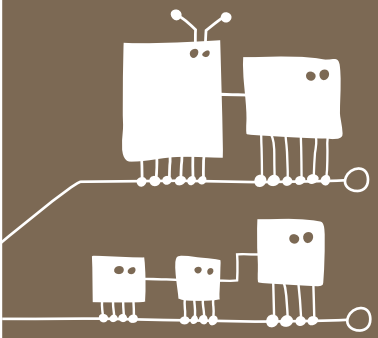
Families matter:

Designing media for a digital age



Lori M. Takeuchi

June 2011

The Joan Ganz Cooney Center at Sesame Workshop

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contents

preface

The 1960s was a period of focused attention on poverty in America: Daniel Patrick Moynihan's sociological analysis of the devastating influence of a "culture of poverty" on children's life chances was followed by national attempts to help children attain educational achievements that could lift them out of poverty. In 1965, Head Start was created, and in 1968, Head Start began funding a television program that would eventually be called *Sesame Street*, operated by the Carnegie Corporation Preschool Television Project.

Both Head Start and *Sesame Street* were conceived as a type of inoculation against educational deprivation. Both also recognized the importance of an engaged and committed family in helping vulnerable children out of poverty. Head Start provided opportunities for parents and their children, and *Sesame Street* was programmed in ways that encouraged parents to watch along with their kids.

Over four decades later, some modest progress has been made in closing the academic achievement gap that Head Start, the Elementary and Secondary Education Act, and special projects like *Sesame Street* set out to address. Unfortunately, for approximately one-third of our nation's children, learning and developmental pathways — starting in the earliest stages of life — are still compromised by a lack of educational and economic opportunity. Hundreds of billions of dollars have been spent on educational intervention and other anti-poverty measures, and the results have not reversed a tide of disappointing and tragic results for millions of children. We need to look to additional ways to help these children and their families.

We believe that new forms of digital media are well positioned to play a constructive role in advancing powerful solutions to national educational challenges. Most families have altered their patterns of media consumption dramatically in recent years. With the advent of new technologies for the home and workplace, great changes in productivity and leisure time activity have occurred. Many observers have pointed to the digital media explosion as a major barrier to connected family time, and several national studies, including a series carried out over a decade by the Kaiser Family Foundation, have pointed to strong public health concerns about children and youth's media exposure levels. But we remain cautiously optimistic that some of the unique advantages of digital media — the strong engagement factor, personalized assessments, the boon to bridging learning across settings, and the 21st century skills they promote — may be parlayed for social progress.

To better understand the difficult landscape that families face in preparing their children to thrive in a dramatically changed learning ecology, the Center undertook the current study. *Families Matter: Designing Media for a Digital Age* combines both in-depth case examples of children and family interactions, as well as a national survey focused on why and how parents are shaping their children's current media consumption habits. The findings show that most families are cautiously sorting out which digital media products are appropriate for their child and his or her unique needs. They also point out that parents of young children are concerned about the quality of the offerings available today, especially for kids in the middle childhood period (ages preschool through elementary) where the marketplace of games, mobile applications, and television products has not yet satisfied the need for educational value.

Finally, the current study reasserts the primacy of family as a great socializing and support system. When media producers, educators, and policymakers align interests with parents, there is no doubt that our nation can dramatically improve its educational performance. As media producers and researchers, we intend to do our part: moving forward, we will integrate the best media tools available with both products and educational models to help families gain a new head start. They deserve nothing less.

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executive summary

This report focuses on two complementary studies that document how families with young children are integrating digital media into the rhythm of daily life. Results from a survey of more than 800 parents of children ages 3 through 10 reveal how parents nationwide feel about raising children in a digital age. In-depth case studies provide further insight into these statistics, probing how parent attitudes toward technology, along with family values, routines, and structures, are shaping young children's experiences using digital media. This research assumes an ecological view of development and learning, which considers the many different spheres of influence — from parents to peers to the social and economic context — that a child now must navigate while growing up.

Key findings

Forces outside of the home shape children's experiences with digital media

Institutional factors determine parental work schedules and childcare arrangements, which in turn affect how much time parents can spend on media-based activities with their kids. *Cultural* factors prioritize certain activities (e.g., socializing with friends and family) over others (e.g., playing video games alone). And *parents' personal histories* — what they played as young children, how they learned to operate new technologies for the first time, and their own experiences raising older siblings, for instance — inevitably shape their childrearing practices around media.

Parents prefer participating in activities with their kids that involve older media

Two-thirds of young children play on TV-based video game consoles, but only half (52%) of their parents are playing along with them. The media activities parents reported *doing* most with their children — watching TV (89%), reading books (79%), and playing board games (73%) — aligned with reports of what they *enjoy* doing most with them. In other words, parents aren't participating in media activities that they themselves don't take pleasure in.

Not all digital media are created equal in parents' eyes

Parents rated computer-based activities as most valuable for young children's learning, but a surprising majority also thinks video games develop skills important to school success. Mobile phones are viewed as least valuable for learning, and the device most prohibited by parents for young children's use; handheld gaming consoles and MP3 players are much more accepted. These perceptions are based on parents' still evolving understanding of what their kids *should* be doing with digital media at certain ages.

Parents worry about digital media interfering with the healthy development of young children

Fifty-nine percent of parents believe that digital media prevent children from getting physical exercise, while 53% are concerned about their children's online safety and privacy. And 40% percent believe that mediated activities infringe on time that would otherwise be spent in face-to-face interactions.

... Yet most parents don't believe their own kids are at risk

Only 18% of parents indicated that their own children spend too much time with technology. Why the apparent paradox? Parents may be unaware of just how much media their kids are consuming. Laptops, MP3 players, and handheld gaming devices tend to be used in the outer reaches of the home, and less typically positioned the way TV sets are, in a family or living room where parents can see *when* and *what* their children are watching, and *for how long*.

Nearly two-thirds of parents restrict their kids' media use on a case-by-case basis

The multiplicity of new platforms and the rate at which they change may explain why so many parents don't impose a firm set of rules — they find it either unnecessary or simply impossible. Meanwhile 22% percent say they do have strict rules around what their kids can do with home-based media, and 8% say they have rules but don't always strongly enforce them. Only 7% of parents claim to have no rules.

Research recommendations

Map children's development to new platforms

Children today have access to a wide array of media platforms, many originally designed for adult use. Just as researchers did for television, the formal and content features of these newer platforms need to be mapped to children's developing cognitive, social, and now even motor and visual capacities, given the availability of gesture-based and 3D gaming systems.

Conduct research on the learning potential of new platforms

Millions of dollars and countless hours have been invested in studying the potential of video games in fostering learning. This large body of research may, in part, explain why 69% of the parents we surveyed believe certain games can develop academic skills. Techno-enthusiasts today are claiming that mobile

devices hold as much potential to transform learning, but we have yet to amass the research base necessary to alter parents' perceptions about mobile devices and other emerging platforms.

Investigate the new coviewing
In the 1970s, researchers discovered that children whose parents talk about *Sesame Street* as they watch learn more from the show. Now, with over two-thirds of mothers in the workforce and more platforms delivering media into homes than ever before, children more often engage with media by themselves, at earlier ages, and for longer periods of time. Today, researchers must turn their attention to mobile devices, virtual worlds, e-books, and other new platforms for media coparticipation, and the ways in which grandparents, older siblings, and other family members can also support young children's learning.

Industry recommendations

Design with the full ecology of the child in mind
Most producers of children's media are tuned into the interactions between player and platform, but few pay sufficient attention to the institutional (family, school), economic, and cultural factors that invariably shape these interactions.

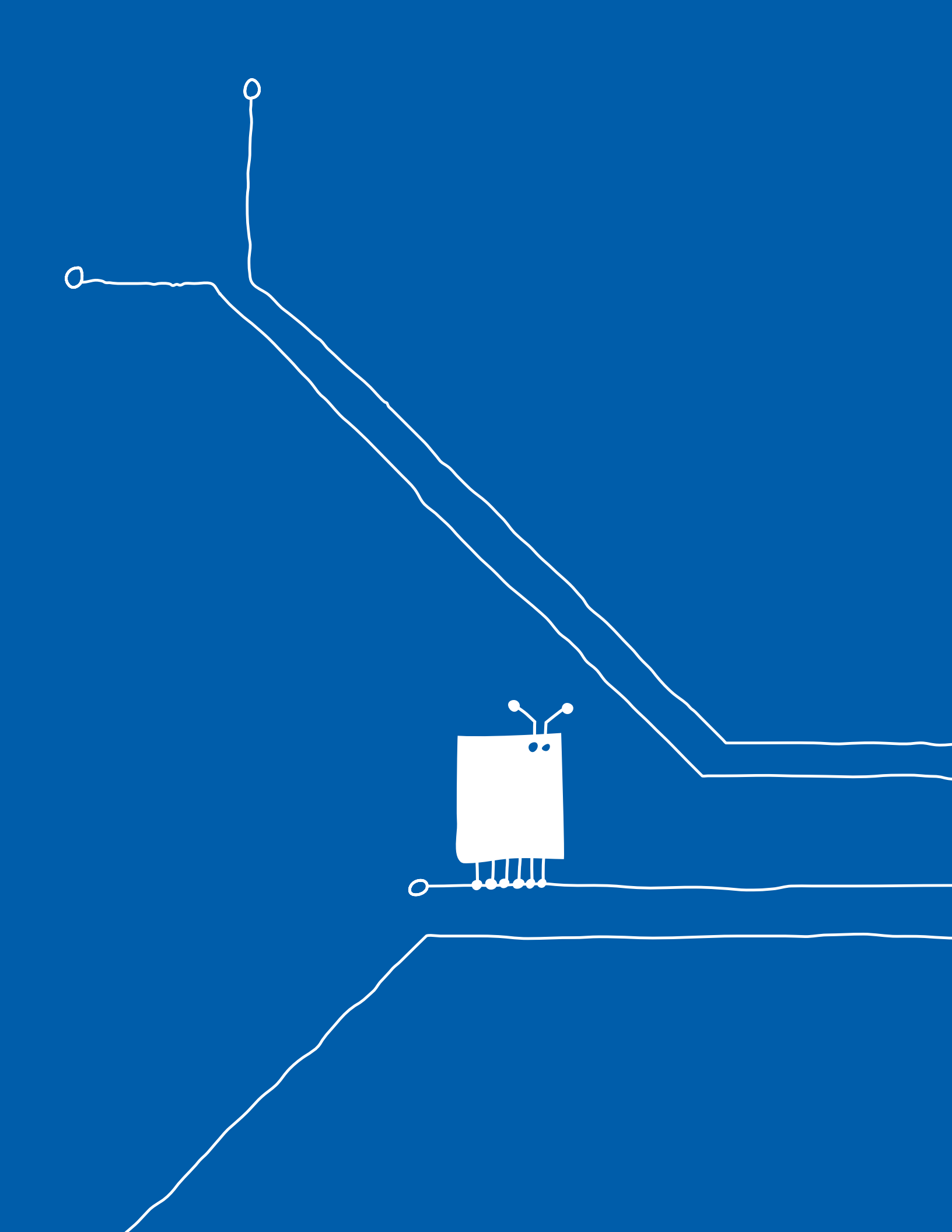
Create video games that appeal to kids and parents alike
Producers need to work on creating experiences that appeal to both parents and children, just as the producers of *Sesame Street* intentionally write adult humor into the show to encourage them to watch with their preschoolers.

Foster family teamwork
Digital media are often blamed for displacing the time kids spend in face-to-face conversation — so producers should design experiences that *require* flesh-and-blood partners to play.

Think outside the (X)Box
Producers should use technology to engage children in the very activities — socializing, outdoor exercise, academic pursuits, and imaginative play — that adults fear digital media are displacing from children's lives.

Anytime, anywhere learning
Mobile devices can enhance networked play and learning by allowing kids to take the necessary hardware outside, and from home to school to grandma's house for uninterrupted continuity of experience.

Design the guilt out of digital-age parenting
Producers should imagine and build devices that let parents interactively participate in media activities with their children, whether one room or one thousand miles apart.



Claudia Guzman picks her husband up from work most evenings, daughter Gabriela (age 8) and granddaughter Dora (age 7) in tow. The 15-mile drive between Highland Park and Monrovia can take up to 60 minutes at the peak of the LA rush hour. While little Dora naps in the back seat, beside her, Gabriela staves off boredom by texting her cousin Michelle. Michelle lives in Atlanta and is 17 — a senior in high school — but the two communicate frequently now. "I like the way me and Michelle still talk and stuff," Gabriela told us two months after getting her own cell phone. "We text each other about almost every day."

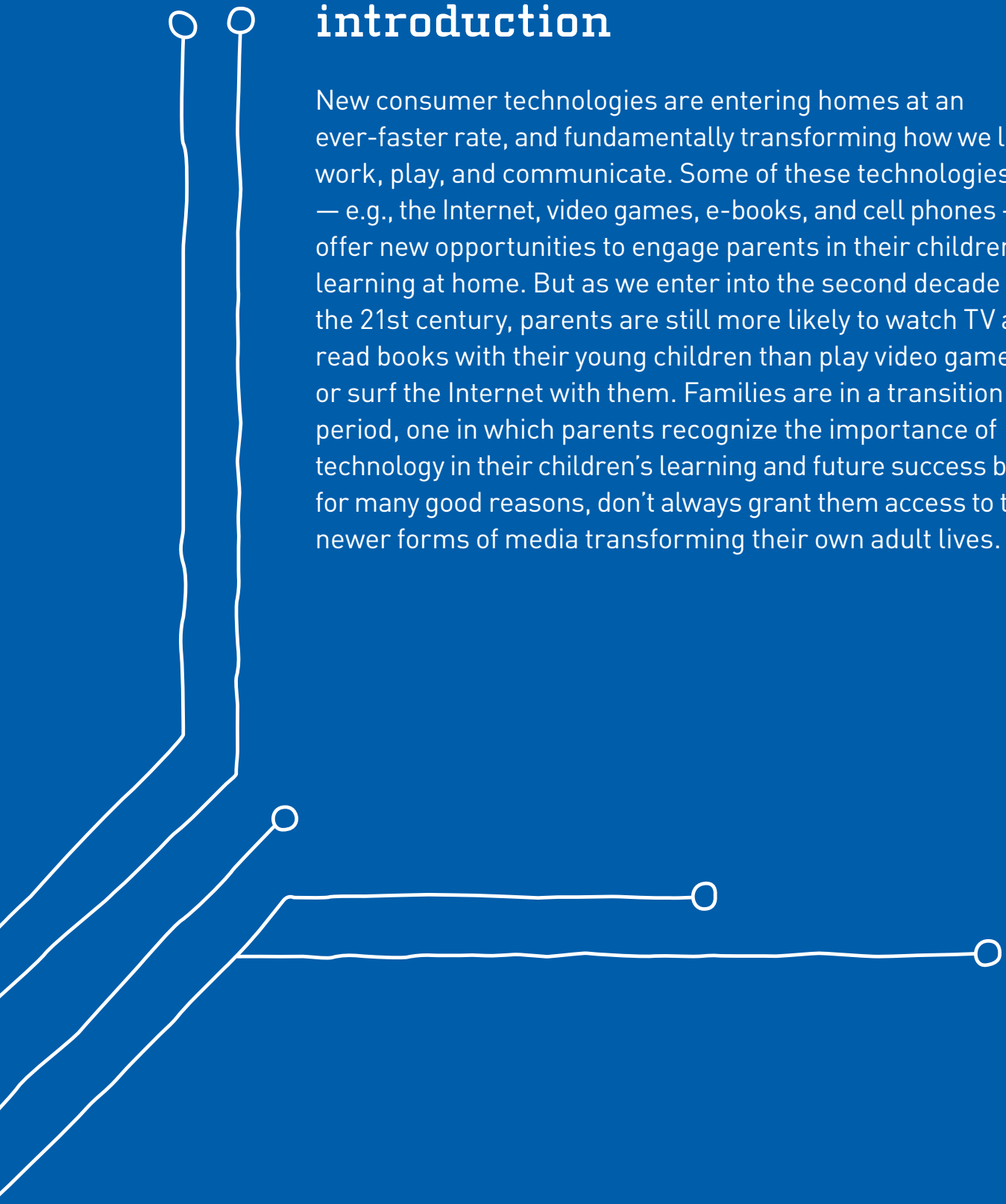
Gabriela's lavender Motorola RAZR is a hand-me-down from her mom, but to Gabriela it's as good as new. Her father Hector, a wireless communications technician, gave her the phone to help her mom coordinate family errands and so he could keep in touch with Gabriela when he's away at work. "Whenever I would stay after school," she explained, "my dad would text me saying, 'Hi, are you okay? I hope you enjoy the rest of your day. I'll see you later.' Or something like that." Gabriela reported enjoying these brief interludes, and took pride in being trained to use the phone by the very best: "My dad, he's been working for a [phone] company like almost all his life. And like he taught me how to text, and like if it's a 213 number and you're calling a 323 number, then you have to put 1, 3-2-3."

Neither Claudia nor Hector had anticipated that the phone would give their daughter such direct access to an otherwise missing older sister figure. And they're not alone in feeling that cell phones have brought extended family closer. According to a 2008 Pew Internet and American Life Project survey, most adults believe that communication technologies today are bringing family members close (60%) or closer (25%) than they did when they were kids (Kennedy, Smith, Wells, & Wellman, 2008). But when we checked in with Claudia seven months after Gabriela started using the old RAZR, she shared an unanticipated outcome of her daughter's cell phone use. Gabriela grew so prolific on the keypad that she ran up a $250 bill on text messages alone. This compelled Hector to enforce a "no more *useless* texting" rule. Gabriela has since decided to stop texting all together...at least for the time being.

Will this new rule affect Gabriela's deepening relationship with Michelle? What about texting with her father, which has allowed them to converse beyond the two short hours they ordinarily share in person on schooldays? How long will Hector's rule last before he signs up for a texting plan, or before Gabriela learns to be more judicious with her texts? This is not the first technology to enter the Guzman home and shake up family rhythms and routines, budgets and beliefs — nor will it be the last. What are parents in similar situations doing to deal with these disruptions? And how is the modern family ecology evolving as a result?

introduction

New consumer technologies are entering homes at an ever-faster rate, and fundamentally transforming how we live, work, play, and communicate. Some of these technologies — e.g., the Internet, video games, e-books, and cell phones — offer new opportunities to engage parents in their children's learning at home. But as we enter into the second decade of the 21st century, parents are still more likely to watch TV and read books with their young children than play video games or surf the Internet with them. Families are in a transition period, one in which parents recognize the importance of technology in their children's learning and future success but, for many good reasons, don't always grant them access to the newer forms of media transforming their own adult lives.



This paper reports on two complementary studies designed to document how families with young children are integrating digital media into the rhythm of daily life. Results from a survey of more than 800 parents of kids ages 3 through 10 reveal current trends in the types of media young children are using at home, and indicate how parents nationwide feel about raising children in a digital age. In-depth case studies provide further insight into these statistics, probing how daily routines, day care arrangements, and even birth order are shaping young children's experiences using digital media, and how, in turn, parents are reconciling their own histories and values with media entering the home. Together, these studies aim to describe the modern family media ecology by asking:

- How are digital media influencing family routines and play and learning patterns?
- What do parents think about the role of digital media in young children's development?
- How are parent attitudes toward technology, along with family values, routines, and structures, shaping young children's experiences using digital media?
- How are parents and children using these media together and apart?

The report is organized as follows: First, we describe the goals and purpose of this research, acknowledging the recent headlines and scholarship that have inspired our inquiries and informed our methodological approaches. Next, we share the results from the parent survey, followed by the case studies of two families we interviewed and observed over a period of a few months. We then analyze the survey results and case studies in tandem, and from this synthesis offer researchers and media producers guidance for improving family engagement with digital media.

How to use this report

Families Matter was written for professionals interested in fostering family engagement and learning with digital media. While we suggest reading the report in its entirety, each section is useful in its own right:

Background and methods (page 12): A brief review of literature on parenting around media, and a description of our ecological approach to understanding learning and development.

Parenting in a digital age: Results from a national survey (page 18): Findings from a web-administered market research survey of 810 parents on what their young children are doing with media, and parent attitudes toward these activities.

The case studies (page 26): In-depth narratives of two girls — Gabriela (age 8) and Sierra (age 7) — and their family media ecologies.

Synthesis: New media and the modern family (page 40): Analysis of intersections between the case studies and survey study findings.

Recommendations (page 46): Translation of both studies' findings into actionable steps for fostering family engagement with digital media.

background and methods

Children today are surrounded by digital media. Households with kids ages 4 to 14 own, on average, 11 consumer electronic devices (NPD Group, 2009), which means they're 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 Facebook and Webkinz. In fact, a line of research sponsored by the Kaiser Family Foundation (KFF) found that youth between the ages of 8 and 18 were spending an hour more with media in 2009 — 7 hours and 38 minutes — than they were in 2004 (6.5 hours). And kids' digital media use isn't replacing the time they spend with older media like television and music. Instead, they're media multitasking, or squeezing an extra hour of media use into the 7.5 non-school hours they have each day, for a total of 10 hours and 45 minutes of media exposure. (Rideout, Foehr, & Roberts 2010).

The KFF study and other large-scale surveys (e.g., Gutnick, Robb, Takeuchi, & Kotler, 2011; Nielson Company, 2009; Rideout, Hamel, & Kaiser Family Foundation, 2006) provide valuable snapshots of the amount of time children are spending with what types of tools and media. But 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 US to date, sought an economically diverse set of 12- to 18-year-olds' perspectives on what they're playing, communicating, and creating with new media to understand how these practices are embedded in the broader social and cultural ecology. What they discovered is that youth are using online media to extend real-world relationships, explore interests, express identities, and expand their independence, all while practicing new technical and social skills (Ito et al., 2009).

Less attention has been paid to how younger children are learning and developing with digital media (Gutnick et al., 2011). As electronic gadgets become ever more affordable, parents are increasingly inclined to purchase them for their young children. In fact, the average age at which children begin to use these devices fell from age 8.1 in 2005 to 6.7 in 2007 (NPD Group, 2007). More recent anecdotal evidence reported by journalists suggests this figure now hovers closer to age 3 or 4. The major thrust of this trend in reporting calls to question, "How young is too young?"[1] Leading news organizations such as the *New York Times* are raising and reflecting concerns from both parents and experts that new technologies are robbing preadolescents of their childhoods[2], compelling them to stay indoors, and depriving them of opportunities to exercise their imaginations. Other stories focus on the cognitive[3] and social[4] consequences of raising young children on too heavy a media diet. As one *New York Times* journalist noted, "The average 3-year-old can pick up an iPhone and expertly scroll through the menu of apps, but how many 7-year-olds can organize a kickball game with the neighborhood kids?" (Stout, 2011)

Parents today worry about the *displacement effects* of screen media over physical exercise, academic activities (e.g., homework), imaginative play, and face-to-face interactions. Their fears are well grounded. To determine whether TV supplants kids' participation in more developmentally appropriate activities, researchers examined the time-use diaries of 1,050 young children collected in 1997 (Vandewater, Bickham, & Lee, 2006). They found that the more TV kids watch, the less time they spend with siblings and other family members, or engaging in creative play, especially among children younger than age 5. But the study failed to detect a relationship between TV viewing and time spent on either active play or book reading. It's worth noting, however, that these data were collected more than a decade ago, when children had access to fewer platforms and weren't consuming as much media as they are today. There is good reason to suspect that Internet, mobile device, and video game play are now threatening kids' active playtime, too.

These concerns are hardly new. We've been worried about media interfering with the healthy development of our children ever since the moving image hit cinemas a century ago (Wartella & Jennings, 2000). What's different today is that newer forms of media — which by design provide interactive experiences for the child — have been shown to motivate, facilitate, and deepen learning in ways that film, radio, and television never quite managed (e.g., Bavelier, Green, & Dye, 2010; Jenkins, Clinton, Purushotma, Robison, & Weigel, 2006; Lieberman, 2006). Furthermore, the recent entry of gesture-based gaming systems like the Wii, Kinect, and PlayStation Move are getting kids off the couch and burning calories while they play (Thai, Lowenstein, Ching, & Rejeski, 2009).

For these reasons, our research seeks to better understand parents' concerns about digital-based play, which to many adults bears no resemblance to the play they experienced growing up. In this report, we will dig into understanding the roots of these concerns, and see how parents are responding. We will attempt to identify the ways parents are playing and learning with their kids on these novel platforms, and gauge how enjoyable and edifying both parties are finding the experience. These insights can lead to valuable recommendations and models for productive family interactions with digital media.

[1] www.cnn.com/2009/TECH/11/02/kids.social.networks/index.html
[2] See www.nytimes.com/2011/01/06/garden/06play.html
[3] See www.time.com/time/magazine/article/0,9171,2048363,00.html or www.theatlantic.com/magazine/archive/2008/07/is-google-making-us-stupid/6868/
[4] See www.nytimes.com/2010/11/21/technology/21brain.html?ref=mattrichtel

Literature on media use and parenting

Because television is the platform that has received the most attention from researchers interested in family engagement with media, we start with this body of literature as a basis for our inquiries about digital technologies in households with young children.

"Too much TV" has been empirically associated with a host of childhood afflictions, including delayed language development in babies, aggressive behavior, and poor academic performance (see American Academy of Pediatrics, 2010 for review). TV commercials are often blamed for the childhood obesity epidemic in the US. Ads for sugary cereals, soda, and fast food have been shown to prompt eating (e.g., Taveras et al., 2006) and increase preschoolers' choice of the advertised item (e.g., Jeffrey, McLellam, & Fox, 1982). To protect children from these threats to their healthy development, in 2001 the American Academy of Pediatrics (AAP) set guidelines recommending that parents limit children's total screen time to two hours of "quality programming" per day, and discourage TV viewing for children younger than age 2 (American Academy of Pediatrics, 2001). Over the past decade, the AAP's guidelines have gained the awareness of a majority of parents (Jordan, Hersey, McDivitt, & Heitzler, 2006).

Today, the Internet, video games, and mobile devices are gaining popularity as daily entertainment sources for kids. And kids aren't watching less TV to make time for these newer media; they're now streaming TV content on their computers and phones during the previously underutilized *in-between* times of their daily routines. In response to the staggering increases seen in children's media use between 2004 and 2009 as reported in 2010 by the Kaiser Family Foundation (i.e., Rideout et al., 2010), the AAP issued an addendum to its 2001 recommendations. This addendum informed pediatricians — and by extension, parents — of the risks that have been empirically associated with the overconsumption of TV and newer forms of media (e.g., sexting, pornography, pro-anorexia websites), and advised constituents on how to protect young people from these risks (American Academy of Pediatrics, 2010). The 2010 policy statement did not alter the screen time limits recommended in 2001, but it did underscore the need to include video game and Internet use in the above-mentioned two hours (see Appendix A).

The AAP guidelines have been shown to be effective in limiting media consumption in at least some families. Carlson and colleagues (2010) analyzed the survey responses of 7,415 youth aged 9 to 15 years to discover that in households where both parents and children reported having set rules around screen time, children were less likely to spend more than two hours per day watching TV and playing videos games. They also found children from African-American and lower-income families to be more likely to exceed the AAP's recommended limits, and their parents to be less aware of these limits. Carlson et al.'s findings suggest that raising parental awareness of the AAP guidelines may be effective in decreasing screen time among 9- to 15-year-olds.

But rule setting isn't the only way parents influence their children's TV viewing. Valkenburg, Krcmar, Peeters, and Marseille (1999) identify three categories of parental mediation: *instructive mediation* involves parents' efforts to explain television content in terms that their child can understand; *social coviewing* refers to occasions when parents watch TV with their kids; and *restrictive mediation* refers to setting time or content limits on kids' viewing, or using TV to reward or punish.

Digital media elicit similar styles of parental mediation, but their interactive qualities offer opportunities for parents to engage more deeply in play and learning with their children. Barron, Martin, Takeuchi, and Fithian (2009) used ethnographic methods to understand how the parents of a set of technologically fluent adolescents helped foster the interests and skills of their children, and identified seven distinct roles in the process: teacher, collaborator, learning broker, resource provider, nontechnical consultant, employer, and learner. For the present study, we crafted several survey questions upon Barron et al.'s taxonomy to determine how parents are supporting younger children's development around digital media.

Plowman, McPake, and Stephens (2008) studied 3- to 5-year-old's technology learning at home, and how other family members such as grandparents and siblings are contributing to this learning. In their survey of 346 families and deeper case studies of 24, the authors discovered that the adults often believed their children were "just picking it up" when it came to demonstrating new technical skills. What the adults hadn't realized is that they were unwittingly modeling technical practices in front of their preschoolers (e.g., logging on to the computer, using the remote control). As part of the Digital Youth Project, Horst (2009) used ethnographic methods to examine parental structuring and regulation of spatial arrangements, routines, and family identity around children's media use. For example, in some homes, parents placed computers in kitchens, hallways, and other common spaces where they could easily monitor what their kids were doing. In others, where tighter living quarters forced parents and children to spend more time watching TV shows together, parents yielded more indirect influences over their children's media consumption.

Taken together, our parent survey and case studies build upon the studies mentioned above in what they have to say about digital media use in families with elementary school-age children. Unlike teenagers, who use new media to extend their social networks and establish independence from their families (Ito et al., 2009), preadolescent-age children still seek connection to parents and other family members (Centers for Disease Control and Prevention, 2005). This is why middle childhood is such a critical period of development to study: there is still hope of drawing children and their parents or other caring adults together in meaningful play and learning!

Conceptual framework: Ecological perspectives on development and learning

This research assumes an ecological view of the developing child, which considers the *microsystems* — the immediate settings in which the child interacts with people and digital media — and the larger social contexts in which these settings are situated (see Figure 1 on p.16). According to Bronfenbrenner (1977), who proposed this broader approach to studying human development, "environmental structures, and the processes taking place within and between them, must be viewed as interdependent and must be analyzed in systems terms" (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 activities at home, in school, and in her community. A *macrosystem* analysis of the opening vignette, to use Bronfenbrenner's terminology, would consider the ways in which the Guzmans' status as working-class, second-generation Mexican Americans shapes their restrictions around their daughter's cell phone use.

Barron (2004; Barron et al., 2009) further articulates Bronfenbrenner's (1977) ecological perspective with particular respect to the development of children's interest in technology. She employs a *learning ecologies* framework to track how adolescents develop technological interest and expertise across time and space, and the social and material supports that enable this development. Digital Youth Project researchers Horst, Herr-Stephenson, and Robinson (2009) conceptualize a young person's *media ecology* as "the varied social, technical, and cultural contexts that structure youth media engagement" (p. 2) and that are meaningful to them. Unlike the media ecologies of past generations — which may have comprised television, radio, and less interactive technologies — today's support the development of technical and other 21st-century skills in the context of socializing, communicating, and playing.

With its focus on preadolescent-age children, the present research contributes to these perspectives by examining how the technological resources in a child's learning ecology may support or inhibit his or her early social, cognitive, and physical development. In theory, the introduction of communication and production tools into the ecology of a young child proffers contact with more capable peers (e.g., Gabriela's 17-year-old cousin) and activities that two decades ago might have been considered beyond the capabilities of an 8-year-old (e.g., movie making, digital photography). The Internet has made it possible for kids around

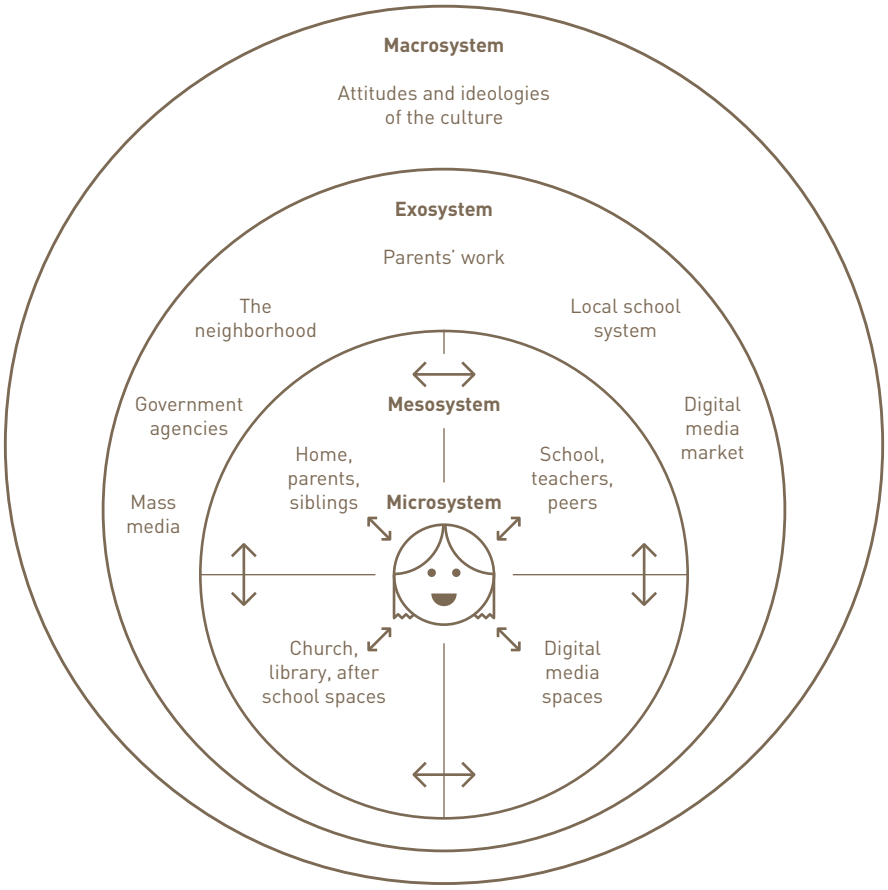
the world to interact, exposing them to new cultures and perspectives. For these reasons, the promise digital media holds for learning is exciting.

In reality, though, not all youth are using these tools to catalyze their cognitive, social, or emotional development. Exposure to people and experiences beyond a child's local community or age is what many parents want to guard their children from. Some argue that these richer, expanded learning ecologies are too much, too soon (see Stout, 2011).

Young children in particular also require significant scaffolding to guide and inspire their positive, safe, and age-appropriate uses of technology; however, such supports are a highly unequal resource (Neuman & Celano, 2006; Warschauer & Matuchniak, 2010).

The final section of this report will examine study findings in light of these ecological considerations and pay particular attention to what is "developmentally appropriate."

Figure 1: An ecological perspective of human development



Macrosystem: The overarching institutional patterns of the culture, such as its economic, social, educational, legal, and political systems (cultural influences)

Exosystem: The larger social structures that influence what goes on in the child's immediate settings (institutional influences)

Mesosystem: Interrelations among the major settings that the child inhabits (distal influences)

Microsystem: Interactions between the child and her immediate environment (proximate influences)

Bronfenbrenner (1977)

Methods

The case studies

Between December 2008 and September 2009, we conducted in-depth case studies of four young girls — three 8-year-olds and one 7-year-old — all of whom reside in the greater Los Angeles area. They were somewhat ordinary as far as their digital media use was concerned. None were budding moviemakers, prodigy programmers, or avid gamers. Their parents weren't engineers or professors of education, or the type to buy them 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. In fact, we 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 & Matuchniak, 2010).

We spent anywhere from two to seven days following the case children around as they went about their ordinary afterschool or weekend routines — to witness what they actually did, versus relying solely on what the children and their parents *said* they did in interviews. This also gave us a sense of the proportion of time spent using digital media versus other activities (e.g., homework, outdoor playtime) and traditional forms of media (e.g., television, music, radio; see Appendix B for more on our case study methods).

Two of the four cases studies — Gabriela and Sierra's[5] — are featured below. Gabriela is actually Sierra's aunt by way of her mother's second marriage (see Figure 12 on page 27), but with just one year between them, the girls act more like cousins. Table 1 displays demographics on the selected families as well as information on sibling counts and parental experience with technology.

Table 1: Case children at a glance

	Gabriela	Sierra
Child's age at time of study	8 years, 6 months	7 years, 2 months
Ethnicity	Mexican-American	Mexican-American
Income level	Low to middle	Middle
Siblings	3 half-brothers (31, 28, 21)	1 older brother (9)
Home setting characteristics	Apartment complex with lots of same-age children	Grandparents and aunt's family live in adjacent house
Parents' age	Late 40s	Late 20s / Early 30s
Home / School technology access	Mid / Low	High / High

The parent survey

The parent survey was written by researchers at the Cooney Center in consultation with market research firm Hotspex, and included questions regarding respondents' childrearing practices around media; their beliefs, attitudes, and perceptions about media; interactions with their children around these media; and demographic information. The survey was estimated to take 20 minutes to complete.

Hotspex administered the survey through its website in July, 2010 to 810 parents (612 mothers and 198 fathers) of at least one preschool- or early-elementary-aged child (ages 3 through 10) living in the US. Respondents were Hotspex "panelists," and invited by Hotspex to complete this particular survey based on their demographic profile (see Appendix B for Hotspex recruiting methods). Because this was a web-based survey, we can assume that all respondents had Internet access; the sample was not representative of the US population in this regard. The sample was also not representative of the US population by race/ethnicity or by state[6] (see Appendix B for a demographic breakdown of survey respondents).

[5] All person and place names are pseudonyms to protect the case families' privacy.

[6] Hotspex panelists from 48 states plus the District of Columbia participated in the parent survey.

parenting in a digital age: results from a national survey

Results from the 2009 Kaiser Family Foundation-sponsored study were an abrupt wake-up call for educators, parents, and practitioners concerned about child and adolescent health. Rideout and colleagues (2010) found that 8-to-18-year-olds were spending an hour more with media in 2009 — 7 hours and 38 minutes — than they were in 2004. While notable for the number of youth surveyed, the KFF study only canvassed children ages 8 and older. Younger children are the focus of *Always Connected*, an analysis of seven recent large-scale studies on the media habits of kids ages 0 through 11 (Gutnick et al., 2011). Released by Sesame Workshop in March 2011, the report reveals developmental patterns in children's media use as they grow older. For instance, kids ages 2 through 5 watch more TV (including DVD and videos) than kids ages 6 through 11 do. And between the ages of 7 and 9, children shift to more interactive pastimes: 70% of 8-year-olds play video games, whereas less than half of 6-year-olds do. Gutnick and colleagues found similar increases in young children's Internet use.

This new survey was designed to complement the important developmental work forwarded by *Always Connected* by digging deeper into the *who*, *why*, and *how* behind these media consumption patterns. We asked more than 800 parents of children ages 3 through 10 not only about the types of media their kids are using at home, but also about their attitudes toward and rules around these media. Here we present these parental assessments and perspectives. Where appropriate, we reference recent or similar surveys to bring further meaning to these findings.

Access to media in the home

Just because there's a computer in a home doesn't mean that the children living there use it. For this research, we were more interested in examining the *access* young children have to certain forms of media than household ownership of these media, which other surveys typically inquire about. Parents may own particular technologies — such as smart phones, laptops, and even video game consoles — but unless their children use them, they weren't counted in this survey.

In a majority of the families that participated in this survey, children are playing video games. More than half (55%) are using Nintendo DSes, iPod touches, and/or other handheld gaming devices, and two-thirds (68%) are playing on TV-based video game consoles such as the Wii, PlayStation 3, and Xbox 360 (see Figure 2). Computers are accessed even more frequently, with 85% percent of parents reporting that their children use them. But the oldest medium we inquired about remains the favorite: 95% of 3-to-10-year-olds watch TV.

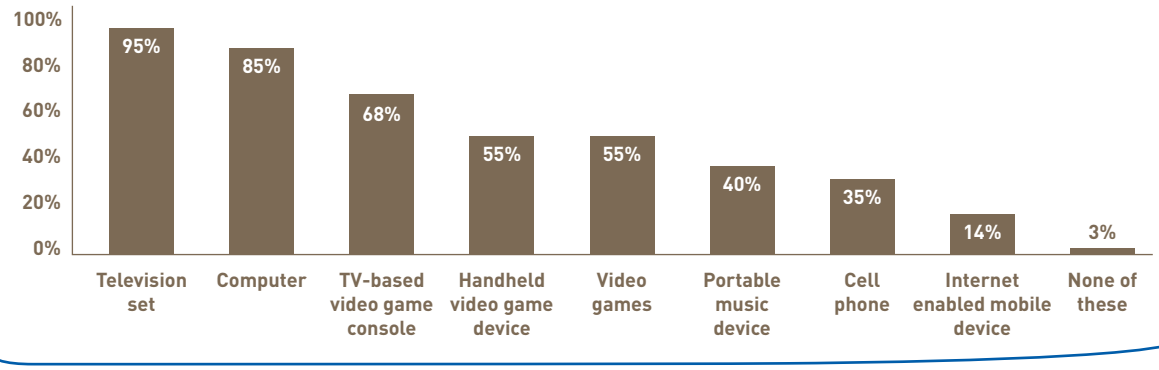
Children this age are less likely to use mobile devices, but the figures are still impressive. Forty percent of parents reported that their children listen to portable music devices such as iPods, and 35% have access to a regular cell phone, usually a parent's or other older family member's. Internet enabled mobile devices — also known as *smart phones* — are less available to young children, with just 14% of parents reporting that their kids use them. Compare these figures to mobile device use among tweens: In 2009, 80% of 11-to-14-year-olds owned iPods/MP3 players, 69% owned cell phones, and 59% owned handheld gaming devices, according to Rideout et al. (2010).

Intergenerational play and learning

These days, two-thirds of kids may be gaming on a Wii, PS3, or XBox 360 at home, but only half (52%) of parents say they're playing along with them (see Figure 3 on page 20). Even fewer parents play video games with their kids on the computer or online — just 44%. Only a third (36%) surf the Internet together. A mere 13% reported playing games on mobile devices with their children. Survey respondents said they are far more likely to watch TV (89%), read books (79%), and play board games (73%) with their kids.

These are activities that they might have done with their own parents when they were young children, and also the ones they named as their favorites. When asked which media-based activity they enjoy doing most with their children, 41% of parents chose watching TV, 23% chose reading books, and 18% chose playing board games (see Figure 4 on page 20). The remaining 18% of respondents said that video games, computers, or mobile devices are the most appealing platforms for family entertainment. So, while 52% of parents report playing TV console based video games with their kids, only 8% would call it their favorite way to pass time with them.

Figure 2: Which of the following items do your children ever use in your home? (Check all that apply)



When parents watch TV, read books, or play games (board or electronic) with young children, they're typically in the position to guide them through new content they may encounter during these leisure activities. But there are other ways that parents are playing supporting roles in their children's learning around media (Barron et al., 2009; Plowman et al., 2008). A little over two-thirds of parents reported ever teaching their kids how to do something on the computer (see Figure 5 on page 21), and just over half have purchased their children digital media for educational purposes. By contrast, just over two-thirds of parents have purchased entertainment-related media such as video games or gaming consoles for their kids.

These figures suggest that parents consider digital media to be primarily for fun and secondarily for learning.

Sometimes the roles parents play in their children's learning around media are less intentional, such as when the adult assumes the position of learner. Thirty-seven percent of parents reported that their child has taught them how to do something technical, like operate the DVD player or navigate their way around a video game. When kids teach others, the process of explaining can deepen their own understanding of concepts, and reinforce perceptions of themselves as capable learners (Damon, 1984).

Figure 3: Which of these activities do you regularly do with your child? (Check all that apply)

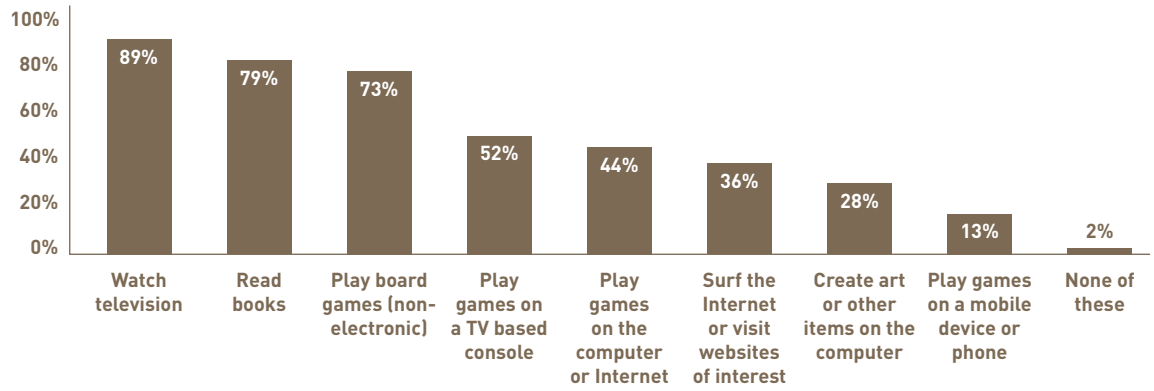


Figure 4: Which of the following activities do you enjoy doing most with your child? (Select just one)

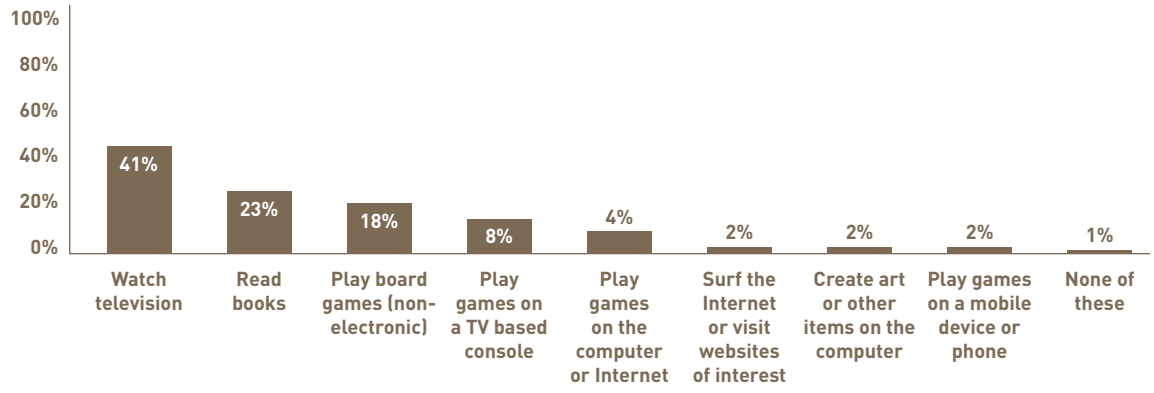
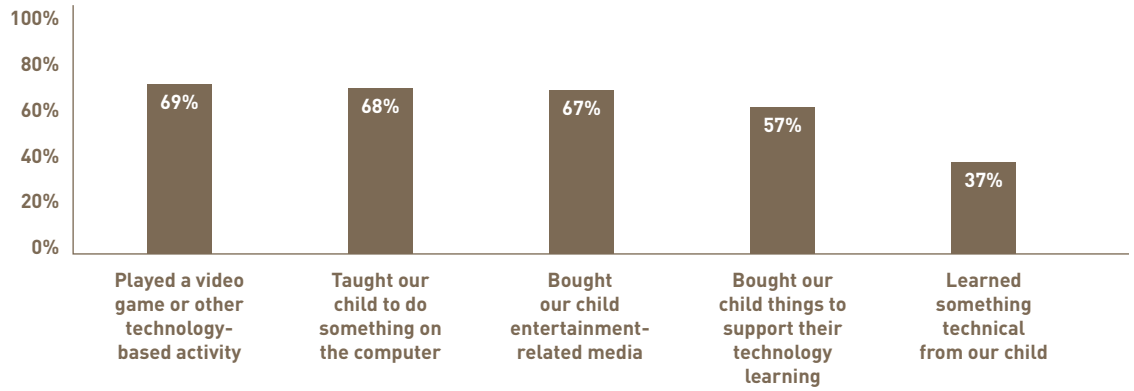


Figure 5: Which of the following have you ever done with or for your child? (Check all that apply)



Parent concerns and perceptions about digital media

What parents choose to purchase for their kids, and whether and how they monitor or regulate their media activities are invariably tied to how they think and feel about digital media. To get a better sense of these perceptions and attitudes, we asked parents to indicate which set of statements linking digital media to healthy development (i.e., physical, social, emotional, cognitive) they agreed with (see Figure 6). The most common concern — selected by 59% of respondents — is that digital media prevents children from getting physical exercise. In other words, kids are playing video games inside at the expense of running around outside. Meanwhile, only about a quarter of parents believe that digital media is bad for other aspects of a child's health, such as his/her posture, eyesight, or hearing. Online privacy and safety, on the other hand, ranked second highest (after exercise) as a source of anxiety, with 53% of respondents sharing this concern. A substantial portion of parents believes that playing with digital media infringes on the time kids should be spending on other activities (52%), with friends or family (41%), or working on school assignments (33%).

Figure 6: Parents regulate their child's media use for different reasons. Check any of the statements below that you agree with.

I try to limit the time my child spends with technology because I:	
59%	Believe it prevents my child from getting physical activity or exercise.
54%	Am concerned about my child's privacy and safety online.
52%	Believe it takes up time my child should be spending on other activities.
42%	Believe that some videogames are too violent.
41%	Believe it takes up time my child should be spending with friends or family.
33%	Believe it takes up time my child should be spending on academic work.
27%	Believe it's bad for my child's health, such as his/her posture, eyesight, hearing, etc.
18%	Think my child spends too much time with technology.
8%	I don't agree with any of these statements.

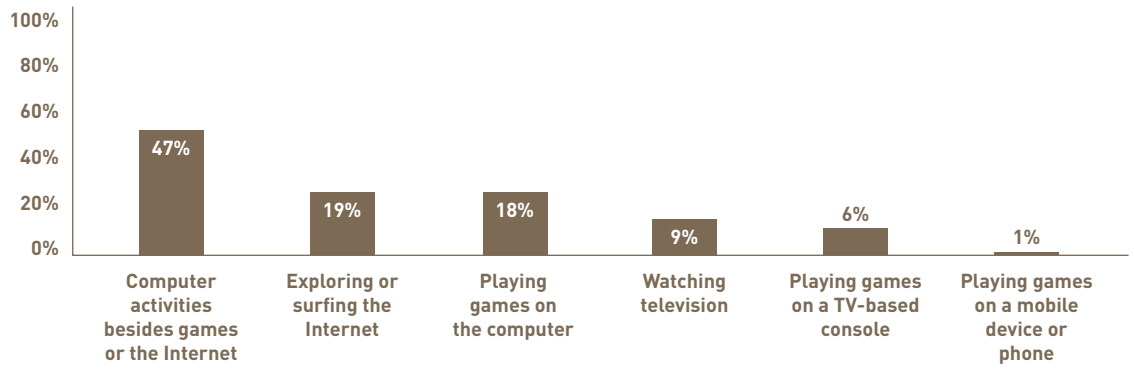
Despite concerns about maintaining a healthy balance of physical, social, and cognitive activities for their young children, only 18% of parents indicated their own kids spend too much time with digital media. In fact, most parents believe that technology in general is important to their children's success in school (73%), as well as to their future career choices (65%; see Figure 7). This ambivalence about the benefits and drawbacks of raising children in a digital household also surfaced in their responses about video games. While 42% of parents think that some video games can be too violent, 69% believe that certain types can help kids develop skills important to their academic success. Fifty-seven percent agree with the statement that games give kids opportunities to practice interpersonal skills like cooperating, negotiating, and communicating.

Parents may be open to the notion of video games as 21st-century learning environments, but when asked to choose the tech activity that holds *most* potential for their child's learning, the greatest number of respondents — 47% — chose computer-based pursuits such as word processing, photo editing, programming, and graphic design (see Figure 8). Exploring the Internet trailed far behind as the second most selected activity at 19%, followed by playing video games on the computer at 18%. Watching television, the media activity that parents most often do with their children (see previous section), ranked fourth, with only 9% of respondents selecting this pastime. A mere 6% believe that playing games on a TV-based console has the most educational potential, another display of parental ambivalence about the worth of video games, particularly on this platform.

Figure 7: Which of these statements about the benefits of technology, if any, do you agree with? (Check all that apply)

73%	I believe that computers and technology in general are important to my child's success in school.
69%	I believe that certain types of video games can help children develop skills important to their academic success (for example, math, reading, science, foreign language learning).
65%	I believe that computers and technology in general are important to my child's future career choices.
57%	I believe that certain types of video games give children practice in cooperating, negotiating, communicating, and other people skills.
7%	I don't agree with any of these statements.

Figure 8: Which of the following do you think has the most educational potential for your child? (Select just one)



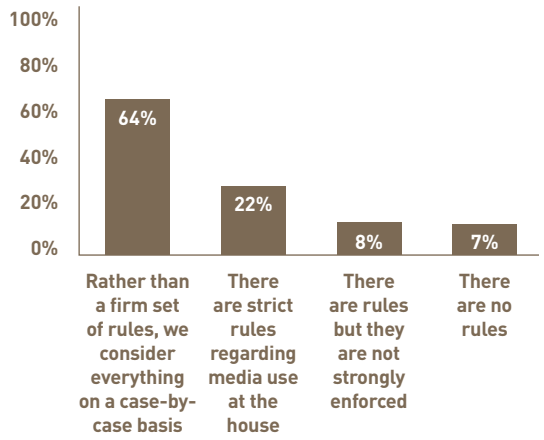
Playing games on a mobile device or phone ranked last; only 1% of parents selected this option. This isn't to say, however, that parents find mobile devices to hold the *least* potential for learning. Given only one selection, it simply wasn't the pastime that parents considered *most* enlightening. Cell phones and other mobile devices may simply be viewed as less appropriate platforms for 3- to 10-year-olds. In a separate question, we asked parents to indicate the youngest age at which a child should be allowed to play with (a) smart phones and (b) regular cell phones owned by either the child or an adult. Three-quarters of parents don't believe kids younger than age 7 should be using regular cell phones, and 83% don't believe kids younger than age 7 should be using smart phones. Ownership is a different matter: 73% of parents think it's inappropriate for children under the age of 13 to own smart phones, while only 40% of parents think it's inappropriate for children under the age of 13 to own regular phones.

Rules and restrictions

The American Academy of Pediatrics' 2001 guidelines recommended that parents discourage babies (ages < 2) from watching TV and limit children's (ages 2+) total media time to two hours of "quality programming" per day (American Academy of Pediatrics, 2001). A few years later, Jordan, Hersey, McDivitt, and Heitzler (2006) found that while most parents were aware of the AAP's recommendations, less than half enforced them at home. They identified a number of reasons why, including parents' own heavy viewing practices; the role that TV plays in family routines; the use of the set as an affordable babysitter; the belief that kids deserve downtime away from school; and a lack of concern over the potentially harmful effects of too much TV.

Today, new media platforms are populating American households faster than the AAP or other expert agencies can offer research-grounded guidelines around them. In the absence of such advice, are parents setting limits on newer media as they enter the home? Twenty-two percent of the parents we surveyed say they have strict rules around what their kids can and can't do with home-based technologies, while 8% say they have rules but don't always strongly enforce them (see Figure 9). Only 7% of parents claim to have no rules. But most parents — a full 64% — prefer to restrict their kids' activities on a case-by-case basis rather than impose a firm set of rules.

Figure 9: What rules are in place for your child when it comes to technology? (Select just one)



Restrictions by platform

Household rules around video games, mobile devices, and the Internet differ by platform and even specific activity. Forty-seven percent of parents don't let their 3- through 10-year-olds use mobile devices. Video games, the Internet, and TV, meanwhile, are far less often prohibited, at respective rates of 8%, 9%, and 3%.

Of the parents who do let their kids use electronic devices, most place some type of time or content restriction on their usage. Only 18% of parents say they limit how much *time* their children spend using mobile devices. Perhaps kids have more control over where and when they can play on these more personal, portable platforms. Nearly equal numbers of parents enforce time restrictions on the Internet, video games, and TV — from 37% to 40% — as these platforms tend to be more stationary, if not more easily monitored by adults, and less likely to be owned by the child than mobile devices.

Parents were more likely to vary by platform in their *content* restrictions. Twenty-seven percent of parents let their kids surf the Internet as long as the sites they visit are educational, and 14% of parents hold the same criterion for the TV shows they let their kids watch. Fewer parents hold video games and mobile devices — media regarded more for their entertainment and communication than educational capacities — to these content standards, at 11% and 5%, respectively.

What lurks in cyberspace

Children's Internet use is monitored or limited in 97% of homes, more often than video games (94%) or television (92%). In other words, only 3% of parents let their kids freely surf the web. Fueled by frequent headlines about Internet predators and cyberbullying, parental concern over who or what lurks online is further reflected in the statistic that 70% of households with children ages 3 through 10 have parental controls set on the family computer.

Parents are generally open to letting their kids visit sites like Club Penguin and Webkinz; only 25% of parents prohibit virtual worlds for kids. But they're wary of social networking sites like MySpace, and of chatting online. About 70% of parents don't permit their kids to engage in these two activities, and 58% don't let their kids surf the Internet freely (see Figure 10). Furthermore, of parents who let their kids play video games, only 47% allow them to play Internet-based games, versus 63% who allow gaming on TV-based consoles like the Wii or PS3, and 68% who allow Nintendo DSes, iPod touches, and other handheld gaming devices.

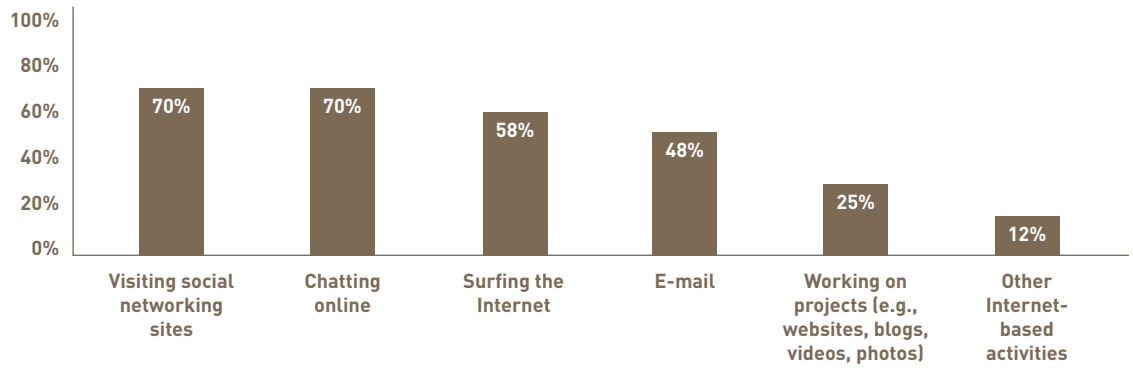
What matters about mobile

As previously mentioned, 47% of parents don't let their 3- through 10-year-olds play with mobile devices, including cell phones, MP3 players, or gaming devices like the Nintendo DS. Of those who do, most are open to letting their kids listen to music; only 22% restrict this particular activity (see Figure 11). For the most part, parents are permissive about their kids using mobile devices for non-connected uses like gaming and music — it's the texting and talking that worries them. Of parents who allow their kids to play with mobile devices, 95% restrict their use in some way. Only half let their kids text, and 38% don't let them talk on the phone. This coincides with parental wariness over chatting and social network activity on the Internet illustrated in Figure 10.

Age matters

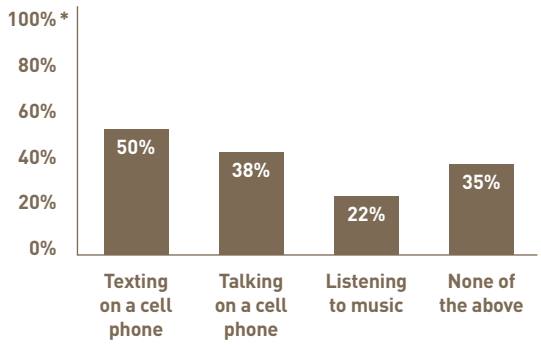
Child age was found to predict rule setting. Interestingly, the relationship between age and rules is not linear: the percentage of children who have rules regarding media use actually peaks at around age 7, and then declines as children grow older. Furthermore, most parents with children ages 6 and under do not set parental controls on their computers, while most parents with children ages 7 and older do. Parent age was also

Figure 10: Which activities, if any, do you restrict your child from doing on the Internet? (Select all that apply)



found to predict rule setting. The oldest parents we surveyed (ages 50+) were most likely to set rules around their children's technology use, while the youngest (under 30) were least likely, even when controlling for the age of the child.

Figure 11: Which activities, if any, do you restrict your child from doing on mobile devices?
(Select all that apply)



* Of parents who let their 3- through 10-year-olds play with mobile devices

summary of survey findings

Here is a rundown of the survey results just described:

Access to media in the home

- Video games are popular, but TV is still the most popular medium in homes.
- Mobile devices have a way to go with this age set.

Intergenerational play and learning

- Parents prefer media they enjoyed as children.
- Parents view digital media as being for fun more than for learning.
- Less intergenerational play is taking place on newer media.
- More than a third of parents have learned something technical from their child.

Parent concerns and perceptions about digital media

- Lack of exercise and online privacy are parents' greatest concerns.
- Fewer than 1 in 5 parents think their kids spend too much time with digital media…
- …Yet 40% believe these activities infringe on time that would otherwise be spent with real people.
- Almost half of parents consider some video games too violent, but 7 out of 10 believe games can help kids develop skills for academic success.
- Parents rate the educational value of the Internet and video games higher than TV, while very few see the educational potential of mobile devices and phones.
- Three quarters of parents don't believe kids younger than age 7 should use cell phones, much less own them.

Rules and restrictions

- Rule setting peaks when children are about 7 years old. Parents with older children (ages 7+) are more likely to set parental controls on their computers.
- Nearly two-thirds of parents say they restrict their kids' activities on a case-by-case basis.
- Parents are much more likely to *prohibit* mobile devices (47%) than the Internet (9%), video games (8%), and TV (3%).
- About 40% of parents *impose time limits* on their kids' TV, Internet, and video game use.
- Parents restrict the Internet more than any other platform, and are particularly wary of chatting and social networking.
- Parents are open to letting their kids use mobile devices for gaming and music, but more hesitant to permit use of their phone capabilities (i.e., talking and texting).
- Older parents (over 50) set rules more often than younger parents (under 30).

case study: gabriella guzman

Hector: I want her to have a childhood as a child as I did, as my wife did. And I think that's a big platform, background, backbone, so that when you grow up, you can say, "Well, you know, I enjoyed my childhood, I scraped my knees, I went out there, I did that..." This is going to be there all the time. And there's going to be a lot more development 10 years from now.

Claudia: There's kids that don't play baseball anymore! They don't ride their bikes anymore. You know, they're pale! They're just indoors... They need to be out.

The Guzman family

The Guzmans are lifelong Dodgers fans. Hector and Claudia were both born in the City of Los Angeles and grew up in neighborhoods with clear views of the palm tree-circled hilltop stadium. Now they rent a two-bedroom apartment in Highland Park, a section of LA nested between the city's downtown and the rolling hills and green spaces of the Arroyo Seco River tributary. Since the 1970s, Highland Park has been a primarily Hispanic community with a mixture of new Central American immigrants and families of Mexican descent.

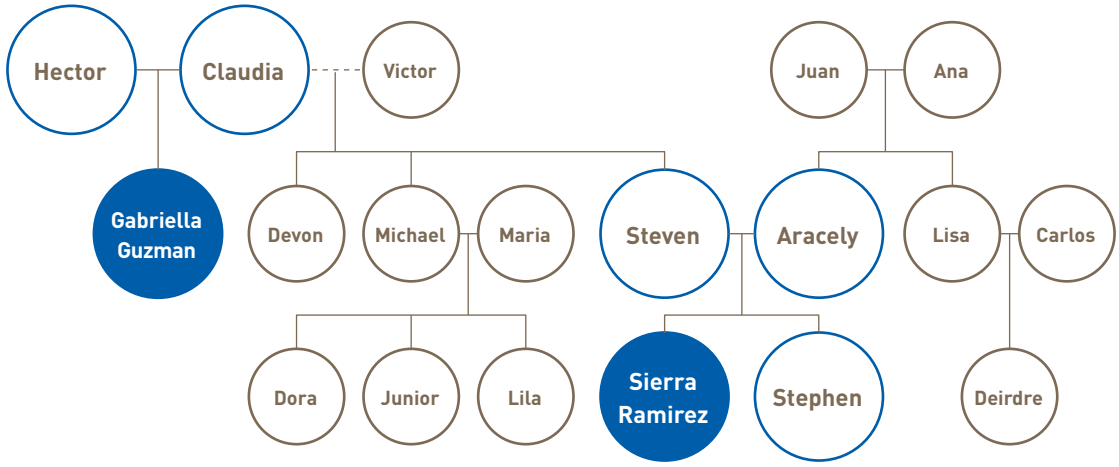
Claudia has three adult sons by a previous marriage: Steven (31), Michael (28), and Devon (21) (See Figure 12). Steven and Michael have families with children about the same age as Gabriela, and Devon lives at Michael's house. Gabriela is essentially an only child, but her half-brothers, nieces and nephews, and all the children living in her apartment complex constantly surround her during the non-school hours of her life. On school days, Claudia looks after her granddaughter Dora — Gabriela's niece just one year her junior — because her daughter-in-law is burdened at home with a newborn and toddler. Gabriela and Dora also attend the same school. Jessica (11) and Stacey (7), sisters from across the courtyard, are at the Guzman's as often as they are in their own apartment. As far as Claudia is concerned, the notion of family extends beyond blood relatives to include neighbors and nearby friends, which effectively distributes childcare responsibilities across several homes in this primarily working class community.

Digital immigrants

Hector and Claudia are in their late 40s. They didn't grow up using computers, but technology has become part of their daily lives at home and work. Hector has been working in telecommunications since graduating from high school. He has an AA degree in electronic engineering and is taking courses towards his bachelor's in the same while he works full-time as a wireless technician. Although Hector is considered a technical expert at work, at home it's a different story:

> Well, I don't touch the computer much. Only my wife or I see Gabriela, you know, fiddling around with it a little bit. Um, and the reason I don't use it too much is because all day long I'm looking at monitors and... I work in communications. And so when I get home that's really the last thing I want to do, or even answer the phone.

Figure 12: Family relationships between the case study girls



The Guzmans bought their Dell computer in February of 2007, which is also when they signed up for high-speed DSL. Before that they had a dial-up Internet connection for their first home computer, purchased in 2003. Hector calls the Dell his wife's domain since Claudia has managed to surpass him in her knowledge of its Windows Vista operating system. In fact, Hector might be considered somewhat of a Luddite as a result of hearing too many stories about technology addiction, such as the one his coworker recently shared:

> And it's my understanding that her son is maybe 4, 5-years-old. […] And they get all those CDs and they play all those games. So, from listening to her, it sounds to me that he's, as soon as he gets home from school and finishes his homework and what have you, he gets glued to that thing for hours on end. […] And it's coming to the point when it's time for dinner, he doesn't want to eat because he wants to limit the time for eating so that he can get back to doing this thing. So it absorbs their mind and that's something we do not ever want for us to happen here.

Instead, Hector and Claudia want Gabriela to enjoy the "humble, simple" joys of childhood — friends, family, baseball, and many of the same things that kept them entertained when they were kids: "I wanted to be outside," Claudia told us, "And that was like in the '60s. So at that time going outside and playing with your bike and playing ball, that was the thing to do." She also recalls her mother warning her, "'Your brain's going to turn to mush if you watch too much television!'" Now, as a parent herself, Claudia echoes her mother's sentiments about "getting immersed into that screen. […] It's not good for their eyes; it's not good for their minds."

Today, computers play a central role in Claudia's occupation as an employment specialist, as the job search process has migrated almost entirely online. About a decade ago, she had no choice but to learn to operate a PC if she wanted to keep her job. What was once done by hand at the work source center Claudia worked for would now be done on the computers, "And I was really afraid to [try] it," she recalled, "I was just afraid I was going to break it, and for the longest time." Steven, Michael, and Devon saw their mother through this transition several years ago:

> I think that most of my technology skills began with [my sons]. Because they'd say, "Don't be afraid, Mom. Look, this is what you have to do. You can do this, you can do that." Or I would tell them, "You know, I want to do this, I need to do that." And they'd get it going for me and they'd help me. Claudia's youngest son especially coached her throughout this phase. Born in 1988 and now in his early 20s, Devon continues to support his mom technology-wise, and is now doing the same for his little sister.

Media in the home

Devon is the one who introduced Gabriela to Club Penguin, uploads songs onto her MP3 player, and for Christmas bought her the Nintendo DS that her parents didn't want her to have. Hector and Claudia ended up letting Gabriela keep the DS, but only because Devon wouldn't be able to get a full refund for the expensive gift. They realize that Gabriela is going to gain access to these spaces one way or another, whether it's through them or someone else, such as an older brother, a friend at school, or on her own.

To the extent that they can, the Guzmans limit what media enter their home. Technology-wise, they live quite modestly: In the living room, there's a 22-inch television set with DVD player and cable box, plus a small stereo system. Hector and Claudia have an older TV plus the Dell PC and an all-in-one printer in their bedroom. Both parents own cell phones, and Claudia has a point-and-shoot digital camera. Besides Gabriela's personal portables — the DS, MP3 player, and an MP4 video player that her cousin David gave her for her birthday — a Timex clock radio CD player is the only other electronic device she gets to keep in her room. Her parents haven't put a TV set in her bedroom "because we don't want her to get herself emerged in television, closing the door, you know, blocking us out, not coming down for conversations." And, like the TV set, the Guzmans keep the family computer out in the open, in their bedroom, where Gabriela can't shut them out.

Hector says he doesn't want Gabriela just "sitting

there and playing some kind of game that she will not learn anything out of," and so, for the most part, only purchases media items that he believes will benefit his daughter. When Gabriela was five, for instance, they bought her an electronic play laptop that had activities to "help her spell words or do math. So that's where she started getting used to using a computer. She knew they were basically play computers, not real computers. But they were *learning* computers." Hector and Claudia also gave her a LeapPad because they thought it would help her learn to read. The only gadget they've bought Gabriela just for fun is her pink MP3 player. They also pay $6 per month for her Club Penguin membership, as they've recognized its social value in connecting Gabriela with her niece Sierra (7) and nephew Stephen (9).

Given the Guzman's otherwise unassuming media inventory, it comes as a surprise that they gave 8-year-old Gabriela a cell phone. When Hector lost his phone on a recent trip to Mexico, his employer replaced it with a company unit. Since he was obligated to pay for the lost phone's service through the end of its contract, he switched the line over to his wife's old Motorola RAZR when she got an upgrade for Christmas. Gabriela's phone came at basically no cost, but Hector decided to lend his daughter the spare phone for practical purposes: to help her mother coordinate family errands, and to keep in touch with them during the day. What they hadn't anticipated is that Gabriela would use the lavender device for fun and develop such an expensive texting habit along the way (see opening vignette).

Playing and learning together

Hector and Claudia don't mind when Gabriela goes online or watches television when she's with them. In fact, they cherish when the family "can sit in the evening and watch certain shows that we like to watch, like *Everybody Loves Raymond* and *Seinfeld* and those comedy shows makes us laugh" (Claudia). On a typical weekday afternoon, Claudia, Gabriela, and Dora spend 30 minutes of pre-homework TV watching *Sabrina the Teenage Witch* or *Phineas & Ferb* while chatting about their school days and snacking on popcorn. This is a daily ritual equally treasured by Claudia and the girls. Weekend movie nights are also cherished, and Hector and the neighborhood girls also attend.

The computer is a tool, not a toy

Inspired to visit the Disney Channel website after hearing her friends talk about it, Gabriela asked her father to help her get online for the first time at age 7. Since then, Claudia's been showing her daughter more sophisticated uses of the family PC. Consistent with her belief "that the computer is a tool, and it's not a toy," Claudia taught Gabriela *Microsoft Word* when she turned 8. Now Claudia is teaching her *Excel* and 10-key, which is analogous to touch-typing on the number pad. And Gabriela enjoys it. According to Claudia, "Whatever interests her, you know? It's kind of like a little game for her." These lessons fall in line with the other non-technical activities that mother and daughter "bond" over — as Gabriela likes to say — like dancing, baking cookies, and trying out new recipes from shows they watch together on the Food Network. There's no real pressure on Gabriela to master these technical skills; mom and daughter do it mostly for fun.

Claudia recently took on the role of teaching a basic computer course for Spanish-speaking immigrant job seekers at the local community college. As a self-proclaimed learner herself, she needed assurance that her customization of the existing curriculum would meet the needs of this special audience. "So that's where Gabriela came in because everything I was writing, I was running it by her first and see if it works. And well, if it works with a third grader, then I'm sure that women will be able to understand it." Both Gabriela and Claudia got something out of this partnership: Claudia used her daughter's feedback to tweak the course's content before taking it to her students and, according to Gabriela, "I did an autobiography. And she taught me how to do the font and the color and how to print it. So, I like doing that."

Role reversals and role models

Father and daughter, meanwhile, bond over the text messages they send one another during the day when Hector is at work. Hector taught Gabriela how to operate the voice and text functions of her cell phone (see opening vignette), and continues

to serve as her go-to guy for wireless support. But every once in a while, Gabriela gets to help her father out: Given his technology-filled workday, Hector rarely touches the PC. He does find YouTube amusing, but needs some help getting there. According to Claudia,

> She always helps her dad with YouTube. He gets lost. He still cannot just sit down and log on "y-o-u-t-u-b-e dot com" for some reason. And he'll be "Gabriela! Gabriela!" You know, and she'll come up here and she'll fix his mess, whatever all websites he put up there.

Gabriela is also the one to set up the DVD player for family movie nights, again because even after "dealing with all of these gadgets and spectrums" all day long, Hector can't recall how to get it to work. "So when I get home and when I want to use this, or I want put it on or I want to turn it off or I want to open it up, guess who's doing it? She's doing it for me."

Otherwise, as the primary breadwinner of the family, Hector doesn't get to spend as much time as he'd like to doing technology-based activities with Gabriela. But he has noticed the subtler ways in which Gabriela is learning from her mother:

> In January, she's going to have a slumber party, okay? And being that she sees her mom putting out documents and making everything really nice in the Windows Word, she's doing the same thing also. In fact just yesterday or the night before, she's putting her little program together in very nice fonts. And she's maneuvering to the Word doc — you know, all options they have there on her own, and I'm not even suggesting anything. I'm just standing right behind her watching her do these things!

As Hector points out, Gabriela is probably picking up many of her technical skills just by watching her mother go about her business on the computer.

Parent attitudes towards and rules around technology

The Guzmans worry about Gabriela getting completely "sucked into the television or sucked into the videogames or sucked into the computer," the way Hector's coworker's son has. Consequently, Hector and Claudia prohibit Gabriela from playing video games, which they feel are not only addicting, but violent, too. This is why Gabriela only plays the DS when her father isn't around — in the car with her mom or upstairs in her bedroom. She knows exactly how he feels about video games.

The Guzmans also limit Gabriela's exposure to media she does have access to in their home. Upon arriving home from school, she's allowed to watch one half-hour show on TV before she needs to get cracking on her homework. In the evenings she can watch more TV because she watches with her parents. Gabriela always asks for permission to log on to Club Penguin, and knows by now that if there are friends, family, or neighbors around, spending time with them takes priority over hanging out on Club Penguin alone, as does playing outside when the weather is fine. If none of the neighbors are around to play, Gabriela will ask her mom to use the computer. If they do come knocking, Claudia shouts, "The girls are outside, log off."

Due to these priorities and to a car-sharing schedule that prohibits long stretches of online play, Gabriela logs on to Club Penguin maybe three times during the school week. On days that Hector takes the car to work, Gabriela is more likely to play afterschool because she doesn't have to go with her mom to pick her dad up from Monrovia at 5:00 p.m. When Gabriela does go online, according to Claudia, "We don't let her stay on for more than like two hours. Then we'll make her get off. And then she can get back on later on." Gabriela understands that these time limits have a purpose: "My dad has a few rules. He said that I can't be on there too long because then I'll be like, 'No, this is boring,' and then I won't want to use it anymore."

Hector worries in particular about his daughter's *solitary* consumption of entertainment media because, "If we allowed her to access the Internet or go onto certain websites, you know, she could get into some kind of trouble or people talking to her, you know, you see those photos on television." So they've set the parental controls on their computer, and Gabriela is only allowed to visit websites that at least one parent has seen and

approved. Claudia believes that this and the other ways they monitor Gabriela's technology activities will "hopefully instill that in her and teach her, you know, for the same reason we teach her not to go out to the sidewalk." Through these actions, Gabriela's parents are teaching her common sense about everything — not just about staying safe on the Internet — just as she and her husband had to develop common sense playing outside when they were her age.

In setting restrictions on Gabriela's media diet, the Guzmans do not believe that they are limiting her development as a citizen of the 21st century. They want Gabriela to be successful in her schooling and life beyond, but do not believe that her participation in technology activities is critical to her achieving this success, at least not as an 8-year-old. For now, in Hector's view:

> My focus is to for her to grow up as a child. Enjoy her childhood and then when it comes to […] high school or college or university. When it comes for her to, you know, get focused on that, then that's when we'll go focus on that. At this point at her age, that is, as I said earlier, not a priority at all. So I don't even enforce her to, or encourage her to do this or do that.

Claudia also wants Gabriela to enjoy childhood, but differs somewhat from her husband on this point "because technology is what it is now, and it's going to get even further. I mean it's not going to go backwards, if anything. So I want her to know the stuff, and I want her to know once again that it's a tool she can use to do her work better." As Claudia discovered first-hand in the late 1990s, it's necessary to keep up with the latest technologies in order to remain marketable in the 21st-century workforce. This may explain why she insists that Gabriela's engagement with digital media transcends pure entertainment, and why she is teaching her daughter basic computer skills after school, while Hector is away at work.

Claudia says she "keep[s] stressing that the computer is a tool, and it's not a toy. So just because you're playing games on it doesn't mean you're playing with a toy. You're using a tool to access a game. And she understands that." Her parents share with her the reasons behind their rules and, so far, she rarely objects to their reasoning. After overhearing her parents' conversations about Dora's red eyes (according to Claudia, Dora "gets so into [her DS], her eyes are like red, red, red, and big black rings under her eyes"), Hector's coworker's son, and so on, Gabriela is bound to believe that playing video games can't be good for her. In fact, Gabriela often echoes her parents' attitudes and values about technology. When asked, for instance, how often she plays with her DS, she answered, "Not every day where I would get addicted to it," and "I don't like sleep with my DS close because I don't want to start playing it because I know that I have to get a good night's sleep."

case study: sierra ramirez

Steven: She had them on five things on one day. It was overwhelming. It was like, "Oh my God." We literally...

Aracely: Well, I think Sierra overheard him say "overwhelming" because she dropped out. She's like, "You're tiring me!" Yah, but there was a point when she was doing ballet and tap and then soccer.

Steven: After soccer we'd go to ballet. You know, we're taking off her cleats and putting on ballet shoes!

Aracely: Squeezing her into the tutu. Like yah, it's like literally, it was bad. [Laughter.]

The Ramirez family

When Sierra Ramirez speaks, she does so with a clarity and assuredness that belies her barely 7 years of age. The second grader has a dark complexion, thick eyelashes, and a round face that, when smiling, reveals a dimple as deep as they get. Her best friend — and foe, which can vary moment to moment — is her 9-year-old brother Stephen. As a young child, Stephen was diagnosed with verbal apraxia and now speaks with a pronounced speech impediment, exacerbated when he's excited about the topic of conversation. When Stephen speaks, Sierra listens on and inserts the occasional clarification or elaboration whenever she thinks it will add to the listener's understanding. She's been doing this for years, acting as an interpreter of sorts for her older brother and, more generally, like the older sibling in the pair, owing to a deadpan sense of humor in stark contrast to her brother's intense energy.

Sierra and Stephen's parents are a similar study in contrasts. Their mother Aracely is a petite woman, talkative and full of energy. At age 28, she works full-time as a legal secretary and is enrolled in the pastry and bakery extended program at Le Cordon Bleu, her "dream come true!" She keeps her kids equally occupied, sending them to a program-rich afterschool center during the week, and to dance, swimming, music, and soccer on the weekends. She packs their schedules because when she and her husband were kids, "we were never a part of it. I was never a part of anything. So [...] we just try to keep them in anything that's active."

Their dad Steven (with a "v") is mellow compared to his wife, but maintains an equally busy pace of life as a property manager. New technologies help him stay on top of things. The 31-year-old uses a Palm Treo, for example, to keep up with paperwork when he's out in the field, generating invoices and soliciting bids from potential contractors with emailed photos of the repair work to be done. The smartphone-PDA also provides three modes of coordinating family matters with his wife during the day: voice, email, and text. And yet, the couple jokes, they still have difficulty reaching one another. Steven and Aracely text — he on his Treo, she on her BlackBerry — "all day long, all day long..."

Electronic gadgets have always fascinated Steven, a third-generation Mexican-American. He started playing video games when he was Sierra's age and still plays them today at age 31. But technology is more than just a diversion for Steven. He took formal courses in computer repair, did an internship at CompUSA, and worked in imaging for a few years. Aracely developed her technical chops later in life — unlike Steven, she didn't have access to computers or video games as a child — but is now confident in her competence, which she developed through her paralegal duties. The Internet, they explained, holds the family together. They have come to depend on it so much for its communication and information capabilities that "without it, we're lifeless."

Media in the home

The Ramirezes own their two-bedroom, one-bath home, which is located on a quiet, palm-tree lined street in Atwater Village, a primarily Hispanic neighborhood of Los Angeles. Aracely's family — her parents and sister Lisa's family — live on the lot behind the Ramirez's, making for lots of two-way traffic between the two households. Aracely's mother often feeds the families of her two daughters, who both have full-time jobs but not always time to cook after work. Both grandparents, as well as Lisa and Lisa's 13-year-old daughter Deirdre can keep an eye on Sierra and Stephen when their own parents can't. In total, 10 family members reside in the two adjacent homes, and all participate in some way in Sierra's media practices.

The Ramirezes access the Internet by way of a desktop PC that sits in the kitchen, and a laptop that is used most often at the dining room table and has come to be known as "the kids' computer." Steven and Aracely also own Internet enabled smart phones. There are three televisions in the house: the largest in the living room, plus smaller sets in the parents' and kids' bedrooms. Beneath their 50-inch flat screen sit five gaming consoles — a Game Cube, Xbox, PlayStation 2, Nintendo Wii, and V-tech V-smile — plus a DVD player. Steven purchased the older-model Game Cube for himself, before the kids were old enough to play, but the Xbox and PS2 were hand-me-downs, one from Aracely's brother and the other from Steven's brother. The V-smile was relatively inexpensive, and "we bought that because that has like alphabet games and that has more of the educational stuff." The Wii is the newest and now the most often played of the family's gaming consoles. Steven and Aracely spent a year and a half deliberating over whether to purchase it, and finally gave in this past Christmas. Ultimately, "we purchased it because we figured we liked the fact that we could play together," said Aracely. "The Wii's family time, is what we call it."

Technology is everywhere in the Ramirez household, seamlessly integrated into family routines. Because Sierra has always had clear access to electronic toys and tools, Aracely and Stephen were unable to name the exact age at which she started using technology on a regular basis. They bought her and Stephen LeapFrog toys and a V-tech play computer when they were preschool age, but it still surprised Aracely when she saw little Sierra operating the mouse on the family PC one day, unassisted, as though she had just "figured it out."

Spending decisions

Just 20 months apart in age, Sierra and Stephen share a bedroom and a bedroom TV set. They each have an iPod Shuffle, although Sierra reports that when her uncle gave just Stephen one, "I thought it wasn't really too fair. So my mom let me have hers." Stephen also owns two Game Boys — an older model that his parents purchased on sale, and one that was given to him as a gift. According to Steven, Sierra and Stephen ask for "everything, everything, everything," especially what they see on TV. His usual response to the kids' pleas is, "No, it's expensive." His wife is more likely to answer, "You don't need it." Aracely says she tries to limit their toy purchases to "stuff we know they're going to play with, like *all* the time," and to specific themes that the kids have developed deep interests in over the years. They're more likely to buy Sierra Barbie and Polly Pockets-themed toys because they know she will play with them. And it took a month of the kids being utterly absorbed by the free version of Club Penguin for their parents to see that subscribing to the paid version would be worth it. Aracely and Steven acknowledge that their kids are more than sufficiently outfitted technology-wise — they point to the kids' overflowing bedroom shelves as evidence of this.

But many of the Ramirez's media expenditures aren't just for the kids. Steven purchased the Sega and Game Cube for his own amusement before the kids were old enough to play. And perhaps because he also loved board games as a child, his kids now have "stacks and stacks" of these non-digital diversions in their bedroom, too. While Sierra and Stephen enjoy playing Stratego, Battleship, Candy Land, Chutes and Ladders, and even chess, their parents bought these games because as adults, they still find them entertaining. Aracely is a Scrabble fiend and is training her kids on this sophisticated board game at home.

Playing and learning together

The pace of modern family life

The Ramirezes live a comfortably middle-class lifestyle, but this lifestyle has its costs, and may in part explain why Steven and Aracely do not completely indulge Sierra and Stephen's every media request. As homeowners, they have a mortgage to pay, plus they invest some portion of their disposable income on the "concerted cultivation" (Lareau, 2003) of their children through art, performance, and athletic programs. They also send Sierra and Stephen to a charter school dedicated to the arts, plus a Monday-through-Friday afterschool program that offers regular computer instruction. The kids have also attended, at one time or another, a music conservatory for guitar, piano, singing, and harmonica lessons, dance and tap class, bilingual acting, soccer league, and Saturday morning swim lessons.

By the time Sierra and Stephen arrive home around 6:00 p.m., they're beat. Steven recounted, with a chuckle that after being dropped at home by the carpool, his son "throws his jacket, goes, 'Oh, what a day!'" Aracely added, "I feel like they just, you know, they come home they kick off their shoes and they do what they want. Like at that point they've already read, they've already had everything under the sun." So she lets them relax, eat dinner, and watch TV until their 9:00 bedtime, but not without some guilt over this routine: "And there's probably like some parents that look at me like that's way too much television. […] I let them. I feel horrible." At the same time, letting the kids occupy themselves with TV, the Wii, or Club Penguin allows Aracely and Steven to cook dinner, catch up on household chores, and have a little downtime after long days at the office. "It makes it easier on us," says Aracely, "It's a really good sitter."

The family penguin network

Family members living in the two adjacent households play games on Club Penguin to raise funds for Stephen's single penguin account, and have collectively earned enough to furnish its palatial igloo with all sorts of goodies from the Club Penguin store. According to Aracely, Sierra's cousin Deirdre is:

> just too cool to play with this. So her excuse to play with this is that she's playing with the kids. She's a huge fan of Club Penguin, but she's 13. So, I don't know what the cutoff is, but she's constantly on there with them. And then my sister, she's a receptionist, and she's constantly playing Club Penguin at work. And she actually plays at work and earns tons of coins for them. So when they come home they're like totally rich. Like they can buy everything. They bought like the latest and greatest igloo.

Sierra and Stephen's 8-year-old aunt Gabriela Guzman (previous case study) is also a member of the Ramirez children's Club Penguin network, but has a separate account and earns coins for her penguin by herself. Gabriela's older half-brother Devon is the one who first introduced Club Penguin to his brother Steven's kids and to Gabriela. On occasion, Stephen and Gabriela call each other on the phone — they live a 20-minute drive apart — so that they can see each other's penguins online and exchange greetings using the chat feature.

Little Stephen has come to be known as the Club Penguin expert across the extended family. Both Sierra and Gabriela say that they learned much of what they know about the virtual world from Stephen. For Christmas this past year, Stephen bought his sister a Club Penguin cheats book, but as the CP enthusiast in the family, he's the only one who directly consults it. Stephen showed her, for instance, how to freeze the water in his penguin's fishbowl, and how to change the channel on the TV set inside his penguin's igloo. Stephen also shared with Gabriela the secret to catching the big mullet in the Ice Fishing mini-game, a trick passed on from his school friend Nikolai.

Like daughter, like mother

Sierra enjoys playing Club Penguin with Stephen, typically sitting side-by-side in front of the laptop. But she is less enthusiastic about CP and digital media in general than her brother is. Given the choice, the 7-year-old prefers to watch TV, play with her Barbie and Polly Pocket dolls, or print pages from the NickJr.com website and color them in with her crayons. Both siblings used to

take typing lessons at their afterschool program, but according to Sierra, "now I don't like it so only he does it." Stephen, on the other hand, has developed an identity as the tech enthusiast among extended family members — including his grandparents on both sides — a distinction that may be attributed in part to his use of computers at school and at home to treat his verbal apraxia.

When Sierra does go online, she visits the Nickelodeon and Cartoon Network web sites, where she recently discovered online coloring books and, according to her father, went "print crazy." She figured out how to print the outlines on the family printer so she could color them in with her crayons and pens. Her parents had to "change the [printer's] defaults because we ran out of ink," but Sierra then figured out how to change those, too, so she could continue coloring this way. Steven and Aracely attribute their daughter's fascination with this activity to the fact that the outlines are coming from the Internet. More likely, though, Sierra is still at the developmental stage at which physical objects are more engaging than virtual ones.

Aracely confessed that she isn't an active player in Stephen's Club Penguin network either, not the way her sister Lisa is. When asked whether she plays the Wii she recently gave the kids for Christmas with them, she replied:

> They often invite me when I'm like in the middle of something. It's like… When I'm cooking, "Mom do you want to play? Are you sure?" And I'm, you know, "Do you want to do that or do you want to eat?" […]You know, I think I more watch. I think that I like more. […] Whenever I'm done doing whatever I'm doing I like come and hang out.

Like Sierra, Aracely prefers messing around with the more tangible stuff. She handcrafts Valentines Day cards, is a scrapbook hobbyist, and is enrolled in an accredited culinary program, none of which goes unnoticed by her daughter. Sierra says she wants to be a "cake baker" when she grows up "'cause my mom bakes a lot of cakes so she inspires me a lot." And when Sierra visits her grandmother next door, they watch cooking shows together.

When we asked Sierra and Stephen to show us their new gaming system, Sierra seemed more excited to walk us through designing a Wii Mii character[7] than playing the games themselves. She admitted, "I get scared I might lose on boxing, so I mostly just play by myself." Apparently, the competitive aspect of video games is a turnoff for Sierra.

Father-son bonding

Steven and Stephen, on the other hand, really connect on the Wii. Not so much over the content of the games as the experience of being in the same room together as they're playing, learning from each other's moves, and egging each other on to do better. In fact, it's not unlike their experience playing sports together. Before the Wii came along, "I had bought him a new Nerf football," says Steven. "So for, you know, like two weeks straight we were just shooting the ball around." *Teenage Mutant Ninja Turtles (TMNT)* on the Wii has replaced the Nerf, and big Steven — who's been a gamer ever since he was his son's age — says he's really enjoying the "bonding." Aracely has had to live with her husband's gaming habit for years and, in fact, used to protest his buying the latest gaming console "because I was like always afraid the homework would fall onto me." But she was open to the idea of buying the family-friendly[8] Wii when it came out, "'Cause I felt like, well hey, it's not like you zone on your own, they can zone with you, which I think is great. You still have what you want, but you… [it's] a little more inclusive."

Before the Wii, there was never occasion to call Dad. But now, when Stephen plays *Teenage Mutant Ninja Turtles* alone, he dials his father's cell number each time he levels up or faces a novel challenge. "He calls when we're out to dinner, 'Dad, Dad, Dad! He spy slammed me!'" explains Aracely. "And I'm like, 'What are you talking about?' But I know that it's like the warriors kicking his butt or something." Even more recently, Stephen has begun to call his dad with board game inquiries, too: "One time he was playing [Battleship] with his sister and he was like, "Dad, Dad, can this person kill this person?" In this way, his Treo allows Steven to be a part of his son's game play even when he is not physically present.

[7] A Mii is an avatar that a Wii player can create to represent oneself in certain Wii games, such as *Wii Sports*, *Wii Fit*, and *Mario Kart Wii*. The system allows one to customize a Mii by specifying the shape of its head, its eyes, body, hair, eyebrows, nose, and mouth; its gender; and the color of its outfit. A player can also give the Mii glasses, facial hair, a birth date, and a favorite color.

[8] Nintendo has marketed the Wii as a gaming console for families.

Sibling chefs

After dinner, Stephen tries to rally the whole family to play *Teenage Mutant Ninja Turtles* on the Wii, boys against girls. Mom passes—she's already thumbing through her cookbooks at the kitchen table next to her husband, trying to figure out what kind of cake to bake for Deirdre's birthday next week. Big Steven is busy too; maybe when he's finished on the computer, he says.

But Sierra is game, that is, if they play *Cooking Mama* instead. Stephen agrees. He runs over to the Wii console beneath their 50-inch flat-panel TV to turn it on while Sierra fetches the Wii Remote from the basketful of Wii paraphernalia. As soon as the game launches, she chooses single-player mode, which is not what Stephen was expecting. "Sierra! Can we do the cook-off? Sierra? Let's do the cook-off." Sierra ignores her brother's request to choose multiplayer mode, and instead proceeds to select Cream Puffs as their first challenge for the evening.

"Come on, Sieraaaaa...."

"Sierra!" chimes her father from the adjacent kitchen area, which has a clear view to the TV in the living room.

"I don't want to do a cook-off," declares Sierra.

Aracely continues to mediate, "Stephen, just this one and the next one. This one and the next one and that's it. Then you can play together." Sierra is satisfied with the ruling and backs away from the TV set to sit on the brown leather couch, which is about 15 feet away from the TV. She starts the recipe by cracking eggs, which requires her to move the remote the way a symphony conductor might keep tempo with a baton. Stephen moves in front of the TV to try to block his sister's view.

"Hey, I can't see!"

"Stephen!" is heard from the kitchen.

Stephen drags his feet on his way to the couch, where he plops himself down on the cushion next to Sierra and then waves his hand in front of the remote, to try to block his sister's movements from the Wii receiver. "Stop it!" whines Sierra, as she continues cracking eggs.

Stephen perks up when he sees what Sierra has to do next, which is to stir the pate a choux for the cream puffs. She draws wide circles with the remote in her right hand—as prescribed by the screen instructions—the way a baker would stir a bowl of batter with a large wooden spoon. She's seated at the edge of the couch, legs outstretched in a wide V, relatively still while she moves her right arm and upper body quite a bit. "Ugh, I'm going to get 'try harder,'" Sierra murmurs under her breath.

"'Try harder,'" the two read aloud in unison, Cooking Mama's assessment of Sierra's 35 seconds of mixing. She advances to the next step, which is to squeeze the batter from a pastry bag into dollops on the baking sheet. Stephen is slouched on the couch but seems to enjoy watching. Cooking Mama chimes, "Wonderful. Better than Mama," at the end of this round.

"Okay, you do this step," says Sierra, handing the remote to Stephen, and then sitting back on the couch to watch. She reads the instructions aloud: "Bake in the oven: Twist the Wii Remote while holding the A Button to adjust the oven. Watch the meter carefully. When it reaches the red part, switch it off." Sierra leaps up, gasps as she covers her mouth with both hands in dramatic support of her brother accurately adjusting the oven, which takes just 6 seconds. She sits back down on the couch in relief. Even though Sierra has played several, much longer steps in assembling their cream puffs, Stephen hands the remote back to his sister when he completes this one.

For the next task, Sierra has to slice the tops off of 5 cream puffs. "Knife," observes Stephen. "Can I help you kill with?" He giggles.

"I'm not killing them, Stephen." Sierra is not as amused.

"Well you're killing right now with a knife," he points out.

Sierra corrects him, "That's not *killing*. That's cutting." She enunciates the "tt" in "cutting," speaking in an adult-like tone.

"Yah, I'm cutting till I'm bleeding," Stephen snickers. "I'm cutting my finger off." Sierra continues to slice, unfazed, and so he leans backward, raises his feet, and gently kicks Sierra in the head. Stephen laughs as his sister simply brushes him away with her spare hand. Sierra ends up earning an "Excellent! Better than Mama!" rating for her slicing skills, for which Stephen squeezes her around the shoulder in a quick side hug.

"Okay, my turn. It's my turn," asserts Stephen. "My turn. Sierra, it's my turn!" She ignores Stephen as she reads the instructions to separate eggs for the cream filling, mouthing the words silently.

"Mom!" whines Stephen, "It's my turn. Tell Sierra it's my turn."

Sierra negotiates before their mother has a chance to intervene. "Listen," she says, turning to face her brother, "if you let me do this now, we can do boxing next." This silences Stephen, who flashes a grin of approval.

"This one's pretty hard," says Sierra, moving her upper body as though to coax the yolk to land safely inside the other egg shell, and dancing her feet around to provide better balance for her torso's movements. She cheers when the yolk makes it, and squeaks when it falls short and onto the floor. Stephen, too, is rapt with the difficulty of this challenge.

Stephen reads the on-screen assessment of Sierra's performance encouragingly: "'Not bad. I will help you.'" Sierra hands her brother the remote. The siblings keep up this mixture of mild cheerleading, jockeying for a turn, bickering, and playful teasing for the final four steps of cream puff production: adding ingredients to the cream, stirring then stewing it and, finally, filling the puffs.

By now it's almost 8:00, and they've been on the Wii for nearly 20 minutes. Sierra reaches for the remote. Stephen yanks it out of her reach and instead twirls it around his wrist by its cord. Sierra grasps for it again, this time screaming, "Stephen, you might break it! That costs $50!" She is only half-serious and half-amused by her own comment. Instead of taking the remote, she stands up to get the *Wii Sports* cartridge out of the basket and then walks over to the TV to replace *Cooking Mama* with the game she promised her brother they'd play next.

When Stephen sees what she is doing, he jumps up, runs to meet his sister at the TV set, pauses, and then runs back to the couch, where he somersaults into a headstand against its seatback. He's excited about the prospect of boxing against his sister instead of just tag teaming her in *Cooking Mama*. Sierra and Stephen work up a serious sweat until about 8:15, when their father joins them to play *Teenage Mutant Ninja Turtles*. Sierra lets the guys compete — *TMNT* isn't her thing — while she plays with her Polly Pockets, half-watching them from the sidelines.

Parent attitudes towards and rules around technology

As much as Steven enjoys playing *TMNT* with his son, he hasn't given up his own gaming interests. In fact, he recently bought himself the Wii version of *Call of Duty*, a notoriously violent videogame. For the most part, Steven tries "to keep [Stephen] away from that game. There's a lot of blood. There's a lot of shooting and stuff." But he doesn't prevent little Stephen from playing a game or two with him either. According to Aracely, "I think it kind of bores him because he's not familiar with the characters. So it works itself out. I mean, he's allowed to play. He chooses not to, which is great." In general, Aracely and Steven do not censor media content that enters their home. Instead,

> Anything having to do with television and shows we're sure to let them know that they're actors. […] Just because, I mean, we watch everything, you know, and it's not a problem. I mean, I take them to movies and I take them to grown-up movies and they're totally fine with it. And there's not really like an age thing for them. I mean, they can't watch horror movies is only because they'll have nightmares, and they're not there yet, which is fine because I don't like them. But […] they've walked into the *Sopranos* like the worst parts and I'm like [inaudible]. So, I mean, it's just little things that we just have make sure that they know that they're actors. That's their jobs, and it's not real. And I just don't want them to pick something up and, you know, reenact it somewhere else. That's our only concern.

Steven's parents brought him up similarly in that "there was no limitation." He says his father and mother — Claudia Guzman, Gabriela's mom — let him and his two brothers watch whatever they liked and play video games of their choosing. But his parents didn't openly discuss potentially disturbing or age-inappropriate content with him and his brothers the way he and Aracely do with Sierra and Stephen.

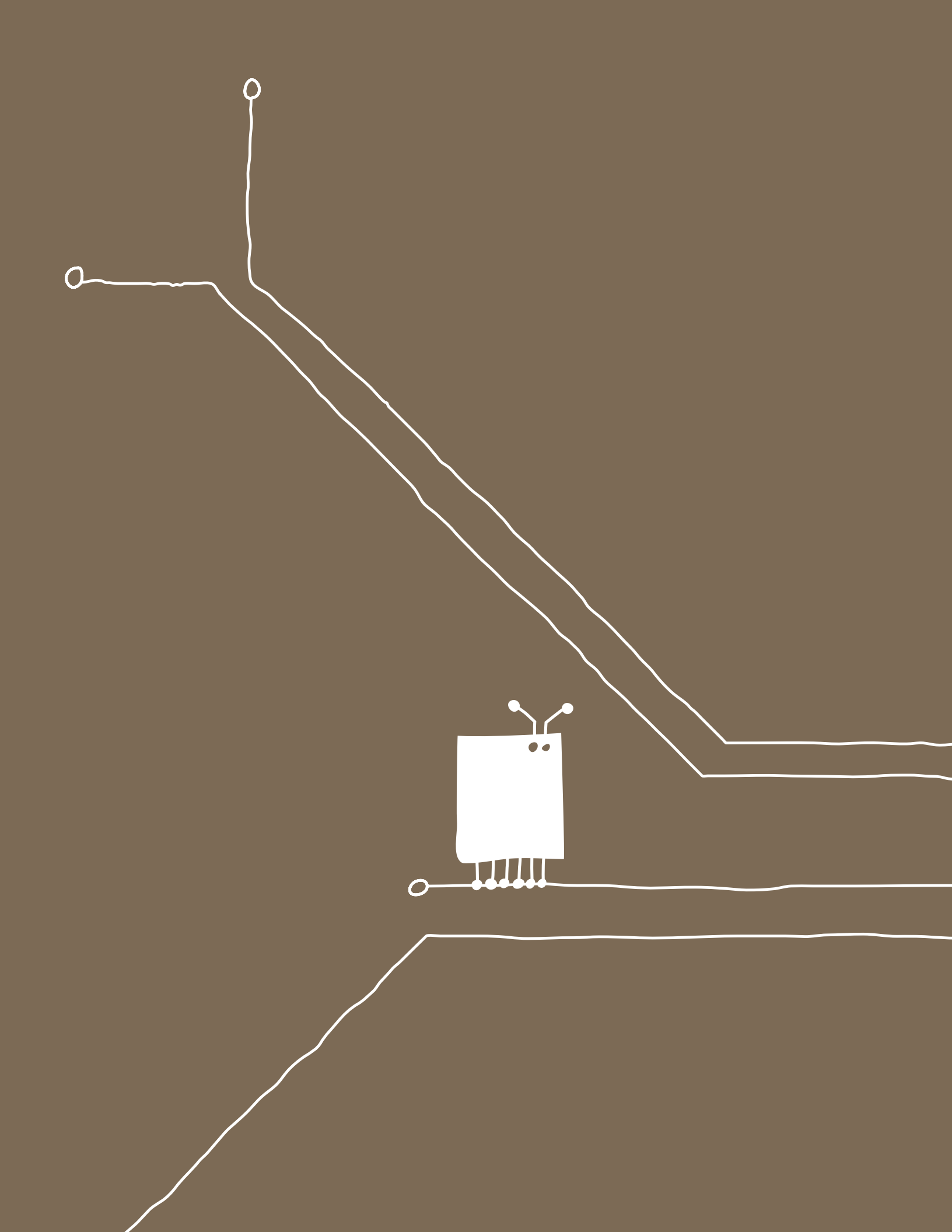
Steven and Aracely also don't feel the need to limit their kids' screen time. With their busy afterschool and weekend agendas, the kids aren't home for long enough to zone out in front of the computer or TV for extended stretches. "They kind of tell themselves when they're over it," Aracely told us.

But the Ramirez's leniency over Sierra and Stephen's media use is, by no means, a reflection of apathy or neglect. Although Steven and Aracely let their kids surf the Web freely — parental controls aren't set on the family computers — they keep an eye on what they're doing online, and expressed one concern about their safety:

> ***Aracely:*** I worry about predators.
> ***Steven:*** I always get weird.... What if there's some weirdo on [Club Penguin]?
> ***Interviewer:*** Right, 'cause you don't really know that they're all kids on there.
> ***Steven:*** Yah, exactly. And you know, for example, her sister's on there, you know, she's 32 years old!

Steven frequently looks over Sierra and Stephen's shoulders when they're on the laptop, offering his guidance — often unsolicited—on an as-needed basis. And "they always run to me and ask me about the laptop." While Sierra calls on her brother to help her out with Club Penguin or the Internet, "my dad shows me like what to do. So that I don't like break it and stuff."

Sierra and Stephen are occasionally teachers, too. Big Steven's "dad comes over and sees the kids on the laptop and he doesn't know how to use the computer. And he's just like amazed by it. He's all, 'Wow, they all use the computer?' It motivates him to want go out there." The kids have also shown Aracely's mother the ropes because "she's never really been on the computer," explained Sierra, "So we let her like have a turn and like teach her how to go on it and stuff."



synthesis: new media and the modern family

Though related by blood and separated by just a 20-minute drive, the Ramirezes and the Guzmans hold notably different relationships with technology. For the Ramirezes, technology is and has always been seamlessly woven into the fabric of family life. The Guzmans, on the other hand, are integrating newer technologies into longstanding family values and routines one step at a time. The point of comparing the Guzmans and the Ramirezes is not to generalize parenting practices to particular family characteristics. Rather, by examining findings from the large-scale survey in the specific context of these two households, we've been able to surface insights valuable to the design of media and environments that support family learning. Here we present what we believe to be the key discoveries of this investigation:

Forget facebook — the power of real social networks

Two-thirds of parents may restrict social networking sites like MySpace and Facebook for fear of what they might expose their kids to. But parents may wish to channel some of that attention to networks at home, school, and in the neighborhood. When children reach school age, classmates begin alerting them to the coolest new websites and the best TV shows. This is how Gabriela first learned about the Internet, and why she subsequently asked her parents for help getting onto DisneyChannel.com. Older family members are often eager to introduce younger ones to the digital media world and, if employed — like Gabriela's adult brother Devon and cousin David — are capable of purchasing gadgets and games as gifts. Gabriela's father prohibits video games, but she still plays them on the Nintendo DS Devon gave her for Christmas, upstairs in her bedroom, in the backseat of the car, but always out of Hector's sight. For every parent who believes he can protect his child from sex and violence by banning certain media from the home, there is quite possibly another family member letting this content in through the back door.

Not that this is always a bad thing. Digital media offer opportunities to practice communicating and collaborating with friends and family members, a benefit acknowledged by 57% of the parents we surveyed. Devon is responsible for signing Stephen and Gabriela up for their trial Club Penguin (CP) accounts. Now Sierra, Stephen, cousin Deirdre, and Aunt Lisa are all working toward the common goal of winning Stephen's penguin enough coins to furnish its swanky igloo. Few such family enterprises exist in modern family life[9], providing occasion for ongoing cooperation and conversation. Gabriela also participates in this network via Stephen, and while she finds the CP mini-games amusing enough, it's the cultural capital that comes with being a CP subscriber that's got her hooked: trading high scores with classmate Pilar, and showing next-door neighbor Ashley the Club Penguin ropes after encouraging her to sign up. Careful coordination in real time and space is often required to set up these virtual networks — such as when Gabriela and Ashley pinpointed the exact posts in their apartments to keep within each other's DS transmission range — and can deepen relationships between co-conspirators.

Scholarship on personal social networks of the technologically *un*mediated variety dates back a few decades, but the developmental implications of this work are as relevant today as ever. Cochran and Brassard (1979) note how the people in parents' networks both directly and indirectly influence the cognitive and social growth of young children by serving as role models (as Uncle Devon models technical know-how to Stephen and Sierra) or active participants in network activities (as Aunt Lisa helps earn coins in Club Penguin play). And while Sierra's grandparents have very little experience with technology, as willing learners, they provide her and Stephen with opportunities to teach them how to operate the computer and search the Internet. This reversal of roles from traditional grandparent-young child teaching interactions is increasingly common in technology-rich households, and of "the sophisticated set of reciprocal exchange skills [that] will, in turn, play an important role in preparing the developing individual to build the network relationships which will be supportive of productive functioning later in life" (Cochran & Brassard, 1979, p. 606).

Go outside and play with your friends

Social networks of the unmediated variety may be as influential as ever, but new technologies are expanding children's *virtual* social networks beyond relatives, neighbors, and local community. Researchers are still exploring the developmental implications of online virtual worlds and social networking sites for young visitors (see Subrahmanyam, 2009); meanwhile, parents are concerned. Hector doesn't like how Club Penguin keeps Gabriela alone, inside:

> When we were growing up, the thing was, you know, go to school, come back, do you homework, and go out there and play, be with your friends and interact with people more than sitting in front of a monitor and three, four hours later, you know, they're still focused on it. And that's something we don't want her to do.

[9] Girl School Cookie sales drives and sports team fundraisers are notable exceptions, but they are often seasonal or temporary and both require membership in specialized communities.

The Guzmans aren't alone: 41% of parents think that time spent with media supplants time kids should be spending with friends and family. An even greater number of parents — 59% of those surveyed — believe digital-age pastimes are keeping their kids from getting enough exercise. Concerns over exercise and fresh air relate to a more general desire expressed by both sets of parents to raise well-rounded individuals. Accordingly, the Ramirezes have packed their kids' afterschool schedules with ballet, harmonica, and soccer. The Guzmans are taking a different approach, placing limits on Gabriela's media use and setting rules that prioritize family and friends over alone time on the computer.

A majority of the parents we surveyed believe in these displacement effects, but a minority — only 18% — indicated that their own children spend too much time with technology. Why the apparent paradox? While there is a body of research indicating that parents often believe their own children to be more immune to the negative effects of media than other people's (e.g., Livingstone & Helsper, 2007; Meirick, Sims, Gilchrist, & Croucher, 2009)—also known as "third-person effects" (Davison, 1983)—they may also be unaware of just how much media their kids are consuming. Laptop computers, iPods, and Nintendo DSes tend to be used in the outer reaches of the home, and are less typically positioned the way TV sets are, in a family or living room where parents can see *when* and *what* their children are watching, and *for how long*. It's also easier for parents to allow their kids to watch just one hour of TV after school — the way Claudia Guzman does — because TV programs come neatly packaged in 30- or 60-minute episodes that way. Trolling around Club Penguin, texting a friend, and surfing the Web, on the other hand, have no clear end markers; kids can keep at these activities forever. And the computer your child says they're doing their homework on is the same computer they use to instant message friends and watch YouTube videos. It's become increasingly difficult to keep an eye on the *when*, *what*, and *for how long* with these newer platforms.

The Guzman case offers another hypothesis for why fewer than 1 in 5 parents think their kids consume too much media: While Hector and Claudia worry about Gabriela's privacy, personal relationships, and outdoor time, thanks to the rules and restrictions they've set up around her media use, they don't believe she's in immediate danger of getting "sucked into the television or sucked into the videogames or sucked into the computer." The Guzmans have managed to keep these threats at bay by managing her schedule and activities, though they realize they might lose some of this control as she grows older, more curious, and independent. Their hunch is probably correct, at least according to Carlson et al. (2010), who found that children whose parents set limits on screen time spent less time with media than children whose parents didn't.

Platform perceptions

Hector and Claudia don't mind that Gabriela owns MP3 and MP4 players, and even gave the 8-year-old her very own cell phone. And while they encourage Gabriela to be proficient on the PC, video games are off limits; at least the console variety, since her parents say it's okay to play Club Penguin mini-games online.

Not all digital platforms are created equal in the eyes of the parents we surveyed either. Computer-based activities (other than surfing the Internet) rated highest among devices as good for kids, but a surprising majority of parents think video games develop skills important to school success. Mobile phones are the platform viewed as least valuable for young children's learning, and the one most prohibited for kids in this age set. Non-cellular mobile devices such as handheld gaming consoles and MP3 players, on the other hand, are much more accepted. And parents are split on their feelings toward the Internet: they appreciate the access it gives their kids to information but fear the access it gives strangers to their kids.

For the most part, these perceptions are based on parents' vague understandings of what their kids *should* be doing with digital media at certain ages.

They may think that for a 7-year-old, playing video games on a cell phone is more appropriate than texting friends on one, or feel that visiting a kid-targeted virtual world like Webkinz is less risky than visiting a chat room or MySpace. As these examples illustrate, certain platforms can provide access to activities that are both more *and* less suitable for young kids. But when the lines are this blurred, how can parents make wise decisions about their children's digital media practices?

What is developmentally appropriate?

As the previous section suggests, there is a need to clarify what it means for a product, platform, or activity to be *developmentally appropriate*. For the practical purposes of this report — which is to inform researchers and practitioners in creating high-quality digital media experiences for families — we subscribe to the ecologically minded definition proposed by the National Association for the Education of Young Children (NAEYC), which considers:

1. What is known about child development as it relates to age-related characteristics and capabilities
2. What is known about each child as an individual
3. What is known about the social and cultural contexts in which children live (e.g., values, expectations, behavioral and linguistic conventions) (NAEYC, 2009)

We've all heard of the 9-year-old bloggers and prodigy filmmakers whose videos get thousands of hits on YouTube. But only a minority of youth is producing content at this level of sophistication (Ito et al., 2009; Lenhart & Madden, 2005) despite frequent media characterizations of an entire generation of digital whiz kids. Perhaps it's okay that Sierra isn't a budding moviemaker, or that Gabriela hasn't posted her autobiography to the blogosphere. They are, after all, just 7- and 8-year-olds. In fact, Sierra admitted to liking her Barbies better than the digital diversions her 9-year-old brother couldn't get enough of. She was an early 7 when we first met her, just shy of the magical age of 8, when kids' digital media use picks up (Gutnick et al., 2011), and when children's brains are more capable of dealing with representational worlds (Piaget, 1964).

Cognitive readiness aside, is it realistic to expect children 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) say these tools support? Are there developmental reasons to postpone these expectations until adolescence, when the user interface of sophisticated programs like iMovie and WordPress 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?

Creative expression and civic engagement using digital media may be the eventual goal, but technology holds a different set of opportunities for the developing young child than it does for teenagers. Before youth can effectively participate in online communities comprising diverse populations and perspectives, they must first learn how to effectively communicate with the flesh-and-blood members of their own families and other local networks. Many parents believe that it's more appropriate for 8-year-olds to play outside with their friends, siblings, and pets, and develop physical coordination and motor skills with tangible objects, rather than with virtual ones inside.

In short, digital media that is developmentally appropriate should be responsive to the age of the child, individual readiness, and what family and local communities believe to be appropriate.

Parent media preferences

Big Steven grew up on Nintendo gaming systems and now plays the Wii with Sierra and Stephen. He generally reserves the mature titles to play by himself or with his adult friends, but occasionally lets his son join him in a game of *Call of Duty*. Aracely, who's all for the father-son bonding, prefers to watch *TMNT* and *Wii Sports* matches from the sidelines. Claudia rarely and Hector never plays Club Penguin with Gabriela, which

means she mostly plays alone and sometimes with the neighbors. Like most of our survey respondents, Gabriela and Sierra's parents are more likely to spend time consuming old media like TV and movies with their kids than newer media like video games and the Internet. It's also noteworthy that the media activities parents reported *doing* most with their children — watching TV (89%), reading books (79%), and playing board games (73%) — aligned with reports of what they *enjoy* doing most with them (41%, 23%, 18%, respectively). In other words, parents aren't participating in media activities that they themselves don't take pleasure in.

The after-school TV show that Claudia most enjoys watching with Gabriela and Dora is *Sabrina the Teenage Witch*, reminiscent of the 1960s sitcom *Bewitched*. She likes the frequent celebrity cameos, especially when it's Dick Van Dyke, a TV star from her own childhood. When the girls switch to cartoons or tween programs on Nickelodeon or Disney, Claudia often leaves to start dinner or tidy up the house. At night, the whole family watches the Discovery Channel and sitcoms on network TV, shows that everyone in the room finds entertaining. For the Guzmans, TV is together time, and regularly scheduled programs structure their before- and after-dinner routines. In the Ramirez home, Steven and Stephen bond over the Wii version of the *Teenage Mutant Ninja Turtles*, a property that first gained popularity in the late 1980s, when Steven was about his son's age. In both families, media content has to have some amount of adult appeal to get parents viewing and playing with their kids.

The case study kids, on the other hand, aren't as picky as their parents. As long as an activity provides opportunities to connect more closely with one of them, they're happy to participate. Gabriela, for instance, eagerly piloted the Microsoft tutorials Claudia designed for her adult ed course. And though the mature subject matter of *Call of Duty* "bores him," according to Aracely, Stephen still embraces any opportunity to play video games with his dad, *TMNT* or not. Come adolescence, this willingness to participate in adult-oriented activities with their parents will surely dissipate. Parents should enjoy it while it lasts.

No two families alike

Gabriela and her mother bond over Word and Excel, but no TV set in the bedroom, and never video games in front of Dad. Sierra and Stephen, on the other hand, can pretty much watch whatever and whenever they want on the set in their room. They also play the Wii with big Steven, sometimes even violent ones. The Ramirezes and Guzmans live in the same city, share the same ethnic heritage, and exhibit equal devotion to the LA Dodgers. So what can explain their different childrearing styles around media?

Some studies have shown household income to predict parental mediation styles (e.g., Carlson et al., 2010; Warren, 2005), while others have demonstrated parent education to be the determining factor (e.g., Valkenburg et al., 1999). Our own survey has shown that older parents are more likely to set rules around their kids' technology use than younger parents are. But the ecological analysis of the Guzman and Ramirez families paints a more complex picture of how parents are raising their children in a technology age. They're granting access, setting rules, and either playing or instructing in reaction to forces both great and small. Here we illustrate how experiential (microsystem), institutional (exosystem), and cultural (macrosystem) factors are shaping family engagement with digital media in these two particular homes.

Personal experience

Hector and Claudia Guzman, now in their late 40s, spent their childhoods outside playing street baseball with the neighborhood kids. Times have changed, of course, and while they would never allow Gabriela to leave the apartment grounds unattended, they'd prefer that she play outside with the girls across the courtyard rather than with other Club Penguin players online. But Steven and Aracely Ramirez, who are both around age 30, spent much of their childhoods indoors watching TV, surfing the Internet and, in Steven's case, playing video games. By their own estimation, they turned out just fine, which may explain why they let their kids make their own media choices. Tapscott (2009) says that this is a generation-wide phenomenon: older parents that are less familiar with and more

suspicious of their kids' digital pastimes restrict more than "Net Gener" (those born after 1977) parents do. McPake and Plowman (2009) would argue that personal histories — not age, per se — is the mediating factor here. They posit that parents often hold a romanticized view of their own technology-free childhoods and want their kids to experience the same. Parents also hold other histories that can powerfully shape childrearing practices around media, such as raising older siblings, and having to learn to operate new technologies for the first time. Recall Claudia's experience learning to use a computer with help from her three sons. It was scary at first, but led to greater job security in the end. Now she's teaching her daughter Microsoft *Word*, *Excel*, and other technical skills that she believes are essential in today's work world.

Institutional

Examination of institutional structures (e.g., parents' work, mass media, school system) that influence what goes on in a child's immediate surroundings can provide further insight into the Ramirez and Guzmans' mediation behaviors. Aracely and Stephen both work full-time, which means that they're not always around to monitor their kids' digital activities the way that Claudia is able to when she's at home with Gabriela after school. Moreover, after their busy, extended days at the office, Aracely and Steven want a little downtime when they get home from work, and the TV set in the kids' bedroom is "a really good sitter." This may also explain why they let Stephen and Sierra "kick off their shoes" and do what they want following an activity-packed afternoon at the community center they attend until their parents get home at night. Work-related forces also explain how Gabriela wound up with a cell phone, despite her father's otherwise Luddite inclinations. Because Hector works for a mobile communications provider, he was in a position to give the 8-year-old her mother's old phone at no financial expense. Another exosystem factor — a household income that supports the ownership of just one car — has made Gabriela and her phone instrumental actors in coordinating the family carpool and other errands.

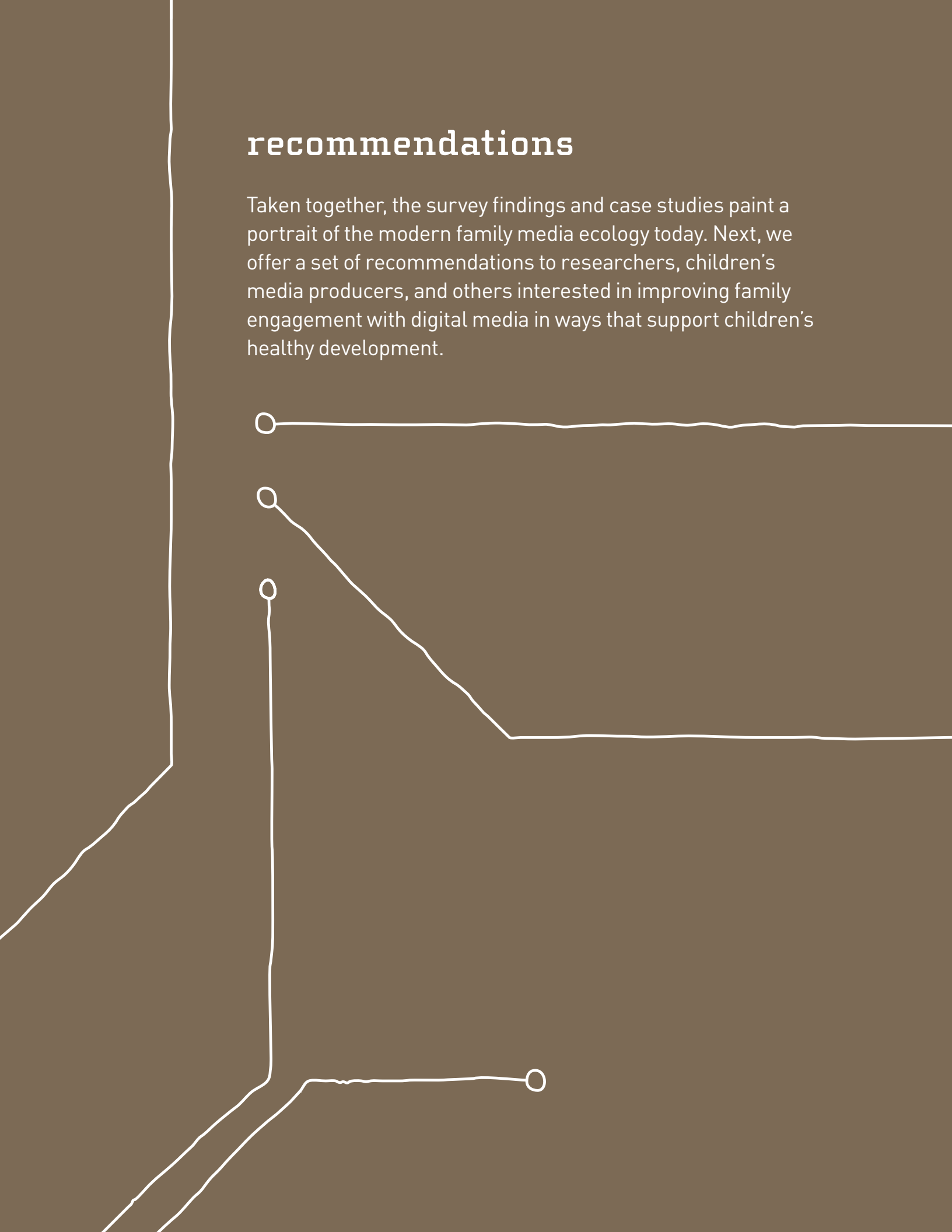
Cultural

Hector and Claudia cherish weekend ball games and picnics at the park with friends and family, like many second-generation Mexican-American families living in the eastern neighborhoods of Los Angeles. Their desire to raise Gabriela to fully participate in family events and in this cultural community — a desire shared among many Mexican-American parents (Delgado & Ford, 1998; Okagaki & Sternberg, 1993)—may further encourage her to go outside and limit screen time indoors. Macrosystem factors can also explain *within*-family differences in mediation styles. Gabriela isn't allowed to play video games, but Steven Ramirez, Claudia's oldest son from a previous marriage, claims he grew up playing video games and that his mom never restricted him and his two brothers from watching R-rated movies. Perhaps broader societal views on what's appropriate for young girls to play and watch can explain Claudia's double standard.

Through this brief analysis, we can see how the intricacies of individual families make it nearly impossible to attribute different mediation styles to demographics alone. A macrosystem factor like gender may influence how the Guzmans are raising their daughter around technology, but for the family that lives in the apartment next door, a more localized factor like birth order could explain why parents restrict one sibling's media practices more than another's. With so many influences operating at so many levels of the family ecology — not to mention the ever-evolving stream of technologies entering the home — is it possible to raise children today on anything but a case-by-case basis?

recommendations

Taken together, the survey findings and case studies paint a portrait of the modern family media ecology today. Next, we offer a set of recommendations to researchers, children's media producers, and others interested in improving family engagement with digital media in ways that support children's healthy development.



research recommendations

Map children's development to new platforms

Much of the television research conducted in the 1970s through '90s examined how children's developmental capacities (e.g., attention, symbolic thinking) interfaced with the content or formal features of television programs. For instance, researchers determined that children under the age of 4 have difficulty distinguishing between reality and the events depicted on television (e.g., Flavell, Flavell, Green, & Korfmacher, 1990; Nikken & Peeters, 1988), and distinguishing between commercials and TV programs (e.g., Levin, Petros, & Petrella, 1982). Singer (1980) found that the salient features of TV shows such as rapid character action, sound effects, and special camera techniques effectively held children's attention. The insights uncovered by these types of studies were then used to create more developmentally appropriate programming for children, and protect younger, more vulnerable viewers from the potentially negative effects of television viewing.

Children today have access to a much wider array of media platforms, many originally designed for adult use. Just as researchers did for television, the formal and content features of these newer platforms need to be mapped to children's developing cognitive, social, and now even motor and visual capacities, given the availability of gesture-based (e.g., Wii, PlayStation Move, Kinect) and 3D (e.g., PS3, Nintendo 3DS) gaming systems. Interactivity adds a layer of complexity to the representational experience of digital media; how might controlling one's movement through a virtual world, for instance, facilitate (or impede) symbolic understandings? Or how might a child's conceptual understanding of the Internet make her more or less effective at searching? Knowledge yielded by this type of research would be valuable to producers interested in scaffolding new technologies to meet the developmental needs of younger users, and to everyone else interested in knowing just "how young is too young?" for each type of platform.

And yet before the advent of Logo[10], who would have thought that preschoolers could learn to program — turtle robots or otherwise? Seymour Papert and his followers have done much to challenge established notions of how young is too young for computational thinking (see Papert, 1980), and have even managed to situate Logo programming activities in the commercially successful LEGO Mindstorms toy robotics kits. Other researchers have furthered our understandings of how new technologies can boost young users to engage in more sophisticated levels of cognition than possible when unassisted by these tools (Pea, 1993). Simulations, for instance, can help deepen children's conceptual understandings by visualizing the objects and relationships missing from their mental models (see Kozma, 1991). New research should investigate how the more advanced visualizations and representations available today, coupled with emerging techno-social configurations (multiplayer games, social networking tools, mobile devices), can further expand the limits of children's cognitive and social capabilities.

Over the past two decades, millions of dollars and countless hours have been invested in studying video games as learning environments. This body of research, along with the fact that a growing proportion of adults grew up with gaming systems, may explain why 69% of the parents we surveyed believe certain video games can develop academic skills. Techno-enthusiasts now claim that mobile devices hold as much potential to transform learning, but parents are skeptical: when asked which tech activity holds the *most* potential for learning, only 1% chose mobile devices. While there is certainly a growing number of researchers and developers investigating mobile learning (e.g., Chiong & Shuler, 2010), we have yet to amass the research base necessary to alter parents' perceptions about mobile devices as well as virtual worlds, social networking sites, and other emerging platforms.

Investigate the new coviewing

The social dimension of media engagement is as important as the more cognitive processes described above. And with the proliferation of newer platforms in homes, there has been a

[10] Logo is a computer programming language developed for educational use in 1967 by Seymour Papert and Wally Feurzeig, based in part on Piaget's theories of development.

resurgence of interest in the research community in coviewing. The LIFE Center[11] recently coined the term *joint media engagement* (JME) to extend the notion of coviewing beyond television, and to more broadly describe what happens when people learn together with media. JME refers to "spontaneous and designed experiences of people using media together, and can happen anywhere and at any time when there are multiple people interacting together with media. Modes include viewing, playing, searching, reading, contributing, and creating, with either digital or traditional media" (Stevens & Penuel, 2010).

The LIFE Center's research has shown that JME is a crucial mechanism for getting social learning off the ground, before formal instruction is possible. This work has drawn attention to the important roles parents, grandparents, siblings, and teachers play in supporting learning, both at home (Barron et al., 2009) and at school (Penuel et al., 2009). However, more research is needed to identify the cultural, economic, and design factors that both foster and inhibit family engagement with digital media. How might the affordances of certain platforms (e.g., mobility, connectivity, asynchronicity) be used to overcome these barriers? What about children who don't have access to social supports at home — can new tools be designed to scaffold learning with media in the absence of adults or more capable peers? And which research and design methods should be employed to investigate these questions?

Study sibling engagement with media

Analyses in this report have focused on parent-child media engagement, but the Sibling Chefs vignette (see page 36) portrays brother and sister as learning partners in digital media play. Siblings are more natural playmates than parents and children are and, if close enough in age, likely to share play preferences. Sierra and Stephen's cooking antics have us asking: Who's in control during the game? Who's teaching whom? How do gender and age differences between players affect play patterns? And how might parental interventions mediate learning opportunities? Stevens, Satwicz, and McCarthy's (2008) naturalistic studies of siblings and friends playing video games together at home examined interactions similar to those observed between Sierra and her brother. Their analyses highlight the spontaneous instances of teaching and learning that players set up among themselves during gaming sessions. Sibling engagement on other platforms — i.e., e-books, Internet search tools, social networking sites, virtual worlds, and mobile devices—is an area of inquiry needing investigators' attention.

Create a children's media research commons

Although some commercial media producers map players' developmental capacities to new platforms in formative studies, very few reveal their findings to the broader children's media community. There are, however, a few notable exceptions. Bryant, Akerman, and Drell (2008; 2010) have published research conducted for Nickelodeon charting features of the Nintendo Wii and DS gaming platforms to preschooler's developmental capabilities. Non-profit media organizations like Sesame Workshop and government-supported initiatives such as those funded by the U.S. Department of Education's Ready To Learn program[12] do release findings from their research and development work on a regular basis (e.g., Chiong & Shuler, 2010; Penuel et al., 2009). But these efforts to share are scattered and, as such, often evade producers' awareness. Children's media companies, with assistance from professional associations (e.g., NAEYC, AAP), children's advocacy organizations (e.g., Common Sense Media, Children Now), and government agencies (e.g., Bureau of Labor Statistics, National Center for Education Statistics) should set up and contribute to a cross-sector clearinghouse that can catalog such research. Producers may find contributing to a *children's media research commons* to be more efficient than keeping findings to themselves for competitive reasons.

[11] LIFE, which stands for Learning in Informal and Formal Environments, is a multi-institution NSF Science of Learning Center hosted at the University of Washington in partnership with Stanford University and SRI.

[12] See pbskids.org/read/about/rtl-grant.html

industry recommendations

Our cross-study analysis has underscored the need for children's media producers to pay closer attention to two dynamic, intersecting systems: (a) the changing needs, capabilities, and interests of children as they grow, and (b) the family and larger ecological system in which this growth takes place. Here we offer specific suggestions on how to acknowledge these systems in the design of new products.

Create developmentally appropriate digital experiences

Acknowledge and promote developmental pathways of digital media engagement…

There are four basic ways in which young people interact with digital media. They

1. consume content (e.g., play a video game, read a website, watch a video on YouTube)
2. produce content (e.g., write a story on Microsoft Word, film a movie)
3. share content (e.g., post a comment to a blog or a movie to YouTube)
4. communicate, cooperate, and coordinate with others, either
   a. people they know in person (text a friend), or
   b. virtual acquaintances (chat on Club Penguin)

Interactions 1 through 3 are numbered in order of how children *typically* develop these capabilities through both digital and non-digital play. Communication skills develop in tandem with consuming, producing, and sharing, but face-to-face interaction precedes interaction with strangers. By designing with these developmental pathways in mind, producers are more likely to create experiences that sufficiently support and challenge children's cognitive capabilities, while also meeting the approval of parents concerned about their social and physical growth.

…but leverage the power of technology to enhance learning

Producers of high-quality media for young children are already familiar with Piaget's stages of cognitive development, but as new digital tools and representations enable children to perform cognitive tasks once thought well beyond their developmental capabilities, these stages may need to be reevaluated for a modern era. While *designing down* — scaffolding new technologies to meet the developmental needs of young users — is important, producers should also *design up*: too many virtual worlds and video games created today for young users target the lowest common denominator of player ability. Producers should leverage powerful tools and visualizations inside of these play environments to extend players' zones of proximal development[13] and, consequently, accelerate and deepen learning.

Make screen time family time

Adolescents use digital media to express identities separate from their families and connect more closely with peers (Ito et al., 2009), but as seen in the case studies, younger children still enjoy spending time with their parents. Producers should therefore create tools and content that leverage this mutual desire for connection while it lasts, inserting opportunities for learning to occur in the process of play and exchange. Hitting the sweet spot of middle childhood is key: a video game designed for parents to play with their 6-year-olds, for instance, is far more likely to engage both players — and meet commercial success — than one targeting teens and their parents.

Design with the full ecology of the child in mind

Most producers of children's media are tuned into the interactions between player and platform, but few pay sufficient attention to the *exosystem* (institutional) and *macrosystem* (cultural) factors that invariably shape these *microsystem* interactions (see again Figure 1 on page 16). Since parents, relatives, and educators are gatekeepers of children's digital experiences, producers should recognize them as equally important audiences in their designs. Producers should ask:

- How will this product align with the intended audience's values and beliefs?
- How will it fit into family routines around work, leisure, daycare, and communicating?
- Will members of the target population be able to afford it?

[13] A concept developed by Lev Vygotsky, the *zone of proximal development* (ZPD) is the difference between what a learner can do alone and what she can do with the help of more capable others or, as discussed here, technological tools (Vygotsky, 1978).

Producers should also look for learning opportunities to be found at the mesosystem, or in the connections between the various settings children frequent. Producers should ask:

- How might the learning and fun inspired by this product carry over to other settings in a child's life?
- How might interests sparked in other settings be deepened and sustained through the child's use of this product?
- What technological, social, and/or institutional supports are required to facilitate this bridging of experience between settings?

Here are some specific suggestions to guide producers on designing with the full ecology of the developing child in mind:

Create video games that appeal to kids and parents alike

Research on television coviewing suggests that children learn more from educational shows when parents watch with them (e.g., Salomon, 1977). If the coviewing effect holds true with learning games, then producers need to work on creating experiences that appeal to both parents and children, just as the producers of *Sesame Street* intentionally write adult humor into the show to encourage parents to watch with their preschoolers. Unlike TV shows, movies, and DVDs with broad audience appeal, video games tend to satisfy either young or mature audiences, but rarely both. What would such a video game look like? Would it accommodate face-to-face interactions — as the Ramirez family's beloved board games do — rather than shoulder-to-shoulder player orientations? More R&D work is needed to extract design principles for effective co-learning games.

Foster family teamwork

Very young children can't quite appreciate the interconnectedness of online communities, so design media that connect kids with people they actually know. Include parents, siblings, neighbors, and grandparents as coparticipants in goal-oriented activities that foster collaboration and problem solving. Digital media are often blamed for displacing the time kids spend in face-to-face conversation — so design experiences that *require* flesh-and-blood partners to play. These real-virtual networks might be similar in spirit to the Ramirezes' Club Penguin account, but also allow players to master topics that connect to what they might be learning in school.

Think outside the (X)Box

Create media-based experiences that transcend the living room and take kids outside, and make use of multiple platforms to connect participants and drive activity. Most major media companies have discovered the power of *transmedia storytelling* in steering young consumers from TV to the Internet and back again. But too few are including in the cycle good, old-fashioned books, the medium that parents most enjoy sharing with their young children and still the best way to develop their early literacy skills. In these ways, technology can be used to engage children in the very activities — socializing, physical exercise, academic pursuits, and imaginative play — that adults fear digital media are displacing from children's lives.

Anytime, anywhere learning

Today, with the falling costs of mobile devices, even the youngest of children can carry a screen around in their pocket for the entirety of their waking hours. Mobile devices can also enhance networked play and learning by allowing kids to take the necessary hardware outside, and from home to school to grandma's house and back again for uninterrupted continuity of experience. Producers should be cognizant of parents' perceptions of cell phone use and ownership among young children, however, and design mobile experiences on non-cellular devices such as Nintendo DSes and iPod touches so that parents are willing let their kids play.

Design the guilt out of digital-age parenting

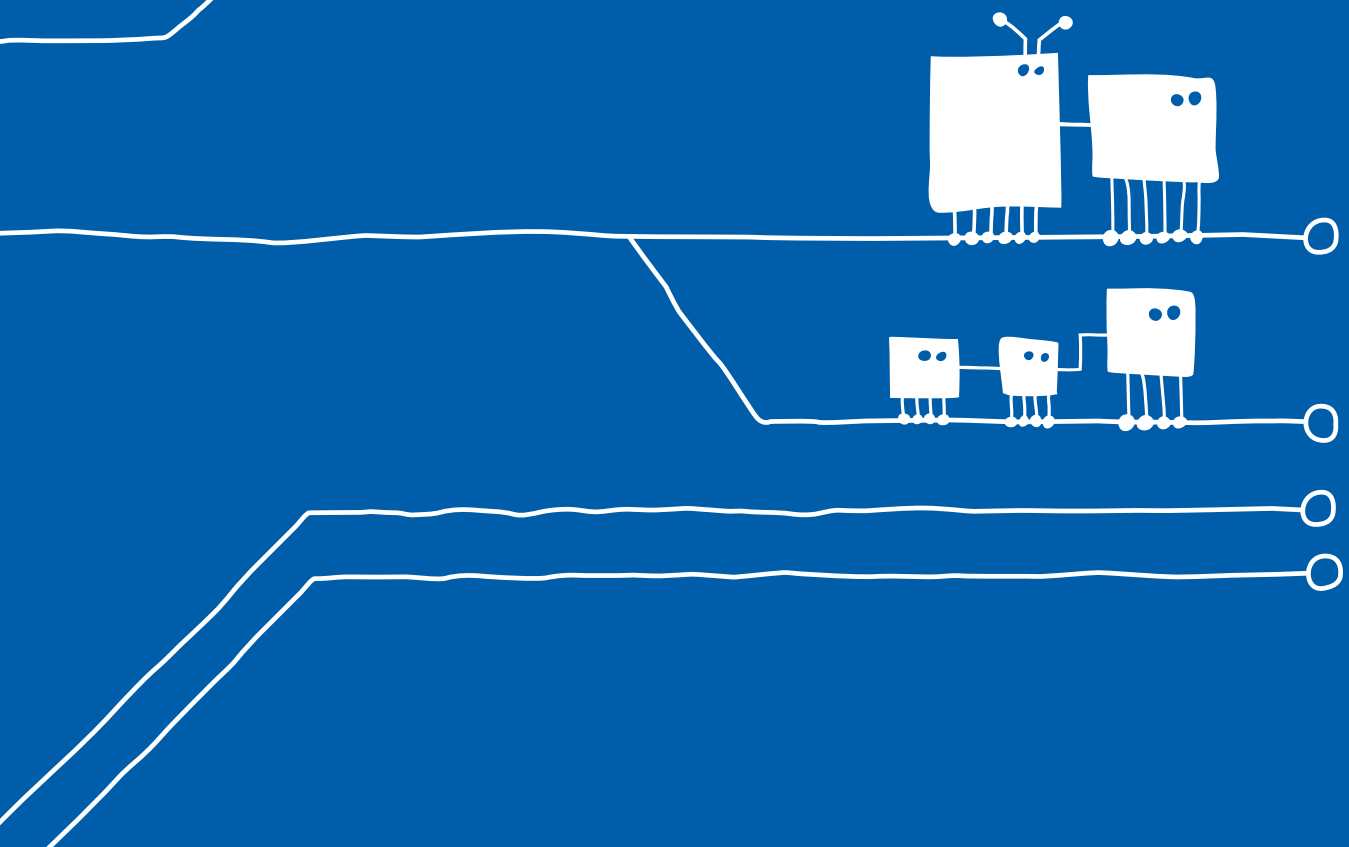
What parent hasn't used the TV, computer, or video games to babysit? Though not ideal, it's how parents without a human sitter ever manage to take showers, cook dinner, or catch a breath on a daily basis. Pediatricians warn of the dangers of too much screen time, and so parents feel bad about what has become a ubiquitous practice. Aracely is certainly among those laden with this sense of guilt. Can new systems be designed that let parents and other caregivers spend some of this screen time with their children, even if they're not in

the same room with them? We challenge producers to imagine and build devices to go beyond the baby monitor model, and let caregivers interactively participate in media activities with their children, whether one room or one thousand miles apart.

conclusion

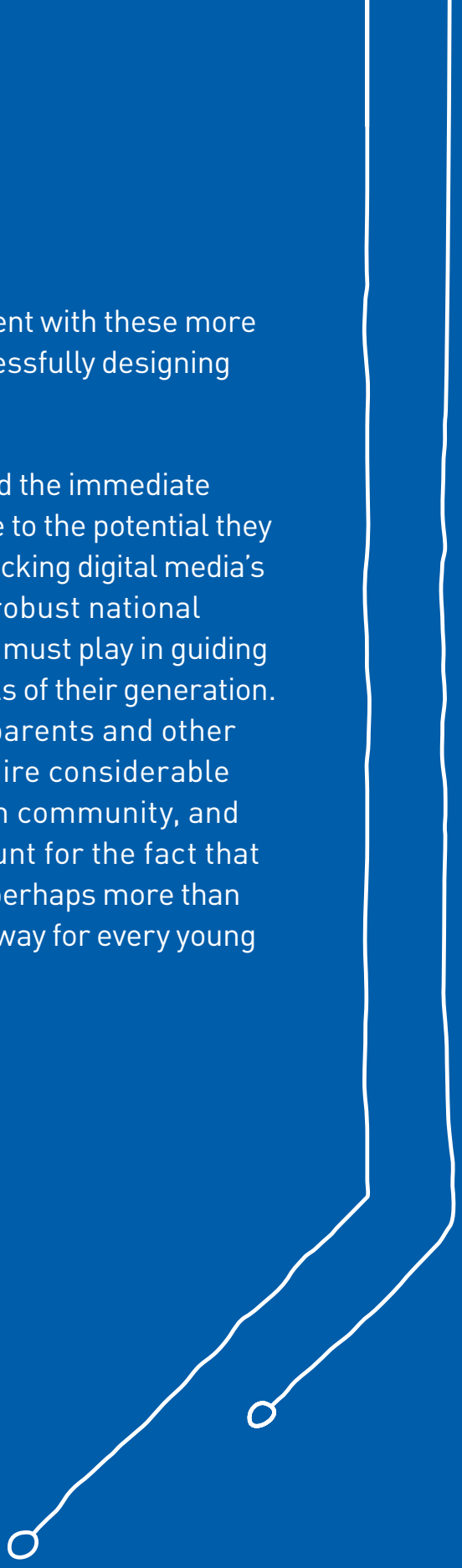
As soon as Gabriela, Hector, and Claudia come to a satisfactory resolution regarding the texting issue and equilibrium is restored at home, the next new technological phenomenon will knock it off kilter again. These cycles of disruption are inevitable and occurring at an ever-faster rate. In fact, by the time this report goes to press, the tools and diversions described here — e.g., gaming, texting, and virtual worlds — may have settled somewhat in our national psyche. In their place, new tools and diversions will be disrupting dinnertimes, making headlines, and altering family rhythms and routines.

Therefore, R&D professionals should not focus too closely on particular platforms that may soon lose currency without examining the larger systems in which these platforms are being used. New platforms will come, some will stay, and many will go. Families, schools, the workplace, faith communities, personal social networks, and other institutions



are far more enduring. Aiming for alignment with these more slowly evolving systems is critical to successfully designing for children's learning with digital media.

Most readers of this report will see beyond the immediate threats emerging media pose to family life to the potential they hold for learning and communication. Unlocking digital media's potential however, will demand a more robust national conversation about the roles that families must play in guiding their children to use the technological tools of their generation. Our research concludes that engaging parents and other family members in these roles will require considerable new thinking by producers, the research community, and policymakers. These efforts must account for the fact that in an era of rapid change, *families matter* perhaps more than ever in charting an exciting, dynamic pathway for every young child's success.



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appendix a: the american academy of pediatrics policy statement on media education: recommendations to pediatricians

The American Academy of Pediatrics (AAP) recommends the following:

1. Pediatricians need to become educated about the public health risks of media. Given the impact that media have on the health of children and adolescents, AAP chapters and districts, as well as medical schools and residency training programs, should ensure that ongoing education in this area is a high priority

2. Pediatricians should ask at least 2 media-related questions at each well-child visit:
   - How much entertainment media per day is the child or adolescent watching? The AAP recommends that children have less than 2 hours of screen time per day.
   - Is there a TV set or Internet access in the child's or adolescent's bedroom? Children or teenagers who are showing aggressive behavior, have academic difficulties, or are overweight or obese should have additional history taken. A recent study revealed that office-based counseling regarding media is effective and could result in the parents of nearly 1 million additional children learning about the AAP recommendation to limit media time to 2 hours/day. Advice to parents should include the following:
     + Encourage a careful selection of programs to view.
     + Co-view and discuss content with children and adolescents.
     + Teach critical viewing skills.
     + Limit and focus time spent with media. In particular, parents young children and preteens should avoid exposing them to PG-13 and R-rated movies.
     + Be good media role models; children often develop their media habits on the basis of their parents' media behavior.
     + Emphasize alternative activities.
     + Create an "electronic media-free" environment in children's rooms.
     + Avoid use of media as an electronic baby-sitter.

3. Pediatricians should continue to urge parents to avoid TV and video-viewing for children younger than 2 years. Increasing amounts of research have shown that infants and toddlers have a critical need for direct interactions with parents and other regular caregivers for healthy brain growth. In addition, the results of 7 studies have shown that infants younger than 18 months who are exposed to TV may suffer from a delay in language development, and 1 study revealed that infant videos may delay language development. No studies have documented a benefit of early viewing.

4. Pediatricians should serve as role models for appropriate media use by limiting TV and video use in waiting rooms and patients' rooms, using educational materials to promote reading, and having visits by volunteer readers in waiting rooms. Pediatricians should also offer in-office reading programs, such as Reach Out and Read, and promote active play.

5. Schools need to begin implementing media education in their curricula. The simplest way to do this would be to incorporate principles of media education into existing programs on drug prevention and sex education.

6. Congress should consider mandating and funding universal media education in American schools.

7. The federal government and private foundations should dramatically increase their funding of media research, particularly in the areas of media education, violence prevention, sex and sexuality, drugs, obesity, and early brain development.

Source: *American Academy of Pediatrics Council on Communications and Media (2010)*

appendix b: study methods

Case study selection and data collection

In addition to the selection criteria described on page 17, we intentionally chose children of about age 8 because this seems to be when interest in and, consequently, time spent with digital media increases (Gutnick et al., 2011). We decided to not include boys because masculine images of gamers and hackers still dominate portrayals of the "digital native" (Prensky, 2001); there is more to learn about girls' relationships with technology. Finally, we chose to focus this research on what children are doing outside of school, as kids in this age range spend most of their technology time at home. Many public elementary schools in the U.S. today prohibit students from bringing cell phones and other handheld electronics to campus, or allow them to visit the computer lab just once a week.

We videotaped and took field notes during these observations, and photographed the settings we visited plus relevant artifacts. The value of these observations is that they offered first-hand glimpses of the case children's early and, in some cases, very first interactions with particular digital tools, yielding more accurate portrayals of early access and initial interest development than interview data could alone. Of course, our 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 our cameras something of interest to capture. We are aware of the extent to which our presence may have altered the families' ordinary routines, but believe that the activities themselves were minimally impacted by these scheduling adjustments.

Interviews were transcribed and videotapes logged and, together with our field notes and photographs, were used to craft detailed narratives of each case study child. These narratives serve as the basis for the Case Studies section of this report. Data sources were also coded for pre-identified and emergent themes using HyperRESEARCH data analysis software. Through the process of analytic induction (Znaniecki, 1934) and deduction, each theme was assessed for its generality across the corpus of data and revised or dropped if counterexamples were found. Out of this iterative exercise emerged a set of themes and a set of exemplifying instances, which serve as the basis for the Synthesis section of this report.

Hotspex recruiting methods

Market research firm Hotspex invited select "panelists" to participate in the Parent Survey. Respondents are initially recruited through email and online advertising campaigns, which direct potential panelists to the Hotspex website. Candidates are then carefully screened to ensure that they are not professional survey takers, and invited, when appropriate, to participate in a variety of market research surveys commissioned by consumer product and other types of companies. Hotspex panelists are rewarded for participating in surveys by a point system that can be used to earn prizes and gift certificates, or make charitable donations. Visit http://www.hotspex.com for more information.

Survey respondent demographics

Respondent population: 810 parents of children ages 3 through 10

Gender
Female 75.6%
Male 24.4%

U.S. region
Northeast: 20.1%
Midwest: 24.0%
South: 37.8%
West: 18.2%

Child age
3-years-old: 10.3%
4-years-old: 14.2%
5-years-old: 11.9%
6-years-old: 17.4%
7-years-old: 13.1%
8-years-old: 10.3%
9-years-old: 13.0%
10-years-old: 9.9%

Parent's highest level of education
High school or less: 25.2%
Some college/trade/tech/ vocational training: 31.6%
College degree: 34.7%
Graduate degree: 8.5%

Annual household income
Less than $50,000: 44.5%
$50,000 - $99,999: 40.0%
More than $100,000: 11.6%
Rather not say: 3.9%

Ethnicity
White/Caucasian: 82.8%
Hispanic/Latino: 6.6%
Black/African-American: 4.6%
Asian/Pacific Islander: 2.8%
Native American: 1.4%
Mixed race: 1.2%
Rather not say: 0.5%

appendix c: relevant articles and reports

Children, adolescents, and television (2001)
By the American Academy of Pediatrics Committee on Public Education
Pediatrics, 107(2)
http://www.pediatrics.org/cgi/content/full/107/2/423
This statement describes the possible negative health effects of television viewing on children and adolescents, such as violent or aggressive behavior, substance use, sexual activity, obesity, poor body image, and decreased school performance. In addition to the television ratings system and the v-chip (an electronic device that blocks programming), media education is an effective approach to mitigating these potential problems. The American Academy of Pediatrics offers a list of recommendations on this issue for pediatricians, parents, the federal government, and the entertainment industry.

Policy statement - Media education (2010)
By the American Academy of Pediatrics Council on Communications and Media
Pediatrics, 126(5)
http://www.pediatrics.org/cgi/content/full/126/5/1012
The American Academy of Pediatrics recognizes that exposure to mass media (e.g., television, movies, video and computer games, the Internet, music lyrics and videos, newspapers, magazines, books, advertising) presents health risks for children and adolescents but can provide benefits as well. Media education has the potential to reduce the harmful effects of media and accentuate the positive effects. By understanding and supporting media education, pediatricians can play an important role in reducing harmful effects of media on children and adolescents.

Parents as learning partners in the development of technological fluency (2009)
By Brigid Barron, Caitlin Kennedy Martin, Lori Takeuchi, & Rachel Fithian
International Journal of Learning and Media, 1(2)
http://www.mitpressjournals.org/doi/abs/10.1162/ijlm.2009.0021
This paper presents research on parent support of the development of new media skills and technological fluency. Parents' roles in their children's learning were identified based on interviews with eight middle school students and their parents. All eight students were highly experienced with technology activities. Seven distinct parental roles that supported learning were identified and defined: Teacher, Collaborator, Learning Broker, Resource Provider, Nontechnical Consultant, Employer, and Learner. The paper presents the approach used to identify these roles, the coding system used, and examples of each role across the cases. The findings highlight the importance of understanding family-based learning relationships when considering pathways to early expertise with new media.

Toward an experimental ecology of human development (1977)
By Uri Bronfenbrenner
American Psychologist, 32(7)
A broader approach to research in human development is proposed that focuses on the progressive accommodation, throughout the life span, between the growing human organism and the changing environment in which it actually lives and grows. The latter include not only the immediate settings containing the developing person but also the larger social contexts, both formal and informal, in which these settings are embedded. In terms of method, the approach emphasizes the use of rigorously designed experiments, both naturalistic and contrived, beginning in the early stages of the research process. The changing relation between person and environment is conceived in systems terms. These systems properties are set forth in a series of propositions, each illustrated by concrete research examples.

Always connected: The new digital media habits of young children (2011)
By Aviva Gutnick, Michael Robb, Lori Takeuchi, & Jennifer Kotler, Sesame Workshop
http://joanganzcooneycenter.org/Reports-28.html
Today's parents, academics, policymakers, and practitioners are scrambling to keep up with the rapid expansion of media use by children and youth for ever larger portions of their waking hours. This report by Sesame Workshop and the Joan Ganz Cooney Center takes a fresh look at data emerging from studies undertaken by Sesame Workshop, independent scholars, foundations, and market researchers on the media habits of young children who are often overlooked in a public discourse that focuses on tweens and tweens. The report reviews seven recent studies about young children and their ownership and use of media. By focusing on very young children and analyzing multiple studies over time, the report arrives at a new, balanced portrait of children's media habits.

Hanging out, messing around, geeking out: Living and learning with new media (2009)
By Mizuko Ito, Sonja Baumer, Matteo Bittanti, danah boyd, Rachel Cody, Rebecca Herr-Stephenson, et al., The Digital Youth Project
http://digitalyouth.ischool.berkeley.edu/report
Conventional wisdom about young people's use of digital technology often equates generational identity with technology identity: today's teens seem constantly plugged in to video games, social networks sites, and text messaging. Yet there is little actual research that investigates the intricate dynamics of youth's social and recreational use of digital media. This book reports on an ambitious three-year ethnographic investigation into how young people are living and learning with new media in varied settings — at home, in after school programs, and in online spaces. By focusing on media practices in the everyday contexts of family and peer interaction, it views the relationship of youth and new media not simply in terms of technology trends, but situated within the broader structural conditions of childhood and the negotiations with adults that frame the experience of youth in the United States.

Developmentally appropriate practice in early childhood programs serving children from birth through age 8: (2009)
By the National Association for the Education of Young Children
http://www.naeyc.org/files/naeyc/file/positions/position%20statement%20Web.pdf
The purpose of this position statement is to promote excellence in early childhood education by providing a framework for best practice. Grounded in research on child development and learning and in the knowledge base regarding educational effectiveness, the framework outlines practice that promotes young children's optimal learning and development. Since its first adoption in 1986, this framework has been known as developmentally appropriate practice.

Generation M2: Media in the lives of 8- to 18-year-olds (2010)
By Victoria Rideout, Ulla Foehr, & Donald Roberts, Henry J. Kaiser Family Foundation
http://www.kff.org/entmedia/mh012010pkg.cfm
A national survey by the Kaiser Family Foundation found that with technology allowing nearly 24-hour media access as children and teens go about their daily lives, the amount of time young people spend with entertainment media has risen dramatically, especially among minority youth. This report is the third in a series of large-scale, nationally representative surveys by the Foundation about young people's media use. It includes data from all three waves of the study (1999, 2004, and 2009), and is among the largest and most comprehensive publicly available sources of information about media use among American youth.

About the author:
Lori Takeuchi, PhD, is Director of Research for the Joan Ganz Cooney Center at Sesame Workshop, where she oversees research projects and partnerships. She started her career at the Cooney Center as a postdoctoral research fellow after earning a PhD in Learning Sciences and Technology Design from Stanford University's School of Education. Lori spent more than a decade designing and producing curriculum-based science software in the greater Boston and San Francisco Bay areas. Before that, she managed the Instructional Television Department at New York's PBS affiliate, Thirteen/WNET. Lori has a Master of Education (EdM) in Technology in Education from Harvard, and her interest in children's media began as a Communication undergraduate at Stanford.

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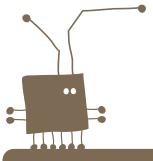

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children's learning
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