American Behavioral Scientist
2016, Vol. 60(1) 59–80

DOI: 10.1177/0002764215601712
abs.sagepub.com
SAGE

Community Variations in Low-Income Latino Families' Technology Adoption and Integration

Vikki S. Katz[1] and Carmen Gonzalez[2]

Abstract

Constrained access to the Internet and new communication technologies is commonly associated with social disparities related to income, education, immigration status, age, and geography. Policymakers in many sectors—and particularly, in education—have placed their bets on increased technology access having the potential to mitigate broader social disparities. In the context of a national digital equity initiative, this study examines how parents and children of low-income Latino families incorporate new technologies into their everyday lives. Through a comparison of three demographically similar communities where discounted broadband is being offered to low-income families with school-age children, we take a bottom-up, communication-centered perspective on a top-down technology policy. Our ecological approach considers the intersection of macro- and meso-level factors that influence Latino families' perceptions of technology and that shape their consequent adoption and integration decisions.

Keywords

technology, families, digital equity, community, immigration, Latinos

Since the mid-1990s, when the Internet and Internet-capable technologies became ubiquitous in family homes—at least, among higher income families—scholars and policymakers have emphasized how adoption rates among lower income families are lagging behind. Researchers have also documented how constrained access to the

[1]Rutgers University, New Brunswick, NJ, USA
[2]University of Washington, Seattle, WA, USA

Corresponding Author:
Vikki S. Katz, School of Communication and Information, Rutgers University, 4 Huntington Street, New Brunswick, NJ 08901, USA.
Email: vkatz@rutgers.edu

Internet and new technologies map closely onto other pervasive, persistent forms of social inequality—including those related to income, education, age, immigration status, and geography (e.g., Horrigan, 2014; Lopez, Gonzalez-Barrera, & Patten, 2013; van Deursen & van Dijk, 2014). The relationship between digital inequality and social disparity has raised the specter of limited access to online opportunities exacerbating these other forms of inequality. Meanwhile, policymakers in many sectors—and particularly, in education—have placed their bets on increased access to technology helping to mitigate broader social disparities.

Efforts ranging from school district technology initiatives to President Obama launching ConnectEd[1] to outfit under-served U.S. schools with high-speed Internet (Cavanagh, 2013) reveal how fundamental technology-related skills have become to assessing students' academic attainment and workplace readiness. Similarly, the Social Science Research Council points to adults' growing needs for access, given the vast opportunities—ranging from health and education resources, to employment—that are available online (Dailey, Bryne, Powell, Karaganis, & Chung, 2010). Prior studies have also emphasized that having broadband access at home (as opposed to only connecting in schools, libraries, or public spaces) is most strongly associated with building the capacity to use the Internet broadly, intensively, and productively (Kim, Jung, Cohen, & Ball-Rokeach, 2004; Livingstone & Helsper, 2007; Lopez et al., 2013).

There is currently only one national initiative in the United States to increase broadband adoption among low-income households, in contrast to the numerous large-scale efforts underway to connect students at schools. Connect2Compete (C2C) emerged from the Federal Communications Commission's 2010 National Broadband Plan with the goal of providing home-based broadband for $9.95 per month, a discounted refurbished computer, and free local skills training, to families with children receiving subsidized school meals.[2] The program's name reflects the anxieties animating this effort to address digital equality; that is, that meaningful access to new communication technologies is crucial to low-income children being "connected" enough to adequately "compete" in the new economy.

In the aftermath of the Great Recession, C2C was reformulated as a public–private partnership, with local telecommunications companies providing discounted broadband connectivity to eligible families and more unevenly, providing the discounted hardware and skills training as well. Our objective in this study was to compare families' experiences in three demographically similar communities in order to examine how a nationally deployed digital equity initiative plays out in different local environments. By focusing on how parents and children in families who qualified for C2C interpreted the offer, made decisions about adopting broadband through this program, and integrated broadband and new technologies into their lives and routines, we were able to take a bottom-up, communication-centered perspective on a top-down policy.

Literature Review and Theoretical Framework

In a speech about C2C in early 2013, then-Federal Communications Commission chairman Julius Genachowski emphasized that the program would help low-income

and minority Americans who are "disproportionately on the wrong side of the digital divide" (Levere, 2013). The existence of a "digital divide" between the more and less well-off, and who is on the "wrong side" of it, has long been taken for granted. The term's continued popularity is tied to the simplicity of the have/have not binary it proffers for understanding digital inequality. Widespread use of this binary framing also helps explain a considerable asymmetry in the academic literature, in that we know much less about lower income social groups, families, and individuals than we do about higher income ones. Furthermore, scholars interested in family technology use have focused heavily on higher income, majority culture families, at the expense of understanding a greater diversity of dynamics related to technology use, across social groups (Alper, Katz, & Clark, in press).

Several scholars have offered correctives for this simplified approach, arguing for the consideration of digital inclusion as a spectrum, documenting participation gaps, and providing new ways to measure new media literacies, capabilities, and meaningful connectedness to and via technology (e.g., Hargittai, 2010; Jenkins, 2006; Livingstone & Helsper, 2007). Empirical research increasingly challenges the notion of a digital divide, since almost all Americans have at least *some* access to the Internet and Internet-capable devices. While U.S. Hispanic[3] households still have lower rates of access to high-speed Internet than non-Hispanic White homes (66% compared with 76%), Hispanic adults' adoption of smartphones and tablets has been on par with, or more rapid than, non-Hispanic White and Black adults (File, 2013; Lopez et. al, 2013). Hispanic adults are also more likely to use smart phones as their primary Internet access device—and along with non-Hispanic Blacks, are most likely to live in mobile-only households.

These topline trends are useful for describing the broad landscape of technology ownership and use among U.S. Latinos. These data fall short, however, of answering deeper questions about how low-income Latino families make decisions about adopting technology, how they engage with technology individually and together, and how their interactions within their local communities influence these activities.

Technology Adoption in Low-Income Latino Families

Prior research on low-income and Latino households reveals important patterns in how they make decisions about adopting technology and integrating it into family life. The first is that, like other low-income families, decisions about adopting technology are both informed and constrained by limited discretionary income. Therefore, the range of devices that these families own reveals more about their priorities than is true in higher income households, where technology purchases involve considerably less sacrifice (Clark, 2013; Katz, 2010). Likewise, as is generally the case for parents raising children in under-served communities, low-income Latino parents' safety concerns are motivators for creating media-rich environments that keep their children home, away from risks beyond their front doors (Livingstone, 2007).

The second pattern is that children play central roles in their families' technology adoption decisions, even though their active involvement in commercial transactions

is generally overlooked (see review in Zelizer, 2002). In both higher and lower income families, children's desires for technology drive parents' purchasing decisions; Pugh (2009) details how lower income parents "symbolically indulge" their children by buying expensive devices, while higher income parents "symbolically deprive" them of inconsequential consumer goods to feel like they are not spoiling their children. In immigrant families, children's influence on technology adoption decisions can be even more direct. These children often act as "brokers" for their parents' local interactions by using their greater fluency in English and familiarity with U.S. cultural norms, to connect their parents with English-only environments. Researchers have documented how children broker to enable their parents to interact with salespeople, make decisions about costly purchases, and manage household finances (Katz, 2014; Orellana, Dorner, & Pulido, 2003; Valenzuela, 1999).

The third pattern is that children also directly contribute to how purchased devices are integrated into family life. Children broker language and culturally relevant content for their parents; their generally greater facility with technology often also enables their parents' connections to new devices and the Internet (Katz, 2010, 2014). Exchanges of expertise do not only flow from children to parents; rather, these are dynamic interactions to which children contribute their linguistic, cultural, and technical skills, and parents contribute their linguistic skills in the native language and their adult knowledge of what their family needs. These interactions often implicate a broad range of media devices and content, providing powerful learning experiences for parents and children alike (Katz, 2014; Lee & Barron, 2015).

The literature thus suggests that collective engagement with various media forms is the norm in low-income and immigrant families. Clark (2013) posits that these interaction patterns are inextricable from income, since smaller living spaces and having to share devices necessarily leads to more joint media engagement. However, the evidence also indicates that families engage more intensively around certain forms of media than others. For example, a representative survey of U.S. adolescents with Central American, Mexican, Dominican, and Chinese parents indicated that only 20% of respondents watched television "mainly alone," and that coviewing most often occurred with family members (Louie, 2003). In ethnographic studies, Tripp (2011) and Benítez (2006) found that Mexican- and Salvadoran-origin parents, respectively, restricted children's access to computers and the Internet, but not television, because parents associated more risk with new technologies despite recognizing the educational opportunities they offered.[4] Clark (2013) contends that differences in how families engage with devices reflect values that parents wish to pass on to their children. She posits that lower income parents tend toward a parenting ethic of "respectful connectedness," and therefore favor media activities that support and sustain intergenerational connections. Television viewing, for example, is perceived as enhancing family connections (Mayer, 2003), whereas time online and on personal devices tend to be treated as solitary activities that detract from family time (Katz & Levine, 2015).

While prior research offer a foundation for the current investigation, there are still considerable gaps in the literature regarding technology engagement in low-income Latino families specifically. Furthermore, most studies have been limited to single

communities, foreclosing the possibility of accounting for local influences on family technology use (e.g., Benítez, 2006; Katz, 2014; Mayer, 2003; Tripp, 2011). To help fill these gaps, we included U.S.-born and immigrant-headed Latino families in a systematic comparison across multiple localities. In doing so, our aim was to uncover family-level variations in technology adoption and use, and to explore how community-level variations influence these behaviors.

An Ecological Framework for Examining Technology Adoption

We posit that low-income families' decisions about adopting and engaging technologies are inextricable from the localized structural and cultural forces that influence their perceptions of the risks and rewards that these technologies provide. As such, our analyses are grounded in an ecological framework that contextualizes individual and family behavior within local environments.

Ecological approaches employ multiple levels of analysis, acknowledging the underlying infrastructures that can support or hinder community life. Using the city as a social laboratory, Chicago School sociologists believed that ecological models contextualized human nature, and were therefore most appropriate for studying social conditions (e.g., Blumer, 1969; Hughes, 1958; Park, 1925). They also considered a broad range of media—and how immigrant residents engaged them—crucial to understanding interactions in local spaces (e.g., Park, 1922).

The Chicago School's approach of integrating qualitative and quantitative research to holistically capture the social dimensions of urban life has long been a guiding framework for scholars interested in the study of people and place. In sociology, Sampson (2012) has taken up the ecological mantle through a longitudinal study of how poverty, crime, civic participation, and environmental features affect individual and community well-being, thereby demonstrating the importance of neighborhood effects. In a related vein, Hampton (2010) works to bridge between research on neighborhood effects and digital inequality, arguing—as we do here—that local context is critical to understanding how connectivity is related to concentrated disadvantage.

Within communication, Friedland (2001) has argued that communities with more integrated communication ecologies (defined as the range of communication activities that connect individuals and institutions) are better equipped to develop solutions for collective problems. Similarly, communication infrastructure theory (CIT), developed by Ball-Rokeach and associates, provides an ecological framework for investigating communication processes within a neighborhood context. By studying key storytellers (i.e., residents, local media, and community organizations) in specific neighborhoods, CIT explains multiple levels of influence on outcomes including civic participation, neighborhood belonging, and collective efficacy (Ball-Rokeach, Kim, & Matei, 2001; Kim & Ball-Rokeach, 2006). CIT also engages traditional Chicago School concerns with a clear focus on how locally available media influence residents' local activities and engagement.

While ecological frameworks vary, they have common underlying tenets: All emphasize the importance of community features for understanding individual

behavior. These approaches also take human agency as a central concern; individuals and families are not at the mercy of structural factors, but instead make choices about locally available resources to achieve their self-determined goals. As such, scholars who utilize ecological approaches seek to identify variations *within* and *between* micro, meso, and macro levels of analysis that can explain differences between individuals and collectives, with regard to particular social outcomes.

In this study, we were concerned with understanding micro-level (within families) and meso-level (across three different communities) variation with regard to how low-income Latino families adopt and engage high-speed Internet and Internet-capable devices. The C2C program offered in all three study sites served as the overarching macro-level factor that aimed to influence technology adoption behaviors by providing low-income families with affordable, locally available Internet service and computers. Our efforts to understand families' decisions about technology adoption and engagement were informed by prior research, and guided by the following research questions:

Research Question 1: How do local decision-makers shape the implementation of digital equity initiatives?
Research Question 2: How do the infrastructures of families' local environments influence their assessments of the risks and opportunities associated with adopting the Internet and related technologies?

Method

In the analyses that follow, we draw on data collected through qualitative interviews with 336 parents and children in three U.S. cities: Chula Vista, California; Tucson, Arizona; and Denver, Colorado. These sites were selected because the school districts in all three areas serve high-poverty, predominantly Mexican-origin, student populations (see Table 1), and all are working to encourage home–school connections through various technology initiatives, including the C2C program. Working in districts that are rolling out C2C allowed us to ensure that participating families—who all met the financial requirement for C2C because their focal child was eligible for free or reduced-cost lunch—had access to at least one affordable option for broadband service at home.

We focused specifically on Mexican-heritage families, headed by both immigrant and U.S.-born parents, rather than recruiting Latinos as a broad category. We did so because Mexican-heritage children now account for 16% of all U.S. children, and that proportion is expected to continue to grow (Child Trends, 2012). Mexican-heritage families also experience greater social disparities than other U.S. Hispanic groups (Brown & Patten, 2013). Children with Mexican-born parents in particular are more likely to grow up in poverty, and to have parents who have not completed high school and who report difficulties speaking English, as compared with other social groups (Child Trends, 2012; Johnson, Kominski, Smith, & Tillman, 2005; Lopez & Velasco, 2011). Mexican-heritage families therefore constitute a particularly high-need

Table 1. Selected School, District, and County Characteristics.[a]

	California				Arizona				Colorado			
	School Site 1	School Site 2	District	County	School Site 1	School Site 2	District	County	School Site 1	School Site 2	District	County
Hispanic students (%)	89	90	69		93	87	82		95	90	57	
Students receiving free or reduced-cost lunch (%)[b]	89	86	50		82	76	77		86	98	70	
English-language learners (%)	49	57	36		62	37	14		65	62	38	
Households with a computer (%)[c]				90				86				86
Households with high-speed Internet service (%)				83				74				75

[a]Data sources: California Department of Education (http://www.cde.ca.gov/), elementaryschools.org, and Denver Public Schools (https://www.dpsk12.org/).
[b]Section 9 of the National School Lunch Act states that children qualify for free lunch if their household income is up to 130% of the federal poverty guidelines for that school year; if their household income is up to 185% of the guidelines, they are eligible for reduced-cost lunch (U.S. Department of Agriculture, 2014).
[c]County-level data are sourced from the U.S. Census' American Community Survey (2013); district-level data on computer ownership and Internet access are not available.

population that stands to gain a great deal from digital equity programs directed at low-income families, like C2C.

Sample Selection

In each study site, we worked with district administrators to identify two K-8 schools with predominantly Mexican-heritage student populations and high proportions of students who qualified for subsidized school meals (see Table 1). We had staff members at each school recruit families for interviews. Families met study criteria if they identified as Latino or Hispanic, if the focal child was between 6 and 13 years old and received subsidized lunch, and if the family had any kind of Internet service at home.

In Chula Vista, families were recruited from lists of parents who had attended informational meetings about the C2C program. In Tucson and Denver, families were randomly selected from all enrolled students at each school. Response rates were high across the three sites (77% in Chula Vista, 78% in Arizona, and 74% in Denver), largely because the school personnel who recruited respondents for interviews had built considerable trust with families over years of working in those schools.

Data Collection

Interviews were conducted between July 2013 and September 2014 by both authors and a team of 8 to 10 bilingual, bicultural graduate and undergraduate students in each site, who were trained by the first author. Interviews were conducted with parents and their focal child separately, in their preferred location (i.e., at school or at home) and language (i.e., Spanish or English), for between 45 and 60 minutes each. Parents were compensated with $25 in cash. Children received either two Sesame Street computer games of their choice or a $15 iTunes gift card, as appropriate for their age. We interviewed 52 families in Chula Vista, 58 families in Tucson, and 60 families in Denver, over approximately 2 weeks per study site.

The interview protocol was guided by theoretical frameworks on technology adoption, family engagement, and communication infrastructure. Parents first answered fixed-answer questions that included general demographic variables and measures of mediated and non-mediated family activities. Parents and children were asked complementary, open-ended questions about technology adoption motivations, including their perceptions of the usefulness of the Internet, various devices, and their own tech efficacy. The interview protocol also included questions about how connectivity affects family relationships, how families make decisions about integrating new technologies into their domestic lives, and the extent to which families are connected to local institutions and resources. Children's interviews focused extensively on detailing their home media environments, including what devices the family owns, where they are used, by whom, and for what purposes. Finally, a section of the protocols was uniquely tailored to each site, asking parents and children to reflect on technology initiatives (e.g., one-to-one computing, computerized testing), specific to their local schools and districts.

Table 2. Demographics for Interviewed Children and Parents.

	Chula Vista, CA	Tucson, AZ	Denver, CO
Children (*N*)	48	58	60
Female (%)	53	43	47
Median grade level	4	5	4
Median age	9	11	9
Interviewed in Spanish (%)	30	2	32
Parents (*N*)	52	58	60
Female (%)	92	91	90
Median age	34	36	33
Interviewed in Spanish (%)	75	60	48
Families interviewed at school (%)	75	40	89

Sample Demographics

We interviewed 166 children and 170 parents across the three study sites.[5] As Table 2 shows, slightly under half of interviewed children were female and the majority were interviewed in English. In Chula Vista, 30% of children opting for interviews in Spanish reflects a greater proportion of respondents who were in kindergarten and first grade compared with the other sites. In Denver, that one third of children opted for Spanish interviews reflects the strong emphasis on bilingual education in that district, including bilingual immersion schools. Neither California nor Arizona schools offer equally comprehensive support for bilingual maintenance, resulting in more rapid language shift to English, even for children from Spanish-dominant homes (Amabisca, 1999; Crawford, 1995).

By contrast, over 90% of interviewed parents were female, reflecting the traditional parental roles in a majority of families across sites. These families had decided that having mothers at home full-time was crucial to their child-rearing priorities, even if it created additional financial strain or required fathers to work multiple jobs. The majority of parents in both Chula Vista (75%) and Tucson (60%) opted to be interviewed in Spanish. More Denver parents were interviewed in English (52%), reflecting a greater proportion of second and third generation respondents. There were also distinctions across sites with regard to where parents opted to be interviewed; in Chula Vista, 75% of parents chose to be interviewed at school when they picked up their children; in Denver, that proportion was even higher (89%). Only Arizona parents were more likely to choose to be interviewed at home (60%), than at school.

Table 3 summarizes demographic information for interviewed families. With a median household size of five and a majority reporting annual household incomes under $25,000, many interviewed families were living under the federal poverty line.[6] Parents' reported unemployment rates in the California (15%) and Arizona (11%) sites were double that of the current national unemployment rate,[7] whereas reported unemployment in Colorado was just under the national rate (5%). Parents in Arizona were more likely to have graduated high school (68%) than parents in California (50%) and

Table 3. Family Demographics, as Reported by Parents.[a]

	Chula Vista, CA	Sunnyside, AZ	Denver, CO
Median household size	5	5	5
Annual household income (%)			
Less than $25,000	70	64	53
Between $25,000 and $45,000	20	25	43
Parent employment status (%)			
Full-time work (40+ hours/week)	19	16	31
Homemaker	39	46	30
Unemployed	15	11	5
Parent marital status (%)			
Married	65	60	64
Living with partner	6	16	18
Divorced	10	12	—
Parent education level (%)			
Eighth grade or less	27	16	29
High school graduate	50	68	49
University graduate	2	7	9
Parent nativity (%)			
Foreign-born	77	71	64
Foreign-born, completed school in the United States[b]	—	39	28
U.S.-born	23	29	36
Residential tenure			
Median years in United States (immigrants only)	13	20	17
Median years in study site (all parents)	8	8	8

[a]For the sake of parsimony, we have included only the most common categories of responses.
[b]Immigrant parents were asked where they had completed their schooling only in the Tucson and Denver sites.

Colorado (49%). A majority of parents in all three sites were foreign-born, with at least one immigrant parent in each family being from Mexico. Immigrant parents' median U.S. tenure ranged from 13 to 20 years across sites, suggesting that respondents were not "new" immigrants. In fact, 39% and 28% of foreign-born parents in Arizona and Colorado, respectively, had last attended in school in the United States, not in their country of origin. Parents in all three sites had lived in their current neighborhood for a median of 8 years.

Data Analysis

Interviews with parents and children primarily consisted of qualitative, open-ended questions, which were audio-recorded and transcribed verbatim. These transcripts and the field notes that researchers compiled directly after each interview constituted the

primary data corpus for analysis. These documents were entered into Dedoose, an online platform commonly used for qualitative data analysis. Dedoose facilitated collaborative analysis using a grounded theory approach (Strauss & Corbin, 1998), in that analysis began with open, followed by axial, and then selective, coding. Open coding involves breaking down data by identifying and naming emergent categories (Creswell, 1998; Strauss & Corbin, 1998). Axial coding involves analyzing the themes that emerge from open data coding (LaRossa, 2005; Taylor & Bogdan, 1998). Finally, selective coding involves integrating broader themes in the data to develop a coherent explanation of the findings, connecting categories identified and refined by axial coding (Creswell, 1998; Strauss & Corbin, 1998).

Findings

Data analysis proceeded from an ecological framework, in that we were primarily interested in the variations within—and across—levels of analysis that explain differences in how low-income, Mexican-heritage families make decisions about adopting digital technologies and integrating them into family life. In the sections that follow, we examine how local decision-makers shaped the implementation of national and district digital equity initiatives, and how families assessed the relative costs and benefits of adopting the Internet and related technologies within those contexts.

National Policy Enacted in Local Environments

At the national (i.e., macro) level, the C2C program was conceived as an initiative to provide low-income students and their families with affordable access to broadband and related technologies, as well as to relevant skills training. Since the program had been reconfigured as a public–private partnership with local telecommunications companies providing C2C broadband offers directly to families, the offer manifested differently, and unevenly, across the three study sites. The same Internet provider was operating in Chula Vista and Tucson. It was more restrictive than the one operating in Denver, in that families did not qualify for C2C—even if they met the subsidized lunch requirements—if they had any debt with the company or had had a contract with them in the past 6 months. In Denver, debt was forgiven if it was more than a year old, and the contract restriction was for 3 months instead of 6.[8] There were also issues with the C2C program that were similar across the three sites. Parents complained about the slow connection speeds[9] that they were offered for $9.95; as a result, some had discontinued service and others had decided not to sign up at all. In all three locations, the C2C offer only provided connection via an Ethernet cord to a single device; a wireless router that would support the numerous Wi-Fi-enabled devices most families used, incurred additional charges.

Therefore, while C2C was ostensibly designed to combat digital inequality and open the Internet to low-income families, in reality, many interviewed families had concluded that C2C was offering a second-class connection that was insufficient for their needs. Furthermore, C2C was developed in accordance with the presumption that

families living below the poverty line still have little to no Internet access or technological capabilities; instead, we found that only 8 of 170 interviewed families were getting online for the first time via C2C.

School District Technology Initiatives

At the meso-level, school district leaders made decisions that shaped the C2C offer itself, as well as how much families knew about it. For example, in Tucson, administrators decided not to offer a computer as part of C2C because the district's one-to-one laptop program meant that students fourth grade and older took a laptop home each day. In Chula Vista, where the telecommunications company was not offering a computer as part of C2C, enterprising district administrators solicited refurbished desktop computers from other programs and offered them to families for free or low cost (starting at $60), to make C2C more relevant and attractive. In Denver, C2C included an offer to purchase a $149 computer because the district was not providing Internet-capable technologies through other programs for families to use at home.

Districts varied in how actively they encouraged families to sign up for C2C. Chula Vista school leadership held informational meetings at high-need schools to educate families about C2C and the opportunity to purchase a computer. As a result, 34 of the 52 interviewed families had obtained a refurbished desktop through the offer, 13 had obtained the computer and signed up for C2C, and two families had signed up for C2C but decided against acquiring a computer. In Tucson, district leadership ensured that C2C personnel attended school events to publicize the program and enroll families. Teachers and school staff also promoted C2C through flyers. This heavy outreach produced mixed results; all 58 parents interviewed in Tucson knew something about the C2C offer, but only 8 had signed up. Denver's outreach was minimal, consisting primarily of photocopied flyers placed in school hallways and main offices. The result was that fewer families knew about C2C and only 9 of 60 interviewed families had signed up—even though they all had at least one child receiving subsidized school lunch.

School districts (and individual schools) also had different approaches for integrating technology into instruction and parent outreach. The one-to-one laptop in Tucson has prompted a broad shift toward digital curriculum, including students being required to complete homework on their laptops and submit it online. Online classroom management tools have enabled parents to track their children's grades and attendance through a portal on the district's Web site. The Denver public school district had also recently launched an online platform where parents can check students' schedules, attendance, and test scores. The district had set up Parent Portal kiosks on campuses at lower income schools to encourage parents to access the Portal even if they do not have Internet service at home. In all three sites, teachers were being encouraged to use Class Dojo, a classroom management mobile app where teachers document students' performance and communicate with parents through text messaging. While digital options to track children's progress and communicate with teachers were made available to all parents, the few who considered themselves tech savvy or were generally

excited about new technologies were more likely to be using these tools than most of the parents that we interviewed.

Local Influences on Families' Technology Adoption Decisions

In all three sites, media-rich households were the norm; most families had a range of devices, including televisions, tablets, smartphones, laptops, computers, and video game systems. All households had Internet service, and many families had had Internet connections since the days of dial-up. C2C was therefore not connecting families for the first time, as the program's designers had envisioned. Rather, they were providing an additional opportunity for families to augment already-rich media environments. Across sites, parents reported having made considerable sacrifices, including delaying needed home or car repairs and forgoing Christmas presents, to afford broadband or save toward purchasing iPads, laptops, and smartphones. Within sites, variations in family technology adoption histories stemmed primarily from parent nativity and education. Immigrant parents with limited formal education were less likely to have initially adopted personal technologies for their own use than college-educated parents born in either country, U.S.-born parents, or immigrant parents who had completed their schooling in the United States.

The few media-light households that we observed shared a common characteristic: parents were either very inexperienced with technology themselves or had strong concerns about its influence on their families, which led to them restricting the range of devices in their homes. Most parents, however, perceived the Internet and related devices as crucial to supporting their children's learning, even if they also had some misgivings or concerns.

Parents' perceptions of technology's relative risks and opportunities do not develop in isolation; we found that they are influenced by community-level factors. School district initiatives and outreach influenced how parents think about technology, as well as how children engage with technology both at school and at home. Community-level cultural forces also either fostered more open engagement with technology, or contributed to parents' technology-related fears and concerns. In the sections that follow, we review the localized dimensions of families' technology adoption that emerged from our analyses at each study site. In the process, we identify the meso-level factors that affected parents' concerns about technology and influenced their decisions about the integrating digital technologies into family life.

Tucson, AZ. Arizona's stringent state immigration law, SB1070, affected interviewed families' everyday lives in Tucson; a few parents and children volunteered considerable detail about relatives' deportation during their interviews (Archibald, 2010). Forcible separations in some families, and fears of deportation in others, appeared to influence how respondents interpreted potential risks and opportunities in their local environments—including C2C and district technology initiatives.

Parents' discomfort with local police surveillance often translated into fears of surveillance via the Internet, especially through the laptops that schools provided to their

children. Parents still had Internet service at home, however, because they considered the opportunities that connectivity offered their kids to be too important to sacrifice, even if they also incurred risk. Having Internet at home was also attractive because it allowed families to further withdraw into private—and therefore, safe—domestic space. Children in Tucson indicated that once their families had broadband at home, they no longer went to community sites, like libraries, to go online. While we cannot draw a causal link, our analyses suggest that having broadband access at home had an additional incentive for Tucson families, by facilitating their withdrawal from public spaces.

Across all three sites, parents were concerned about their children's tech use and online activities, but Tucson parents expressed greater fears of children being overexposed online or oversharing on social networking Web sites. These fears, stemming from personal experiences or media coverage, prompted parents to develop protective monitoring strategies. These strategies included installing content-blocking systems, reviewing browser caches on children's devices, talking with children about online safety, and locking up devices when parents were away. For example, a father described how his eighth-grade daughter's use of the school laptop made him uncomfortable:

> She likes talking to her friends and send[ing] pictures . . . [but] here comes popping [up] some people from another country. . . . Immediately we reported it to the school and they took the laptop and changed the whole hard drive.

While parents felt supported by schools' content-blocking initiatives, it became clear that schools' strong online safety rhetoric had permeated families' perceptions (and sometimes, augmented fears) of the Internet.

The impact of local factors in Tucson was also unique because school-issued laptops both limited children's sense of device ownership, and raised concerns over family's liability. Parents had to sign a document agreeing that all laptop activity would be monitored by the school and accept financial responsibility for any damage to the device. These rules, coupled with school surveillance of online activity, limited families' integration of the school laptop into everyday life. Children often used the laptops to complete homework and then switched to other devices for recreational activities. Children also mirrored their parents' anxieties about the consequences of school laptops being used inappropriately. A seventh-grade boy recalled his concern when his brother tried to download a game similar to Minecraft:

> I told him, "I don't want you downloading stuff, because [if] I get a virus or they check my computer and they ask me why I have this, I get caught."

Children and parents also volunteered concerns about having school-owned devices at home because of past theft. They worried about the school laptop being stolen and their being liable for the cost of replacing it.

District-level rhetoric related to school-issued devices, coupled with community-level fears in Tucson, thus resulted in families feeling the risks of technology adoption

and integration more keenly than the potential rewards. In Denver, where Latino families did not feel so closely monitored by law enforcement, technology engagement was influenced by a different set of localized factors.

Denver, CO. Given Denver's distance from the U.S.-Mexico border, most immigrant parents had first settled in California or Arizona before moving to Denver based on recommendations that it was a good place to live, work, and raise children. U.S.-born parents' own immigrant parents or grandparents had followed similar settlement trajectories. While immigration-related concerns were also raised by Denver respondents, they were less pressing than in Tucson, especially for the many families headed by U.S.-born parents. Families in Denver were also more integrated into their local environments. Children in Denver were involved in a broad range of afterschool activities and spent a lot of time outdoors with their families, who appreciated the free recreational opportunities that the city's physical environment afforded them.

Denver families reported the broadest range and number of Internet-enabled devices across the three study sites; in many households, sharing was seldom necessary. Less sharing meant that children expressed more ownership and reported less parental restrictions on their media activities. These feelings of autonomy were augmented by Denver being the only study site where schools did not issue any of the technologies that families had in their households. As a result, families generally felt no oversight or obligation to limit their technology use to school-sanctioned pursuits.

While parents in Denver employed monitoring strategies similar to those reported in Tucson and Chula Vista, their concerns also reflected fears stemming from local tragedies in places frequented by young people (i.e., the Columbine school and Aurora movie theater shootings). Parents were aware that continuing media coverage of these events heightened their fears about children's school safety, which in turn made them relatively less fearful for their children's online safety. In fact, children reported that parents trusted them enough to go online independently, as long as they followed house rules about when and how often electronic devices could be used. Children in Denver were thus more aware of the benefits of managing their technology time than in the other two sites. For example, a fifth-grade boy described why he did not want his own cell phone, even though many of his peers were acquiring them:

> I don't want my own [cell phone] because then I won't play with my family. I'll be, like, into my phone. All my cousins have phones now, so they don't hang out with me anymore.

In Denver, parents were particularly open to new technologies, both because they had the longest personal tech use histories and were more likely to have been born and/or educated in the United States, as compared with parents in the other two study sites. These personal characteristics interacted with localized factors to influence family technology engagement; families here were more integrated into their community, children used devices more independently, and parents' concerns were more centered on school shootings than on their children's tech use. In Chula Vista, where most parents were immigrants and had less experience with computers and the Internet, these

technologies were valued both for skills development and maintaining cross-border family ties.

Chula Vista, CA. Almost 80% of parents in Chula Vista were immigrants from Mexico, and many had lived rather fluidly between northern Mexico and Chula Vista throughout their lives. Some had settled more permanently in the area when their children started school. They were proud of their community, saw it as a good place to raise children, and were generally willing to take advantage of local opportunities related to technology. This was the study site where C2C was most heavily promoted, and parents were largely accepting of the district's rhetoric emphasizing technology's rewards over its risks. Technology adoption and integration among Chula Vista families thus seemed less restricted or cautious than in Tucson or Denver.

While parents in Chula Vista also expressed general concerns about online safety and employed similar monitoring strategies to ensure that their children were not accessing inappropriate content, these families emphasized meaningful coengagement with technology. With younger children, parents used the Internet to help with homework activities, as described by a mother of a first-grade boy:

> Now we're using [online] translation [services] to find out about the kids' school stuff, since they assign everything in English. I quickly use the Internet, the computer, to get the answers that I need.

With older children, joint engagement was more of a dynamic exchange; a mother of a seventh-grade girl said,

> The way we utilize [the Internet] most of the time is research. If my daughter is sick, we go to WebMD symptoms. . . . We look it up, and that's how I'm able to show them and I, myself, learn also.

The frequency of joint engagement with technology was also reflected in parents' device preferences. Many favored a computer (as opposed to smartphones, which were generally preferred by parents in other sites) because the larger screen facilitated going online together.

Immigrant parents generally had limited technology skills and relied on their children for help with technical tasks (e.g., turning on computers, connecting to the Internet), as well as with searching and translating online information. While parents across all three sites indicated that their children broker technology for them in different capacities, more parents in Chula Vista expressed excitement about developing their own technological skillsets alongside their children. As one father of a third-grade boy said,

> He knows more than me, obviously, because he learns a lot of that in school. . . . And in fact, I expect to be learning more about it, because every year they give him stuff where he can learn on the Internet.

Given Chula Vista's location, cross-border communication was also a central family activity. Children often brokered their parents' connections with friends and family in Mexico through platforms like Facebook and WhatsApp. These free services enabled more frequent and affordable cross-border communication; one mother of a second-grade girl described how these technologies facilitate family engagement, in person and online:

> All my family is in Mexico. Now I don't have to buy more [calling] cards to speak with them. On Facebook we share photos, comments. We make plans to do something, meet up, and I'm delighted.

Conclusions

In this study, we assessed how local decision-makers shaped the implementation of a national digital equity initiative in light of their assumptions about low-income, Mexican-heritage families' needs—and conversely, how these families' technology adoption and engagement decisions were influenced by their localized perceptions of tech-related risks and opportunities. Just as Chicago School sociologists argued in the early 20th century that local environments were integral to examining social conditions in an increasingly diverse society, our findings demonstrate that digital inequality in the 21st century cannot be understood out of context. We took a bottom-up approach to understanding how local factors influence families' evaluations of what these innovations offer.

The intersection between macro (i.e., national) and meso (i.e., community) levels of analysis revealed important differences between demographically similar families' experiences, based on how telecommunications companies shaped C2C in each district, and on how school district leadership influenced C2C's dissemination to families. We encountered conflation between school- and community-level influences on families' technology adoption decisions because C2C was administered through the schools and because schools were direct purveyors of Internet-capable devices in two of the three districts. Meso-level factors influenced the micro (i.e., family) level, which was evident via parents' perspectives of their communities—and specifically, via their evaluations of their families' security within those communities. These perspectives shaped how parents assessed the relative risks and rewards of their families' technology adoption and engagement.

While our study design facilitated collection of a large corpus of qualitative data from parents and children and permitted systematic comparison between families in three communities, it also had its limitations. Respondents in Arizona and Colorado were selected randomly, and in California, from a listed sample of families who attended a C2C informational session. Our findings in Arizona and Colorado are therefore representative in a way that the California data are not. We also did not interview C2C-eligible families who had not had Internet access in the past year; we therefore cannot comment on how their experiences differed from those who had current access, whether through C2C or other means. Finally, our sampling strategy precluded comparisons across social groups. However, we intentionally focused on Mexican-origin families

rather than on Latinos as a conglomerate category, which obscures significant differences between specific heritage groups. In the subsequent stage of this research, a nationally representative telephone survey of lower income parents with school-age children will facilitate important comparisons across racial/ethnic groups.

From a policy perspective, our results emphasize that digital equity programs hold real promise for addressing broader social inequalities—but only if developed with a textured understanding of how families evaluate digital technologies' affordances for addressing their own needs and goals. Perhaps our most striking finding was that almost none of the 170 C2C-eligible families we interviewed could credibly be framed as being on the "wrong side of the digital divide," as then-FCC Chairman Genachowski had described them when C2C was first developed. Very few of these families were going online for the first time, and most owned a broader range of digital technologies than C2C designers could have anticipated. For all of these reasons, the program was mismatched to families' needs; the connection speed offered was too slow, and a single Ethernet cord was too limited to provide access to most families' multiple Internet-capable devices.

We are not suggesting that digital inequality is no longer an issue for lower income families with school-age children in the United States, nor that efforts to increase families' connectivity at home (as opposed to children's connections at school) are not incredibly important. Our findings do, however, underline the urgent need for more nuanced treatments of digital inequality than binary, "divide" rhetoric can provide. Respondent families, and others like them, see the value of the Internet and related technologies for addressing their needs—and particularly, for supporting their children's educational success. Providing tailored support for children's and parents' efforts to develop the skills necessary for meaningful connection to the Internet and related technologies will require action at all levels. Schools are critical partners for any outreach effort, as the most direct local linkage to families and as the sites of parents' primary motivations for adopting and learning how to use technologies. But outreach efforts must be responsive to residents' localized apprehensions about technologies, or schools risk inadvertently exacerbating them.

At the macro level, program designers have to take seriously families' existing practices, motivations, and fears related to technology within their particular localities. Policymakers are generally concerned with how successful local programs will be "scalable" for regional or national implementation. They should be equally concerned about how national programs will scale as well, by assessing what adjustments are necessary to successfully tailor programs to the needs of particular social groups in particular localities. Developing programs capable of achieving national goals related to digital equity will require meaningful local partnerships with the families these programs are designed to serve. Doing so makes such programs more likely to be both relevant and sustainable, and enhances their potential for combating the broader forms of social inequality that are so often faced by lower income communities.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This research was supported by the Bill and Melinda Gates Foundation.

Notes

1. For more details on the overhaul of E-Rate into the ConnectED program, see http://www.whitehouse.gov/issues/education/k-12/connected
2. See http://www.everyoneon.org/about/c2c
3. As Taylor, Lopez, Martínez, and Velasco (2012) note, there is little agreement among Americans with roots in Spanish-speaking countries with regard to the use of Hispanic or Latino as an ethnic referent. We therefore use Latino throughout, except when citing studies that used Hispanic as the referent term.
4. Ambivalence about the risks and opportunities of their children's Internet use are true for parents across the socioeconomic spectrum; see Livingstone (2009).
5. We interviewed less children than parents because four children across the three sites opted not to participate in the study. We take it as a good sign that children understood that their parents' consent did not mean that they were obligated to participate in the interview if they did not wish to do so.
6. The 2015 federal poverty level for a five-person household is $28,410 (U.S. Department of Health & Human Services, 2015).
7. As of May 2015, the U.S. unemployment rate was 5.5% (U.S. Department of Labor, 2015).
8. For many parents, even 3 months was too restrictive, as they could not imagine being without Internet service for such an extended period of time.
9. In Denver, for example, the telecommunications company offered C2C customers download speeds up to 5 megabits per second (Mbps) and upload speeds of up to 1 Mbps. By contrast, that same provider's average Internet speeds in Denver are 42 Mbps for downloads and 10 Mbps for uploads (www.speedtest.net).

References

Alper, M., Katz, V. S., & Clark, L. S. (in press). Researching children, intersectionality, and diversity in the digital age. *Journal of Children and Media*.

Amabisca, A. (1999). Alone together: Social integration of immigrant students at the middle school level. *The Multilingual Educator*, *2*(2), 10-14.

Archibald, R. C. (2010, April 23). Arizona enacts stringent law on immigration. *The New York Times*. Retrieved from www.nytimes.com/2010/04/24/us/politics/24immig.html

Ball-Rokeach, S. J., Kim, Y. C., & Matei, S. (2001). Storytelling neighborhood paths to belonging in diverse urban environments. *Communication Research*, *28*, 392-428.

Benítez, J. L. (2006). Transnational dimensions of the digital divide among Salvadoran immigrants in the Washington, DC metropolitan area. *Global Networks*, *6*, 181-199.

Blumer, H. (1969). *Symbolic interactionism: Perspective and method*. Englewood Cliffs, NJ: Prentice Hall.

Brown, A., & Patten, E. (2013). *Hispanics of Mexican origin in the United States, 2011* (Pew Research Hispanic Trends Project). Retrieved from http://www.pewhispanic.org/2013/06/19/hispanics-of-mexican-origin-in-the-united-states-2011/

Cavanagh, S. (2013, June 6). Obama unveils proposal to overhaul federal E-rate program. *Education Week*. Retrieved from http://blogs.edweek.org/edweek/DigitalEducation/2013/06/obama_unveils_proposal_to_over.html

Child Trends. (2012). *Immigrant children*. Retrieved from http://www.childtrends.org/?indicators=immigrant-children

Clark, L. S. (2013). *The parent app: Understanding families in the digital age*. New York, NY: Oxford University Press.

Crawford, J. (1995). *Bilingual education: History, politics, theory and practice* (4th ed.). Los Angeles, CA: Bilingual Education Services.

Creswell, J. W. (1998). *Qualitative inquiry and research design: Choosing among five traditions*. Thousand Oaks, CA: Sage.

Dailey, D., Bryne, A., Powell, A., Karaganis, J., & Chung, J. (2010). *Broadband adoption in low-income communities* (Social Science Research Council). Retrieved from http://www.ssrc.org/publications/view/1EB76F62-C720-DF11-9D32-001CC477EC70/

File, T. (2013). *Computer and Internet use in the United States* (U.S. Census Bureau). Retrieved from https://www.census.gov/prod/2013pubs/p20-569.pdf

Friedland, L. A. (2001). Communication, community, and democracy toward a theory of the communicatively integrated community. *Communication Research*, *28*, 358-391.

Hampton, K. N. (2010). Internet use and the concentration of disadvantage: Glocalization and the urban underclass. *American Behavioral Scientist*, *53*, 1111-1132.

Hargittai, E. (2010). Digital na(t)ives? Variation in Internet skills and uses among members of the "Net Generation." *Sociological Inquiry*, *80*, 92-113.

Horrigan, J. (2014). *Schools and broadband speeds: An analysis of gaps in access to high-speed internet for African American, Latino, low-income, and rural students* (Federal Communications Commission). Retrieved from http://apps.fcc.gov/ecfs/document/view?id=60000978758

Hughes, E. C. (1958). *Men and their work*. Glencoe, IL: Free Press.

Jenkins, H. (2006). *Convergence culture: Where old and new media collide*. New York: New York University Press.

Johnson, J., Kominski, R., Smith, K., & Tillman, P. (2005). *Changes in the lives of U.S. children: 1990-2000* (Working Paper No. 78). Washington, DC: Population Division, U.S. Census Bureau.

Katz, V. S. (2010). How children use media to connect their families to the community: The case of Latinos in Los Angeles. *Journal of Children and Media*, *4*, 298-315.

Katz, V. S. (2014). *Kids in the middle: How children of immigrants negotiate community interactions for their families*. New Brunswick, NJ: Rutgers University Press.

Katz, V. S., & Levine, M. H. (2015). *Connecting to learn: Promoting digital equity among America's Hispanic families* (The Joan Ganz Cooney Center at Sesame Workshop). Retrieved from http://www.joanganzcooneycenter.org/publication/connecting-to-learn-promoting-digital-equity-for-americas-hispanic-families/

Kim, Y.-C., & Ball-Rokeach, S. J. (2006). Community storytelling network, neighborhood context, and civic engagement: A multilevel approach. *Human Communication Research*, *32*, 411-439.

Kim, Y. C., Jung, J., Cohen, E., & Ball-Rokeach, S. (2004). Internet connectedness before and after September 11 2001. *New Media & Society*, *6*, 611-631.

LaRossa, R. (2005). Grounded theory and qualitative family research. *Journal of Marriage and Family*, *67*, 837-857.

Lee, J., & Barron, B. (2015). *Aprendiendo en casa: Media as a resource for learning among Hispanic-Latino Families* (The Joan Ganz Cooney Center at Sesame Workshop). Retrieved from http://www.joanganzcooneycenter.org/publication/aprendiendo-en-casa-media-as-a-learning-tool-among-hispanic-latino-families/

Levere, J. L. (2013, March 20). Reaching those on the wrong side of the digital divide. *The New York Times*. Retrieved from http://www.nytimes.com/2013/03/21/business/a-campaign-to-help-people-learn-internet-skills.html

Livingstone, S. (2007). From family television to bedroom culture: Young people's media at home. In E. Devereux (Ed.), *Media studies: Key issues and debates* (pp. 302-321). London, England: Sage.

Livingstone, S. (2009). *Children and the Internet*. London, England: Polity Press.

Livingstone, S., & Helsper, E. (2007). Gradations in digital inclusion: Children, young people and the digital divide. *New Media & Society*, *9*, 671-696.

Lopez, M., Gonzalez-Barrera, A., & Patten, E. (2013). *Closing the digital divide: Latinos and technology adoption* (Pew Hispanic Center). Retrieved from http://www.pewhispanic.org/2013/03/07/closing-the-digital-divide-latinos-and-technology-adoption/

Lopez, M., & Velasco, G. (2011). *Childhood poverty among Hispanics sets record, leads nation: The toll of the great recession* (Pew Hispanic Center). Retrieved from http://www.pewhispanic.org/2011/09/28/childhood-poverty-among-hispanics-sets-record-leads-nation/

Louie, J. (2003). Media in the lives of immigrant youth. *New Directions for Youth Development*, *100*, 111-130. doi:10.1002/yd.66

Mayer, V. (2003). Living telenovelas/telenovelizing life: Mexican American girls' identities and transnational telenovelas. *Journal of Communication*, *53*, 479-495.

Orellana, M. F., Dorner, L., & Pulido, L. (2003). Accessing assets: Immigrant youth's work as family translators or "para-phrasers." *Social Problems*, *50*, 505-524.

Park, R. E. (1922). *The immigrant press and its control*. New York, NY: Harper & Brothers.

Park, R. E. (1925). *The city*. Chicago, IL: University of Chicago Press.

Pugh, A. (2009). *Longing and belonging: Parents, children, and consumer culture*. Berkeley: University of California Press.

Sampson, R. J. (2012). *Great American city: Chicago and the enduring neighborhood effect*. Chicago, IL: University of Chicago Press.

Strauss, A., & Corbin, J. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Thousand Oaks, CA: Sage.

Taylor, P., Lopez, M. H., Martínez, J., & Velasco, G. (2012). *When labels don't fit: Hispanics and their views of identity* (Pew Hispanic Center). Retrieved from http://www.pewhispanic.org/2012/04/04/when-labels-dont-fit-hispanics-and-their-views-of-identity/

Taylor, S. J., & Bogdan, R. (1998). *Introduction to qualitative research methods* (3rd ed.). New York, NY: John Wiley.

Tripp, L. M. (2011). "The computer is not for you to be looking around, it is for schoolwork": Challenges for digital inclusion as Latino immigrant families negotiate children's access to the Internet. *New Media & Society*, *13*, 552-567.

U.S. Department of Agriculture. (2014). *School meals eligibility guidelines*. Retrieved from http://www.fns.usda.gov/school-meals/income-eligibility-guidelines

U.S. Department of Health & Human Services. (2015). *Poverty guidelines, research and measurement*. Retrieved from http://www.aspe.hhs.gov/poverty/index.cfm

U.S. Department of Labor. (2015). *Labor force statistics from the Current Population Survey*. Retrieved from http://data.bls.gov/timeseries/LNS14000000

Valenzuela, A. (1999). Gender roles and settlement activities among children and their immigrant families. *American Behavioral Scientist*, *42*, 720-742.

van Deursen, A., & van Dijk, J. (2014). The digital divide shifts to differences in usage. *New Media & Society*, *16*, 507-526.

Zelizer, V. (2002). Kids and commerce. *Childhood*, *9*, 375-396.

Author Biographies

Vikki S. Katz is Associate Professor in the Department of Communication, and Affiliate Graduate Faculty in the Department of Sociology, at Rutgers University. She received her PhD and MA from the Annenberg School for Communication and Journalism at the University of Southern California. Her research focuses on immigrant family communication dynamics and their influence on social incorporation; for more information, please visit www.vikkikatz.com.

Carmen Gonzalez is an Assistant Professor in the Department of Communication at the University of Washington. Her work examines inequality in the areas of health and civic engagement through community-based research. Carmen received her PhD, MA, and BA from the Annenberg School for Communication and Journalism at the University of Southern California.