication, and levels of multi-tasking. Katie’s baby brother (born since my observational visits) will grow up mastering a different set of skills, habits, and dispositions around technology than his sister’s “mini-generation.” However, even as new technologies captivate young users in ever-faster cycles, the developmental capacities and predilections of children remain, for the most part, stable. By keeping their developmental characteristics in mind, adults—who are, by the logic of the mini-generation theory, the perpetual digital immigrants (Prensky 2001)—should always feel empowered to know and do what is best for young children in a digital age.

Appendix: URLs of Websites Cited in the Article

Name	URL
Barbie.com	<a href="http://www.barbie.com/">http://www.barbie.com/</a>
Bravo	<a href="http://www.bravotv.com/">http://www.bravotv.com/</a>
Club Penguin	<a href="http://www.clubpenguin.com/">http://www.clubpenguin.com/</a>
<i>Dazzling Nails</i>	<a href="http://myscene.everythinggirl.com/games/dazzlingnails/nails.aspx">http://myscene.everythinggirl.com/games/dazzlingnails/nails.aspx</a>
Disney Channel	<a href="http://disney.go.com/disneychannel/">http://disney.go.com/disneychannel/</a>
EverythingGirl.com	<a href="http://www.everythinggirl.com/">http://www.everythinggirl.com/</a>
Facebook	<a href="http://facebook.com/">http://facebook.com/</a>
<i>Fashion Designer</i>	<a href="http://www.girlsgogames.com/game/fashion-designer-2.html">http://www.girlsgogames.com/game/fashion-designer-2.html</a>
<i>Freecell</i>	<a href="http://www.freecell.net/">http://www.freecell.net/</a>
GirlsGoGames.com	<a href="http://www.girlsgogames.com/">http://www.girlsgogames.com/</a>
Google	<a href="http://www.google.com/">http://www.google.com/</a>
MyScene.com	<a href="http://myscene.com/">http://myscene.com/</a>
<i>Project Runway</i>	<a href="http://www.bravotv.com/project-runway">http://www.bravotv.com/project-runway</a>
<i>Shopping Spree</i>	<a href="http://myscene.everythinggirl.com/games/shoppingspree/shoppingspree.aspx">http://myscene.everythinggirl.com/games/shoppingspree/shoppingspree.aspx</a>
Webkinz	<a href="http://www.webkinz.com/">http://www.webkinz.com/</a>
Webkinz Parent’s Area	<a href="http://www.webkinz.com/us_en/parents_area.html">http://www.webkinz.com/us_en/parents_area.html</a>
YouTube	<a href="http://www.youtube.com/">http://www.youtube.com/</a>

Notes

1. To protect the children’s identities, all names are pseudonyms, and location details have been altered.
2. The CAT/6, short for California Achievement Tests, Sixth Edition Survey, is part of the Standardized Testing and Reporting (STAR) Program. The tests measure the reading, language arts, spelling, and mathematics knowledge of California students in grades 3 and 7.
3. The falling cost of computing power for the consumer can be explained by Moore’s law, which states that the number of transistors that fit on an integrated circuit doubles about every two years.
4. See Reid-Walsh (2007) for discussion of [MyScene.com](http://www.MyScene.com), [Barbie.com](http://www.Barbie.com), and [EverythingGirl.com](http://www.EverythingGirl.com), connected commercial websites designed by Mattel to immerse tween online play in its brand.
5. Marsh (2008) surveyed 175 5–11-year-olds to identify the nature of play in online virtual environments but did not measure literacy gains as a result of this play.

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